



# **ANNUAL REPORT 2010**

## **Transportation Safety Bureau**

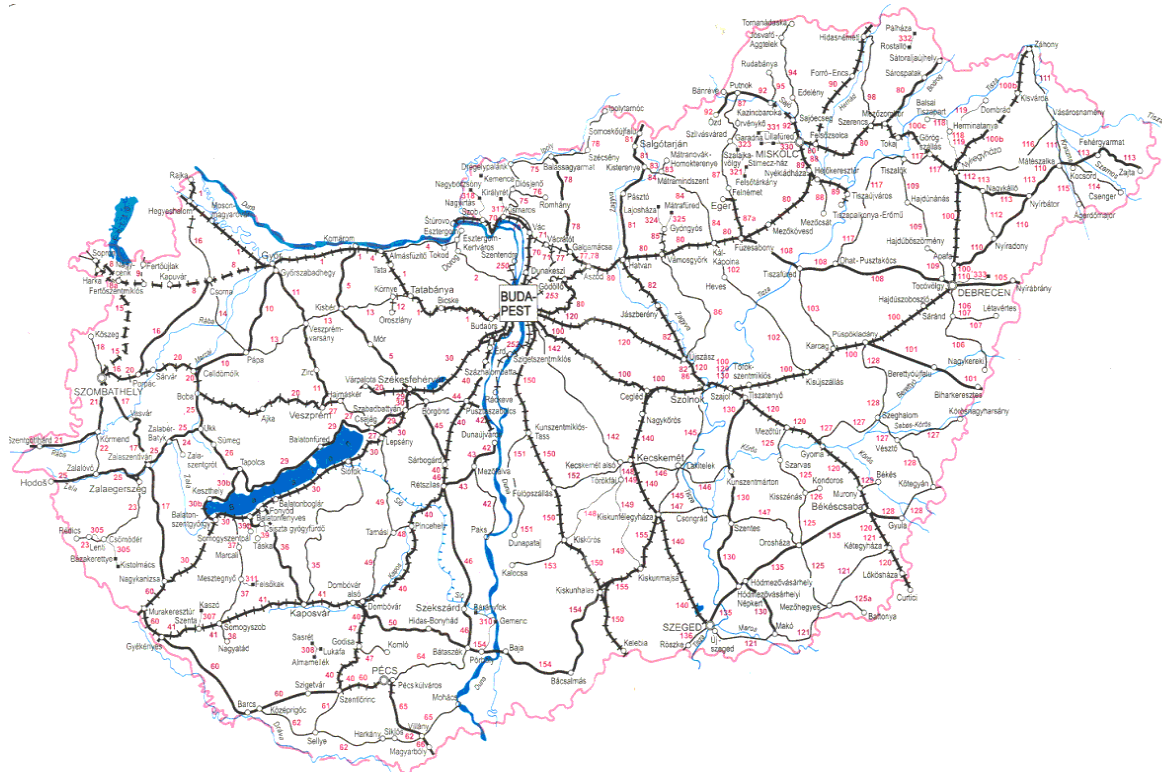
### **Hungary**



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## MAIN CHARACTERISTICS OF RAIL TRANSPORT IN HUNGARY



## CHARACTERISTICS OF THE RAILWAY LINES OF HUNGARY

Main lines	4556 km
Regional lines	1390 km
Other lines	1877 km
<b>Total</b>	<b>7823 km</b>
Electrified lines (out of total)	2826 km
Lines equipped with track condition and occupancy detection (out of total)	2201 km
Number of protected level crossings	2752
Total number of level crossings	5996

## SUMMARY

The Republic of Hungary fully implemented all essential requirements concerning accident investigation of the Railway Safety Directive 2004/49/EC in its national law. The Transportation Safety Bureau was established on 1<sup>st</sup> January 2006 as the legal successor of Civil Aviation Safety Bureau (founded in 2002). TSB operates in a multimodal form. Its main duty is the independent technical investigation of aviation, railway and marine accidents and incidents. Within the organisational framework of TSB, the Railway Department began to operate on 1<sup>st</sup> March 2006, thus 2010 was the fourth full year of its operation.

In 2010, there was no occurrence (serious accident) on the railways which the Railway Department of TSB was obliged to investigate pursuant to the regulations.

TSB decided at its own discretion to conduct independent technical investigation into 39 further occurrences.

During year 2010, TSB issued 18 safety recommendations regarding 9 completed investigations. The majority of these recommendations were accepted by the addressees. Furthermore, TSB issued 3 safety recommendation prior to the completion of the investigation, in which it recommended immediate preventive actions which were accepted and implemented by the operator.

Having regard to the fact that one third of the accidents on the railways occur at level crossings (collisions with road vehicles, running over people), TSB continued to put special emphasis on the investigation of such accidents using the previous years' experiences as well as paying special attention to accidents occurring at other places during which people were run over.

<b>Abbreviations</b>	
CASB	Civil Aviation Safety Bureau
IC	Investigating Committee
LC	Level crossing
Máv Zrt.	Hungarian State Railways Plc.
NIB	National Investigation Body
NTA	National Transport Authority (the National Safety Authority of Hungary)
TSB	Transportation Safety Bureau

## 1. INTRODUCTION

The Transportation Safety Bureau of Hungary (TSB) as a multimodal organisation for the investigation of accidents was established on 1<sup>st</sup> January 2006.

The Annual Report 2010 of TSB - in accordance with Article 23/3 of the Railway Safety Directive 2004/49/EC - gives an account on the following:

- the implementation of 2004/49/EC Railway Safety Directive into the Hungarian law,
- the relations of TSB with other concerned organisations,
- the philosophy and process of the independent technical investigation at TSB,
- the overview of the past 12 months from transport safety point of view,
- the experiences of the independent technical investigations carried out by TSB,
- the safety recommendations issued by TSB and the provisions made in relation to the recommendations, and
- the participation of TSB in the work of the European Railway Agency.

### 1.1 Legal basis - The implementation of the Safety Directive in the Hungarian law

The Republic of Hungary implemented all essential requirements concerning accident investigation of the Railway Safety Directive 2004/49/EC in Act CLXXXIV of 2005 on the technical investigation of aviation, rail and marine accidents and incidents. Based on the Directive, Transportation Safety Bureau was established on 1<sup>st</sup> January 2006 which – as a multimodal organisation - is responsible for the independent technical investigation of aviation, railway and marine accidents and incidents.

The detailed regulations of the technical investigation are included in the decrees of Act CLXXXIV of 2005 which were separately issued for the three modes of transports by the Minister for Economy and Transport. The decree on the regulations of the technical investigation of serious railway accidents, railway accidents and incidents (7/2006 GKM) was issued on 27<sup>th</sup> February 2006.

Within the organisational framework of TSB, the Railway Department began to operate on 1<sup>st</sup> March 2006 pursuant to the regulations.

**The national Act guarantees the complete independence of TSB from all other actors of the concerned transport sector.** The Act defines the objective of the independent technical investigation as follows:

“The objective of the independent 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 also states that “it is not the purpose of the investigation carried out by TSB to apportion blame or legal liability”.

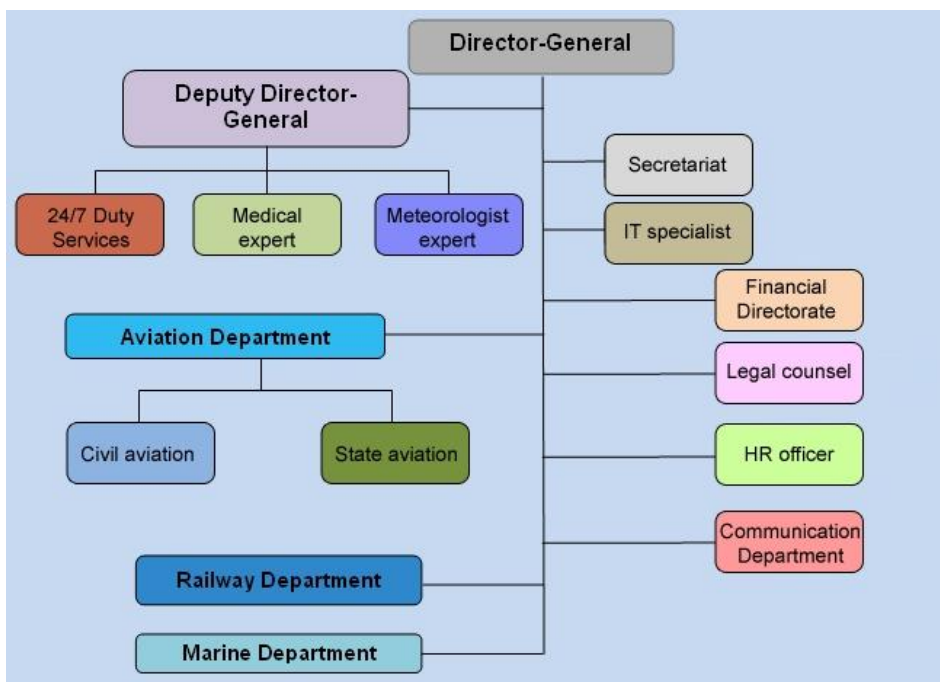
The Act contains the rights and responsibilities of the investigators defined in the Safety Directive.

According to the national regulations:

- All aviation, railway and marine occurrences shall be reported to TSB.
- The members of the Investigating Committee of TSB are authorized to be present at the site of any occurrence and to conduct the technical investigation parallel with the police investigation (if there is one).
- Based on the results of the investigation, TSB is entitled to issue safety recommendations and recommend immediate preventive actions before the completion of the investigation, if necessary. The implementation of safety recommendations is not obligatory, however, the addressees must report to TSB once a year whether they have accepted or rejected them. (The addressees must forthwith respond to the recommended immediate preventive actions.)
- The anonymity of the relevant parties is guaranteed. TSB shall make public the final reports on the results of the technical investigation. However, the final report shall not contain data based on which the relevant parties can be identified. The final report shall not be used in criminal procedures.

While the provisions of the Safety Directive are fully implemented regarding the independent technical investigation, the powers of the National Transport Authority are curtailed by the fact that the national safety rules have not yet been issued up to the present. Thus the NTA does not have a right to prepare the rules and regulations, only approves them.

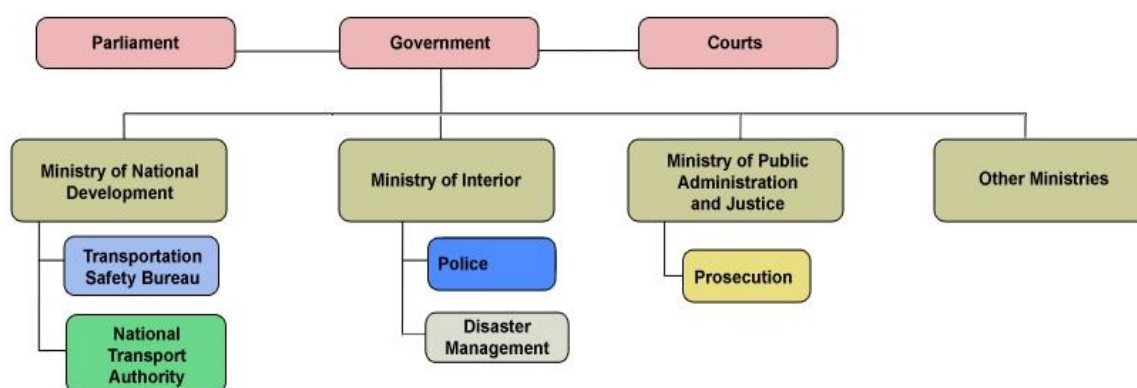
## 1.2 Organisation of TSB Hungary



- TSB regards prevention as the main objective of its activity. TSB endeavours to share the findings, the results and the experiences of the technical investigations with a wide circle of organisations in the profession as well as with the civil sector.
- The predecessor of TSB was the Civil Aviation Safety Bureau which conducted investigations in the field of aviation between 2002 and 2005 in line with Directive 94/56/EC establishing the fundamental principles governing the investigation of civil aviation accidents and incidents.

- TSB was established on 1<sup>st</sup> January 2006. The Aviation Department and the 24/7 Duty Services operated from the beginning of 2006 and the other departments and units grew gradually during the year. The Railway and the Marine Department began to work officially on 1<sup>st</sup> March 2006. The total number of permanent staff at the end of 2006 was 50 which increased to 57 by the end of 2007. The reason behind this increase is that since 1<sup>st</sup> July 2007, the Aviation Department of TSB has been conducting investigations into occurrences involving state (military and police) aircraft as well, which required further human resources.
- The Railway Department – in accordance with the regulations – began its work on 1<sup>st</sup> March 2006 with 5 employees delegated by the Safety Directorate of Hungarian State Railways Plc. (MÁV Zrt).
- The Railway Department consists of 9 investigators and the Head of Department.

### 1.3 Organisational flow of TSB Hungary



\* The governmental structure changed by the completion of this report; however, the changes do not concern the place of TSB within the governmental hierarchy.

TSB is supervised by the Ministry of National Development. The Director General of TSB works under direct supervision of the Minister. According to the national law, the Minister shall not instruct TSB in matters concerning the independent investigations.

- The Minister reports to the government annually on the activities of TSB, the lessons learned from the independent investigations, the processes and trends concerning transportation safety.
- The Ministry of National is the national regulator.
- The general rules regarding the operation of the railways are currently defined by the state-owned MÁV Zrt, the largest operator in Hungary. The National Transport Authority only assents to the amendments to the rules.
- Based on the outcome of the investigations, TSB may issue safety recommendations to the other actors of the concerned transportation sector (safety authority, operators, legislators, etc). The implementation of safety recommendations is not compulsory, however, the addressees are obliged to compile an annual report on their response (acceptation, implementation, or refusal).
- TSB is authorized to get access to all data relevant to the occurrence in question (including data stored on data recorders).



- The Investigating Committee of TSB may conduct its site investigation simultaneously with the police investigation.
- TSB and the police may help each other's work with exchange of factual data and results of expert analyses. The IC may withhold information obtained in the course of the investigation from other authorities in occurrences when the owner of the information would have had the right to do so.
- TSB, the police and the disaster management mutually inform each other about the received occurrence reports.

## **1.4 Overview of the last 12 months**

### **1.4.1 Trainings**

In order to maintain and improve the professional knowledge of the accident investigators, the trainings organised based on our trainings plan continued in 2010. Within the framework of workplace trainings, the new colleagues learnt and the 'old' ones revised their knowledge on the investigation procedure, the special equipment and software used to read out data from strip chart and other data recorders.

Four colleagues participated in a course and successfully passed the exam in 'Railway traffic studies'. Another two colleagues gained suburban train driving licence. These studies can be utilised effectively in the investigations.

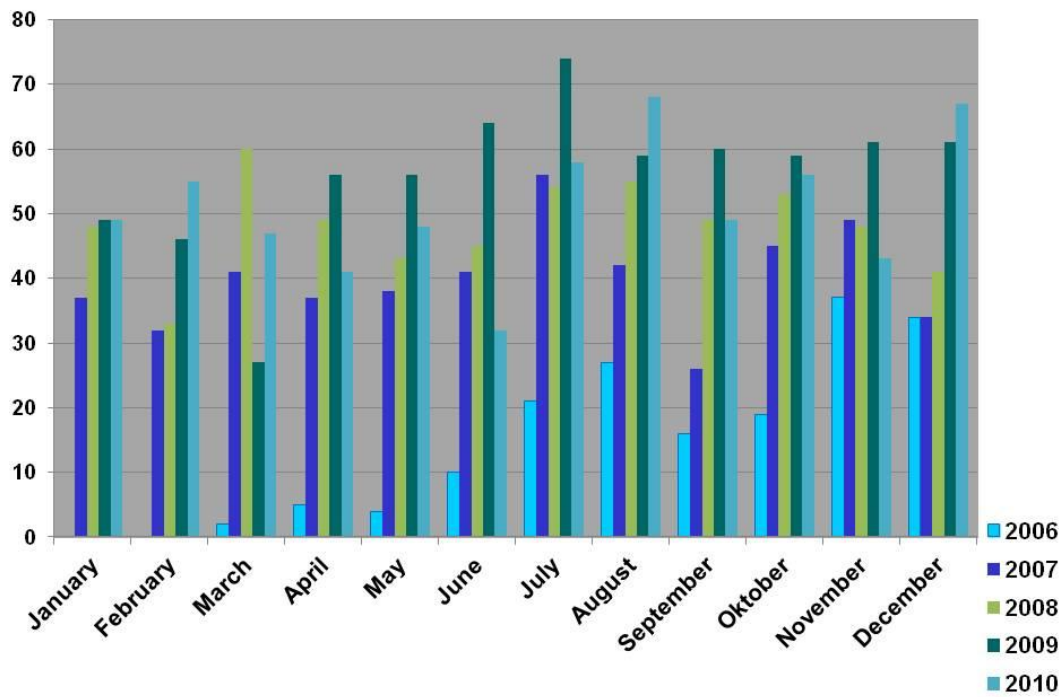
Our colleagues also succeeded in passing the public administration examinations - basic and higher level - obligatory for all civil servants in Hungary.

Colleagues who had signed study contracts - studying engineering and law - also fulfilled all requirements stated in their contract. The concerned colleagues participated in the required courses/sessions and passed the exams necessary to maintain their licences.

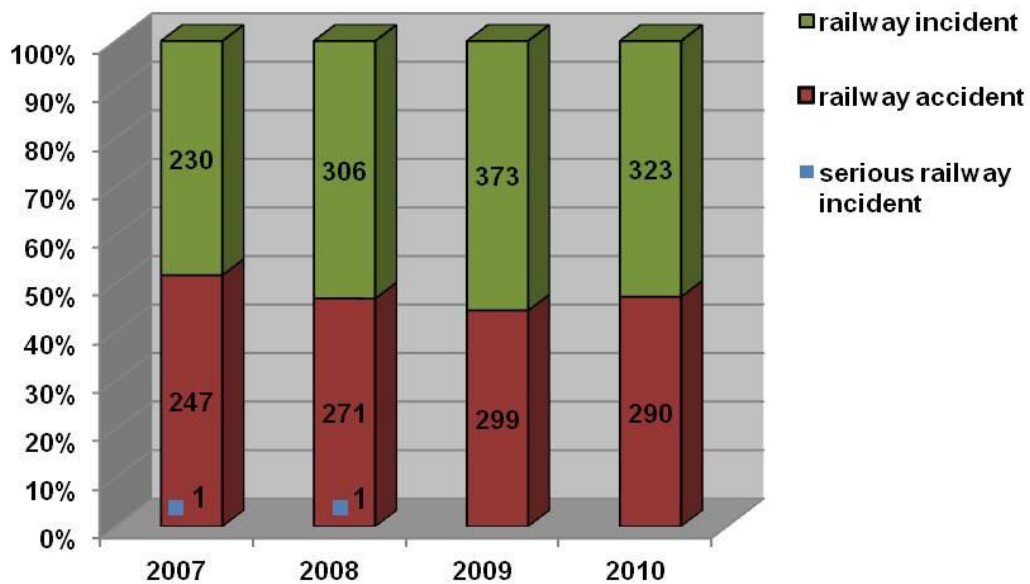
### **1.4.2 Reports**

The earlier tendency in the rising number of accident reports stopped in 2010 and there was a slight decrease. (There was a similar tendency in the field of aviation, where it took a bit more time to develop a routine in reporting and in cooperation due to the large number of the concerned parties.)

**Reported railway occurrences in 2006-2010 by months**



**Reported railway occurrences in 2006-2010 by category**



**Reported significant accidents in 2008-2010 by content**

SIGNIFICANT RAILWAY ACCIDENTS	TSB		
	2008	2009	2010
	<b>132</b>	<b>165</b>	<b>131</b>
- collision	1	-	-
- derailment	1	2	-
- injuries caused by rolling stock in motion	88	113	89
- accident at LC	42	50	42
- fire in rolling stock	-	-	-

**Reported occurrences in 2007-2010 by content**

	TSB			
	2007	2008*	2009	2010
<b>NUMBER OF REPORTS</b>	<b>478</b>	<b>578</b>	<b>672</b>	<b>613</b>
<b>Serious railway accident</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>-</b>
<b>Railway accident</b>	<b>247</b>	<b>271</b>	<b>299</b>	<b>290</b>
- collision	14	29	24	31
- derailment	19	19	21	13
- accidents at LCs	90	101	95	88
- injuries caused by rolling stock in motion	104	108	128	116
- fire (in rolling stock)	15	12	24	13
- others	5	2	7	29
<b>Railway incident</b>	<b>230</b>	<b>306</b>	<b>373</b>	<b>323</b>
- trains in opposing direction on the same rail track	2	3	2	-
- signalling to occupied rail tracks	1	-	-	-
- SPAD	2	4	10	13
- overhead contact line fault	57	66	89	75
- suicide	73	106	114	104
- others**	81	127	158	131

\* corrected according to the CSI definitions

\*\* the data contains the seven security related reports (e.g bomb alert) in 2009

## 2. INVESTIGATION PROCESS

### 2.1 Independent basis of the investigation

Pursuant to the national law, TSB is independent of all persons and organisations whose interests are contrary to the duties of the investigating organisation, in particular:

- authorities granting permission to put vehicles into service,
- authorities granting permission and controlling the operation and the maintenance of the vehicles,
- authorities issuing driving licences,
- the organisation operating the transport infrastructure,
- transport companies,
- railway undertakings
- the organisation determining railway tariffs,
- the organisation distributing routes,
- the safety authority and
- all regulators in the field of railways.

Under the national law, the civil servants of TSB shall not be the owners, senior officials or employees of the above mentioned organisations.

The Director-General and the Investigating Committee of TSB shall not be instructed in their scope of duties concerning the technical investigation.

### 2.2 Accident investigation philosophy of TSB Hungary

Under the Hungarian regulations, TSB shall investigate serious railway accidents.

The definition of 'serious accident' under the national regulations - in accordance with the Railway Safety Directive 2004/49/EC – is as follows:

*“Any train collision or derailment of trains, resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment of at least HUF 500 million and any other similar accident with an obvious impact on railway safety regulation or the management of safety”.*

Apart from serious accidents, the national regulations permit TSB to investigate other occurrences - at its own discretion - that may have an impact on the safety of rail transport as well as on the regulations and management of railway safety.

TSB availed itself of the opportunity provided by the regulations to decide which occurrences – apart from serious accidents – are to be investigated. TSB based its decisions regarding which occurrences require investigation on the following fundamental principles:

- **occurrences resulting in serious injuries to persons, extensive material damage and/or hindering railway transport significantly,**
  - **the latent danger of the occurrence can be considered significant – irrespective of its actual consequences,**
  - **accidents or incidents recurring at the same site or in the same manner**
- should be investigated.

When deciding which occurrences to investigate - besides the ones with serious consequences - it helps a great deal that the Railway Department regularly requests information from railway undertakings and relevant authorities on occurrences which are not investigated in details. The collection and evaluation of these data provides the possibility to be able to discover recurrences and certain tendencies in the accidents. These observations can create bases for further investigations.

In order to increase efficiency in decision making, it is necessary to gain as much information as possible. Therefore, having adopted the method widely used in the field of aviation and adjusted to railway transport - a draft has been compiled initiating the amendment of the relevant act to introduce investigations conducted by operators (railway undertakings). Its implementation is expected in 2011. This would create a connection between the investigations conducted by railway undertakings and the activity of TSB, also in such cases when TSB does not conduct technical investigation. According to the plans, TSB would commission the safety organisation of the relevant railway undertaking to investigate minor accidents and to inform TSB of their outcomes. This way, the possibility to gain more knowledge of and continually monitor the transport safety situation broadens.

### **2.3 The investigation process of TSB**

The Duty Services of TSB (dispatchers) receive the reports of the occurrences 24 hours a day.

The members of the Investigating Committee (IC) are appointed by the Director-General. The IC consists of one field investigator technician and at least one accident investigator. In case of more serious or complicated occurrences, one of the heads of department on duty and/or the spokesperson of TSB may be present on the site.

If an occurrence is not obliged to be investigated under the law, the head of the concerned department may decide whether or not to conduct an investigation.

The Investigating Committee carries out the site survey (parallel with other authorities) and decides on the direction of the investigation, the required technical and technological examinations as well as selecting the organisations and/or experts to be initiated in the investigation if necessary.

The draft reports on the occurrences are discussed by a board made up of the heads of departments of TSB.

The relevant parties of the investigation may make reflections on the draft report within 60 days from the date of receipt which are to be evaluated when compiling the final report. After this 60-day-period, TSB convenes a meeting for a final discussion with the participation of the representatives of the persons and organisations concerned. The purpose of the final discussions is that all concerned parties can hear the comments sent in reflection to the draft report as well as the viewpoint of TSB regarding the comments before the completion and publication of the final report. According to Hungarian law, the investigators may decide whether or not to include the parties' comments in the final report, the comments of an NIB of a Member State have to be included. Subsequently, the final report is made public.

All the three major departments of TSB have a separate 'Investigators' Manual' which lays down the methodological and technical requirements based on which the investigations shall be conducted by the investigators of TSB, taking the special characteristics of the given mode of transport into account.

### 3. INVESTIGATIONS/ RECOMMENDATIONS

For practical reasons, this chapter deals with the closed investigations together with the safety recommendations issued in the course of or after the completion of the investigations.

#### 3.1 Overview of investigations conducted by TSB

In 2010, there was no serious railway accident in Hungary which TSB was obliged to investigate. TSB conducted investigations - at its own discretion - on 39 further occasions, based on the fundamental principles listed in 2.3.

##### Investigations commenced in 2006-2010 by the amount of damages

Amount of damages	Number of occurrences				
	2006	2007	2008	2009	2010
Over HUF 500 million (Euro 2 million)	-	1	-	-	0
HUF 100-500 million	2	2	2	1	1
HUF 0-100 million	12	4	11	12	13
No damage	2	5	4	6	25

##### Investigations commenced in 2006-2010 by the number of persons injured in the occurrences

	Fatal					Serious				
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
Passenger	-	-	3	-	1	1	4	6	-	2
Railway staff	-	1	4	2	1	1	-	1	1	1
LC user	2	3	12	7	11	5	1	2	3	12
Unauthorised person	-	2	-	-	-	-	-	-	-	-

##### Investigated occurrences in 2006-2010 by their presumed cause (based on the reports)

Cause of the occurrence	Number of occurrences*				
	2006	2007	2008	2009	2010
<b>Human factor</b>	<b>12</b>	<b>8</b>	<b>12</b>	<b>15</b>	<b>30</b>
- personnel of railway undertaking	5	2	6	10	10
- other person	7	6	6	5	20
<b>Technical factor</b>	<b>5</b>	<b>4</b>	<b>5</b>	<b>4</b>	<b>9</b>
- defect in the track	1	2	4	4	5
- defect of the rolling stock	4	2	1	-	4

\* data may contain accumulation

**Number of investigations lasting longer than one year between 2006-2010**

	TSB				
	at the end of 2006	at the end of 2007	at the end of 2008	at the end of 2009	at the end of 2010
Railway	0	12	11	7	1

**3.2 High priority topics in 2010**

Having regard to the fact that one third of the accidents on the railways occur in level crossings (collisions with road vehicles, running over people), in 2010 TSB continued to put special emphasis on the investigation of such accidents using the previous years' experiences as well as paying special attention to accidents occurring at other places during which people were run over.

The number of accidents occurring at LCs slightly decreased compared to 2009. However, the number of collisions with cars increased. All these accidents can be related to human factors when the driver does not pay sufficient attention or they break the rules on purpose. Besides these causes, the design of the LC was also found to be a contributing factor on a few occasions, such as lack of required visibility to the signals, inadequately placed signposts etc to which the Investigating Committees drew the attention in their safety recommendations.

A positive experience in 2010 is that as opposed to the three occasions in 2009 when the accidents occurred due to the operation deficiency or fault of the warning lights and barriers, in 2010 there was no such occurrence.

Having evaluated the data of 2010, it can be established that the number of accidents when road vehicles ran into the side of trains significantly increased. These accidents can almost solely be related to the inattention of LC users.

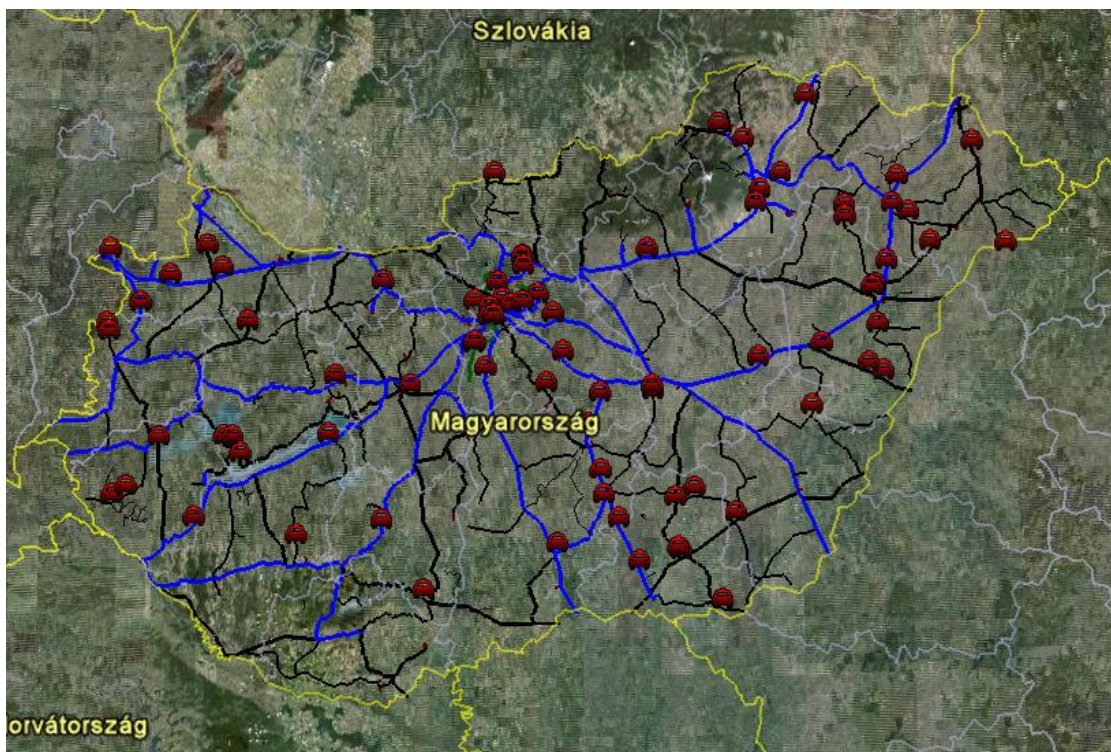


Figure 1.: Accidents occurred in LCs

The tendency of 2007 and 2008 regarding accidents occurring at LC AS 41 between Tócsövölgy and Balmazújváros stations (4 occasions) continued in 2009 and 2010 too. The safety recommendations issued by the IC i.e. to introduce a different traffic control method - which was supported by the transport authority as well as by the infrastructure manager - was not implemented due to the lack of financial resources. Other, less costly measures were introduced but were unable to prevent further accidents. The improvement of the LC remains among the development plans.

Two accidents occurred within a short time period between Makó and Apátfalva stations, in section no. 795 at an unprotected LC. Based on the findings of the technical investigation, TSB issued a safety recommendation. During its implementation, the visibility of the LC was significantly improved and no accidents have been reported afterwards.

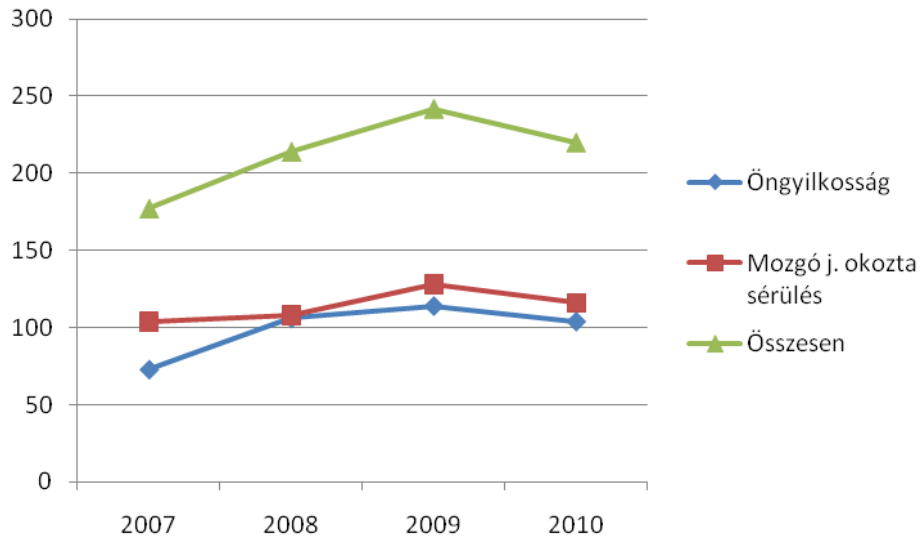
When looking at the consequences of accidents occurred at LCs in 2010, we can highlight the accident of 20 October 2010 between Kiskunlacháza and Délegyháza stations. A lorry carrying pebbles drove onto LC AS 322 - protected by warning lights - regardless of the Stop signal and collided with freight train 40760-1. The engine-driver died in the accident, the locomotive and the first two wagons derailed, fell and sustained substantial damage. The infrastructure was also damaged and there were disruptions in railway traffic. TSB began the investigation immediately and issued safety recommendations suggesting immediate preventive actions based on the site-survey and the findings of the initial examinations. The addressee accepted the recommendations, their implementation is in progress.

Learning from the experiences of the investigations, more attention should be paid to the improvement of level crossings in the transport safety campaigns in the future. It would be advisable to examine level crossings which are not safe any longer due to their design (e.g. parallel road nearby, visibility conditions, etc.). They could be closed and nearby safer level crossings could be used instead. Unused LCs with still operating warning lights at inaccessible track sections and desolate places should also be closed in order to improve traffic morals and routines which usually contribute to the occurrence of the above type of accidents. By closing down unnecessarily operating LCs, there would not be such ideas in people's minds that "the signals are not so important and sometimes can be ignored". These wrong practices may lead to accidents in other normally operating LCs.

When examining accidents involving pedestrians, it is difficult to ascertain whether or not the person wanted to commit suicide. However, only such cases are regarded as suicides in which the relevant authority unambiguously states the fact of intentional self-harm.

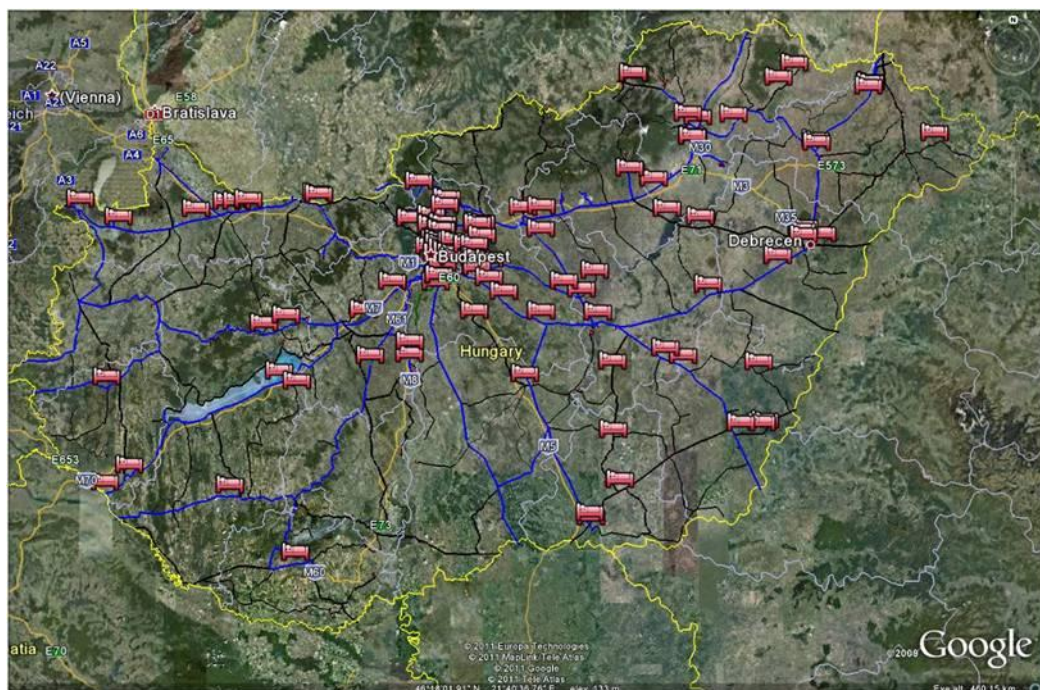
The rising tendency of injuries to persons caused by rolling stock in motion between 2007 and 2009 stopped in 2010. Compared to the previous year, it decreased by 10%; from 128 to 116 cases. Similar can be said about suicides whose number decreased from 114 in 2009 to 104 in 2010. These changes can be seen in the below figure.





**Figure 2.: The number of injuries to persons caused by rolling stock in motion (indicated with red) and that of suicides (indicated with blue)**

According to our experiences, the police still tends to close cases in which persons are run over with the statement that 'no sign criminal act has been found' and wilful self-harm is not mentioned or only mentioned as a possible cause. In statistics, this increases the number of injuries caused by rolling stock in motion and indicates latency with regard to suicides.



**Figure 3.: Injuries to persons caused by rolling stock in motion on the railways of Hungary**

In connection with injuries to persons caused by rolling stock in motion and suicides, it can be stated that such accidents occur in various parts of Hungary. The purpose of this type of evaluation is to find out whether there are certain points / areas / track sections on the railway network where the number of such accidents is significantly higher. At such places, intervention is advisable by the infrastructure manager or the relevant authorities.

The data of 2010 reinforce the previous experiences, according to which, the most dangerous areas of the Hungarian railway network from this point of view are the following:

- Városligeti-elágazás in Budapest: 12 occurrences between 2007 and 2009; 4 occurrences in 2010.
- The section between Debrecen and Apafa stations: 15 occurrences between 2007 and 2009; 3 occurrences in 2010.
- The section between Kőbánya-Kispest and Monor stations: 23 occurrences between 2007 and 2009; 4 occurrences in 2010.
- The section between Dunakeszi and Vác stations: 24 occurrences between 2007 and 2009; 4 occurrences in 2010.

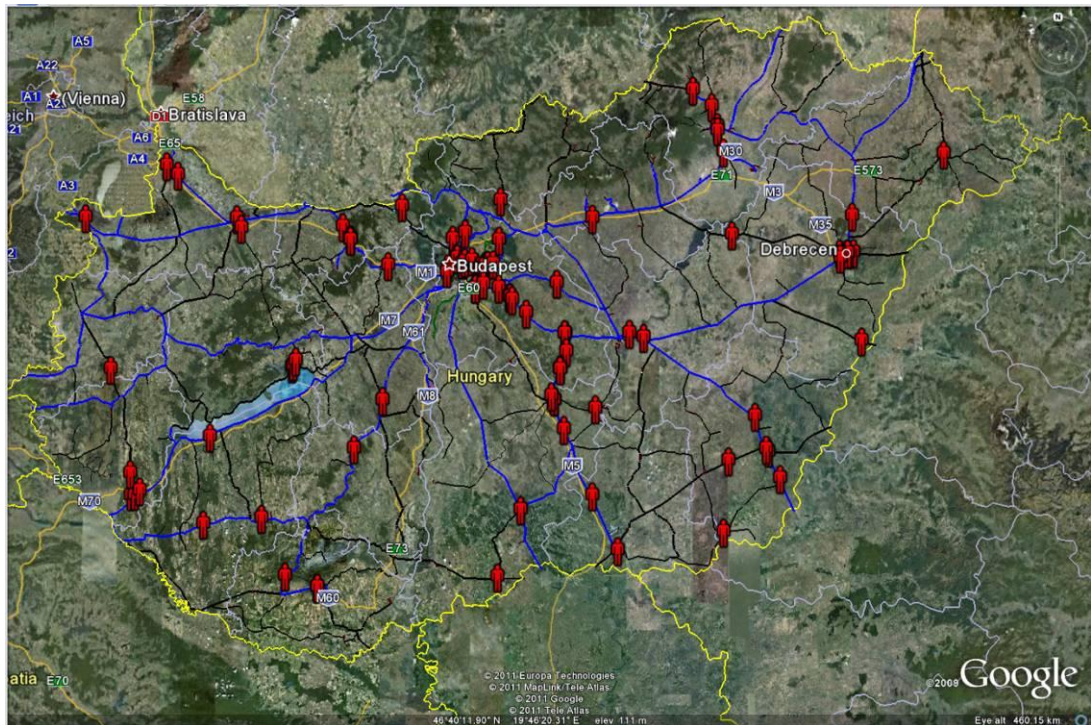


Figure 4.: Suicides by area

A remarkable achievement in the Hungarian railway transport is that there has been no serious railway accident since 2008. However, to maintain this positive tendency, it is essential that all participants of the sector learn from the occurrences whose consequences were close to serious. Therefore, TSB decided on a number of occasions to investigate accidents which did not have serious consequences but created rather dangerous situations. Such was the incident occurred between Tatabánya and Tata stations when a part of the wheel of a passenger train carriage broke off, as a result of which the train derailed. Another case was when a freight train passed a signal at danger at Almásfüzitő station - which occurrence could be related to human factors (wrong signalling). Similarly, another train passed a signal at

danger at Újszász station and stopped just 50 metres from a passenger train coming on the same track in opposing directions. This latter case occurred due to the lack of professional knowledge of the staff.

Having evaluated the previous year's information, and looking at the number and the source of danger of the occurrences, the two underlining risk factors seem clear by now; these are SPADs and trains running in opposing directions on the same track.

Year	Without consequences	Splitting points open	Trains in opposing direction on same track	Signalling trains to already occupied track	Crossing LCs in open position	Total
2009	3	3	3	2	-	12
2010	6	3	2	1	1	13

**The consequences of reported SPADs**

### 3.3 Investigations commenced in 2010

Date 2010	Occurrence	Category
01.09.	Train no. IC 536 collided with a car at LC no. SR1 - operating normally and protected by warning lights and half barrier - at Ludas station. As a consequence of the collision, the 3 passengers of the car lost their lives.	Railway accident
02.09.	One carriage of a passenger train derailed with 4 axles when approaching Budapest Nyugati station.	Railway accident
02.12.	Train no. 1247 passed YH main signal at danger and ran through LC SR4 (protected by warning lights and half barrier) which was in open position between Andrásida and Zalaszentiván stations. No one was injured.	Railway incident
02.17.	Train no. 7807-2 collided with a car at LC AS72 - protected by warning lights) between Kiskunfélegyháza and Galambos stations. The driver and the passenger of the car died at the site.	Railway accident
03.10.	Train no. 6615 collided with a car at LC AS41 (protected by warning lights and operating normally) between Balmazújváros and Tócsóvölgy stations. The passenger of the car died at the site and the driver of the car suffered serious, life-threatening injuries.	Railway accident
03.15.	3 wagons (23. 24. 25.) of train no. 53410 derailed when departing from Miskolc marshalling yard. The derailed wagons damaged the rail track and blocked the left track of Budapest-Miskolc railway line.	Railway accident
03.15.	A shunting vehicle ran over a person lying between the rail tracks at Győr station. The person died at the site. (TSB began the investigation in April.)	Railway accident
04.19.	The 3rd carriage of train no. 9408 derailed and its wheel broke between Tatabánya and Tata stations	Railway accident
04.29.	Train no. 37015 collided with a car at unprotected LC between Makó and Apátfalva stations. The driver and the passenger of the car suffered serious injuries.	Railway accident
05.25.	Train no. IC704 collided with a car at normally operating LC no SR2 (protected with warning lights) at Szatymaz station. The driver and passenger of the car died at the site.	Railway accident
07.11.	The last wagon of a freight train derailed and fell onto its side when departing from Búcsuszentlászló station.	Railway accident
07.14.	A passenger train collided with a car at normally operating LC SR2 (protected with warning lights) at Örkény station. Two passengers of the car suffered serious and one minor injuries.	Railway accident
07.16.	A passenger train collided with a car at normally operating LC no. AS52 (protected with warning lights) between Szombathely and Kőszeg stations. The driver of the car suffered serious injuries.	Railway accident
07.16.	A passenger train collided with a car at normally operating LC no. AS13 (protected with warning lights) between Nyékládháza and Hejőkeresztúr stations. The driver of the car died at the site, his passenger suffered minor injuries.	Railway accident
07.19.	A locomotive collided with a passenger train while shunting on track no. III of Pécs station. Two passengers suffered minor injuries.	Railway accident

<b>08.12.</b>	A passenger train collided with a motorbike at normally operating LC no. AS386 (protected with warning lights) between Pápa and Vaszar stations. The motorcyclist died at the site.	Railway accident
<b>08.17.</b>	A passenger train crashed a person on a bicycle between Szentes and Szegvár stations.	Railway accident
<b>08.21.</b>	A passenger train collided with a car at an unprotected LC between Órbottyán and Vácrátót stations. The driver of the car suffered serious injuries.	Railway accident
<b>08.21.</b>	A passenger train ran over a cyclist at normally operating LC no. AS316 (protected with warning lights) between Hajmáskér and Pétfürdő stations. The cyclist died at the site.	Railway accident
<b>08.23.</b>	A passenger train collided with a horse-carriage at normally operating LC no. AS2382 (protected with warning lights) between Hajdúhadház and Apafa stations. The driver and the passenger of the carriage died.	Railway accident
<b>09.04.</b>	A passenger train passed V1 exit signal at danger at Ikrény station, split points no.1 open and stopped. No one was injured.	Railway incident
<b>09.27.</b>	One loaded wagon of a freight train derailed with two axles when approaching Adony station. No one was injured.	Railway accident
<b>10.05.</b>	A freight train departed from Almásfüzitő station without permission and passed K5 exit signal indicating 'Stop'. The train split points no. 12/a open and then stopped.	Railway incident
<b>10.07.</b>	A passenger train collided with a car at an unprotected LC between Nyírgelse and Nyíradony stations. The driver of the car suffered serious injuries.	Railway accident
<b>10.10.</b>	A freight train passed exit signal E5 indicating 'Stop' at Budapest-Ferencváros station without permission. It split points no. 32 open and ran on towards Kőbánya-Kispest instead of Rákos station.	Railway incident
<b>10.13.</b>	Two passenger trains collided with each other at Hártókút station on the Királyrét Forest Railways. One of the trains derailed. Two passengers suffered serious and one passenger suffered minor injuries.	Railway accident
<b>10.15.</b>	IC train collided with a car at an LC protected with warning lights between Petőfiszállás and Kiskunfélegyháza stations. The driver of the car died at the site.	Railway accident
<b>10.20.</b>	A shunting locomotive ran over a pointsman at Nyíregyháza station.	Railway accident
<b>10.22.</b>	A freight train collided with a lorry at LC no. AS322 protected by warning lights between Kiskunlacháza and Délegyháza stations. The engine-driver died at the site and the lorry driver suffered serious injuries.	Railway accident
<b>11.04.</b>	The first wagon of a freight train derailed when departing from Fényeslitke station.	Railway accident
<b>11.15.</b>	A train passed an exit signal at danger at Újszász station and stopped 50 metres from a passenger train coming on the same track in opposing direction.	Railway incident
<b>11.19.</b>	A passenger train collided with a car at an LC protected by warning lights and half barriers between Sóstóhegy and Kemece stations. One person died and another suffered serious injuries.	Railway accident
<b>11.23.</b>	A carriage of HÉV (suburban train) burnt down at Budapest Rómaifürdő stop,. No one was injured.	Railway accident

<b>12.06.</b>	A passenger train collided with a car at an LC protected by warning lights between Lesencetomaj and Tapolca stations. The driver and the passenger of the car suffered serious injuries.	Railway accident
<b>12.08.</b>	A freight train derailed with one wagon at points when approaching Dombóvár station.	Railway accident
<b>12.09.</b>	Two wagons derailed when shunting at Lökösháza station.	Railway accident
<b>12.13.</b>	One wagon of a freight train derailed at points at Budapest. Soroksár stop.	Railway accident
<b>12.19.</b>	Two wagons derailed when shunting at Hódmezővásárhely station.	Railway accident
<b>12.19.</b>	A passenger train collided with a car at an LC protected by warning lights between Mártély and Hódmezővásárhely-Népkert stations. The driver of the car suffered serious injuries.	Railway accident

### 3.4 Investigations completed in 2010 with the issued recommendations

The final reports issued in 2010 analysed occurrences of the following types:

- SPAD
- collision,
- derailment,
- accident at LC,
- occurrences which do not qualify as serious railway accidents but as a result of which there were fatalities.

**In 2010, 26 final reports were compiled and published on the website of TSB. Further 3 draft reports were compiled and sent to the relevant parties for reflections.**

The above investigations were closed and the final reports were published in the beginning of 2011 considering the 60 days provided by law for the relevant parties to reflect on the draft report.

#### Investigations completed in 2010

##### 2007-328-5



On 7 September 2007, four carriages of passenger train no. 3434 derailed on switch no. 6 (double slip) when departing from Budapest-Keleti pu.

No one was injured. The derailed carriages did not fall onto their side but sustained damage of different extent. The rail track also sustained damage and the occurrence caused some delays on the railway line.

The IC conducted a site survey and determined the following:

The suspension tab of the connecting rod for one of the blades at no. 6 double slip got separated from the blade. Under its own flexibility and free of the retraction of the connecting rod, the blade got close enough to the main rail to derail the passing train. The IC noticed that the safety pin of the nut-and-bolt fastening of the suspension tab was missing, indicating the possible cause of the separation of the tab from the blade.

#### Factual statements directly connected to the occurrence of the accident

The nut-and-bolt fastenings were not secured at the last repair of the double slip and this fact remained unnoticed when accepting the work done.

*Factual statements indirectly connected to the occurrence of the accident*

The lack of equipment securing the nut-and-bolt fastenings and the loosening of the bolts remained unnoticed and unrepaired at the periodical inspection of the switch.

Other risk factors

As a result of the developments, more and more large-radius switches are built on the railway network and the speed of the trains passing through them is higher. This is an advantage from traffic point of view, however it creates safety risks. Therefore, more resources should be allocated and attention should be paid to the maintenance of switch.

Safety recommendations

**BA-2007-328-5-01:** The IC recommends infrastructure managers to ensure that after the switch have been repaired, only professionally and adequately assembled equipment are accepted and released into service. Therefore the current practice of acceptance-release should be reviewed and if necessary, detailed guidelines/checklist should be compiled with regard to the aspects of inspection.

The safety recommendation was issued as the derailment of the train was a consequence of the switch not been assembled adequately, and the deficiencies went unnoticed and unrepaired.

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2008-0008-5



On 7th January 2008, locomotive (reg. no. V43-1156) of train no. 5122, upon leaving Tarcál station, derailed with one bogie and one axle between switch no. 17 and 11 on the open track after the exit signal.

As a consequence of the accident, the engine-driver suffered minor injuries. 19 trains were delayed by 1278 minutes altogether, 2 trains were partially cancelled and the passengers of 2 trains were transported by train replacement buses.

After the report of the accident, the IC conducted a site survey. Based on the gathered data and information, the IC established that the cause of the accident was a defect in the rail track, i.e. the lack of vertical reinforcing on several sleepers on track III of the station at the small-radius arch before switch no. 11.

The IC requested and received the data and documents required for the investigation, which reinforced the findings of the site survey.

Train no. 5122 departed from Tarcál station at 12:32 hrs and accelerated to 37 km/h speed. It travelled with a speed of 35 km/h when the first bogie fell off the right rail with both its axles at the middle of the small-radius arch before the switch, pushing the rails sideways. The wheel flanges of the left hand side wheels jumped up on the rail, ran on it for a while and then fell onto the outer side of the rail. The rear bogie of the locomotive and the carriages remained on the rail track.



**Factual statements directly connected to the occurrence of the accident**

The IC established in the course of the investigation that the derailment of train no. 5122 was caused by the fact that the lateral rigidity of track III of Tarczal station was not sufficient.

The locomotive generated such a gauge widening that caused the derailment of the train when it was departing from the station at the small-radius arch before switch no. 11 - where several sleepers had previously become unstable due to the breakage of the rail bolts.

**Factual statements indirectly connected to the occurrence of the accident**

It was found in the course of the investigation that the breakage of the rail bolts in the small-radius arch is a result of a longer process.

The IC established in the course of the site survey that some of the wooden sleepers had rotted away. The lower parts in a relatively good condition kept the seeping water in the holes. As a consequence, the bolts soon got corroded; their necks 4-5 centimetres below the head became thin due to the corrosion, and the bolts eventually broke under the excess load and pressure.

The signs of decay were visible. The switch of Tarczal station were measured in June 2007 when sudden and significant gauge widening was found, which showed that some abnormal process was happening in the rail track.

No further action has been taken after the switch inspection. The broken rail bolts remained unnoticed and even though the gauge widening was established, no speed limit was introduced.

The IC received information according to which the lack of resources required for track maintenance makes troubleshooting and safe operation difficult. Therefore in some cases, the track maintenance staff is forced to tolerate unsafe track conditions (measures close to a limit when operation/train services should be stopped) without doing repair work on the track.

**Safety recommendations**

Safety recommendation was not issued.

**2008-052-5**



On 7 February 2008 at 8:50 hrs, when leaving track VII of Budafok-Háros station, the 6<sup>th</sup> wagon (reg. no. 33 55 785 1029-9) - loaded with petrol - of freight train no. 83521 derailed in section no. 64+15 and after stopping it fell onto its side.

No one was injured. The right overhead contact line circuit was switched off for 22 hrs 47 mins and the left circuit was switched off for 23 hrs 57 mins at the station.

As a consequence, trains could only travel with lowered pantograph on track IV of the station. The cargo was unloaded at 16:40 hrs and the tank wagon was lifted back onto the track by 21:26 hrs.

The accident occurred due to the gauge widening which can be attributed to the bad, worn away condition of the rail track.

**Factual statements directly connected to the occurrence of the accident**

The accident occurred due to the gauge widening which can be attributed to the bad, worn away condition of the track network - among them track VII - of Budafok-Háros station.

According to the 'Technical expert's opinion', the gauge width was 1475 mm, which is the result of an irreversible process - it can only be repaired as part of a significant reconstruction.

To the IC's knowledge, dynamic measures are rarely done on the subordinate tracks of the station and their results are only locally and not sufficiently used. The IC believes that it would be necessary to do periodical dynamic measures on tracks with 10 km/h speed limit in order to decide whether or not they should be closed off traffic.

The gauge should be no shorter than 1430 mm and no longer than 1465 mm taking the gauge widening in the arches into consideration, except for the subordinate tracks of stations whose maximum permitted gauge is 1470 mm. These values were exceeded (according to the measurements of PVTK Bp. PHAO).

Based on the above, it can be concluded that Budafok-Háros station is in such a bad technical condition which continuously creates dangers to traffic. Trains may only travel with a speed of 10 km/h on tracks II. IX. and XII, and tracks I. VII. VIII. X. XI are closed off from traffic or may only be used for shunting.

**Factual statements indirectly connected to the occurrence of the accident**

At the time of the accident, while Budapest-Kelenföld station was under reconstruction, freight trains waiting for engine replacement or staff change were regularly stopped at Budafok-Háros. (Some trains are still stopped there.) Train no. 83521 was such. This excess traffic increases the risk of accidents on the overused and worn away track network of the station.

**Other risk factors**

The cargo of train no. 83251 was petrol which increased the danger having regard to the busy roads and built-up areas nearby.

It was difficult and took a long time to unload the cargo as the wagon was tilted.

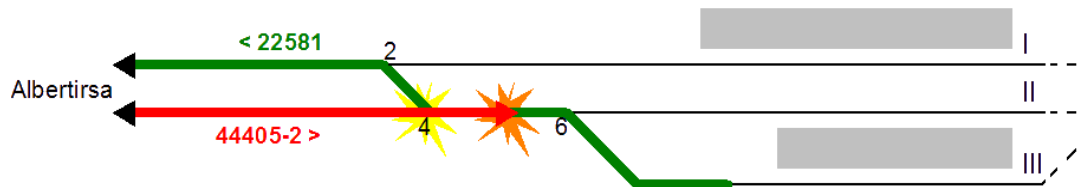
**Safety recommendations**

Safety recommendation was not issued.

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**2008-385-5**

On 30 August 2008 at 11:25, having passed entry signal 'A' indicating 'Stop', freight train no. 44405-2 split switch no.4 open and then collided with wagon no. FMK-002 of work train no. 22581 departing from platform III of Ceglédbercel-Cserő station. No one was injured.



The IC did not conduct a site survey. The final report was compiled based on the interviews with the concerned staff, on the strip chart recorders and other relevant documents.

The accident was attributed primarily to human factors (SPAD). However, the IC believes that another contributing factor was the too frequent duty service of the engine-driver who, besides, spends approximately 6 hours commuting to work.

Another risk factor was that the braking effect of the freight train was slightly weaker than required.

**Factual statements directly connected to the occurrence of the accident**

Train no. 44405-2 passed entry signal of Ceglédbercel-Cserő station indicating 'Stop'. Instead of decelerating, the train continuously accelerated before the entry signal. The occurrence of the accident can be attributed to human factors.

**Factual statements indirectly connected to the occurrence of the accident**

The braking effect of the freight train was slightly weaker than required.

The engine-driver spends a long time commuting to work, which increases his tiredness.

The train control system of the locomotive is incapable of checking the activity of the engine-driver when approaching a Stop signal and cannot stop the train before the signal if necessary.

**Safety recommendations**

Safety recommendation was not issued.

### **2008-408-5**

On 9 September 2008, one wagon of freight train no. 42011-2 derailed with two axles when departing from Székesfehérvár station. No one was injured. The rail track and both engines of switch no. 21 sustained damage and there were significant disruptions in railway traffic.

The IC established the following:



- Significant gauge defects and rail distortions were found on the track where the train derailed.
- The wheel loads of the derailed vehicle were asymmetric exceeding the permitted value.

Factual statements directly connected to the occurrence of the accident

On side of the rail track at the place of the derailment was sunk to such an extent that exceeds the limit for safe operation.

The track is in a very poor condition on the whole area of the station (this is why speed limits - 10-20 km/h - were introduced).

The rail track had been inspected regularly, however, the defects and size-distortions had not been repaired.

Factual statements indirectly connected to the occurrence of the accident

The fact that the wheel loads of the derailed vehicle were asymmetric also contributed to the derailment as the wagons were more sensitive to the track defects.

### **Safety recommendations**

Safety recommendation was not issued.

**2009-382-5**

On 7 August 2009, fast train no. 529 departed from Sátoraljaújhely station at 03:51 hrs to Budapest-keleti pu according to schedule. Upon leaving the station, it collided with a Mercedes Sprinter 318 CDI Ukrainian bus at LC no. SR-2 - protected with warning lights - in section no. 443+70. As a consequence of the collision, one of the passengers of the bus died at the site, 2 suffered serious and 6 suffered minor injuries.

The locomotive (reg. no. M 41-2334) became inoperative. Entry signal 'A', mast 'c' of the LC and one end of the insulated rail section sustained damage. The bus was written off.

The construction of the LC complied with the regulations and the so called 'reduced visibility triangle' was ensured at the time of the accident.

The accident occurred as the bus driver did not pay sufficient attention when he was approaching the LC.

**Factual statements directly connected to the occurrence of the accident**

Based on the site survey, the analysis and evaluation of the available documents and photographs, the IC established the following:

- The warning lights were operating normally and were visible at the time of the accident.
- Train no. 529 did not exceed the speed limit (80 km/h).
- The occurrence of the accident is attributed to human factors i.e. the bus driver drove onto the LC regardless of the Stop signal.
- The construction and security of the LC complies with the relevant regulations of section h) of KM Decree 20/1984. (XII.21.). The reduced visibility triangle was ensured from the direction the bus approached the LC.
- The signposts on the road were placed and adequately and were well visible.
- The fact that the bus driver set off from Ukraine the previous evening and drove continuously during the night until the accident occurred at 03:55 hrs may also have affected his concentration. Due to his tiredness and the excess strain when driving at night, he did not notice the Stop signal at the LC. The IC does not agree with the hypothesis that the bus driver fell asleep as he was well able to follow the road and its turns with his vehicle.

**Other risk factors**

LC SR 2 at Sátoraljaújhely station is surrounded with thick, overgrown vegetation.

**Safety recommendations**

Safety recommendation was not issued.

### **2008-130-5**

On 21 March 2008 at 9:17 hrs, having departed from track IV and passed exit signal indicating 'Stop', train no. 65540-1 collided with train no. 65411 passing track III at Szerencs station. The two vehicles collided with a little force, therefore only the first right rear-view mirror of the locomotive (reg. no. V43-1060) of train 65540-1 broke.

The IC believes that the occurrence was attributed to human factors and therefore it does not wish to issue safety recommendation.



#### **Factual statements directly connected to the occurrence of the accident**

The engine driver of train no. 65540-1 did not pay sufficient attention to the exit signal indicating Stop, it collided with passing train no. 65411.

#### **Safety recommendations**

Safety recommendation was not issued.

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### **2008-136-5**



On 26 March 2008 at 01:18 hrs, the 15<sup>th</sup> and 16<sup>th</sup> twin wagon (nos. 23 80 435 1919-4 and 25 80 436 805-5, carrying cars) of train no. 44405-2 derailed at switch no. 22 when approaching track XIII of Kőbánya-felső station. The second half of the 15<sup>th</sup> wagon was running towards track XIV and collided with an Eas wagon (scrapped) standing on the track.

The railway vehicles sustained minor damage and the rail track was damaged on an approximately 200-metre length.

The IC established that train no. 44405 ran onto a switch where the blade had fit closely and adequately to the stock rail. However, as the train was approaching the track, the blade of the switch moved away from the stock rail under the 15<sup>th</sup> wagon (and as a consequence the projecting blade was closer to the other side stock rail) to such an extent that it allowed the following wagons to run on another track.

The direct cause of the accident was the opening of switch no. 22 while the train was approaching the station.

The indirect cause of the accident was the uncertainty of the traffic staff with regard to basic terms as well as their wrong practices.

*Factual statements directly connected to the occurrence of the accident*

The direct cause of the accident was the opening of switch no. 22 while the train was approaching the station.

*Factual statements indirectly connected to the occurrence of the accident*

In the course of the investigation, the IC established the following:

- The traffic control (and its documentation) at the station was not executed as prescribed in the regulations in force,
- The knowledge of some traffic control staff members regarding basic terms is uncertain. The provisions of F. 2. Traffic Regulations are not effectual due to the lack of knowledge and the wrong practices.

**Safety recommendations**

Safety recommendation was not issued.

**2009-113-5**



On 23 March 2009, the first wagon of freight train running from the Vác factory of DDC to its Beremend factory (carrying cement bricks) derailed and tipped to its side when departing from track VIII of Pusztaszabolcs station. Further two wagons derailed with one axle. The rail track and the signal box sustained damage. When the still standing wagons were trailed away, there was a similar derailment at the other end of the station.

The IC conducted a site survey in the course of which it found that the cargo was not adequately arranged in the wagons. Therefore the IC examined the loading technique/procedures and made checking calculations as well. The rail track repair works had begun before the site survey, however, the data obtained from the infrastructure manager showed that the track had already been deformed beyond the size limit prior to the accident.

It was established that the accident can be attributed to the asymmetric load of the wagons, which does not cause derailment directly but it makes the wagons more sensitive to track defects.

*Factual statements directly connected to the occurrence of the accident*

The freight train was loaded asymmetrically and the track distortion exceeded the size-limit (when it is obliged to be repaired). These factors together led to the derailment of the train.

**Safety recommendations**

Safety recommendation was not issued.

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**2009-413-5**



On 23 August 2009 at 21:18 hrs, freight train no. 98658 - running from Veszprém to Paks and carrying stone - approached the main transit track (III) of Aba-Sárkeresztúr station and ran through it without previous authorization. It travelled on the same track as passenger train no. 38421 - which departed from Sárbogárd station at 21:13 hrs with permission - in opposing direction. The traffic controller notified the engine-drivers (through the locomotive running foremen) via mobile phone to stop the trains. The two trains then stopped approximately 3400 metres from each other on the open track.

The IC established the following:

- Freight train no. 98658 ran through Aba-Sárkeresztúr station without previous authorization.
- The engine-driver was not in possession of the timetable relevant to his train.
- Line Székesfehérvár-Sárbogárd is not mentioned on the so called 'Type, route and station knowledge certificate' given to the engine driver.
- The staff was unable to show documentation on the line-knowledge trips done by the engine-driver.
- The engine-driver reported to be on duty on 16:00 hrs on 23 August to the movements inspector of Veszprém station - where there was no locomotive running foreman on duty at that time - as well as to the locomotive running foreman of Székesfehérvár VSZT via telephone.

The IC believes that the accident can be attributed to human factors.

The IC issued a safety recommendation.

*Factual statements directly connected to the occurrence of the accident*

- Freight train no. 98658 ran through Aba-Sárkeresztúr station (where it should have stopped according to the timetable) without previous authorization from the movements inspector.



- The station staff gave a signal to the arriving train that it can run until the shunting limit signal (this signal is normally given when shunting). The train crew did not consider this signal strange or dubious.
- The engine-driver did not have valid line-knowledge for the given route. Line Székesfehérvár-Sárbogárd is not mentioned on the so called 'Type, route and station knowledge certificate' given to the engine driver. The staff was unable to show documentation on the line-knowledge trips done by the engine-driver.
- The engine-driver was not in possession of the timetable relevant to his train.

*Factual statements indirectly connected to the occurrence of the accident*

- Due to the building of M6 motorway, the railway traffic has increased at Aba-Sárkeresztúr station recently. There are a lot of trains carrying stone, empty wagons and others doing various services, and the station (and its staff, i.e. only one person) was not designed for such busy traffic.
- The movements inspector of Aba-Sárkeresztúr station did not inform the arriving train as to how long it was going to stay at the station.
- The engine-driver reported for duty on 16:00 hrs on 23 August at station where there was no locomotive running foreman on duty at that time who could have given the timetable to the engine-drivers in this changed traffic situation.

**Safety recommendations**

**BA2009-413-5-01:** The IC recommends MÁV-Trakció Zrt to examine how the "Timetables to be kept" is handed over to engine-drivers and what way it is documented. MÁV-Trakció Zrt should take the necessary measures to ensure that engine-drivers are in possession of the timetable of the train they are forwarding.

The justification of the recommendation is as follows:

The engine-driver of train no. 98658 only noticed that he did not have the timetable before leaving Veszprém station. He went back to the station office - where there was no locomotive running foreman on duty at that time - and picked up a timetable which he thought was the right timetable for his train. It turned out later that the timetable book he picked up was not the one issued by MÁV Zrt. under no. 'Gy.148-947/2009' which also contains the timetable for train no. 98658 but it was another similar timetable.

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## 2009-0443-5



On 5 September 2009 at 09:23 hrs, train no. IC 75-2 passed entry signal 'B' signal at danger at Nagylapos crossover and approached the track of Nagylapos station on which train no. 7442 was standing. The movements inspector noticed the occurrence and gave a 'Stop' signal to train IC 75-2 (which was running with approximately 10 km/h speed). Train IC 75-2 stopped 150 metres from the rear of train no. 7442.

The block system between the two stations developed a fault due to the previous day's storm. As a consequence, block signal no. AT376 became inoperative (red light was on the signal) and it was impossible to send clear signal onto entry signal 'B' of Nagylapos crossover. At the same time, traffic control was also impossible between Nagylapos and Gyoma.

The IC concluded in the course of the investigation that several factors contributed to the occurrence of the accident. These were as follows:



- The staff did not comply with the regulations of the written order given at Mezőtúr station when travelling with train no. IC75-2.
- The Unified Vigilance Warning and Train Control Device (EÉVB) was not switched off at the right place.
- The 'look-out service' i.e. a second person on board the locomotive ordered at Mezőtúr station could not prevent the accident.
- Having passed the entry signal, they followed behind the train standing in the occupied block section.
- This was the first occasion the engine driver of train no. IC 75-2 had driven a train after the section had been reconstructed and he had not been informed about the changes.

Having evaluated the available data and information, the IC issued five safety recommendations.

Factual statements directly connected to the occurrence of the accident

- Train no. IC 75-2 passed entry signal 'B' at danger at Nagylapos crossover without permission.
- The Unified Vigilance Warning and Train Control Device (EÉVB) of the locomotive of train no. IC75-2 was not switched off at the place prescribed in the regulations. Therefore the switched off EÉVB was unable to perform its safety function (i.e. to stop the train). As a result, the train passed a block signal and the entry signal of Nagylapos crossover with high speed.
- The 'look-out service' i.e. a second person on board the locomotive ordered at Mezőtúr station could not prevent the accident. (This occurrence draws the attention to the importance of human factors when travelling under less safe circumstances.)
- Having passed the entry signal, the staff did not act as prescribed in the regulation, but the continued their way and followed behind the train standing in the block section.

Factual statements indirectly connected to the occurrence of the accident

- The block system between the two stations developed a fault due to the previous day's storm. As a consequence, block signal no. AT376 became inoperative (red light was on the signal) and it was impossible to send clear signal onto entry signal 'B' of Nagylapos crossover.
- This was the first occasion the engine-driver of train no. IC 75-2 had driven a train after the section had been reconstructed. Nor had the engine-driver driven a train in this section (of railway line no. 120) in the time period when the engine-drivers were informed about the changes.
- The IC believes that the lack of line knowledge in the changing circumstances as well as the fault of the signal box together contributed to the occurrence of the accident.

Other risk factors

- Based on the information available to the IC, there is no designated place in the area of the crossover where the EÉVB can be switched off according to Regulation E.1. Thus the engine-driver would not have been able to switch the EÉVB off as prescribed.
- The current regulations with regard to giving written orders at Nagylapos crossover are unrealistic and practically impossible to execute. Compliance with them creates significant disruptions in railway traffic. The current regulations themselves carry the risk of more serious accidents to occur.

Safety recommendations

**BA-2009-443-5-01** Based on the current regulations, the acquired familiarity with routes and tracks never expires, regardless of the date of exam or substantial changes in the track layout and infrastructure. The IC believes that an engine-driver might get into trouble due to unexpected, substantial changes in the track layout. It can lead to dangerous situations especially when the engine-driver meets these changes in extraordinary circumstances (e.g. signal box error). An engine-driver who has not been working on a given route for a prolonged period, unavoidably loses routine, and this loss of familiarity may also have a similar outcome.

The IC, in accordance with the EU directive, believes that the current regulations concerning the validity of track layout familiarity of engine-drivers should be reviewed.

Therefore the IC recommends the NTA to review – in co-operation with MÁV Zrt - the current regulations on the route knowledge of the engine drivers and make recommendations to their change accordingly. In particular, the IC suggests that a booklet which contains the major changes in the infrastructure (including the setting up of main signals) should be issued no later than the Modifications to Timetables, and that the engine-drivers shall be familiar with the information in the booklet as a precondition to work.

**BA-2009-443-5-02** The IC recommends the NTA to fully review the regulations on route knowledge including positions in which to work is subject to route knowledge, with special regard to Directive 2007/59/EC of the European Parliament and of the Council as well as Directive 18/2010. (III.12.) of the Ministry of Transport, Telecommunication and Energy in case of engine-drivers.

**BA-2009-443-5-03** In the course of the investigation, the IC established that there is no designated place at Nagylapos crossover where the locomotive crew would be able to do the couplings prescribed in Appendix 2 of Regulation E.1. The recent changes in the crossovers - in their construction and traffic controlling role - may create dangerous situations while these changes are not fully included in the current regulations. Therefore the IC recommends the NTA to review – in co-operation with MÁV Zrt - the current regulations on disabling the Unified Vigilance Warning and Train Control Device (EÉVB) in certain situations in order to clarify where exactly the EÉVB may be disabled (at places such as Nagylapos crossover).

**BA-2009-443-5-04** In the course of the investigation, the IC established that according to the current regulations, the movements inspector of Nagylapos crossover - who works on his own at the crossover - should have left the office having written the so called 'written order' and should have gone to entry signal 'B' 2200 metres away to hand out the written order to the train crew. Afterwards he should have gone back to the office to send line clear or subsidiary signal onto entry signal 'B'. The IC believes that the current regulation is unrealistic and poses further risks of more serious accidents. Therefore the IC recommends the NTA to review – in co-operation with MÁV Zrt - the rules of writing and handing out written orders with regard to Nagylapos crossover and similar places, in order to find a reasonable and feasible solution while ensuring safe railway transport.

**BA-2009-443-5-05** In the recent years during the renovation of the railway network, new crossovers have been set up with different functions and structures. In parallel, the definition of 'crossover' changed significantly when the Traffic Regulations were amended. Based on the circumstances of the occurrence, the available documents and the statements heard at the Closing Discussion, the IC concluded that these changes and the relevant rules are not obvious. Thus, the IC believes that the rules should be reviewed in order to ensure their uniform, clear interpretation as well as to enhance railway safety. Therefore the IC recommends the NTA to review the definition of crossover and the rules and procedures related to railway traffic at crossovers, with special emphasis on the different functions and modern structure of crossovers.

The IC also wishes to draw the attention of parties concerned in railway transport to the importance and thoroughness of monitoring and controlling work procedures during which special attention should be paid on complying with the relevant regulations and orders, stopping wrong practices as well as on maintaining a good level of theoretical and practical professional knowledge.

### **2009-500-5**

On 3 October 2009, passenger train no. 35412 (Bzmot335) collided with a Renault type van at LC no. AS 391 protected with warning lights between Edelény and Szendrő stations.

As a consequence of the occurrence, the driver of the van died at the site, the van burnt down and the motor coach (driver's cab) of the train also caught fire.



The IC established the following:

- The warning lights were operating normally at the time of the accident.
- The warning lights and the signposts on the road were well visible and the reduced visibility triangle (clearance) was ensured.
- The railway vehicle travelled with the permitted speed.

The IC believes that the accident was attributed to human factors in connection with the driver of the van.

#### **Factual statements directly connected to the occurrence of the accident**

The IC established the following:

- The warning lights were operating normally at the time of the accident.
- The warning lights and the signposts on the road were distinctively visible and the reduced visibility triangle (clearance) was ensured.
- The railway vehicle travelled with the permitted speed.

The IC believes that the accident was attributed to human factors in connection with the driver of the van.

#### **Safety recommendations**

Safety recommendation was not issued.

### **2009-531-5**

On 17 October 2009 at 12:10 hrs, passenger train no. 6588 collided with a car at LC AS2179 - protected with warning lights and half barriers - between Ebes and Debrecen stations. The car was torn in two and part of it was crushed underneath the locomotive. After stopping, the part of the car under the locomotive caught fire which spread onto the driver's cab of the locomotive. The driver of the car died at the site of the accident.



The IC established the following:

- The half barrier of the LC was in vertical (open) position at the time of the accident.
- Train no. 6588 had closed LC no. AS2132 between Ebes and Debrecen stations, however, it remained closed for a longer time than usual (it did not open automatically) and therefore after the timing it went into failure mode (the warning lights turned dark and the half barriers opened).
- The right track on which the train travelled was polluted. This pollution was found almost at full length of the track between Ebes and Debrecen stations, between railway sections 2096 and 2198.
- The fire brigade arrived at the accident site at 12:28 hrs, however they only started extinguishing it at 13:10 hrs (42 minutes later).
- The warning lights and the signposts on the road were well visible.
- The reduced visibility triangle (clearance) was continuously ensured from the prescribed distance.
- The Institute for Forensic Sciences examined the substances sent to them. According to the expert's opinion, the substance on the rails isolates electrically, as a consequence of which the train running on it may not be able to close the track circuit (i.e. close the LC).
- Train no. 6588 travelled with the permitted speed.
- The IC issued a safety recommendation as follows: "Having regard to the fact that the fire-extinguishing began with a significant delay (42 minutes) as the work permit was not granted on time, the IC recommends MÁV Zrt to compile a regulation - in cooperation with the Disaster Prevention - which ensures that the fires under the overhead contact lines can be extinguished as soon as possible."

The justification of the safety recommendation is that the fire-extinguishing could have begun with an even longer delay should the fire have broken out at other locations and other time.

#### **Factual statements directly connected to the occurrence of the accident**

- The IC established in the course of the site survey that there was pollution of unknown origin on the right track (both rails) on an uninterrupted line between Ebes and Debrecen stations, which formed a deposit on the wheels of the train. This substance has an isolation effect, as a consequence of which the train running on it was unable

to close the track circuit. Therefore LC AS2179 could not detect the locomotive. The barriers of the LC opened after train IC605 had run through it in opposite direction and the next road vehicle intending to cross the LC collided with train no. 6588.

- The signposts on the road indicating the level crossing nearby are intact and clean in both directions.
- Train no. 6588 did not exceed the speed limit.
- The warning lights were distinctly visible.

#### Other risk factors

The IC believes that the fact that the fire extinguishing began with a delay posed further risks and also increased the material damage.

#### Safety recommendations

**BA2009-531-5-01:** Having regard to the fact that the fire-extinguishing began with a significant delay (42 minutes) as the work permit was not granted on time, the IC recommends MÁV Zrt to compile a regulation - in cooperation with the Disaster Prevention - which ensures that the fires under the overhead contact lines can be extinguished as soon as possible.

The justification of the safety recommendation is that the fire-extinguishing could have begun with an even longer delay should the fire have broken out at other locations and other time.

#### 2009-0503-5



On 4 October 2009 at 11:29 hrs train no. 2042 collided with a tractor at an unprotected LC between Tököl and Szigetcsép stations, at railway section no. 267. As a consequence of the collision, 3 passengers of the train suffered injuries and the first and second carriages of the train sustained damage.

The IC believes that the accident was attributed to human factors. Nevertheless, taking the circumstances of the accident into consideration, the IC issued a

safety recommendation on 12 October 2009, in which it recommends the NTA to obligate the infrastructure manager to ensure the visibility at the LC pursuant to the relevant regulations.

The NTA instructed BKV Zrt on 23 November 2009 to ensure the prescribed visibility triangle, which BKV Zrt executed.

#### Factual statements directly connected to the occurrence of the accident

The required visibility (so called reduced visibility triangle) was not ensured at the LC due to the thick vegetation, as a consequence of which, the drivers of the vehicles approaching the LC were unable to see each other.

The driver of the tractor had not ascertained that it was safe to cross the LC before driving onto it.

## **Safety recommendations**

**BA2009-503-5-01A:** The IC recommends the NTA to obligate the infrastructure manager (BKV Zrt.) to ensure the visibility triangle prescribed in the regulations at the LC between Tököl and Szigetcsép stations in railway section no. 267. In case it is not feasible, the infrastructure manager should arrange for the protection of the LC.

The justification of the safety recommendation is as follows:

If neither the full nor the reduced visibility triangle is ensured at the unprotected LC in railway section no. 267, the LC does not comply with the provisions of point 26.3 g) of the Appendix of KM Decree 20/1984 (XII.27.).

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## **2009-578-5**

On 14 November 2009 at 20:02 hrs, locomotive (reg. no. V43-3313) of train no. 8216-1 collided with the rear of freight train no. 45911-2 standing on track VI at Nagykanizsa station. The collision occurred when the locomotive was looping. As a consequence of the collision, the locomotive sustained minor damage. The last wagon (31 51 536 1696-8) of the freight train - loaded with coal - also sustained damage and some of its cargo were scattered.

The engine-driver suffered injuries on his left leg. The accident can be attributed primarily to human factors.

### **Factual statements directly connected to the occurrence of the accident**

#### **The actions of the engine-driver**

- The engine-driver did not insist that he should be informed previously about which switches, routes and tracks (clear or occupied) he should go on with what speed.
- The engine-driver did not pay sufficient attention. He switched on the light in the driver's cab en route. He did not begin to decelerate immediately when noticing the freight train.

#### **The actions of the traffic staff**

- The locomotive departed from track IV through switch no. 16 without the permission of the chief movements inspector.
- The chief movements inspector ordered the route to be set for train no. 45911-2 at 19:43 hrs. The task of the staff at track VI before the departure of the freight train was to stop the prohibited shunting movements (the order to set the route is also an order to stop the prohibited shunting movements).
- The shunting route was set at track VI (transit main track) even though no permission had been given to occupy the track. By setting switch no. 16, the shunting route for the locomotive was prepared, yet the freight train was still on track VI and the exit signal was indicating line clear for it.

Although there was still 54 seconds to act, the staff at track VI did not attempt to interrupt the shunting movement towards track VI by the available means (e.g. by the loudspeaker or by notifying the foreman shunter via the chief movements inspector).

### **Other risk factors**

Although they work at different places by location, the traffic controllers and the locomotive running foremen who had the authority to act did not harmonise their work. Nor did they give unambiguous order to the chief movements inspector in time as to what locomotive would forward train no. 45911-2 until which station.

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## **Safety recommendations**

Safety recommendation was not issued.

### **2009-583-5**



On 19 November 2009 at 7:10 hrs train no. 999 collided with a car between Ikrény and Enese stations at Rábapatona stop at LC no. AS137 protected by half barriers and warning lights.

As a consequence, the driver of the car dies at the site of the accident, the car was written off and the locomotive sustained minor damage.

The IC established the following:

- The LC was in failure state at the time of the accident, i.e. the warning lights were dark and the half barriers were in open (vertical) position.
- The visibility was limited and therefore the warning lights and the road signposts could not be seen clearly.
- The full visibility triangle was ensured.
- The railway vehicle travelled with the permitted speed.
- The car drove onto the LC without decelerating.

Following the accident, the IC conducted tests at the site to check the operation of the LC.

At the request of GYSEV Zrt and Műszerautomatika Kft, LC no. AS137 was inspected in cooperation with the signal box engineering unit of GYSEV Zrt on 21 November 2009.

The IC concluded that the following factors contributed to the occurrence of the accident:

- The warning lights did not operate normally.
- Human factors related to the driver of the car.
- Limited visibility.

#### **Factual statements directly connected to the occurrence of the accident**

LC no. AS137 was in failure state at the time of the accident, i.e. the warning lights were dark and the half barriers were in open (vertical) position.

- The car drove onto the LC without decelerating, stopping and looking around. No braking marks were found.
- The road signposts indicating the LC are intact and clean in both directions.
- Train no. 999 did not exceed the speed limit.

#### **Factual statements indirectly connected to the occurrence of the accident**

The limited visibility had a significant role in the occurrence of the accident. According to the train staff, an eye-witness and the meteorologist's expert opinion, the visibility was approximately 150 metres at the time of the accident.

### Other risk factors

The IC established that the warning lights of LC AS137 had turned to failure state on ten occasions between 16 October 2009 and 19 November 2009 (when the accident happened). The traffic controllers resolved the problems (the failure state) on all occasions in compliance with the relevant regulations. Despite the recurring same fault, neither the inspection staff nor the other staff members took actions to examine the problems more thoroughly.

### Safety recommendations

Safety recommendation was not issued.

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### 2009-627-5

On 9 December 2009 freight train with two Czech locomotives (series 740) running from Ostrava to Ajka-Bauxitakodó - carrying coal - was separated at Devecser station as the rest of its route was going to be on a hilly area.

While the train was waiting for departure, its crew left it - without stopping the locomotive and locking the wagons - and went to the traffic office. As a consequence, the train broke loose (as the station is on a slight incline), split points no. 1 open and rolled towards Tüskevár station.



The crew was unable to stop the train either at the area of Devecser station or on the open track. It was eventually stopped by the movements inspector of Tüskevár station - who had been notified about the incident - with two double scotch blocks. Beforehand he arranged for train no. 905 (which was to arrive at Tüskevár) to be stopped at the neighbouring station.

The IC established the following:

- the train was not braked adequately,
- although it is not directly connected to the above, no brake test was conducted on the train,
- the crew left the train contrary to the regulations,
- the locomotive was not equipped with a train control system prescribed for this railway line,
- the vigilance warning device - on which the buttons, handles and signs were labelled in a language unknown to the engine-driver - was disabled,
- the operation licence of one of the locomotives had expired before the time of the occurrence and it was given to a different railway undertaking (not the one that operated the locomotive).

Furthermore, it is difficult or in some cases not possible for certain railway undertakings to gain knowledge about the railway line.

The IC issues safety recommendations in order to rethink/review the rules on gaining 'line-knowledge' as well as to harmonise the language of the signs on the control panels of locomotives with the language knowledge of engine-drivers.

*Factual statements directly connected to the occurrence of the accident*

The crew left the train without taking the required measures to secure the train against free run and to lock it.

The vigilance warning device of the locomotive was disabled, therefore it was unable to serve its train-stopping function when the train broke loose.

*Factual statements indirectly connected to the occurrence of the accident*

The operation licence of the traction locomotive was invalid. According to its operation licence, the assisting locomotive had no permission to run on this railway line as an assisting locomotive.

At Devecser station, the track which was chosen to park the wagons on had no safety dead-end track.

The movements inspector of Tüskevár station did not answer the phone when Devecser called, therefore he was informed about the occurrence with a delay.

Other risk factors

It is difficult for certain railway undertakings (not regularly running on the Hungarian railways) to gain knowledge about the railway lines.

The switches on the locomotive were labelled on a foreign language unknown to the crew. Nor did they have any knowledge of the functions of the switch.

**Safety recommendations**

Such occurrences can be prevented by complying with the relevant regulations. However, in order to draw attention to the importance of compliance and to the indirect causes, the IC issues the following safety recommendations:

**BA-2009-627-5-01:** As in was the case in this present occurrence there is a risk that railway vehicles do not possess valid operation licence or they do not comply with the regulations in their licence.

In order to keep a record of and control the relevant information easier, the IC recommends the NTA to summarise all restrictions and exemptions in the operation licence of railway vehicles separately and in a clear, concise manner.

This way, the essential elements of the operation licence related to traffic can be known more easily and their documentation and monitoring can be made simpler and more reliable.

**BA-2009-627-5-02:** The IC recommends the NTA and the infrastructure managers on openly accessible railway lines to create a system in order to monitor the operation licences of railway vehicles, with special emphasis on their validity, restrictions and exemptions while demanding of railway undertakings to provide the required information. .

By implementing this recommendation, it could be ensured that vehicles not in possession of valid operation licence or not complying with the conditions in their licence will not run on the railway network.

**BA-2009-627-5-03:** When railway undertakings wish to run trains on new routes, at present they can only go on journeys to get to know the route on the trains of their competitors.

Another possibility is to request another member of staff to go with them, however, the infrastructure manager has no obligation to grant such requests.

Therefore, the IC recommends the NTA to review the relevant regulations as to whether or not it is ensured for all railway undertakings without discrimination that locomotive crews can gain knowledge of the routes or may request assisting staff. If necessary, the relevant regulations should be amended accordingly.

By implementing this recommendation, it could be ensured that the staff of every railway undertaking is able to gain knowledge of the railway lines/routes.

**BA-2009-627-5-04:** The IC has found in the course of the investigation that the locomotive crew did not know the functions of the switches on the locomotive adequately, therefore - despite previous trainings - they were not sure how to operate them.

Therefore the IC recommends the NTA to obligate railway undertakings to provide traction vehicle staff with standard, concise 'type'-documents which include the essential safety information and handling/operation rules in a language known to the staff. Engine-drivers should have the opportunity to get to know these documents. A

By implementing this recommendation, there would be less chance that crews make mistakes and the gained knowledge can be applied with more confidence and more accuracy.

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### **2009-052-5**



On 4<sup>th</sup> February 2009 at 8 hours 45 minutes, the fifth wagon (reg. no. 33 87 787 6849-3) of train no 45213 running from Slovakia derailed with 4 axles on track X while approaching Rajka station. As a consequence of the derailment, the rail track and the derailed wagon sustained minor damage.

The IC conducted a site survey on 4<sup>th</sup> February 2009, during which it examined track X and found major track gauge deficiencies.

The IC believes that the reason behind the accident was the worn-out state of track X and the fact that the gauge was much wider than prescribed in the regulations. Furthermore, the wheel load of the derailed wagon slightly exceeded the prescribed value, which also increased the chance of the accident.

#### **Factual statements directly connected to the occurrence of the accident**

The value of the gauge width of track X significantly exceeded the prescribed value.

#### **Safety recommendations**

The IC does not consider it necessary to issue safety recommendations as the relevant rail track inspectorate revealed and highlighted the deficiencies. Such accidents can only be avoided if rail tracks in such bad conditions are reconstructed or closed off from traffic.

**2010-018-5**

On 9 January 2010 at 09:46 hrs, train no. IC536 collided with a car at LC SR1 of Ludas station. The LC is equipped with half barriers and warning lights which were operating normally at the time of the accident.

As a consequence of the occurrence, the driver and one passenger of the car died at the site and the other passenger lost his life in hospital. The car was written off and the locomotive sustained damage. No one was injured on the train.

The IC established the following:

- The warning lights were operating normally at the time of the accident.
- The warning lights and the road signposts were clearly visible.
- The reduced visibility triangle was ensured from the direction of the car towards the direction of the train.
- The railway vehicle travelled with the permitted speed.
- The car drove onto the LC disregarding the closed - horizontal - position of the half barriers (drove round them).

The police impounded the locomotive for the duration of the strip chart recorder being evaluated.

The IC attributed the accident to human factors in connection with the driver of the car.

**Factual statements directly connected to the occurrence of the accident**

The car drove onto the LC disregarding the closed - horizontal - position of the half barriers (drove round them), therefore the accident can be attributed to human factors in connection with the driver of the car.

- LC SR1 was operating normally at the time of the accident
- The signposts on the road indicating the level crossing nearby are intact and clean in both directions.
- Train no. IC536 did not exceed the speed limit.

**Safety recommendations**

Safety recommendation was not issued.

**2010-069-5**

On 9 February 2010 at 08:27 hrs, 2010, one carriage (the penultimate) of train no. 2759 derailed with four axles between points no. 13 and 19 when approaching track XIV of Budapest-Nyugati station.

The IC conducted a site survey after the occurrence.

The IC established that the track gauge where the train derailed was faulty. The direct causes of the derailment were as follows:

- the track was overused and had been worn away; the gauge was significantly broader than prescribed
- the previously installed gauge stabilizer was broken.

The required resources to maintain the rail track were not provided by the infrastructure manager and this led to the occurrence of the accident. Furthermore, not only the resources are scarce but due to the inadequate organisation of work the usage of the resources is less efficient. Nonetheless, the railway undertaking has an operation licence (whose granting is subject to the above preconditions i.e. sufficient resources, their efficient allocation and good organisation of work).

Therefore the IC issues a safety recommendation in order to improve supervision in the procedure of granting operation licences.

*Factual statements directly connected to the occurrence of the accident*

Excess gauge width was found at the location of the derailment, at which it is unsafe to maintain railway traffic. The previously installed gauge stabilizer was broken, which also contributed to the gauge widening.

The rail track is in very bad condition at this part of the station, therefore a 20 km/h speed limit had been introduced

*Factual statements indirectly connected to the occurrence of the accident*

The resources (human and material) at the disposal of the infrastructure manager are insufficient to maintain the rail tracks as prescribed.

The work organisation (of contractors) does not ensure that the tasks are performed professionally and at the right time.

**Safety recommendations**

**BA-2010-069-5-01:** The experiences of the investigation indicate that the available resources are insufficient to maintain the rail tracks and their fittings at the required quality. Furthermore, the current way of work organisation does not ensure the adequate, fast and professional usage of the resources available while the operation licence of the infrastructure manager states the opposite.

Therefore the IC recommends the National Transport Authority to review whether or not the required resources are provided for the infrastructure manager - in harmony with the operation licence - and whether the way they use the resources fulfils the safety requirements at the location of the accident (financial and professional suitability).

This way - with the adequate work organisation and usage of the resources - safe railway traffic would be ensured at this part of the railway network as prescribed in the operation licence.

**2010-085-5**

On 17 February 2010 at 9:50 hrs, the motor coach (reg. no. 6341 019-5) of train no. 7807-2 collided with a car at LC no. AS72 - protected with warning light - at Kővágóér stop between Kiskunfélegyháza and Galambos stations.

As a consequence of the accident, two passengers of the car lost their lives. The motor coach sustained minor damage but remained operable. The car was written off.

The rail track was closed until 11:40 hrs. One train service was partially cancelled and further two trains were delayed by altogether 97 minutes.



The IC conducted a site survey on 17 February 2010 during which it took photographs and examined the LC. The IC received the statement of an eye-witness from the competent police as well as the operation register of the LC from the VBO, the report compiled by the signal box engineering unit and the strip chart recorder of the motor coach which the IC used when compiling the final report on the investigation of the accident.

The IC established in the course of the investigation that the warning lights were indicating flashing red light signal towards the road at the time of the accident. The construction and design of the IC complies with the relevant regulations in force. The train did not exceed the speed limit.

The IC believes that the accident can be attributed to human factors in connection with the driver of the car.

**Factual statements directly connected to the occurrence of the accident**

The car drove onto the LC disregarding the flashing red signal of the warning lights, therefore the accident can be attributed to human factors in connection with the driver of the car.

**Factual statements indirectly connected to the occurrence of the accident**

The attention of the driver might have dulled due to monotony and then when approaching the LC he suddenly had to do two more complicated countermeasures.

**Other risk factors**

The visibility and attention-drawing effect of signposts such as the one at LC no. AS72 is smaller than the signposts normally used at other LCs (i.e. signposts repeatedly pre-indicating the nearby LC and using more intensive optical effects so as the road vehicles can be aware of the LC from a longer distance).

**Safety recommendations**

Safety recommendation was not issued.

### **2010-122-5**

On 10 March 2010 at 14:20 hrs, passenger train no. 6615 (arriving from Fűzesabony) collided with a car (arriving from Balmazújváros and turning right, onto the LC) at LC AS21 protected with warning lights between Tócsövölgy and Balmazújváros stations, on railway line no. 108.

The passenger of the car died at the site and the driver was taken to hospital with serious injuries. As a consequence of the collision, the locomotive (M41-2133) sustained minor, and the car sustained substantial damage.

The warning lights of LC AS41 operated normally at the time of the accident; they indicated 'Stop' towards the road. The car drove onto the LC disregarding the Stop signal, where it collided with the passenger train. Train no. 6615 did not exceed the speed limit.



The IC conducted a site survey immediately after the accident and examined the site on a number of occasions afterwards as well. In the course of the investigation, the IC examined the construction and design of LC assuming that it might have had an indirect effect on the occurrence of the accident. The IC considered the accidents previously occurred at this LC as well as the effects of the measures taken by the relevant authorities. It also emphasised the deficiencies of the construction and design of the junctions at the LC causing recurring accidents.

After the recurring accidents at the location, the TSB conducted technical investigations in 2007 and in 2008 and issued safety recommendations suggesting immediate preventive actions in order to increase safety at the LC. It recommended examining whether the protection of the LC is sufficient and whether or not it would be advisable to introduce a traffic system on the road in harmony with the operation of the LC. In order to implement the safety recommendation, the TSB negotiated with the organisations involved in the maintenance and operation of the railway management. TSB did not participate in the site-surveys carried out by the relevant authority as it was not informed about them. However, TSB requested and studied the reports and decisions of the authority.

During this present investigation, the IC considered it necessary to issue a safety recommendation.

#### **Factual statements directly connected to the occurrence of the accident**

Based on the findings of the site survey and of the available data, the IC concluded that the warning lights of LC AS41 were operating normally at the time of the accident - they indicated Stop towards the road.

The car drove onto the LC disregarding the Stop signal and collided with the passenger train.

#### **Factual statements indirectly connected to the occurrence of the accident**

The present setting of the LC may cause a dangerous traffic situation when road vehicles drive past the signpost indicating the nearby LC and gradually approach the LC concentrating on the turning manoeuvre and may not notice the warning lights on the other side of the road (in 25-metre-distance) due to another larger vehicle turning and thus hindering visibility.



In the knowledge of the facts, it can be established that the construction of the intersection at LC AS41 (Házgyári bejáró út – main road no. 33. Fűzesabony - Debrecen) makes crossing the LC dangerous at times. Non-compliance with the regulations on placing warning lights also increases risk when intending to cross the LC.

Other risk factors

- The reduced visibility triangle from the industrial estate towards Debrecen is not ensured; it is hindered by hoardings. (In its resolution no. EA/KA/NS/A/2417/6/2010, the NTA ordered the Regional Centre of MÁV Zrt. Infrastructure Management to remove them.)
- The yellow dotted line painted on the road indicating a dangerous place had faded, thus it cannot serve its function. Therefore the NTA obligated the City Management Department of Debrecen City Hall to repaint the area (resolution no. EA/KA/NS/A/2417/6/2010).

**Safety recommendations**

**BA2010-0122-5-01:** The IC recommends the NTA to obligate the infrastructure manager supplement LC no. AS41 with another warning light (similar to warning lights ‘a’) so that the light signal is visible to vehicles arriving to the LC from Balmazújváros direction as well. The justification of the safety recommendation is that the position warning lights at the LC at present is not satisfactory from transport safety aspects as it is not visible to vehicles arriving to the LC from Balmazújváros direction.

The IC expects from the implementation of the above recommendation that it will be safer to cross the LC. The IC also maintains its statements in safety recommendation AM2008-0191-5-01 issued as part of Final Report 2007-0323-5 earlier that a good solution would be to harmonise the operation of the LC with the operation of the road signals.

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## **2010-0190-5**



On 29 April 2010 at 12:40 hrs, train no. 37015 collided with a car at an unprotected LC between Makó and Apátfalva stations, in railway section no. 795+76. As a consequence of the accident, the driver and the passenger of the car suffered serious head injuries and they were taken to hospital in Szeged by an ambulance helicopter. No one was injured on the train. The train was delayed by 128 minutes.

The IC conducted a site survey on 29 April 2010, during of which it took photographs, collected the necessary documents available at the site and examined the construction of the LC.

The IC established the following in the course of the site survey:

- The signposts: “Beginning of level crossing”, “Stop! Give way!” are only visible from the road from a 30-50 metre distance.
- No signpost indicating danger - level crossing nearby - was found before the LC.
- There are no distant signposts on the road indicating the nearby LC
  - The “Beginning of level crossing” signpost is not repeated on the left side of the road despite the fact that the signpost on the right side is not continuously visible to the road vehicles within 100 metres before the LC.

The IC informed the NTA on the above conclusions in a safety recommendation suggesting immediate preventive actions on 6 May 2010.

Train no. 37015 travelled with the permitted speed. The IC believes that the engine-driver did his utmost to avoid the collision.

In the view of the IC, the driver of the car drove into the LC without sufficient attention and caution. He was unable to cross the LC before the approach of the train, which resulted in the collision of the vehicles.

### **Factual statements directly connected to the occurrence of the accident**

Based on the findings of the site-survey as well as on the evaluation and analysis of the obtained documents and the available photographs, the IC established the following:

- The driver of the car started decelerating with a delay before the LC - the IC believes that he did so after the acoustic warning signal given by the train. As a consequence, the car drove into the clearance area, resulting in the collision of the two vehicles.
- The indication (signposting) of the LC towards the road vehicles do not comply with the regulations of Decree 83/2004. (VI. 4.) GKM on the planning, application and placing of signposts.

- The signposting of the unprotected LC on Újszeged - Kétegyháza railway line between Makó and Apátfalva stations in railway section no.795+76 towards the approaching trains is adequate and is in compliance with the relevant regulations.
- The visibility to the road vehicles arriving to the LC is not hindered by the vegetation or the built environment. The reduced visibility triangle is ensured from the road.
- Train no. 37015 travelled with the permitted speed. The IC believes that the engine-driver did his utmost to avoid the collision.

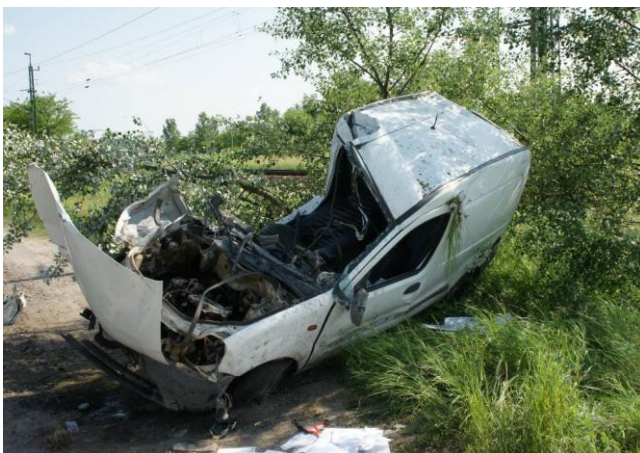
### **Safety recommendations**

**BA2010-190-5-01A:** The IC recommends the NTA to examine the construction of the LC between Makó and Apátfalva stations in railway section no. 795+76; the visibility and adequacy of the signposts on the road before the LC and take the necessary actions after the completion of the examination.

The justification of the safety recommendation is that the signposting of the LC in Apátfalva is not adequate.

(According to the information available to the IC, a similar accident occurred at the same location on 5 April 2010 when train no. 37030 collided with a car. There were no injuries then.)

### **2010-229-5**



On 25 May 2010 at 14:00, the locomotive (reg. no. V 43-1128) of train IC 704 collided with a car at LC SR2 - protected with warning lights - at Szatymaz station.

As a consequence of the accident, the two passengers of the car died at the site. The locomotive sustained minor damage, however, it became inoperative. The car was damaged beyond repair.

The rail track was closed off traffic until 15:55 hrs. The passengers of a passenger train were transported by a replacement bus service. Further even trains were delayed by altogether 682 minutes and a freight train by 116 minutes.

The IC established in the course of the investigation that the warning lights were indicating flashing red signals towards the road. The construction of the LC complies with the relevant regulations in force (however, a single-track distance signal was missing). The train did not exceed the speed limit.

According to the findings of the IC, the accident can be attributed to human factors in connection with the driver of the car.

#### **Factual statements directly connected to the occurrence of the accident**

The car drove into the LC regardless of the flashing red lights, therefore the accident can be attributed to human factors in connection with the driver of the car.

#### **Factual statements indirectly connected to the occurrence of the accident**

Due to the monotony, the attention of the car driver may have withered and then when turning, he suddenly had to do more complicated manoeuvres.

### Other risk factors

If and when the signals of the LC are defective, their attention-drawing function decreases and there is not enough information for the drivers to avoid the accident in time.

### Safety recommendations

Safety recommendation was not issued.

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### 2010-0304-5



On 16 July 2010 at 10:25 hrs, train no. 35045 collided with a car at LC AS13 between Nyékládháza and Hejőkeresztúr stations. The LC is protected by warning lights which were operating normally at the time of the accident. As a consequence of the collision, the driver of the car lost his life at the site, his passenger suffered minor injuries. Two trains were cancelled and one train was delayed by 35 minutes.

Train no. 35045 travelled with the permitted speed. The IC believes that the engine-driver did his utmost to avoid the collision.

In the course of the investigation, the IC established the following:

- There is a signpost on road no. 3307 pre-indicating the nearby LC.
- The signposts on road no. 3307 pre-indicating the nearby LC are inadequate.
- The reduced visibility triangle towards the rail track (for road vehicles approaching the LC) is not ensured.
- It is difficult to see the signals of the warning lights from the direction the car was approaching the LC.

Taking the above findings into consideration, the IC issued safety recommendations.

The IC believes that the car driver drove into the LC without sufficient attention and caution. He was unable to cross the LC in time before the train would reach the LC and thus the two vehicles collided.

### Factual statements directly connected to the occurrence of the accident

Based on the findings of the site-survey, the obtained documents and the evaluation and analysis of the available photographs, the IC concluded the following:

- Train no. 35045 travelled with the permitted speed. The engine-driver did his utmost to avoid the collision.
- The car driver drove into the LC without sufficient attention and caution. He disregarded the Stop signal of the warning lights and was unable to finish crossing the LC in time, which resulted in the collision of the two vehicles.

*Factual statements indirectly connected to the occurrence of the accident*

It is difficult to see the signals of the warning lights from the road. The reduced visibility triangle from the car's direction towards the rail track is not ensured due to the height and thickness of the vegetation. The vegetation significantly hinders visibility.

*Other risk factors*

The indication (signposting) of LC AS13 on the road is not unambiguous. On the signpost (after the junction, before the LC) indicating 'LC with warning lights, without barriers nearby' not the distance of the LC is indicated but the width limit (8m) for vehicles wishing to cross the LC.

**Safety recommendations**

**BA2010-304-5-01:** The IC established in the course of the investigation that the visibility of the warning lights of the LC between Nyékládháza and Hejőkeresztúr stations in railway section no. 13+75 is different from each direction. It is particularly difficult to see the signals from the direction where the car was arriving to the LC.

Therefore the IC recommends the NTA to examine the construction of the LC between Nyékládháza and Hejőkeresztúr stations in railway section no. 13+75, with special emphasis on the visibility of the warning lights, and take the necessary actions after the completion of the examination.

By implementing the recommendation, the visibility of the warning lights would be ensured and thus the risk of accidents would be reduced.

**BA2010-304-5-02:** The IC established in the course of the investigation that the so called visibility triangle is not ensured due to the height and thickness of the vegetation at the LC.

Therefore the IC recommends the NTA to examine the LC, with special emphasis on the visibility triangle, and take the necessary actions after the completion of the examination.

By ensuring the required visibility triangle, both the railway and road vehicles would clearly see the LC, which reduces the risk of further accidents.

**BA2010-304-5-03:** The IC established in the course of the investigation that on the signpost (after the junction) indicating 'LC with warning lights, without barriers nearby' not the distance of the LC is indicated but the width limit (8m) for vehicles wishing to cross the LC. Furthermore, the similar signpost located in the opposite direction is also faulty (the train on the signpost is facing the opposite direction).

Therefore the IC recommends the NTA to examine the signposting of the LC on the road, and take the necessary actions after the completion of the examination.

By implementing the recommendation, the LC would be clearly and adequately signposted for road vehicles.

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## **2010-354-5**



Train no. 9235 collided with a motorbike at LC AS386 (protected with warning lights) between Pápa and Vaszar stations.

As a consequence of the accident, the motorcyclist lost his life at the site. The train sustained damage but remained operative. The motorbike sustained minor damage.

The rail track was closed off traffic until 17:13 hrs.

The IC examined the construction and the operation of the LC.

The IC established in the course of the investigation that the warning lights were indicating flashing red lights towards the road at the time of the accident. The train did not exceed the speed limit.

The IC believes that the accident can be attributed to human factors in connection with the driver of the car.

The IC established that the reduced visibility triangle is not ensured from either directions due to the overgrown trees and bushes. (However, the lack of the visibility triangle did not influence the motorcyclist in observing the signals of the warning lights; therefore it was not the direct cause of the accident.)

Taking the above findings into consideration, the IC issued safety recommendations.

### *Factual statements directly connected to the occurrence of the accident*

The motorcyclist drove into the LC disregarding the flashing red signal of the warning lights. Therefore the accident can be attributed to human factors in connection with the driver of the car.

### *Other risk factors*

The reduced visibility triangle at the LC was not ensured due to the thick vegetation.

### **Safety recommendations**

**BA2010-354-5-01:** The IC recommends the NTA to obligate the infrastructure manager (MÁV Zrt.) to ensure the reduced visibility triangle (which is not ensured at present due to the thick vegetation) at LC no. AS386 between Pápa and Vaszar stations.

The justification of the safety recommendation is that neither the reduced nor the full visibility triangle is ensured at present at the LC in railway section no. 386, which creates risks in both road and railway transport as the vehicles cannot always see each other

### 3.5 Other recommendations

**On two further occasions, TSB issued 3 safety recommendations suggesting immediate preventive actions before the completion of the investigation, based on the initial findings.** Two recommendations have been implemented by the addressee. The third recommendation was accepted, its implementation is in progress.

**BA-2010-190-5-01A:** The IC recommends the NTA to examine the construction of the LC between Makó and Apátfalva stations in railway section no. 795+76; the visibility and adequacy of the signposts on the road before the LC and take the necessary actions after the completion of the examination.

The justification of the safety recommendation is that the signposting of the LC in Apátfalva - to vehicles coming from the road - is not adequate.

Accepted, implemented

**BA-2010-490-5-01A:** The IC established in the course of the site survey that the signals of the warning lights of the LC between Kiskunlacháza and Délegyháza stations in railway section no. 322+95 is difficult to see from the direction the lorry was arriving to the LC.

Therefore the IC recommends the NTA to examine the LC, including the visibility of the warning lights with special emphasis on heavy lorries which take up most of the traffic at the LC, and take the necessary actions.

By implementing the recommendation, it would be ensured that the signals of the warning lights are visible for a longer time and from a longer distance and therefore the drivers would be able to choose a more optimal place to start decelerating and stop before the LC.

Accepted, implementation in progress

**BA-2010-490-5-02A:** The IC established in the course of the site survey that the reduced visibility triangle at the LC between Kiskunlacháza and Délegyháza stations in railway section no. 322+95 is not ensured from more than one direction due to the height and thickness of the vegetation.

Therefore the IC recommends the NTA to examine the LC with particular attention to the reduced visibility triangles, and take the necessary actions.

By ensuring the reduced visibility triangles, both the road and the railway vehicles arriving at the LC would be able to see each other, thus the risk of accidents would be reduced.

Accepted, implemented

### 3.6 Experiences of the technical investigations

The Railway Department has been in operation since March 2006. Based on the experience that have been gathered since then, the following observations can be made:

- Similarly to the previous years, a typical cause of the occurrences is **human factors** (this trend is the same in other branches of transport - aviation and marine - in which TSB conducts investigations). Among the technical causes, track deficiencies are still dominant. Other causes were faults in vehicles, questions of visibility, adequate signposting and insufficient design of LCs.
- In 2010, trains were at risk but the occurrences had no consequence on 13 occasions - one more than in 2009. Such occurrences were **SPADs**, trains running on the same track in opposing direction and signalling trains to already occupied tracks. These kinds of incidents carry the possibility of more serious consequences; therefore more attention should be drawn to them. The main cause of these incidents is human factors, which highlights the acute need to use modern signal boxes and train control systems. These developments cannot always be executed - due to financial difficulties - and are not done parallel with track reconstruction. Furthermore, railway staff should be well-prepared to deal with unexpected situations in which the signal box fails and the traffic has to be controlled very differently from the normal practice.
- On two occasions, TSB initiated investigation and issued safety recommendation in connection with newly built or reconstructed rail tracks and signal boxes. Both investigations commenced related to SPADs and further findings lead to the safety recommendations.
  - On 5 September 2009 at 09:23 hrs, train no. IC 75-2 passed entry signal 'B' at danger at Nagylapos crossover and approached the track of Nagylapos station on which train no. 7442 was standing. The main causes of the accident are as follows:
    - Train no. IC 75-2 passed entry signal 'B' at danger at Nagylapos crossover without permission.
    - The Unified Vigilance Warning and Train Control Device (EÉVB) of the locomotive of train no. IC75-2 was not switched off at the place prescribed in the regulations. Therefore the switched off EÉVB was unable to perform its safety function (i.e. to stop the train). As a result, the train passed a block signal and the entry signal of Nagylapos crossover with high speed.
    - The 'look-out service' i.e. a second person on board the locomotive ordered at Mezőtúr station could not prevent the accident. (This occurrence draws the attention to the importance of human factors when travelling under less safe circumstances.)
    - Having passed the entry signal, the staff did not act as prescribed in the regulation, but they continued their way and followed behind the train standing in the block section.
    - This was the first occasion the engine-driver of train no. IC 75-2 had driven a train after the section had been reconstructed. Nor had the engine-driver driven a train in this section (of railway line no. 120) in the time period when the engine-drivers were informed about the changes.



- Based on the information available to the IC, there is no designated place in the area of the crossover where the EÉVB can be switched off according to Regulation E.1. Thus the engine-driver would not have been able to switch the EÉVB off as prescribed.
- The current regulations with regard to giving written orders at Nagylapos crossover are unrealistic and practically impossible to execute. Compliance with them creates significant disruptions in railway traffic. The current regulations themselves carry the risk of more serious accidents to occur.
- Having evaluated the available data and information, the IC issued the following safety recommendations to the NTA:
  - The IC recommends the NTA to review – in co-operation with MÁV Zrt - the current regulations on the route knowledge of the engine drivers and make recommendations to their change accordingly. In particular, the IC suggests that a booklet which contains the major changes in the infrastructure (including the setting up of main signals) should be issued no later than the Modifications to Timetables, and that the engine-drivers shall be familiar with the information in the booklet as a precondition to work.
  - The IC recommends the NTA to fully review the regulations on route knowledge including positions in which to work is subject to route knowledge, with special regard to Directive 2007/59/EC of the European Parliament and of the Council as well as Directive 18/2010. (III.12.) of the Ministry of Transport, Telecommunication and Energy in case of engine-drivers.
  - The IC recommends the NTA to review – in co-operation with MÁV Zrt - the current regulations on disabling the Unified Vigilance Warning and Train Control Device (EÉVB) in certain situations in order to clarify where exactly the EÉVB may be disabled (at places such as Nagylapos crossover).
  - The IC recommends the NTA to review – in co-operation with MÁV Zrt - the rules of writing and handing out written orders with regard to Nagylapos crossover and similar places, in order to find a reasonable and feasible solution while ensuring safe railway transport.
  - The IC recommends the NTA to review the definition of crossover and the rules and procedures related to railway traffic at crossovers, with special emphasis on the different functions and modern structure of crossovers.
- On 11 February 2010 at 12:15 hrs, train no. 1247 passed YH signal at danger between Andrásida and Zalaegerszeg stations. Its locomotive and first carriage passed LC SR4 - equipped with warning lights and half barriers - which was in open position. No one was injured.
- Having evaluated the available data and information, the IC recommended the following to the NTA:
  - to review the signals given by the entry signal of the station with special regard to permitted speed and 'line clear' signals,
  - to harmonise the regulations in force with regard to speed limits on the railways,
  - to eliminate the deficiencies of regulations in F.1. Regulations regarding pre-signals and to harmonise these regulations with the actual practice,

- and to review 'Andráshidai elágazás' as a junction and as a station as well as the related traffic regulations.
- With regard to the elimination of problems revealed by the technical investigations, to the implementation of recommendations into the regulations as well as to the creation of a clear and unambiguous regulatory system, the problem in Hungary is that despite the EU expectations, **there are no national railway safety and railway traffic rules** at present. The authorisation to create such system and rules can be found in the law on railway transport; however the actual rules have not been compiled yet. In practice, this means that the transport authority is still not the organisation which prepares the rules, it only approves them. As a result, the NTA responded to several safety recommendations of the TSB saying that they agree with the recommendations but they have no possibility to implement them. The organisation dealing with the regulations and prepares their amendments is one of the railway undertakings which should be the obligant of these regulations.
- **International cooperation** has become more common in the investigation of railway accidents. TSB provides and receives assistance in the investigation of accidents in which the railway vehicles, their maintenance company, the staff, the railway undertaking or the location of the occurrence are in different countries. The cooperation provides a lot of new opportunities during the investigations, however it creates challenges as well, primarily in language knowledge aspects.

### 3.7 International cooperation

In 2010, the international practice was no different from the previous years, namely that the investigating bodies contact each other in relation to concrete accidents when more members states are concerned (from the operator's, manufacturer's, maintenance's side or staff, etc), Such was the cooperation between TSB and the Austrian and Romanian investigating body in 2010 when the latter organisation requested information from TSB for the investigation of accidents occurred at border stations as well as requesting assistance to site surveys.

Participation in technical investigations upon request from foreign investigating organisations:

Date of accident	Location of accident	Reason of cooperation
16. 06. 2010	Austria - Braz	The inspection of the coupling of twin-wagons took place in Hungary for practical reasons.
11. 08. 2010	Romania - Curtici	A Hungarian locomotive collided with a Romanian train at border station; therefore a joint investigation was conducted.

The TSB continued to participate actively in the work of the European Railway Agency (ERA) in 2010. The cooperation within the ERA extends to the compiling of methodology guidelines as well as to the development and operation of data collecting systems. The cooperation with the ERA (with its costs covered by the EU) offers the opportunity for KBSZ to participate in compiling the methodologies relevant to future activities in the railway sector. This way KBSZ can not only learn the system at first hand, but there is also a chance to enforce interests arising from national specialities in this field. Furthermore, we can also learn from the good practices of other Member States.

Outside of the ERA, some of the European investigating bodies (e.g. Germany, Austria, Switzerland, Czech Republic, Holland, Luxemburg, Denmark, Estonia etc) established a regional cooperation forum in whose work the TSB also participates.

Within the framework of this forum, - besides discussing local problems and making recommendations towards the ERA - there is an opportunity to learn about the investigation procedure of certain accidents and gain experience in the investigation of various types of rarely occurring occurrences.

#### 4. SUMMARY OF RECOMMENDATIONS

By 2010, the practice that the addressee of the safety recommendations should primarily be the National Transport Authority has become a routine. TSB deviates from this practice only when it issues safety recommendations to organisations which are not under the scope of authority of the NTA. This way it could be achieved that when the addressee of the recommendation is a railway undertaking, the response does not come from the addressee itself for which the implementation would involve considerable work and/or financial sources but an outside, impartial professional organisation would respond to the recommendation. The other advantage is that when the recommendation suggests eliminating conditions/factors that are unlawful or pose risks to transport safety, the NTA has the possibility to oblige the relevant parties with deadlines to take action, which would increase efficiency in the implementation of recommendations.

In 2010, the Railway Department of TSB closed the investigation of 26 occurrences with final report and issued 18 safety recommendations to 9 occurrences.

**On two further occasions, TSB issued 3 safety recommendations suggesting immediate preventive actions before the completion of the investigation, based on the initial findings.** Two recommendations have been implemented by the addressee. The third recommendation was accepted, its implementation is in progress.

##### Summary of responses to safety recommendations issued in 2007-2009

	2007	2008	2009	2010
Accepted and implemented	4	15	11	3
Accepted and partially implemented	2	2	-	-
Accepted, implementation in progress	7	3	7	17
Accepted, no information on implementation	-	3	-	-
Rejected	2	4	3	1
No answer	-	1	3	-

Reasons for rejection of safety recommendations issued in 2009 included: no scope of authority, the addressee is solving the problem by other methods/solutions.

There was one safety recommendation in 2010 with which the addressee did not agree and wished to solve the problem differently.

3.4 contains a detailed list of the issued safety recommendations.