



KÖZLEKEDÉSBIZTONSÁGI  
SZERVEZET

TRANSPORTATION SAFETY  
BUREAU

# **ANNUAL REPORT 2007**

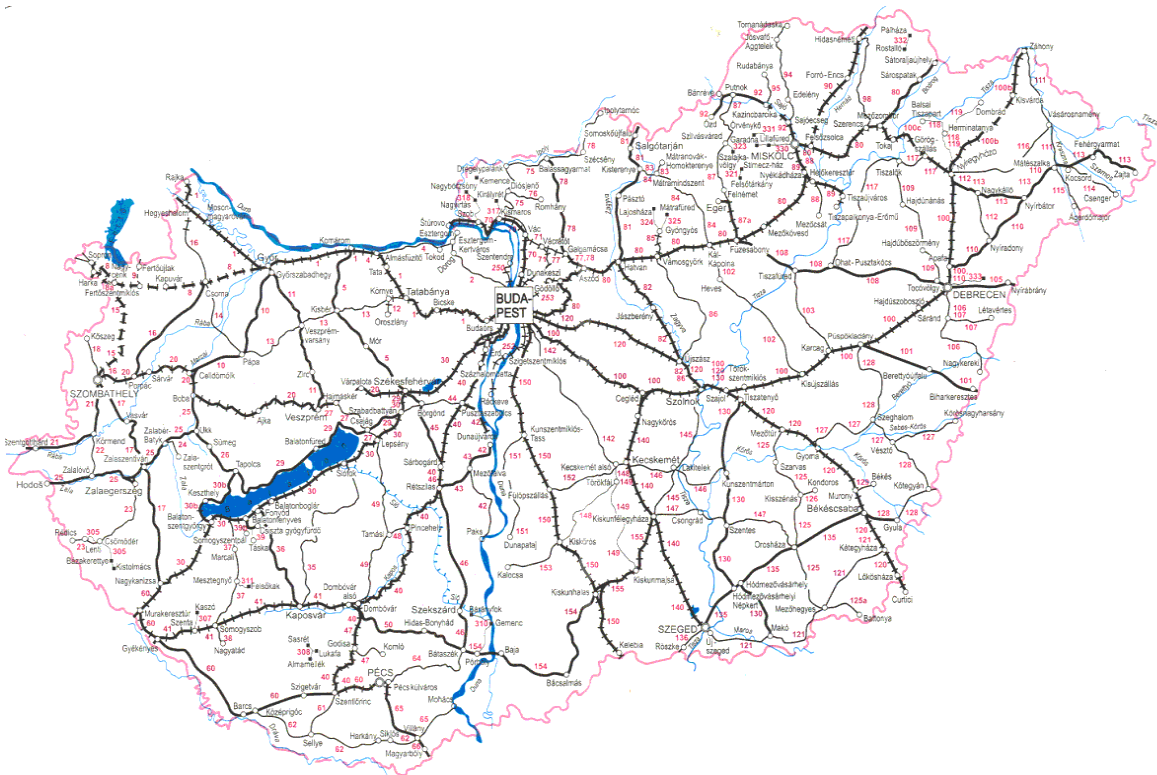
## **Transportation Safety Bureau Hungary**



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## Main characteristics of rail transport in Hungary



### Characteristics of the railway lines of Hungary

|  |                |
|--|----------------|
| Main lines   | 5200 km        |
| Secondary lines  | 2700 km        |
| Other lines  | 400 km         |
| <b>Total</b>   | <b>8300 km</b> |
| Electrified lines (out of total)   | 2800 km        |
| Lines equipped with track condition and occupancy detection (out of total) | 2178 km        |
| Number of protected level crossings  | 2846           |
| Total number of level crossings  | 5981           |

## 1. 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 2007 was the first full year of its operation. The number of reports increased in leaps and bounds as the operators and authorities became acquainted with the activity of TSB and relations were established.

In 2007, there was one occurrence (serious accident) on the railways which the Railway Department of TSB was obliged to investigate pursuant to the regulations.

In addition to the above mentioned occurrence, TSB decided at its own discretion to conduct independent technical investigation into 11 further occurrences.

The Railway Department of TSB issued its first final reports in 2007.

During year 2007, TSB issued 15 safety recommendations regarding 7 commenced investigations. The majority of these recommendations were accepted by the addressees.

A unified transport authority was established in Hungary in 2007 (National Transport Authority), which is a favourable change from transport safety point of view. The administration of all branches of transport - including the railways - is now under one organisation which makes cooperation between the TSB and the NTA easier.

| Abbreviations |   |
|---------------|---|
| CASB          | Civil Aviation Safety Bureau  |
| IC            | Investigating Committee   |
| LC            | Level crossing  |
| Máv Zrt.      | Hungarian State Railways Plc.   |
| NTA           | National Transport Authority (the National Safety Authority of Hungary) |
| TSB           | Transportation Safety Bureau  |

## **2. INTRODUCTION**

### **2.1 Introduction to the report**

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 2007 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 circumstances of the establishment of TSB,
- 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.

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

#### **2.2.1 Change in the supervisory authority**

A unified transport authority was established in Hungary in 2007 (National Transport Authority), which is a favourable change from transport safety point of view. The administration of all branches of transport - including the railways - is now under one organisation which makes cooperation between the TSB and the NTA easier.

Within this organisational framework, the National Transport Authority supervises the other branches of transport as well, thus problems concerning more than one branch (e.g. safety questions of level crossings) can be tackled more easily.

Another positive change is that the NSA established a separate department in 2007 to perform the required controlling tasks. However, the effects of this change have been visible only since the beginning of 2008 as this is when the new department began its work.

#### **2.2.2 Changes in the market of rail transport**

During year 2007, after the separation of the forwarding branch, the passenger transportation also separated from the former national railway company MÁV Zrt. 2007. It remains under the proprietorship of MÁV but operates as an independent organisation under the name of MÁV Start Zrt. However, MÁV Zrt. has not yet become a purely infrastructure managing organisation; it continues to be an integrated railway undertaking.

#### **2.2.3 Changes in railway safety**

In the course of the investigations, TSB has experienced several times that there was a significant number of accidents which could have been prevented by certain investments (e.g. installation of more up-to-date automatic door systems, modernisation of signal boxes where the traffic situation requires to do so, improvement of the infrastructure, reconstruction of old rail tracks, etc.) The necessity of these investments has been recognised by the profession and the investments have been initiated, however, the progress is slow due to their costliness and the lack

of financial sources. Thanks to the EU resources to be received, these developments are likely to accelerate in the near future.

## 2.2.4 Reports

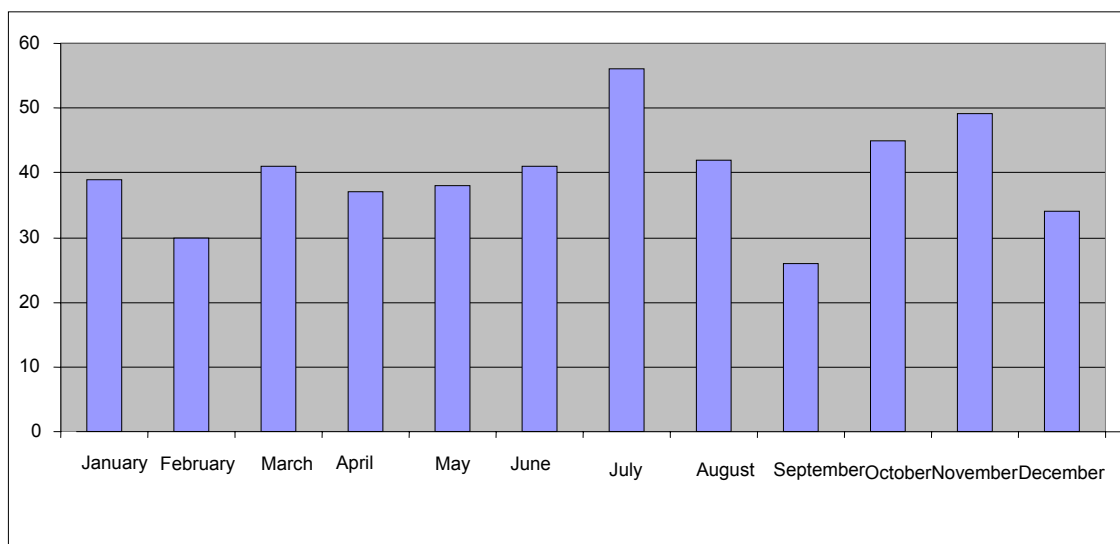
The number of reports on railway occurrences increased significantly in 2007. Having acquainted with the activities of TSB and having established professional relations, a reporting routine was developed which reflected the actual number of occurrences. 2006 was the year of introducing a new system and establishing relations within the profession. The changes in the number of reports received by TSB cannot be associated with the changes of railway safety in Hungary. (The tendencies are similar in the other two branches of transport.)

### Number of reported occurrences

| Reported occurrences  | CASB (predecessor) |      |      |      | TSB  |      |
|-----------------------|--------------------|------|------|------|------|------|
|                       | 2002               | 2003 | 2004 | 2005 | 2006 | 2007 |
| Aviation              | 216                | 277  | 333  | 295  | 437  | 493  |
| Railway<br>01.03.2006 |                    |      |      |      | 178  | 478  |
| Marine<br>01.03.2006  |                    |      |      |      | 65   | 73   |

Compared to the previous year, TSB received the reports on occurrences quicker and more regularly. The total number of reported occurrences in 2007 as well as the number of occurrences reported per month is likely to be the annual average.

### Reported railway occurrences in 2007 by months



### 2.2.5 Changes in the closing of the investigations

A new element was built into the process of the closing of technical investigations, namely the '*closing discussion*'. Practically, it means that TSB sends out the draft reports – as prescribed in the Safety Directive – to the parties concerned who have 60 days to make (written) reflections, after which a closing discussion is held where the parties can discuss their views, reflections and the occurring contradictions. This discussion is also a good opportunity to clarify possible misunderstandings. Experience shows that the interest in the closing discussions have been high so far, the concerned parties have actively participated, as a result of which TSB can issue more professional, well-founded final reports accepted by all relevant parties.

### 2.2.6 The improvement of the technical background of the investigations

In order to facilitate the field investigations, TSB procured a GPS plotter which operates with high accuracy and is able to produce a precise plot automatically, based on the points and tracks recorded at the site of the occurrences. This is a significant technical support for the later reconstruction of the site and for the conduct of the necessary evaluations.

## 2.3 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”.

#### Reported railway occurrences in 2006/2007 by category

| Category of occurrence | Number of occurrences |      |
|------------------------|-----------------------|------|
|                        | 2006                  | 2007 |
| Serious accident       | 0                     | 1    |
| Accident               | 155                   | 247  |
| Incident               | 20                    | 230  |

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.

In 2007, there was one serious railway accident in Hungary which TSB was obliged to investigate pursuant to the current regulations.



**Reported occurrences in 2007 by content**

|                                      |  |            |
|--------------------------------------|--|------------|
| <b>Number of occurrences in 2007</b> |  | <b>478</b> |
| <b>Accident</b>                      | <b>Collision</b>   | 14         |
|                                      | <b>Derailment</b>  | 19         |
|                                      | <b>Accident at LC</b>  | 90         |
|                                      | <b>Accident to persons caused by rolling stock in motion (excluded suicides)</b> | 104        |
|                                      | <b>Fire</b>  | 15         |
|                                      | <b>Other</b>   | 0          |
| <b>Incident</b>                      | <b>SPAD</b>  | 5          |
|                                      | <b>Other</b>   | 91         |
| <b>Suicides</b>                      |  | <b>73</b>  |

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.

**2.4 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.

### **3. ORGANISATION**

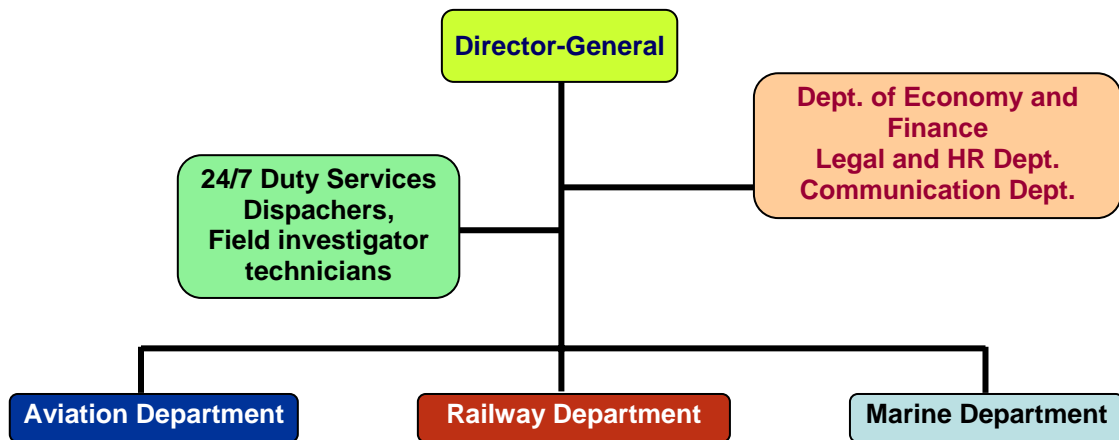
#### **3.1 Introduction to the organisation**

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

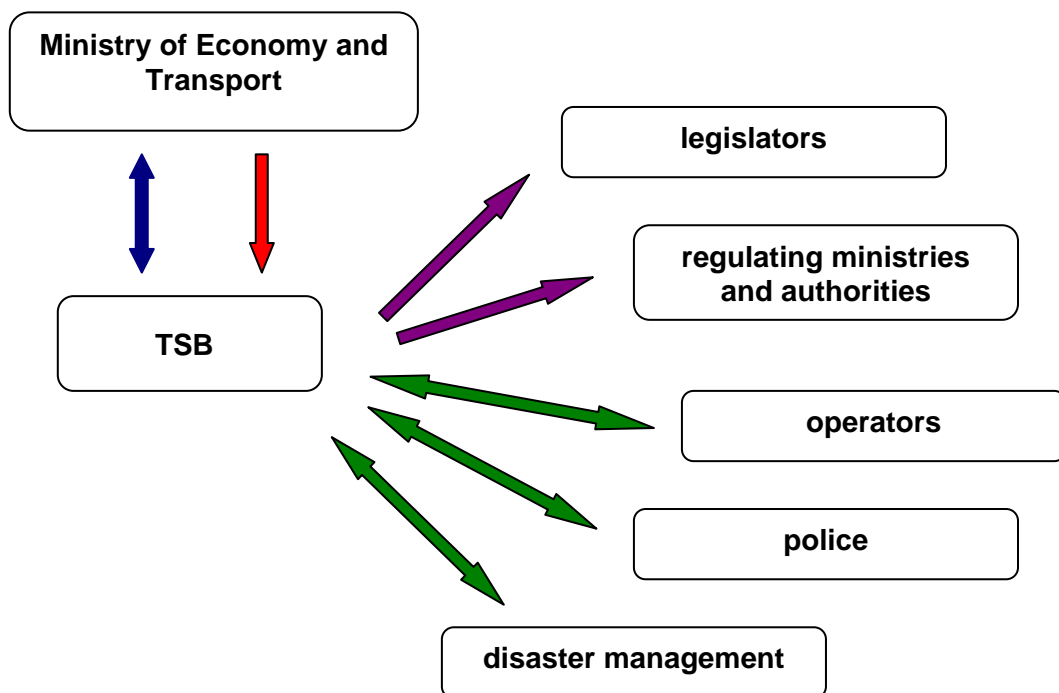
conducting investigations into occurrences involving state (military and police) aircraft as well, which required further human resources.



**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). This was a temporary solution for two months after the enactment of the previously mentioned Act.

The planned number of staff in the Railway Department was 13. At present, 9 people work at the Railway Department. Recruiting new staff is fairly difficult due to the lack of applicants who would fulfil the professional requirements and köztisztv ként akar dolgozni.

### 3.2 Organisational flow



- TSB is supervised by the Ministry of Economy and Transport. The Director General of TSB works under direct oversight 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.
- Based on the outcome of the investigations, TSB may issue safety recommendations to the other actors of the concerned transportation sector (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.

## **4. INVESTIGATION PROCESS**

### **4.1 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.

### **4.2 Institutions involved in the investigation**

TSB regularly cooperates with Budapest University of Technology and Economics (BME) in cases requiring special expertise, equipment, analyses and expert opinion.

### **4.3 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 closing discussion with the participation of the representatives of the persons and organisations concerned. 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.

## 5. 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.

### 5.1 Overview of investigations conducted by TSB

In 2007, there was one serious railway accident in Hungary which TSB was obliged to investigate. TSB conducted investigations - at its own discretion - on 11 further occasions, based on the fundamental principles listed in 2.3.

#### Investigations commenced in 2006 and 2007 by the amount of damages

| Amount of damages                     | Number of occurrences |      |
|---------------------------------------|-----------------------|------|
|                                       | 2006                  | 2007 |
| Over HUF 500 million (Euro 2 million) | 0                     | 1    |
| HUF 100-500 million                   | 2                     | 2    |
| HUF 0-100 million                     | 12                    | 4    |
| No damages                            | 2                     | 5    |

#### Occurrences investigated in 2006 and 2007 by injuries to persons

|               | Fatal |      | Serious |      | Minor |      |
|---------------|-------|------|---------|------|-------|------|
|               | 2006  | 2007 | 2006    | 2007 | 2006  | 2007 |
| Passenger     | -     | -    | 1       | 4    | 7     | 4    |
| Railway staff | -     | 1    | 1       | -    | -     | 1    |
| LC user       | 2     | 3    | 5       | 1    | 6     | -    |
| Trespasser    | -     | -    | -       | -    | -     | -    |

**Investigated occurrences in 2006 and 2007 by their presumed cause (based on the reports)**

| Cause of the occurrence            | Number of occurrences* |          |
|------------------------------------|------------------------|----------|
|                                    | 2006                   | 2007     |
| <b>Human factor</b>                | <b>12</b>              | <b>8</b> |
| - personnel of railway undertaking | 5                      | 2        |
| - other person                     | 7                      | 6        |
| <b>Technical factor</b>            | <b>5</b>               | <b>4</b> |
| - defect in the track              | 1                      | 2        |
| - defect of the rolling stock      | 4                      | 2        |

\* Data may contain accumulation

### 5.1.1 Investigations commenced in 2007

See Appendix 1 for the short summary of the investigations commenced in 2007.

### 5.1.2 Investigations completed in 2007 with the issued recommendations

In 2007, the Railway Department of TSB completed the investigation of 12 occurrences with final reports. Safety recommendations were issued in connection with 4 occurrences.

#### 28. 06. 2006

A heavy lorry drove onto the LC at Vásárosnamény station regardless of the red lights and collided with a passenger train.

Two lorries were approaching the LC after each other. The driver of the second lorry saw the red lights, stopped and warned the first lorry of the red lights by blowing the horn. However, the first lorry kept on driving. The engine-driver approaching the LC noticed the lorry at the LC and immediately applied emergency brake at 41 km/h speed but he could not avoid the collision.

The diesel locomotive of the passenger train derailed and sustained damage. The rail track also got damaged. The damage amounted to approximately 11.5 million HUF in total.

**The IC did not consider it necessary to issue safety recommendations.**

#### 03. 07. 2006.

A car collided with the electric locomotive of a passenger train at an LC between Érd and Tárnok station on open track. The LC was protected with half barrier and warning lights which did not operate normally i.e. were dark towards the road. The reason behind the failure of the warning lights was the fact that unknown people had stolen 10 linear metres of signal feed track circuit cable approximately 30 minutes prior to the occurrence.

It was found in the course of the technical investigation that the engine-driver misunderstood the verbal instructions of the section control personnel, which was given through the

locomotive radio. Thus the train mistakenly passed the well-operating warning lights before the unserviceable ones with reduced speed - 15 km/h - prescribed for such events.

Having conducted tests, the IC established that the necessary - and prescribed - visibility (so called visibility triangle) before the LC was not provided as the vegetation on the right side of the rail track hindered both the engine-driver and the driver of the car from noticing each other before approaching the LC.

**The following safety recommendations were issued in the course of the investigation (as immediate preventive actions):**

|   |   |
|---|---|
| <p><b>BA 23.1:</b> The IC recommends MÁV Zrt. to take internal measures by which the following regulation can be enforced: "good visibility shall be ensured in a suitable 'visibility triangle' according to the characteristics of the LCs and their way of protection" (Regulation no. D.5, point 3.9.8 on the "Traffic safety inspection of level crossings and pedestrian crossings").</p>   | <p><b>Accepted - implemented</b></p>                |
| <p><b>BA 23.2:</b> The IC recommends MÁV Zrt. that Appendix 7 (1.169) of F.2. Traffic Regulations should be complemented with the following: "if warning lights on the open track are unserviceable and if error correction has been performed, it shall be entered in the Station Log in detail".</p>  | <p><b>Accepted - implemented</b></p>                |
| <p><b>BA 23.3:</b> The IC recommends MÁV Zrt. that 15. 233 of F.2. Traffic Regulations should be complemented with the following: „on railway lines on which there is block section traffic, movements inspectors shall apply signals to trains which have not been informed by a 'written instruction' on the failure of open track warning lights, which ensure that the trains are able to stop in front of the given level crossings".</p>        | <p><b>Rejected</b></p>                              |
| <p><b>BA 23.4:</b> The IC recommends that a technical solution should be worked out so that on rail tracks equipped with automatic block signals, when these block signals are switched to 'Stop-position', the locomotives would receive 75 Hz alternating-current coded signals from the track circuit (i.e. signal – long pause – signal). This would enforce the automatic and immediate stopping of trains by means of a technical solution.</p> | <p><b>Accepted – implementation in progress</b></p> |

**The following safety recommendations were issued in the final report**

|   |   |
|---|---|
| <p><b>BA2006-0023-5-05:</b> The IC recommends that the mobile phone communications - concerning the organisation of the traffic - of the chief signal box and the traffic control personnel of MÁV Zrt should be recorded.</p>                | <p><b>Accepted – implementation in progress</b></p> |
| <p><b>BA2006-0023-5-06:</b> The IC recommends MÁV Zrt. that the telephone communications of traffic operation personnel (i.e. the movements inspectors of neighbouring stations – at least on the main railway lines) should be recorded.</p> | <p><b>Accepted – implementation in progress</b></p> |
| <p><b>BA2006-0023-5-07:</b> The IC recommends MÁV Zrt. that the communications (landline and mobile phone) of signal box dispatchers should be recorded.</p>  | <p><b>Accepted – implementation in progress</b></p> |
| <p><b>BA2006-0023-5-08:</b> The IC recommends the NTA and MÁV Zrt. that in future procurements and permissions preference should be given to signal boxes which can record operations.</p>  | <p><b>Accepted – implementation in progress</b></p> |



**11. 07. 2006**  
**15. 07. 2006**  
**09. 09. 2006**  
**24. 06. 2007**

On all four occasions, at the same location, between Csajág and Balatonkenese stations, a passenger train collided with a car at an LC protected with warning lights operating normally and giving Stop signal towards the road. No one was injured in the first case, neither was the material damage significant, therefore TSB did not conduct a site survey. One LC user died and another one was seriously injured in the second occurrence, therefore TSB commenced a technical investigation. As two further, similar accidents occurred at the same site in the course of the investigation, the IC closed them with one final report. The cause of all four occurrences was the following: the cars turned from the main road onto the LC regardless of the "No left turn" traffic sign.

It came to light in the course of the field investigation and data collection that the construction of the LC is special due to the closeness of the main road running parallel with the railway line. Motor vehicles are permitted to turn onto the LC only from the main road, from two directions (instead of the possible three directions). However, there are two other considerably safer LCs in either direction, one 500 metres and the other 700 metres from the LC at which the accidents occurred. Both nearby LCs are not only protected with half barrier and warning lights but there are also turning lanes and acceleration lanes leading onto them. It was found in the course of the investigation, that motor vehicles often turn onto the LC from the main road - from where the warning lights of the LC cannot be seen - regardless of the "No left turn" traffic sign.

**Regarding the above occurrences, the IC issued the following safety recommendation:**

**BA2006-0033-5-01:** The IC recommends the National Transport Authority that it should - together with the bodies concerned - re-examine the position of LC no. AS380. The NTA should also consider whether it is justified to maintain LC no. AS380 - taking into consideration that LC no. SR2 at Balatonkenese station approximately 500 metres away is protected with warning lights and half barrier, and LC no. AS373 approximately 700 metres away in the direction of Lake Balaton are much safer and there are turning lanes to both latter LCs - or whether the application of other technical instruments should be ordained.

**Accepted – implementation in progress**

For the English version of the final report, see the website of TSB: [www.kbsz.hu](http://www.kbsz.hu).

**23. 07. 2006**

At Balatonmárfürdő station, the engine-driver of passenger train "A" started the train regardless of the "Stop" sign of the V2 exit signal after the indication of the chief ticket inspector. The Unified Train Control and Vigilance Warning Installation on the locomotive stopped the train with emergency breaking. The train split point no. 3 open which had been set to deviating direction to give way to another train ("B") approaching the station from the opposite direction. Train "A" then stopped at point no. 1. Having noticed train "A", the engine-driver of train "B" entering into the station immediately applied the emergency brake and stopped approximately 50 metres from train "A" (standing opposite). The IC established that the accident occurred owing to human factors described below.

There are both remote-controlled (controlled from the Central Traffic Operation Control Office) and remote-surveillance (monitored from the Central Traffic Operation Surveillance

Office) stations on the concerned main railway line. Balatonmáriafürdő station can be operated both from the Central Traffic Operation Control Office and locally by a D55 type signal box installed at the station. At the time of the accident, the signal box was in remote-controlled mode and was operating normally.

The IC has established that the staff of the train (ticket inspector, chief ticket inspector) did not do their duties as prescribed in the regulations. This can be attributed primarily to human factors, however, the fact that the staff is directed and given orders from different traffic managements and thus the cooperation is not efficient may also contribute to such occurrences.

The ticket inspector of train "A" did his work as a matter of routine and did not bear in mind that the "Ready to depart" signal shall only be given when the exit signal of the station gives line-clear signal to the train. (i.e. this signal in remote-controlled stations is equivalent to the authorization of the train to depart).

The engine-driver of train "A" knew it from experience that the provided time period for changing shifts will not be enough - owing to the tight schedule and the delays - to perform the usual tasks at the next station, therefore he had begun to do these tasks on the way, at the previous station (the station where the incident happened). Thus, he had to divide his attention. Another fact which might have increased the risks was that he was on duty for the 6<sup>th</sup> time in 8 days during which he had always started or finished his shifts at night. Furthermore, the temperature in the driver's cab was 38-40 C degrees due to the lack of adequate air-conditioning.

According to the account of other employees working on this line, it happens several times that chief ticket inspectors signal out trains regardless of the "Stop" signal (or without even looking at the given signals). If they are not followed by consequences (e. g. points split open or trains running in converging directions), such actions are not always reported.

**Regarding the above occurrence, the IC issued the following safety recommendations:**

|  |   |
|--|---|
| <p><b>BA2006-0040-5-01:</b> The IC recommends MÁV Zrt. that the locomotive radio system should be made suitable for safe and reliable communication.</p>   | <p><b>Accepted – implementation in progress</b></p> |
| <p><b>BA2006-0040-5-02:</b> The IC recommends the NTA to check whether all members of traffic operation staff on railway line no. 30 have taken the examination on the current Executive Regulations on the line.</p>  | <p><b>Accepted - implemented</b></p>                |
| <p><b>BA2006-0040-5-03:</b> The IC recommends the NTA to authorize the personnel - who are not authorized at present to signal out trains - working at stations controlled by the Central Traffic Operation Control Office (KÖFI) to signal out trains (similar to the movements inspectors at other stations who are authorized to do so) as they have more possibility to ensure the safe departure of trains than those who work in the Central Traffic Operation Control Office.</p> | <p><b>Rejected</b></p>                              |
| <p><b>BA2006-0040-5-04:</b> The IC recommends MÁV Zrt. that during the modernisation of locomotives, they should work out a solution so that engine-drivers would be least affected by the outside temperature during their work.</p>  | <p><b>Accepted – implementation in progress</b></p> |

### 06. 08. 2006

A freight train was signalled out from platform XVI of Komárom (HU) marshalling yard towards Komarno (SK) station. The first wagon of the freight train derailed with 4 axles and the second wagon with 2 axles. No one was injured in the accident. The rail track was slightly damaged. Neither the locomotive nor the signal box sustained damage.

The investigation established that the accident was caused by a scotch block left under the first wheel of the first wagon.

**The following safety recommendations - suggesting immediate preventive actions – were issued in the course of the investigation:**

|   |                               |
|---|-------------------------------|
| <b>BA2006-048-5-01:</b> The IC recommends the introduction of an instrument or sign which makes the scotch block clearly visible from a distance. | <b>Rejected</b>               |
| <b>BA2006-048-5-02:</b> The IC recommends that point 26 of Station Regulations of Komárom should be revised.                                      | <b>Accepted - implemented</b> |

### 30. 08. 2006

BDt type control car of a passenger train collided with a concrete mixer between Pécel and Isaszeg stations. The concrete mixer fell onto the rail track as a consequence of a road accident at Nagytartcsa junction.

- 3 passenger and 1 staff suffered minor injuries,
- the control car derailed and sustained substantial damage,
- one catenary support fell and the traction overhead line broke off,
- the left track sustained substantial damage on approximately 30 metre-length,
- the lorry was a write-off,
- the liquid concrete pouring onto the rail track, and the wreckages of the cars blocked both tracks as a result of the accident.

**The IC did not consider it necessary to issue safety recommendations.**

### 06. 11. 2006

A passenger train collided with a car at an LC protected with warning lights between Dunakeszi and Rákospalota-Újpest stations. One LC user dies and two seriously injured in the accident.

It was found in the course of the investigation that the warning lights were operating normally at the moment of the collision. The accident happened owing to the inattention of the driver of the car.

**The IC did not consider it necessary to issue safety recommendations.**

### 16. 03. 2007

A car drove onto the rail track regardless of the Stop signal of the warning lights and collided with a passenger train between Cegléd and Nyársapáti stations. The two people sitting in the car died in the accident. According to the competent police authority, the accident occurred due to the inattention of the driver of the car and to his non-compliance with the rules.

**The IC did not consider it necessary to issue safety recommendations.**

### **13. 10. 2007**

A passenger train collided with a car at an LC without barriers between Mártély and Mindszent stations. Two LC users died in the accident.

The car was driving with high speed on a road parallel with the rail track, coming in opposite direction from the train. It indicated and then turned from the road without applying the brakes as it intended to drive through the rail track before the train. Approaching the LC, the engine-driver saw the car intending to turn and when he realised that the car would not stop before the LC, he applied the emergency brake.

**The IC did not consider it necessary to issue safety recommendations.**

### **5.1.3 The experiences of the technical investigations**

The experiences of the past two years prove too little to define tendencies from the transport safety point of view. Nevertheless, there are some typical features described as follows:

- It came into light in the course of the investigations that the causes of the occurrences included human factors, technical problems as well as the inadequacy of regulations. In the majority of the cases, however, the reasons behind the occurrences were attributed to the human factor.
- When investigating the cases at which human factors contributed to the occurrence of the accidents, the investigators discovered that there were also rules which were not absolutely inadequate but required supplementation.
- Based on our experiences, it is problematic that the number and frequency of comprehensive operational checks conducted by the operators are decreasing or have been stopped altogether at some places. The National Transport Authority has supervisory right only over certain fields, and has no authority to conduct comprehensive checks.
- It might bring improvements in the future that the NTA has intensified its supervisory activities in its present scope of authority and has established a separate department for performing these tasks. However, substantial improvement will only be expected when the scope of its supervisory authority is extended to the field of general railway operation and the required resources are provided.
- Positive effects may also be expected from the following measures: the appearance of the new national railway safety rules, the elevation of internal company rules and procedures onto legislative level as well as placing the training and testing of traffic operation personnel under the supervision of the NTA
- It is likely that the number of accidents caused by technical problems will decrease as according to the new decree (whose preparation is now in progress) of the railway act, the NTA will examine - as part of a regular inspection - the technical condition of railway vehicles being in service similarly to road vehicles.

Based on the experiences of the last two years, TSB sees the most significant problems in categorising and differentiating between occurrences in which the **injuries to persons are caused by rolling stock in motion** and **suicides**. Suicides cannot be considered as accidents or incidents as they are committed intentionally.

Nevertheless, establishing this fact is not the function of the independent investigating body but that of the police. The police, however, often close their investigation by stating that "No evidence has been found which would indicate criminal act." and do not make a definite statement on the question of intentional self-harm or only consider it as one of the possible causes. Therefore these occurrences are classified as accidents. As a consequence, there are numerous – mostly fatal – accidents (50% of all accidents according to our estimation) whose causes are most probably suicides.

### 5.3 International cooperation

Having been established in January 2006, TSB Hungary immediately joined the work of the European Railway Agency. TSB was among the first organisations which began to provide data of the occurrences to the ERA.

At present, TSB participates in the work of ERA Safety Unit. Furthermore, the Organisation is present at the plenary sessions of the national investigating bodies as well as assisting the 3 working groups of ERA - annual reporting, accident causation classification and safety recommendations - by disseminating its experiences TSB also indicated its intention to participate in the working group dealing with the competencies and trainings of accident investigators. This work started in 2008.

The majority of European investigating bodies considers regional cooperation important; therefore there are several independently organised investigators' forums in Europe. TSB Hungary regularly meets the representatives of the investigating bodies of neighbouring countries in order to discuss current issues, problems and to work out initiatives and recommendations for their solution.

## 6. RECOMMENDATIONS

In 2007, the Railway Department of TSB closed the investigation of 12 occurrences with final report and issued safety recommendations to 4 occurrences.

5.1.2 contains a detailed list of the issued safety recommendations.

TSB issued one further safety recommendation at the request of the Austrian investigating body, in connection with the following occurrence:

A freight train arriving from Hungary derailed near Vienna. The cause of the occurrence was a technical failure. TSB recommended an immediate preventive action as follows:

**AM2007-0392-5-01** The IC recommends Máv Cargo Zrt. to draw the attention of the personnel performing the inspection of railway vehicles to pay particular attention to suspension brackets, springs and how they are fitted when inspecting Saadkms CFR Ro-La type, ten-axle wagons (registration numbers from 83 53 4983 000 to 83 53 4983 159).

#### **Accepted and implemented.**

The Railway Department issued two further safety recommendations in the course of the investigations suggesting immediate preventive actions. These are as follows:

**Safety recommendations suggesting immediate preventive actions**

**BA2007-0047-5-01:** Until new regulations are issued, the IC recommends that F.2 Traffic Regulations should be complemented with the following: in track sections installed with automatic block signals, if it is not possible to ascertain the traffic conditions by evaluating the light signals (reports) on the signal box, the switchover to station-distance traffic should be ordered. Furthermore, the IC recommends a new regulation which permits the traffic operation staff to switch over to “station-distance traffic” before the arrival of the technical staff - if circumstances require doing so.

This way it can be assured that only one train is running between two stations at a time.

**Accepted and partially implemented, further implementation in progress**

**BA2007-0047-5-02:** The IC recommends that F.2 Traffic Regulations should be further complemented with the following: light signals should be considered unserviceable, if the signalling (reporting) on their normal operation ceases.

**Accepted and partially implemented, further implementation in progress**

**AM2007-0211-5-01:** The IC recommends the NTA to examine whether the traffic is safe for trains at LC AS 182 between Rákos and Pécel stations with the current speed regulations or whether it would be justified to ordain a speed-restriction signal until the construction of M0 motorway has been finished.

**Accepted and implemented**

**AM2007-0211-5-02:** The IC recommends the supplementation of traffic regulations with the following: warning lights should be considered unserviceable – independent of the feedback messages on their operation – if they are damaged to such extent that they cannot function normally.

**Rejected**

**Summary of responses to safety recommendations issued in 2007**

|   |   |
|---|---|
| <b>Accepted and implemented</b>   | 4 |
| <b>Accepted and partially implemented, further implementation in progress</b> | 2 |
| <b>Accepted, implementation in progress</b>                                   | 7 |
| <b>Rejected</b>   | 2 |

## APPENDIX 1

### Investigations commenced in 2007

| Date 2007 | Occurrence   | Injuries to persons  | Category                        | Note  |
|-----------|--|--|---------------------------------|---|
| 17.01     | Two passenger trains were approaching each other on the same track (open track). They stopped 5500 metres from each other. |  | Railway incident                |   |
| 25.01     | Two tank wagons of a freight train derailed when approaching a railway station.  |  | Railway accident                |   |
| 06.02     | Passenger train collided with the rear of a freight train on open track.   | 1 fatality<br>2 persons seriously injured<br>5 persons suffered minor injuries | <b>Serious railway accident</b> | Safety recommendation was issued in the course of the investigation suggesting an immediate preventive action - accepted, partially implemented, further implementation in progress   |
| 16.03     | Passenger train collided with a car on open track, at LC protected with warning lights.                                    | 2 fatalities   | Railway accident                |   |
| 18.06     | Passenger train collided with a lorry on open track, at LC protected with warning lights.                                  | 1 fatality<br>1 person injured (minor)   | Railway accident                | Two safety recommendations were issued in the course of the investigation suggesting immediate preventive actions – one of the safety recommendations was accepted, the other has not yet been agreed upon (owing to different views) |
| 24.06     | Passenger train collided with a car on open track, at LC protected with warning lights.                                    |  | Railway accident                | Part of a series of occurrences   |
| 29.08     | Passenger train collided with a semi trailer on open track, at LC protected with warning lights. 2 carriages derailed.     | 4 persons injured (minor)  | Railway accident                | Safety recommendation was issued in the course of the investigation suggesting an immediate preventive action -   |

|              |  |                  |                  |   |
|--------------|--|------------------|------------------|---|
|              |  |                  |                  | accepted,<br>implementation in<br>progress  |
| <b>07.09</b> | Four carriages of passenger train derailed at Budapest Keleti pu. (Eastern Railway Station)  |                  | Railway accident |   |
| <b>13.10</b> | Passenger train collided with a car on open track, at LC   | 2 fatalities     | Railway accident |   |
| <b>02.11</b> | Locomotive of passenger train (no. 6205) approaching a station collided with a lorry (being involved in the reconstruction of the station).  |                  | Railway accident | Part of a series of occurrences   |
| <b>02.11</b> | Locomotive of passenger train (no. 63203) approaching a station collided with a lorry (being involved in the reconstruction of the station). |                  | Railway accident | Part of a series of occurrences   |
| <b>15.12</b> | A child suffered an electric shock when climbing onto a tank wagon stored permanently at a station.  | 1 person injured | Railway accident | 1 safety recommendation rejected, no response to the second safety recommendation |