

MINISTRY OF
NATIONAL DEVELOPMENT
TRANSPORTATION SAFETY
BUREAU OF HUNGARY

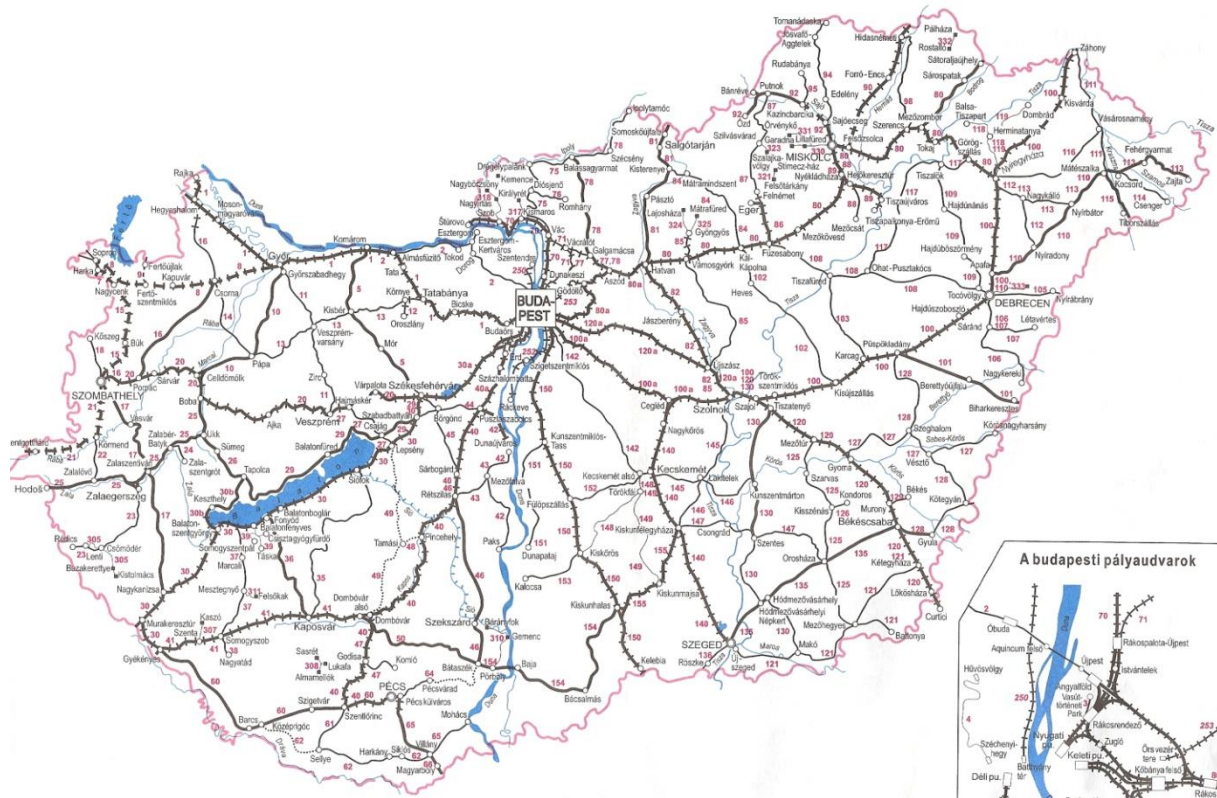
ANNUAL REPORT 2016
Transportation Safety Bureau
Hungary

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RAILWAY NETWORK IN HUNGARY



Basic data of the infrastructure:

<u>National lines:</u>	7690 km IM: MÁV (94%), GySEV (6%) Trans-European network: 2830 km (37%)
<u>Regional lines:</u>	480 km (100% narrow gauge)
<u>Suburban lines:</u>	210 km
<u>Local network:</u>	in Budapest, Debrecen, Miskolc, Szeged
<u>Level crossings:</u>	6041 (48% active, 52% passive)

SUMMARY

Hungary fully implemented all essential requirements concerning accident investigation of the Railway Safety Directive 2004/49/EC in its national law.

Transportation Safety Bureau was established on 1st 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 safety investigation of aviation, railway and marine accidents and incidents. Within the organisational framework of TSB, the Railway Department began to operate on 1st March 2006.

Pursuant to Government Decree 230/2016. (VII. 29.) on the assignment of a transport safety body and the termination of Transportation Safety Bureau with legal succession, the independent organisational status (as a central authority) of Transportation Safety Bureau was terminated with an effect of 1 September 2016, and TSB was integrated in Ministry of National Development as a division. As part of this integration, the functions supporting the operation of the organisation (finance, communication, law, IT, HR) were wound up, and their responsibilities were transferred to the Ministry and other entities and units of public administration. As a result of such reorganisation, the Railway Department of TSB, which used to work with a clear professional profile dedicated to railway, became Railway and Dispatcher Department.

In 2016, there was no occurrence (serious accident) on the railways which the Railway Department of TSB was, pursuant to the regulations, obliged to investigate.

TSB decided at its own discretion to conduct independent safety investigation into 28 occurrences. This is 15% less than in the previous year.

During year 2016, TSB published 30 final reports, including 16 safety recommendations. 8 of these recommendations have been implemented, implementation of 7 recommendations is in progress, 1 of them was left unanswered. TSB issued 5 safety recommendations prior to the completion of the investigations started in 2016, in which recommended immediate preventive actions, all of these recommendations has been implemented.

At its own discretion, TSB included in the scope of the safety investigation some occurrences of signals passed at danger (SPADs), taking into consideration hazards and high frequency of these cases with an otherwise fortunate outcome. Based on previous positive experiences, TSB monitored with particular consideration the occurrences related to level crossings (LC accidents) and to persons injured by railway vehicles, initiating safety investigations in cases that appeared to be instructive. In 2016, we laid great emphasis on revealing the root causes of the occurrences, especially in the aspects of human and organisational factors.

Abbreviations	
IC	Investigating Committee
LC	Level crossing
MÁV Co.	Hungarian State Railways Plc.
NIB	National Investigation Body
NSA	National Safety Authority

	(the National Safety Authority of Hungary)
RSD	Railway Safety Directive (2004/49/EC directive)
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 1st January 2006.

The Annual Report 2016 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 safety investigation at TSB,
- the overview of the past 12 months from transport safety point of view,
- the experiences of the independent safety 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.

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

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

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

Powers of TSB have been extended: previously, the scope of TSB activity had not included investigations of accidents and incidents occurred on local railways. Serious accidents are not frequent on these railways (underground railway, cogwheel railway, funicular, tram – Budapest, Miskolc, Debrecen, Szeged, – cableways, ski-lifts), nevertheless, related hazards are high, considering the high number of passengers transported daily. Extension of the investigation scope by including these railway systems was justified by this hazard, completion of the safety investigations additionally generated being possible by an allocation of minor extra resources.

Act CLXXXIV of 2005 on the safety investigation of aviation, rail and marine accidents and incidents was also amended parallel to this, the amendment concerning TSB activity by introducing the institution of accident investigation of the operator in the railway sector as well. Positive experiences of the accident investigation system of the operator, well established in the aviation sector, can be effectively applied to enhance safety in the railway sector also. Therefore, according to the new regulation for occurrences not included in the serious accidents category required to be investigated by the National Investigation Body (NIB), in case NIB takes decision on not conducting a safety investigation of the occurrence, the safety unit of the railway undertaking will be requested to conduct the investigation of the operator and inform NIB on the results in a report.

This regulation does not aim the duplication the safety system, it does not concern investigations required by the safety management system (SMS). Its objective is to ensure that reports, being issued anyway by the accident services of railway undertakings, would be forwarded to NIB, furthermore, authorizes NIB to request additions, when necessary, to these reports – by this, the regulation helps NIB in collecting data on safety issues. Involving organisations already actors of the SMS in the activity of NIB does not require extra resources (HR, etc.) on either side, nevertheless, it broadens significantly the information base of NIB activity and, by this, the enhancement possibilities of railway safety.

These rules were implemented into the decree on the regulation of the safety investigation of serious railway accidents, railway accidents and incidents (7/2006 GKM) issued on 27th February 2006, the new number of this decree: 24/2012 NFM issued on 8th May 2012.

Within the organisational framework of TSB, the Railway Department began to operate on 1st 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 safety investigation as follows:

‘The objective of the independent safety 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’.

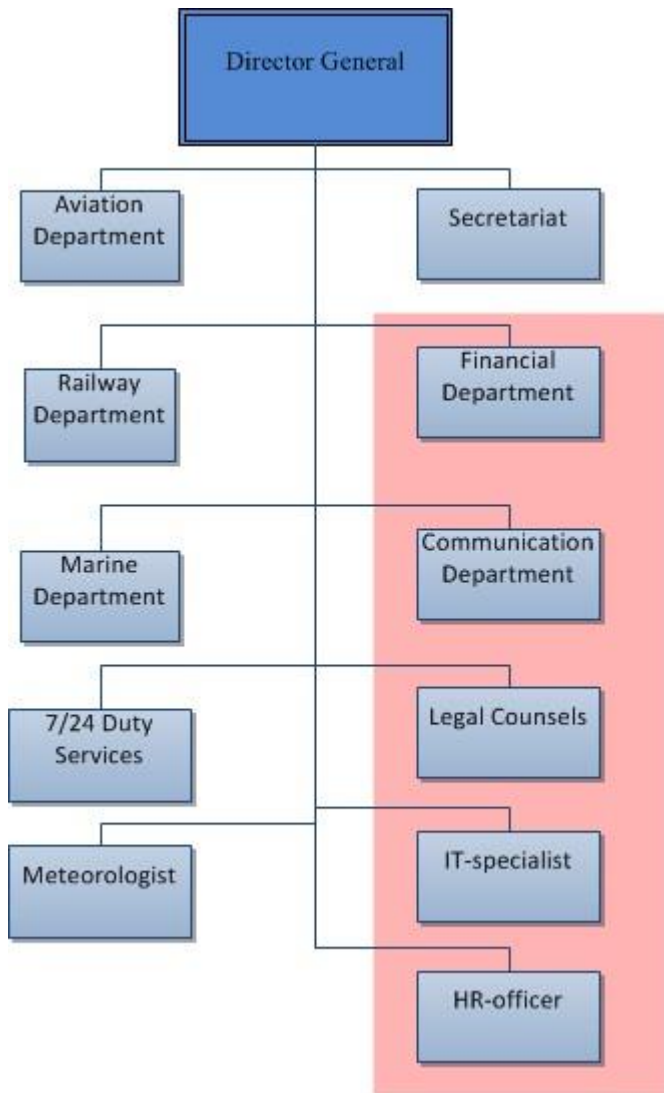
The Act contains the rights and responsibilities of the investigators defined in the Safety Directive.

According to the national regulations:

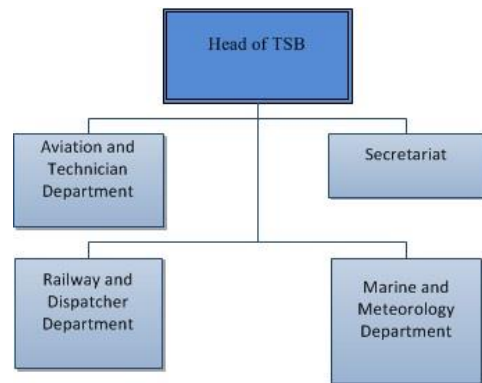
- All aviation, railway and marine occurrences shall be reported to TSB.
- The members of the Investigating Committee of TSB are authorized to be present at the site of any occurrence and to conduct the safety investigation parallel with the police investigation (if there is one).
- Based on the results 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 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.

1.1 Organisation of TSB Hungary

The organisation and relations of the NIB is shown in several figures, indicating our internal organisational structures and relations with other affected organisations effective before and after 31 August 2016.



The organisation till 31 August 2016 (the wound-up units highlighted with pink colour)

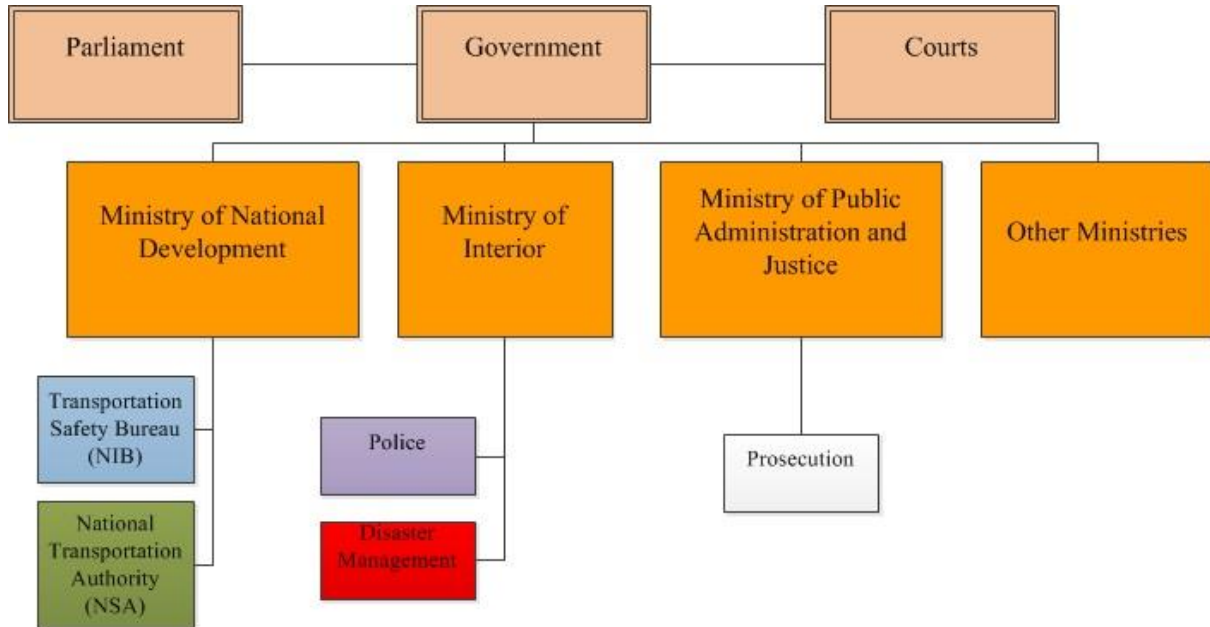


The organisation from 1 September 2016

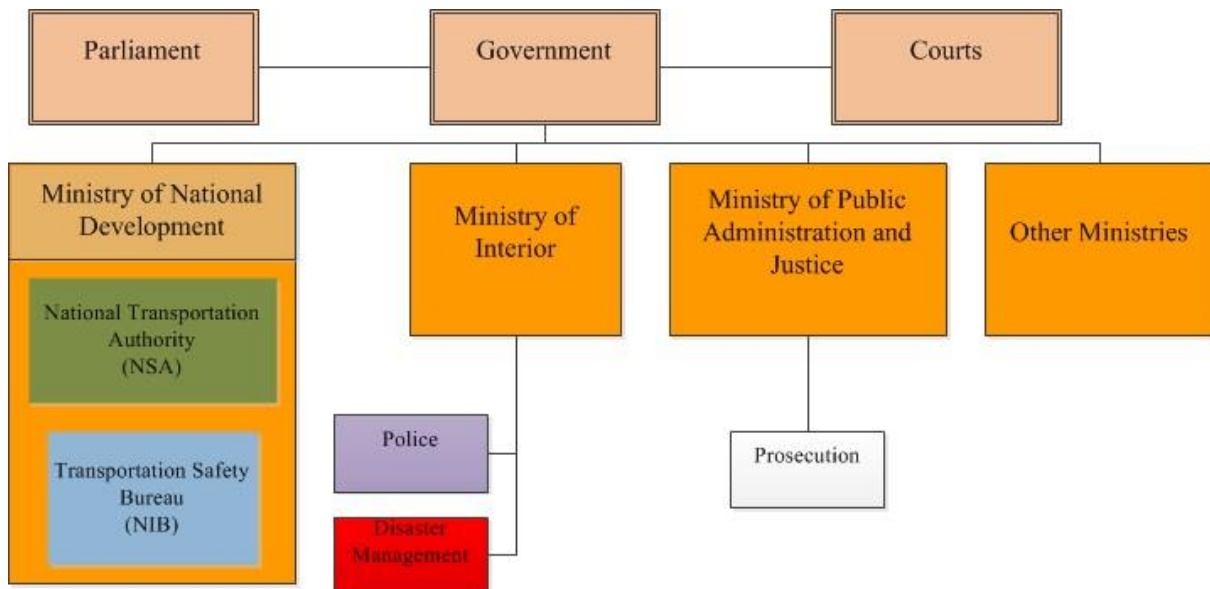
- TSB regards prevention as the main objective of its activity. TSB endeavours to share the findings, the results and the experiences of the safety investigations with a wide circle of organisations in the profession as well as with the civil sector.
- TSB was established on 1st January 2006. The Aviation 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 1st March 2006.
- The total number of permanent staff at the end of August was 54, which decreased to 40 until 31st December. The Railway Department consists of 8 investigators and the Head of Department.

1.2 Organisational flow of TSB Hungary

The following two charts show the system of relations of the NIB:



System of relations till 31 August 2016



System of relations after 1 September 2016

- Within Ministry of National Development, NSA is ranked Deputy State Secretariat, and TSB is a Division. Accordingly, NSA is positioned at a higher level, the addressee of the safety recommendations is different within the same entity, and supervision is common at the ministerial level.
- The Ministry of National Development is the national regulator.

- Based on the outcome of the investigations, TSB may issue safety recommendations to the National Safety Authority (NSA). The implementation of safety recommendations is not mandatory; the addressees however are obliged to compile an annual report on their response (acceptation, implementation, or refusal).
- TSB is part of the Ministry of National Development. The Head of TSB works under direct supervision of the Deputy State Secretary. According to the national law, the Minister shall not instruct TSB in matters concerning the independent investigations, but, according to the organizational rules, the Minister has the power to do so.
- TSB 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 general rules regarding the operation of the railways are currently defined by the state-owned MÁV Co., the largest infrastructure manager in Hungary. The National Safety Authority only assents to the amendments to the rules.
- 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.

2. INVESTIGATION PROCESS

2.1 Independent basis of the investigation

Pursuant to 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 safety 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 recurrence and certain tendencies in the accidents. These observations can create basis for further investigations.

In order to increase efficiency in decision making, it is necessary to gain as much information as possible. The institution of accident investigation of the operator has been introduced in the railway sector as well. Positive experiences of the accident investigation system of the operator, well established in the aviation sector, can be effectively applied to enhance safety in the railway sector also. Therefore, according to the new regulation for occurrences not included in the serious accidents category required to be investigated by NIB, in case NIB takes decision on not conducting a safety investigation of the occurrence, the safety unit of the railway undertaking will be requested to conduct the investigation of the operator and inform NIB on the results in a report.

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 or by his deputy on duty. 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 advises the Director General to 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.

Other processes are the same as those specified in the ERA guide relating to technical investigations: collecting of data, investigative interviews, analysis etc.

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

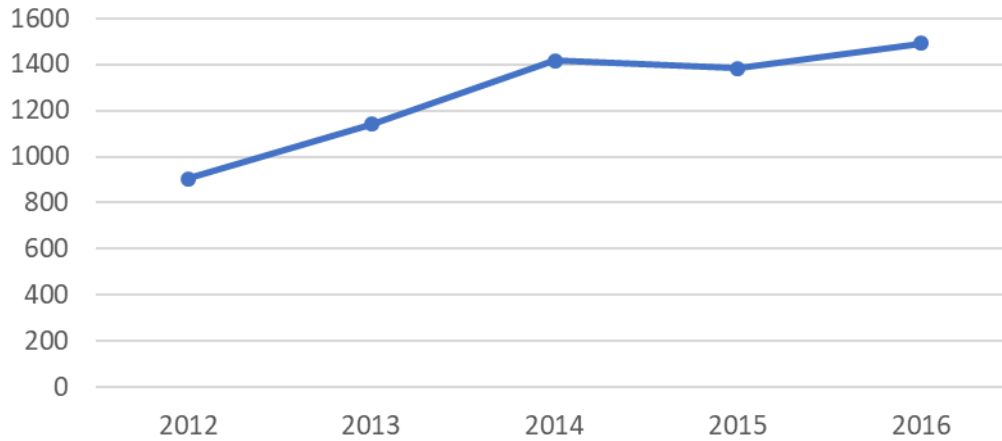
The relevant parties of the investigation may make reflections on the draft report within 60 days from the date of receipt which is to be evaluated when compiling the final report. After this 60-day-period, TSB convenes a meeting for a final discussion with the participation of the representatives of 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. OVERVIEW OF THE YEAR 2016

3.1 Notifications

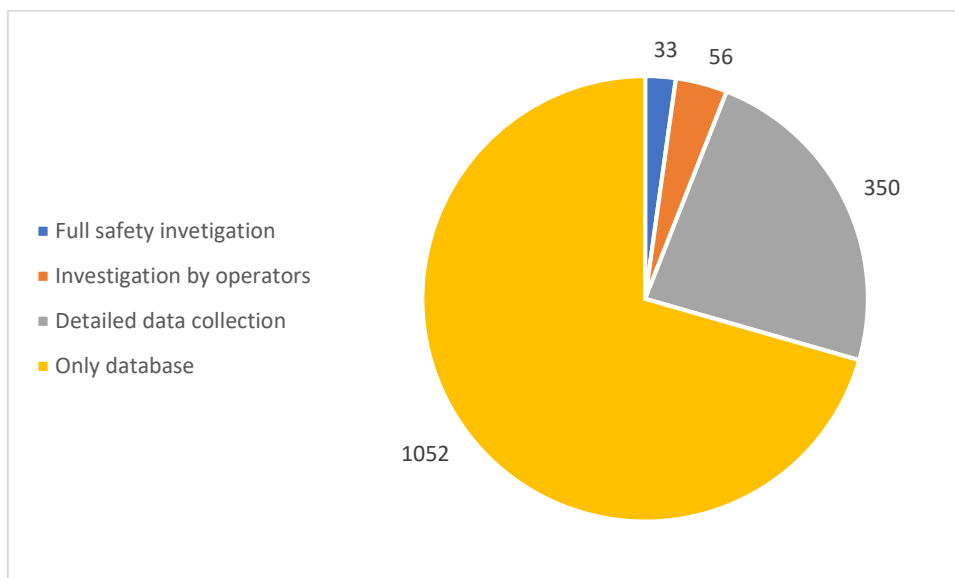
In accordance with the extension of its powers TSB began during the fall of 2011 to receive notifications on occurrences concerning local railways also (underground railway, cogwheel railway, funicular, tram – Budapest, Miskolc, Debrecen, Szeged).



Numbers of notifications

It can be stated that there was no significant change in the number of notifications received from the occurrence fields investigated in the previous period. This shows that players in the industry now tend to be aware of and actually comply with the notification requirement.

3.1 Investigations



The activities following notifications

In 2016, we decided to perform an immediate *site survey* (based on data in the notifications) on 46 occasions; such surveys were usually performed by a team of three members. 29 of the 46 site surveys affected locations in the national railway network, which shows that the consequences of the accidents and incidents in such networks are more serious, and that the investigation into such accidents/incidents is more likely to require detailed data collection at the scene.

Detailed data collection was performed on 350 occasions in total. A purpose of detailed data collection was to find out whether the occurrence may offer such lessons to learn which justify the performing of a full investigation by us. In these cases, we asked the railway companies for information and data, and decided on the investigation on the basis of such inputs. Another form of detailed data collection is when we ask the competent authorities for information relating to whether a case where a person by a vehicle was a suicide or an accident caused by rolling stock in motion. This is needed because, pursuant to the relevant EU regulation, classification must be made on the basis of a decision of the authorities.

In 2016, we commenced a *full safety investigation* in 28 cases. With regard to the nature of the given occurrence, an investigating committee of 2 to 5 members is appointed to perform the investigation. When staffing an investigating committee, we ensure that investigators with relevant professional knowledge and experience be available in each committee for a successful investigation. Such areas of expertise are, for instance: traffic control, mechanics, infrastructure or human and organisational factors. The investigating committee is chaired by a member appointed by the Head of TSB, and such chair is responsible for successful and timely completion of the investigation. Compared to the headcount, it can be seen that an investigator had to chair 3.5 investigating committees on average in 2016. This number significantly exceeds the quantity of 2 investigations/year specified by the European Union Agency for Railways in its activity assessment report on the operation of Railway Department TSB in 2012.

In 2016, TSB invited operators to investigate 56 occurrences. In the railway sector, since 2012 – similarly to aviation – TSB has the opportunity to request information from operators on the causes of railway occurrences which need no investigation by TSB but may offer a lesson to learn in connection with general safety on rail transport. Today, the conditions of investigation by the operator are given: in order to meet the personal requirement of the performing of investigation by operators, accident investigation training sessions are running since 2013. Over 200 people involved in the investigation of occurrences completed the courses.

3.3 Safety Investigations started by TSB in the area of railway transport in 2016

Date 2016	Description of the occurrence	Classification
06 01	After the passenger train IC 922 departed from Track 3, Tatabánya, a man jumped out of the train, fell on the platform and then under the train.	Railway accident
08 01	1 loaded 4-axle wagon of freight train leaving Ferencváros Keleti-Rendező Pályaudvar derailed with 2 axles on Points No. 553.	Railway accident
08 01	The Points No. 21 were burst open at the term terminal in Bécsi út, Budapest, at unknown time	Railway incident
02 02	While leaving traffic at the terminal in Bécsi street, Budapest, a tram passed the signal 'G' without permit, burst the points No. 6 open, and returned to traffic.	Railway incident
12 02	A freight train rolling through Kisbér Station was stopped because its second wagon was on fire.	Railway accident
21 02	Three 4-axle wagons of the freight train No. 44281 derailed with 12 axles while approaching Rajka Station.	Railway accident
07 03	At Mosonszolnok Station, a freight train passed the exit signal at danger, burst the Points No. 2 open, and left the station in a direction opposing its scheduled.	Railway incident
31 03	Arriving from the direction of Boráros square, a tram derailed with one axle at the downslope entrance of the tunnel before its stop at Fővám square.	Railway accident
31 03	While departing from the terminal, the tram passed the signal at danger, and burst the points open.	Railway incident
05 05	A passenger train collided with a motorbike at the unprotected level crossing in the area of Tószeg Station, and the motorcyclist died.	Railway accident
07 05	The number 19 tram (reg. No.: 2203) derailed with two bogies at the tram terminal at Bécsi street, Budapest.	Railway accident
16 05	A passenger train collided with a car at a level crossing (AS 220) protected with (operable) warning lights between the stations Veresegyház and Órbottyán.	Railway accident
22 05	The rack railway vehicle with reg. No. 55-65 derailed with its last bogie while approaching Széchenyi-hegy Station, Budapest.	Railway accident

02 06	A train collided with a car at the unprotected level crossing in Section 601 between the stations Táborfalva and Lajosmizse.	Railway accident
21 06	A train in Szeged city unobserved the position of the points in front of the crossroads, and went to the wrong direction to the left. Both of its bogies had passed the points by the time it stopped.	Railway accident
25 06	While approaching Track IV at Hatvan Station, a passenger train crashed to the crane working on Track V.	Railway accident
27 06	A HÉV train collided with a car at an unprotected level crossing in Section 143 between Dunaharaszti-Külső and Szigetszentmiklós-Gyártelep.	Railway accident
16 07	A light engine passed the warning light AS 1242 in 'break-down' state at a speed exceeding 15 km/h between the stations Zamárdi-Felső and Szántód-Köröshegy.	Railway incident
25 07	A train collided with a heavy truck at the level crossing (AS 685) protected with (operable) warning lights between the stations Barcs and Babócsa. The truck caught fire as a consequence of the crash.	Railway accident
14 08	A passenger train derailed with its 2 leading axles on the Points 6 while approaching Track IV, Újszász Station.	Railway accident
23 08	A group of wagons pushed during a shunting operation at Budaörs Station got onto the route of an approaching train.	Railway incident
30 08	A tram passed the entry signal at Danger without permit at the terminal in Fesztetics Gy. Street, Budapest, and it derailed with one bogie on the first points due to switching under the tram.	Railway incident
03 09	The overhead wire broke and fell on the passenger train in service between Budapest Déli Station and Kelenföld Station, and one person travelling on the train had a minor injury.	Railway accident
08 09	The rack railway vehicle derailed with 5 axles on the points at Széchényi-hegy station.	Railway accident
17 09	A shutdown locomotive ran away from the dead-end track No. IV at Ferencváros Station, a travelled through Soroksári út Station, and derailed on a heap of earth which blocked the track.	Railway incident
05 10	A passenger train hit over cattle and derailed between Vajta and Nagydorog stations.	Railway accident

07 10	A locomotive detached from its train set hit over two women who died on the spot at Kapuvár Station.	Railway accident
03 11	The 24 th wagon of a freight train departing from Track 5 at Kétegyháza Station derailed with 1 axle on Points 3.	Railway accident
09 11	A train crashed to a car which had got stuck up in the level crossing (AS 491) protected by warning lights and half-barriers between Kápolnásnyék and Gárdony Stations.	Railway accident
18 11	A tram No. 49 derailed on the points.	Railway accident
28 11	A train collided with a semi-track at an unprotected level crossing between Győrszabadhegy and Pannonhalma. The shunter died.	Railway accident
02 12	Two underground trains got stuck up in the tunnel at St. Gellért square, along the M4 line, in Budapest.	Railway incident
05 12	Two underground trains collided at the Pillangó Street Station, Budapest.	Railway accident

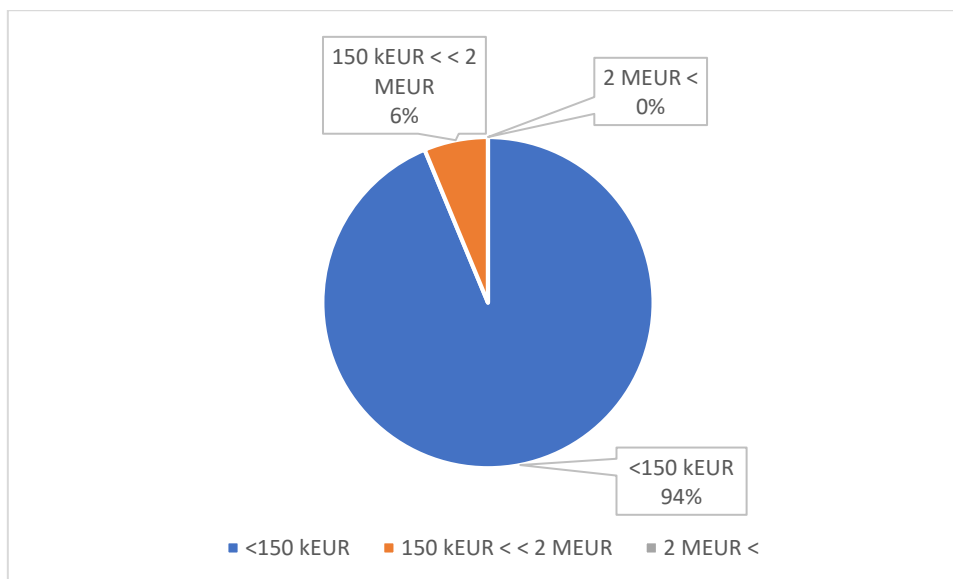
4. INVESTIGATIONS COMPLETED IN 2016 WITH THE ISSUED RECOMMENDATIONS

In 2016, 30 final reports were compiled and published on the website of TSB. Further 7 draft reports were compiled and sent to the relevant parties for reflections. The above investigations were closed and the final reports were published at the beginning of 2017 considering the 60 days provided by law for the relevant parties to reflect on the draft report.

The final reports issued in 2016 analysed occurrences of the following types:

- Derailment 11 occurrences
- Accident at LC 6 occurrences
- SPAD 6 occurrences
- Collision 5 occurrences
- Trains opposite each other 1 occurrence
- Caused by rolling stock in motion 1 occurrence
- Other 2 occurrences

Investigations completed in 2016 by the amount of damages:



Number of investigations lasting longer than one year over 2012-2016

Year	at the end of 2012	at the end of 2013	at the end of 2014	at the end of 2015	at the end of 2016
Amount	12	14	12(8)	9 (5)	13 (8)

Numbers in brackets show the amount of reports which sent to relevant parties

5. INVESTIGATIONS CLOSED IN 2016.

5.1 2014-0204-5

Overview of the occurrence

The number 24 tram (Reg. № 1415), moving in the direction of Keleti Station, derailed with two axles in the crossing of Fiume Road and Salgótarján Road. No one was injured, but there was some damage to the vehicle and the accessories of the railway track. The IC attributed the occurrence to the worn-out state of the pavement of the railway track. BKV Zrt. replaced the pavement at the scene of the accident in October 2015.

Factual statements directly related to the occurrence of the event

The tram rolled onto a loose stone cobble which turned out of its seat when the vehicle rolled over it, and it lifted the fourth bogie of the vehicle out of place.

Factual statements indirectly related to the occurrence of the event

Despite regular checks and troubleshooting, the track is in a worn state, which increases the probability of similar occurrences.

Other risk factors

The IC added no such comment.

Actions taken by the operator/authority etc. during the safety investigation

After the occurrence, BKV Zrt., the operator, performed replacement and change of the cobble pavement on a continuous basis. In October 2015 – after a reallocation of resources – the cobble pavement in the affected section was removed, as well as the railway intersection (which was out of use anyway), and the track was paved with cold asphalt. The plans of track reconstruction were to be completed in 2016.

5.2 2014-0720-5

Overview of the occurrence

The train № 2135 passed the entry signal at danger at Dunakeszi Station, without authorisation, burst a switch open on its way, and got into the exit path of the train № 2364 arriving from the direction of Budapest, and entered Track VIII of the station, where it moved toward the train № 2364 coming from the opposite direction. The train № 2135 was stopped by the train control system, while train № 2364 was stopped by its locomotive driver; the distance remaining between the two trains was 38 metres.



Figure 1: The train № 2135 as photographed from the locomotive driver's cabin of the train № 2364

The IC attributed the occurrence to human factors on the part of the locomotive driver of the train № 2135, to the operation of the train control system of the locomotive of the train, and to human factors on the part of the traffic manager personnel.

Based on the aforesaid, the IC issues safety recommendations relating to the psychological evaluation of locomotive drivers, to the train control system applied in the affected locomotive, and to the selection of managers by MÁV Zrt.

Factual statements directly related to the occurrence of the event

The locomotive driver of the train № 2135 did not perceive the yellow light of the block signal, the yellow-white light of the repeating signal, and he handled the more frequent vigilance signals automatically, without being actually aware of their meaning, and his train passed the entry signal D at danger without braking.

The danger situation developed was not detected by the district inspector either who was staying next to him and did not intervene in the process.

Factual statements indirectly related to the occurrence of the event

The train control system used in the locomotive of the train № 2135 does not set starting of the braking process as a condition of resetting the more frequent vigilance signals.

The traffic manager at Rákospalota-Újpest station requested authorisations in a way other than specified in the F.2. Train loading and running regulations: he failed to give the departure times of the departed trains.

The traffic manager at Dunakeszi station did not require regular work, thus contributing to the misunderstanding of the information received.

The locomotive driver of the train № 2135 started moving with his train without authorisation from the traffic manager on two occasions.

Other risk factors

- The locomotive driver of the train № 2134 moved at a speed exceeding the limit on Track VIII at Dunakeszi station.
 - The locomotive driver of the train № 2134 did not have at hand the documents required in the Instruction E.1, and thus, he was not able to contact the traffic manager of Dunakeszi station.
 - The locomotive driver of the train № 2134 reset the red signal in the driver's cab by using the forward/reverse switch at Dunakeszi station.
 - The EMIG computer did not work at Dunakeszi station at the time of the occurrence.
- Safety recommendation issued after the investigation

The Investigating Committee of TSB Hungary proposes that the following safety recommendations be issued as a conclusion of the investigation:

BA2014-720-5-1 During its safety investigation, the IC of TSB Hungary found that “the Government Degree № 203/2009. (IX.18.) on the health requirements for employees in positions related to the safety of railway transport and the order of their medical evaluation” requires no psychological evaluation as part of the mandatory periodical medical evaluation for locomotive drivers: it entrusts the evaluating physician with the judgment of the need for psychological evaluation. Regarding that the evaluating physician only meets the employee at the evaluation session, they will not be familiar with the employee's personality or working habits, and may not perceive the necessity of psychological testing; accordingly, the changes in the psychic state of a locomotive driver may not always be revealed, although they may influence the driver's work. Therefore,

TSB Hungary recommends the owner of the legal provision to modify the text of the Government Degree № 203/2009. (IX.18.) on the health requirements for employees in positions related to the safety of railway transport and the order of their medical evaluation in such manner that psychological evaluation should always be part of the periodical medical evaluation of the locomotive drivers.

The position of the IC is that in the case of accepting and implementing the above recommendations, locomotive drivers would also undergo a psychological evaluation every third year as a minimum as part of their periodical medical evaluation. As a result, possible changes to their psychic state could be detected and demonstrated. Thus, the evaluating physician could detect and manage any possible negative tendencies.

BA2014-720-5-02 During its safety investigation, the IC of TSB Hungary found that the more frequent vigilance signals of the Train Warning and Protection System used in the locomotive of the train № 2135 can be cancelled exclusively by operating the control pedal/button, regardless of the speed of the vehicle. With regard to the fact that handling of the vigilance pedal may become automatic in the case of locomotive drivers, the device does not always drive the driver's attention to the necessity of reducing the speed. Therefore,

TSB Hungary recommends National Transport Authority to cause the railway companies operating such devices to perform a risk analysis relating to the operation of such devices, and to take action as necessary to apply devices which reduce such risks.

The position of the IC is that in the case of accepting and implementing the recommendation, the risk of events occurring for similar reason could be reduced substantially, and the possible consequences of such events could be mitigated substantially.

BA2014-720-5-03 During its safety investigation, the IC of TSB Hungary found that the Station Manager of Dunakeszi Station misjudged his role and did not require regular work from his colleagues, which contributed to the occurrence. When he was appointed to the station manager position, his employer only took into consideration his professional qualifications. The station manager position, however, also requires leadership attitude and patterns of behaviour. The candidate was not able to acquire these competences during his tertiary education or at the railway training courses because neither form of training includes such subjects. Therefore,

TSB Hungary recommends National Transport Authority to review (in the Safety Management System of MÁV) the rules and practice of the training and appointing of managers who supervise operative work, and to take action as necessary to really enforce those personal requirements during the selection process which had been introduced in order to reduce risks.

In the case of accepting and implementing the above recommendation, the risk of accidents occurring due to a similar cause may be reduced significantly in the opinion of the IC.

5.3 2014-1089-5

Overview of the occurrence

On 20 October 2014, at 09:17, between the stations Környe and Tatabánya, the passenger train with reg. no. 34447 crashed with the tail of a local bus at a level crossing (№ AS36) protected with warning lights in Tatabánya town. One passenger of the bus died after being taken to hospital, 4 passengers were injured severely, and 7 had minor injuries.

The IC attributed the accident to human factors on the part of the bus driver.

The IC found the design of the level crossing compliant with the legal requirements, however, the IC recommended Government Office, Komárom-Esztergom County to prevent similar accidents by modifying traffic control on the roads which lead to the level crossing; as a result, the Government Office ordered a transport safety review.

The IC proposes that a safety recommendation be issued relating to modification of the traffic pattern of the bus turn-around located next to the level crossing № AS36.



Factual statements directly related to the occurrence of the event

The IC attributed the occurrence to human factors on the part of the bus driver, because he entered the level crossing with the warning lights giving alternating red signals, and was not able to leave the level crossing before the train arrived.

Factual statements indirectly related to the occurrence of the event

The bus driver had to divide his attention between the traffic situations (the road traffic vs. the warning lights at the level crossing) which were different but present concurrently.

Other risk factors

Due to the design of the bus, the warning lights cannot be seen at every moment before entering the level crossing.

The sunshine coming from the opposite direction also made it more difficult to view the warning lights.

BA2014-1089-5-01: During its safety investigation, the IC found that the design of the level crossing № AS36 located between the stations Tatabánya and Környe complies with the laws in effect, however, the drivers of the vehicles arriving from the bus turn-around located next to the level crossing have to

concurrently ensure their chance to return to the main road safely and their chance to enter the level crossing safely.

TSB Hungary recommends the Mayor's Office of Tatabánya City of County Rank as operator of the road infrastructure to reconstruct the bus turn-around in Környei street, as well as its pattern of traffic in such manner that the drivers of the vehicles arriving from there should not be forced to check the conditions of safe crossing of the main road and the level crossing concurrently.

In the case of accepting and implementing the above recommendation, the safety of the level crossing № AS36 can be improved.

5.4 2014-1095-5

Overview of the occurrence

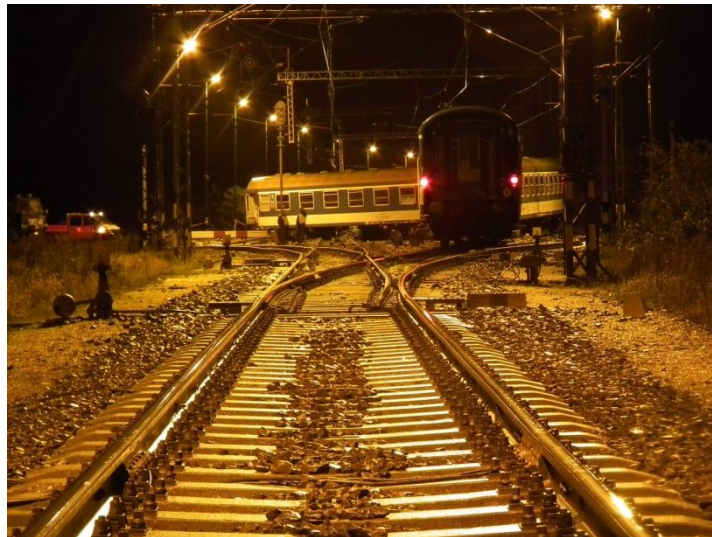
On 21 October 2014, at 20:40, the passenger train with reg. № 9021 rolled in to Ostffyasszonyfa station over switches in straight position, with proper signal handling. The leading four wagons of the train derailed on the switch № 1.

None of the 50 people on the train was injured. Passengers left the derailed train with the help of the train crew, and they were provided with coaches to continue their travel.

The occurrence caused serious damage to property. The superstructures of the switches № 1 and 3 and the switch zone were heavily damaged, and two exit signals were crashed down. The derailed vehicles were also seriously damaged.

The IC found that the primary cause of the occurrence was a collision with a wild animal. Inadequate maintenance of the locomotive as the direct cause led to the derailment accident which had significant consequences; otherwise it would probably have been an incident with negligible consequences. Shortcomings of maintenance were also found in the track maintenance area, and those also contributed to the incident indirectly. The collision with the wild animal would have negligible consequences in the case of proper maintenance.

The IC issued no safety recommendation.



Factual statements directly related to the occurrence of the event

The IC attributed the occurrence to the following direct causes:

Collision with an animal which hit the SW cover and its locking system.

The locking structure, which was not assembled using the parts specified in its plan drawing (using a cotter instead of a shaft), could not resist the impact of the collision.

Factual statements indirectly related to the occurrence of the event

Noncompliant fastening (other than specified in its plan drawing) of the dust plate used on Switch 1 at Ostffyasszonyfa station also contributed to the occurrence.

Other risk factors

The IC added no such comment.

5.5 2014-1145-5

Overview of the occurrence

On 04 November 2014, at 04:20, at Dombóvár station, the № 5 wheel pin of the 27th wagon (Reg. №: 31 55 5977 357-3) in the freight train № 63871-2 broke off while the train was leaving the station on Track VIII.

As a consequence, the wagon with the broken pin derailed with four axles, while the two wagons in front of it derailed with two axles. About 20 metres after the point of derailment, the broken pin, together with the case, dropped on the track. The two trailing wagons disconnected from the train when reaching the switch № 25, and, as a result, the train was braked automatically, and it stopped. No one was injured in the accident.

As a consequence of the derailment, 7 switches on the path of the train and the associated ladder track system were damaged and excluded from service.

The investigation found that the derailment of the wagon (Reg. №: 31 55 5977 357-3) in the freight train № 63871-2 was caused by the fatigue breakage of its leading axle.



Factual statements directly related to the occurrence of the event

The IC attributed the occurrence to the following direct causes:

the leading axle of the wagon with reg. № 31 55 5977 357-3 became unguided as a result of breakage of the axle pin № 5,

the breakage of the axle pin was the consequence of a fatigue process caused by the cyclically repeated mechanical load.

Factual statements indirectly related to the occurrence of the event

The IC added no such comment.

Other risk factors

The IC added no such comment.

5.6 2014-1293-5

Overview of the occurrence

On 03 December 2014, at 15:02 at Telekgerendás station, the passenger train № 7715, performing service on the Békéscsaba – Szeged line made an unscheduled stop on the switch № 5 because the locomotive driver realised that the switch would guide it to Track III where a freight train was staying. After stopping, the train reversed to have the switch № 3 in front of it, and then, after proper setting of the switches, it entered Track II which was clear.

The occurrence caused no personal injury or damage to property.

During the investigation, the IC found that, owing to the design of the safety installation, the entry signal displayed a 'Stop' signal to the train № 7715 in all likelihood, which it passed without prior notification and authorisation. No brake problem was found with the train. The IC attributed the occurrence to human factors on the part of the locomotive driver.

Factual statements directly related to the occurrence of the event

The locomotive driver believed he saw a pattern on the entry signal which actually could not have been displayed at that moment, and then he rolled on with his train according to the pattern he thought he had seen.

Factual statements indirectly related to the occurrence of the event

There was a safety installation malfunction at the station at the time of the occurrence, which brought about a situation which was different from the usual daily routine. Such malfunction had no influence on the signal patterns of the entry signal.

Other risk factors

No signalling is installed for the train control system on the Szeged – Békéscsaba railway line, which prevents the elimination of human errors related to locomotive drivers in the management of railway traffic.

5.7 2014-1357-5

Overview of the occurrence

On 16 December 2014, at 14:16 at Rákosrendező station, the train № 21125 performing service between Istvántelki Maintenance Workshop and Budapest-Nyugati station passed the individual exit signal (K3) at 'Stop!' without authorisation. Subsequently, the train burst open the switch № 16 (which was in wrong position for it).

The occurrence caused no personal injury. No trains got onto the same track concurrently as a consequence of such passing of a signal. The incident did not obstruct traffic on the main track.

Due to loss of the affected train from traffic, three train services were cancelled on the whole line.

During the investigation, the IC found that the train № 21125 moved through the station on a wrong path due to misunderstanding a pass signal displayed by the signal K2 to another train for the neighbouring track.

The train only applied emergency braking and stopped after realising the switch in wrong position. The train did not touch the path set for the train № 21125, and did not jeopardise the movement of the train № 21125.

A contributing factor to the occurrence was that the locomotive driver might have been tired at the time of the occurrence, and such fatigue prevented him from interpreting the signals along the track properly, even if just for a short time.

Regarding that the IC explored contradictions in the regulation of the traffic of the trains moving between Rákosrendező station and Istvántelki Maintenance Workshop, the IC proposes that a safety recommendation be issued to eliminate such contradictions.

Factual statements directly related to the occurrence of the event

On the basis of the information available, the IC attributes the occurrence to the locomotive driver's thinking erroneously that the pass signal displayed by the neighbouring individual exit signal K2 was addressed to his train.

Factual statements indirectly related to the occurrence of the event

The IC found that such misinterpretation of the displayed pattern on the individual exit signal had a contributing factor as well: as a combined effect of several factors, the locomotive driver might have been tired at the time of the occurrence, which temporarily made him unable to concentrate sufficiently to identify properly the patterns displayed by the two adjacent signals (located closely to each other).

Owing to his experience, the locomotive driver realised that he had no sufficient time to perform his tasks before the scheduled departure time of the train № 2126, so he got into time constraint. Being under pressure to solve his tasks, he chose the solution he thought to be the fastest: he concentrated on completion of the service with the train within the shortest possible time, and thus he paid less than necessary attention to observe the signals.

Other risk factors

During the investigation, the IC found that, as regards the management of train traffic, not all the tasks are consistently regulated between the stations Istvántelki Főműhely and Rákosrendező. In practice, the personnel managing daily train traffic bypass such inconsistencies, and perform their activities according to a locally evolved practice.

BA2014-1357-5-01: When exploring the circumstances of the event, the IC found that, as regards the management of train traffic, not all the tasks are consistently regulated between the stations Istvántelki

Főműhely and Rákosrendező. In practice, the personnel managing daily train traffic bypass such inconsistencies, and perform their activities according to a locally evolved practice. This circumstance implies a potential danger situation from the aspect of organising train traffic.

TSB Hungary recommends National Transport Authority, and indirectly to the railway undertakings affected, to revise the procedures applied currently in order to bring the traffic of the train sets moving as trains between the stations Rákosrendező and Istvánteleki Főműhely in harmony with the instructions which are parts of the safety management system.

In the case of implementing the recommendation, the potential danger situation currently implied in the system could be eliminated, as a result of which the general level of safety of train traffic would increase on the given line section.

5.8 2014-1362-5

Overview of the occurrence

The train № 807 moving through Dunai Finomító station according to timetable crashed with a spike driver on Track 1 of the station. No one was injured; the spike driver was destroyed, and the locomotive of the train became unserviceable. The IC attributed the occurrence to human factors on the part of the turnout locksmith and the supervisor of the works.

Factual statements directly related to the occurrence of the event

Despite the rules, the supervisor of the works failed to go to the station office prior to the start of the works or during the course of events, and did not agree with the traffic manager about the works to be done, and did not record in advance the start, finishing of the works and the restarting of the works at the new site.

However, the turnout locksmith entered the times of starting and finishing his work (in order to prove his presence); what is more, he added that 5 more people were working together with him, thus he misled the traffic manager.

Factual statements indirectly related to the occurrence of the event

The supervisor did not arrange for placing the required signals and assigning of a watchman, and he left the work area.

Other risk factors

The turnout locksmith made his comments without indicating the time of his entries.

5.9 2014-1413-5

Overview of the occurrence

The leading bogie of the tram number 47 (Reg. № 1413) moving in the direction of Városház square (Budafok) derailed with both axles in the turnout № K2604 in Móricz Zsigmond Circus. No one was injured, but there was minor damage to the vehicle and the railway track. The IC attributed the occurrence to the worn-out condition of the railway track.

The reconstruction of the track section involved in the occurrence is scheduled to commence in 2016.



Factual statements directly related to the occurrence of the event

Due to the worn-out condition of the railway track, the groove of the left (inner) rail was worn, weakened, and broke along the track which had been providing a widened tread for a considerable time, and consequently, both wheels of the tram became unguided, and the tram derailed.

Factual statements indirectly related to the occurrence of the event

Despite regular inspection and repairs, the track is in a worn-out condition, which increases the probability of similar accidents.

Other risk factors

The IC added no such comment.

5.10 2015-0065-5

Overview of the occurrence

A number 14 tram, consisting of three cars derailed with 4 axles when departing from its terminal at Lehel tér, Budapest. No one was injured, but the vehicles were damaged. The IC attributed the occurrence to the technical condition of the turnout affected, and to human factors on the part of the tram driver and the traffic managing dispatcher of BKK. The IC proposes no safety recommendation, regarding that similar occurrences may be prevented by observing the relevant rules.

Factual statements directly related to the occurrence of the event

Due to the design of the turnout, the switch tongues do not get in their end position in every case.

The tram driver did not check the position of the switch before starting the vehicle.

Factual statements indirectly related to the occurrence of the event

At the time of the accident, the tram drivers had to report any defect related to the operation of the infrastructure to the traffic managing personnel employed by the traffic organising company and not by the company operating the infrastructure, which actually took place when the defect was detected.

Safety-critical information detected outside the railway company was not transmitted to the technical personnel of the railway company, so elimination of the defect could not be started immediately.

The traffic managing personnel working with the traffic organising company (and not with the railway company) did not call the attention of the tram drivers to the hazard posed by the malfunction of the switch.

The elimination of the repeatedly occurring defect within the framework of the guarantee provided by the contractor had not been performed until the derailment.

After realising departure to the wrong direction, the tram driver started the tram again, and due to that, the vehicle left the rails.

Other risk factors

The IC added no such comment.

5.11 2015-0302-5

Overview of the occurrence

On 05 April 2015, at 06:35, the passenger train (reg. № 3059) approaching Track 12 at Budapest-Keleti station bumped into the buffer stop at the end of the track at low speed. Three of the passengers staying on the train had minor injuries. The motor train set and the buffer stop were significantly damaged.

The IC proposed a safety recommendation relating to a review of the design of buffer stops.



Factual statements directly related to the occurrence of the event

The IC attributes the occurrence to human factors on the part of the locomotive driver who very probably fell asleep for a short time during the approach and before the stop, and thus, he failed to stop the train in front of the buffer stop.

Factual statements indirectly related to the occurrence of the event

There is no methodology for the identification and possible control of the risk of people's fatigue in domestic railway practice. Accordingly, the risk arising from the locomotive driver's fatigue was not assessed and controlled.

Other risk factors

When vehicles equipped with coupling heads appeared, the buffer stops constructed earlier were not transformed to be compatible, so buffer stops cannot perform their safety increasing function in the case of those vehicles.

BA2015-302-5-1 During its safety investigation, the IC of TSB Hungary found that the design of the buffer stop at the end of Track 12, Budapest Keleti Station is dysfunctional when the buffer stop is hit by a vehicle equipped with a coupling head or centre buffer.

TSB Hungary recommends National Transport Authority to review whether at those points of the national railway network where the use of bumper stops is required such bumper stops (with regard to their design) are functional in the case of motor train sets, and to send the findings of their review to the railway companies which operate the affected infrastructure.

According to the position of the IC, in the case of accepting and implementing the recommendation, the infrastructure operators (relying on the findings of such review) may find and implement technical

solutions which meet the requirements of the mixed vehicle park on the one hand, and the force of the impact generated during the bumping of the vehicles equipped with a coupling head to the buffer stop can be distributed symmetrically on the other. Higher levels of safety may be achieved by introducing such technical solutions during renovations, reconstructions or specific development projects.

5.12 2015-0315-5

Overview of the occurrence

On 07 April 2015, on Children's Railway, MÁV Zrt., the locomotive of a train moving from Húvösvölgy to Széchenyihegy derailed next to the entry signal at the down-side end of Jánoshegy station. The derailed locomotive rolled on, and finally leaned to the side, towards the hillside, in an angle of ca. 45 degrees.

The IC found that there was a minor plane distortion in the railway track, and there was a significant directional error, the rails were worn out at the side, with a rough surface. The wheel load on the critical wheel of the locomotive was lower than expected, and additionally, the movement of the bogie was slightly obstructed.

As the maintenance of the railway track is performed on the basis of a set of outdated and incomplete rules issued 54 years ago, the IC proposes a safety recommendation relating to a revision of the track maintenance rules.



Factual statements directly related to the occurrence of the event

The wheel load of the locomotive dropped at the moment of derailment

The directional error of the joint caused a large run-up angle and a high demand for guiding force at the point of derailment.

The friction between the rail and the wheel flange was high because the contacting surfaces were fairly rough.

Factual statements indirectly related to the occurrence of the event

The static lateral wheel load of the locomotive was also the lowest in the case of the derailed wheel, and the spring limiter of the bogie may also have hit the plane distortion which was slightly worse than the limit value.

The lubrication of the rails and wheel flanges, which is done to decrease wear, has not been resolved since the modernisation of the vehicles.

A heavy rail system is built in a curve with small radius, which increases the risk of development of directional errors.

Track maintenance is based on outdated rules, with a too complex maintenance system, and very scarce resources are available.

Other risk factors

Only one dimension was recorded on the measurement sheet during the earlier measurement of the treads of the locomotive, and thus, the values characterising axle crookedness cannot be traced back.

The traction gear is completed with a chain connection, which may contribute to the risk that a locomotive leaning to the side pulls the passenger wagons with itself.

In the last few years, only 200 to 250 sleepers were actually replaced annually instead of the required 2000.

2015-0315-5 The IC found that the maintenance of narrow-gauge rail lines is performed according to the outdated, insufficient, and too strict MÁV Instruction D.56. The Instruction does not specify existing line structures in all cases, the specified dimension limits cannot be met during operation, and thus the specialist staff works on the basis of subjective dimension limits.

TSB recommends National Transport Authority to initiate the revision of Instruction D.56 (including reasonably less strict dimension limits which are in proportion to safety risks) with the railway infrastructure manager.

In the case of accepting and implementing the above recommendation, the supervision of the lines could be based on more reasonable regulation with objective technical conditions.

5.13 2015-0320-5

Overview of the occurrence

On 08 April 2015, at 07:36 hours, the last two wagons of the train No. 83331, which was accessing Track III of Nógrádszakál station and leaving after a stop were routed to Track II incidentally. The empty wagon No. 31 56 277 2073-5, Type Habbins, derailed and turned across.

Due to the occurrence, both the Balassagyarmat-Ipolytarnóc and the Nógrádszakál-Nógrádszakál state border railway lines were locked. The passengers on the trains were transported by replacement coaches between Balassagyarmat and Ipolytarnóc stations.

No person was injured in the occurrence.

During the site survey after the accident, the IC concluded that the occurrence may be attributed to human factors.

The site survey found that Shunt 1 of the station was changed over under the wheels of the moving train, and due to this, the front bogie of the wagon No. 31 56 277 2073-5 was routed to Track III, while its rear bogie was routed to Track II. The train ran through the station in this way, until the up side of the station where the track branches out toward Nagykürtös station, i.e. the distance between the centres of tracks begins to increase (i.e. not parallel anymore), and the misdirected wagon derailed. As a consequence of derailment, the main brake pipe of the freight train was damaged, which braked and stopped the train.

During the investigation, the IC concluded, independent of the cause of the occurrence, that the Station Instructions which regulates international traffic needs updating, and for this reason the IC suggests that a safety recommendation be issued in connection with the occurrence.



Factual statements directly related to the occurrence of the accident

In the opinion of the IC, the occurrence may be attributed to human factors, as the switch No. 1 of Nógrádszakál station was set to straight direction position before the train No. 83331 left it, and without an authorisation given to the pointsman, and as a result of that, the bogies of the last but one wagon in the train set ran on different tracks, and the wagons derailed.

Factual statements indirectly related to the occurrence of the accident

The train No. 83331 was allowed to access in diverging direction instead of the straight direction specified in the service timetable given to the station.

The train No. 83331 accessing Nógrádszakál station failed to stop in front of the switch No 1 which was set inappropriately (in diverging direction) for it.

The train stopping at Nógrádszakál station to change crew stopped at another location than that specified in the instructions, and due to that, the tail of the train was left outside the entry signal of the station.

Other risk factors

Some of the provisions in “Station Instructions for traffic management on the Malé Straciny/Nógrádszakál – Ipolytarnóc /Lucenec shared (peage) railway line used by MÁV Ltd. and ŽSSK CARGO a.s.” have become outdated, have not been adapted to changes, and due to that, daily practice has developed procedures differing from those provisions.

BA2015-0320-5-01: Some of the provisions in “Station Instructions for traffic management on the Malé Straciny/Nógrádszakál – Ipolytarnóc/Lucenec shared (peage) railway line used by MÁV Ltd. and ŽSSK CARGO a.s.” intended to regulate the managing of the traffic of trains have become outdated, have not been adapted to changes with time, and due to that, daily practice has developed procedures differing from those provisions.

TSB Hungary recommends Hungarian Transport Authority to review the harmony between “Station Instructions for traffic management on the Malé Straciny/Nógrádszakál – Ipolytarnóc/Lucenec shared (peage) railway line used by MÁV Ltd. and ŽSSK CARGO a.s.” and the F.2. Train Loading and Running Regulations in effect in Hungary, and to call MÁV Ltd. to upgrade the Station Instructions.

According to the position of TSB the implementation of this recommendation would contribute to making the rules of the traffic management of the international freight trains transparent easy to comply with and to interpret uniformly for all of the parties concerned.

5.14 2015-0459-5

Overview of the occurrence

On 12 May 2015, the second wagon of a passenger train moving from Széchenyihegy to Hűvösvölgy derailed with its leading bogie after Jánoshegy station. The train travelled ca. 30 metres after derailment until stopping.

The IC found that two graduated leaves of the leaf spring of the derailed wheel had been long before the accident without being detected. The wagons are not inspected properly before connecting them to the train.

Factual statements directly related to the occurrence of the event

Two graduated leaves of the leaf spring of the derailed wheel had been long before the accident without being detected. The wagon derailed soon after breakage of the remaining spring leaves receiving extra loads.

Factual statements indirectly related to the occurrence of the event

The bogie of the wagon was not subject to the necessary inspection and repair at the specialised garage.

Inspection of the wagons is the locomotive drivers' task according to the technological requirements of railway operation, but no time is allocated to this task.

Due to the bogie design of the wagon, it is fairly time-consuming to check the condition of the leaf springs visually.

Other risk factors

The parameters of the wheels of the wagon fell outside the dimension limits, but their asymmetry already indicated that the rolling of the wagon is not perfect. During the repair of this defect (removal and machining of the wheel pair), possible ring leaf defects can also be identified.

No appropriate run time record is available in the maintenance process.

The railway track contains minor plane distortions and sudden alterations of tread.

5.15 2015-0476-5

Overview of the occurrence

On 19 May 2015, at 23:45, a truck with Slovakian registration plate and the locomotive of the train № 97002 collided in the level crossing located in Railway Section 1185 between Szombathely and Ják-Balogunyom stations. The locomotive driver, the shunter and the assistant shunter suffered minor injuries as a consequence of the accident. The truck driver was severely injured. Due to the impact forces, the locomotive left the track with all of its axles, and the leading bogie of the leading wagon of the train derailed with two axles. The railway track was also damaged moderately, while the truck was damaged heavily. The Diesel oil leaking from its the fuel tank polluted the environment.

The warning lights protecting the level crossing were unserviceable (black) at the time of the occurrence.

According to the IC, the occurrence can be attributed to human factors on the part of the truck driver, but there was a contributing factor, too: the warning lights protecting the level crossing were out of order. As the accident could have been prevented by observing the relevant provisions of existing railway instructions, regulations and the KRESZ (Highway Code), the IC finds it unnecessary to issue a safety recommendation relating to the occurrence.

**Factual statements directly related to the occurrence of the event**

The IC attributed the accident to human factors on the part of the truck driver who entered the level crossing without stopping and checking the possibility of safe crossing, despite the fact that nothing prevented him from perceiving the train approaching from the left at low speed.

Factual statements indirectly related to the occurrence of the event

The warning lights protecting the level crossing were out of order.

The trucks were travelling one after the other in close succession, so the driver of the truck approaching the level crossing had no sufficient time to check the road signs and the warning lights.

Other risk factors

The IC added no such comment.

5.16 2015-0516-5

Overview of the occurrence

On 19 May 2015 on Szajol station the pantograph of the locomotive train № 45415-2 fractured, and 35 minutes later the pantograph of the locomotive train № 346-1 also fractured.

Factual statements directly related to the occurrence of the event

The IC found that the train № 45415-2 was allowed to enter the station despite the fact that the cause and location of the permanent short circuit formed in the overhead network of the station had not been found and it had not been checked whether the structure clearance was unobstructed.

Following the occurrence, the electrical operations manager authorised the train № 346-1 to move although he had no accurate information on the condition of the infrastructure.

Factual statements indirectly related to the occurrence of the event

The traffic manager did not give priority to the information implying a traffic safety risk after receiving reports with conflicting information contents from the electrical operations manager and the duty team staying on-site.

Other risk factors

The IC added no such comment.

5.17 2015-0527-5

Overview of the occurrence

The passenger train № 2329 in service between Vác and Budapest-Nyugati station crashed with the buffer stop at the end of Track V.

The train approached Track V of the station at a speed of ca. 20 km/h. During the approach, the locomotive driver set the brake valve to service brake mode, but the train did not slow down as expected, so he applied emergency braking. The train crashed with the buffer stop at the end of the track due to the short distance available.

The IC found that, at the beginning of braking (with D12 brake valve № 696 set in service brake mode), the pressure in the main line rose over 5 bars instead of decreasing, so no braking effect was formed, it was actually formed only later on, in the emergency braking mode. The phenomenon which caused a collision to the buffer stop despite initiated braking can be reproduced if the brake lever is subject also to a vertical force in addition to the operating force, e.g. when the locomotive driver leans on the brake lever.

TSB issued a safety recommendation to MÁV Start Zrt. during the investigation, proposing an out-of-turn inspection of the vehicles equipped with type D brake valves in order to screen out this defect, with the device set to travel mode and at least two braking modes. The recipient performed the recommendation, and the defective valves found were sent to repair.

When closing the investigation, TSB issues another safety recommendation to National Transport Authority, recommending them to obligate MÁV START Zrt. to elaborate the currently missing repair and assembly technology for the type D12 brake valves installed in the vehicles operated by the company, which should include a review of the dimension limits of the cooperating parts, the specification of the tilt limits of the guide bush, and the measurement of actual tilt of the guide bush in service brake mode, due to the construction design.

Factual statements directly related to the occurrence of the event

The IC attributed the accident to the following direct causes:

- the pressure in the main line rose over 5 bars with the type D12 brake valve № 696 set in service brake mode,
- the irregular increase of pressure in the main line resulted in a delayed braking effect, which in turn resulted in a critical increase of the braking distance.

During the maintenance of the affected brake valve, the guide bush and the cap screw were assembled with their dimensions close to the limit values; thus, when the brake lever was pushed down, the guide bush was able to tilt in the hole of the cap screw as far as allowed by the largest free play between them, and, as a consequence, it opened the fast load valve.

Factual statements indirectly related to the occurrence of the event

As a result of the opening of the fast load valve, the pressure in the main line rose over 5 bars.

The D2 assembly and repair technology, which is also used with the assembly and repair of the brake valve D12 includes no dimension limits or inspection procedure to identify the above problem and prevent the phenomenon described above.

Other risk factors

The IC added no such comment.

Interim safety recommendation

TSB Hungary issued the following safety recommendation on 11 June 2015, during the investigation:

BA2015-0527-5-01A: During the investigation performed so far, the IC found that upon a slight push on the brake valve lever D12 (e.g. someone leaning on it) used in the locomotive the pressure in the main line increased (see the main line pressure diagram recorded on the test bench attached), which influences the braking effect exerted on the train, and the expected braking effect cannot be achieved, especially in a braking position.

TSB recommends MÁV-Start Zrt. to inspect the vehicles equipped with type D braking valves, out of turn, with the device set to travel mode and at least two braking modes, in order to screen out this defect.

In the case of implementing the above recommendation, unintended brake release caused by operating possibly defective brake valves could be avoided on moving trains.

5.18 2015-0653-5

Overview of the occurrence

On 01 July 2015, at 00:24, the freight train № 44471 was guided, without prior notification, to Track V occupied by the wagons of the train № 2420 at Rákospalota-Újpest station. After the freight train stopped, the distance between the two trains was 300 metres.

The traffic manager in charge reported to the event to the line traffic manager at 00:45, and then authorised the train № 44471 to go on in the direction of Rákosszentmihály station at 00:49, thus changing the scene of the event.

The freight train was 25 minutes late due to the occurrence.

During the investigation of the event, the IC concluded that it can be attributed to human factors.

The station crew involved in managing traffic for trains failed to follow the specified procedure when setting the route for the train № 44471, and consequently, they did not identify the fact that the track assigned for the movement of the train was occupied, and they guided the train to the occupied Track V of the station without prior notification.

Regarding that similar cases can be prevented by observing the relevant rules, the IC proposes no safety recommendation to be issued.

Factual statements directly related to the occurrence of the event

The IC found that the occurrence can primarily be attributed to human factors.

The station crew involved in managing traffic for trains failed to follow the specified procedure when setting the route for the train № 44471, and consequently, they did not identify the fact that the track assigned for the movement of the train was occupied, and they guided the train to the occupied Track V of the station without prior notification.

Factual statements indirectly related to the occurrence of the event

The IC added no such comment.

Other risk factors

Based on information available, the IC concluded that:

the station safety installation installed at this station has no feature to give feedback to the station crew involved in traffic management for trains relating to the occupied status of the track at the station, or to inspect the current occupation status of the tracks automatically when the crew are about to send out 'Clear' signals.

the station crew and the train crew involved in the occurrence did not treat the occurrence as required by the nature of the occurrence and the rules fixed in the relevant instructions, they tried to conceal it, and reported it with a delay only, and with data content which is different from the actual facts.

5.19 2015-0659-5

Overview of the occurrence

On 03 July 2015, at 16:06, at Uzsa station, the train № 9603 (95 55 0117 252-7) entered Track I which was occupied by the train № 9616 (95 55 0117 339-2) instead of the unoccupied Track II. The approaching train stopped about 230 metres from the other track staying on the same track.

Two services were partly lost due to the occurrence: 2 passenger trains were 91 minutes late. No one was injured.

During the investigation, the IC concluded that the occurrence could be attributed to human factors. According to a wrong local practice, the assigned route was not reported by telephone, and thus, an assignment error remained undetected.

The instructions intended to regulate the managing of train traffic, as well as the Operation Rules of the equipment contain clear rules relating to the way how to manage concurrent train movements. The wrong practice which evolved here overrode part of the rules, and, as a result, some of the accompanying safety guarantees got lost, and the checks integrated in the work process did not reveal this.

Regarding that similar cases can be prevented by observing the relevant rules, the IC proposes no safety recommendation to be issued.

Factual statements directly related to the occurrence of the event

According to the position of the IC, the occurrence can be attributed primarily to human factors. Due to a mishap and to non-compliant operation of the equipment, the assignment of the route was not performed in accordance with the oral instruction, and neither the traffic manager nor the pointsman noticed it.

The route assignment was not reported by telephone, and so that opportunity to detect the error was missed.

Factual statements indirectly related to the occurrence of the event

The IC added no such comment.

Other risk factors

The IC added no such comment.

5.20 2015-0674-5

Overview of the occurrence

On 07 July 2015, at 02:10, on a route closed from Track X at Kecskemét station, the first wagon (Reg. № 33 56 596 5137-6) and the second wagon (Reg. № 33 80 534 2381-4) of the train № 73729 (Rail Cargo Hungaria Zrt) derailed on the switch number 28 of the station while leaving the station at a speed of 10 km/h, with handling of the switch. The leading wagon derailed with two axles, and the other with 4 axles.

Due to the derailment, the switch rod and the connecting rod of the switch number 28 were deformed, the sleepers supporting the turnout were damaged, and the switch tongue suffered some deformation needing correction. The rods and the dust plate of the switch number 26 were also damaged by the derailed wheels.

The tracks Nos. VII, VIII, IX and X of Kecskemét station were also excluded from the traffic for the duration of the elimination of the damages.

During the investigation of the scene, the mark of a long skid was found between the rails in the crossing of the switch number 28, and a chock wearing the typical marks of damage caused by jamming. The IC found that the cause of derailment was a chock left in front of a wheel of the train.

Factual statements directly related to the occurrence of the event

According to the IC, the cause of the accident was the failure to remove the chock from the track. The chock with worn finish was used in a wrong place, and was not removed from the rail before the train started, and, while skidding along the rail, it was jammed in the crossing part of the switch number 28, and blocked the rolling rails, which finally caused a lift and derailment of the vehicles.

Human factors related to the shunting assistant, who failed to collect the chock, also contributed to the occurrence.

Factual statements indirectly related to the occurrence of the event

It was found during the investigation that the finish of the chock which caused the derailment was worn with the first signs of rust, which significantly influenced its visibility, especially in the circumstances of poor lighting.

After evaluating the lessons learnt from earlier similar accidents, MÁV Zrt., finding the level of safety adequate, did not find it necessary to take action to improve the visibility of the device and thus to decrease a safety risk.

The locally evolved practice changed the scopes of responsibility, because the shunting assistant supposed that the examiner had replaced the chock as a favour, as it had occurred before.

Other risk factors

The IC added no such comment.

5.21 2015-0729-5

Overview of the occurrence

On 23 July 2015, at 11:10, a passenger train collided with a car which was crossing the track despite the red warning lights at a level crossing (protected with warning lights), involving a dirt road, at Csorna station. The 4 occupants of the car died on the spot.

According to the IC, the cause of the accident can be attributed to human factors related to the driver of the road vehicle.

During the investigation of the scene, the IC found such circumstances around the level crossing which may result in distraction, which may have contributed to the occurrence, so the IC proposed that an interim safety recommendation be issued.

Factual statements directly related to the occurrence of the event

The IC attributed the occurrence to human factors related to the driver of the road vehicle: the driver entered the level crossing in spite of the stop signal of the warning lights.

Factual statements indirectly related to the occurrence of the event

On a regular basis, there are trucks parked in a place where they partly hide the traffic signs and warning lights.

Other risk factors

The traffic signs at the side of the road are partly worn-out and damaged.

BA2015-0729-5-01A: During investigation of the scene, the IC found that the road signs warning of the level crossing are incomplete, damaged, and difficult to see. In addition, as shown by the wheel marks recorded, trucks are parked at the northern side of the level crossing on a regular basis, hiding the road signs warning of the level crossing, and make it difficult to observe the warning lights.

TSB Hungary recommends the Inspectorate of Transport of Győr-Moson-Sopron County Government Office to review the environment and design of the level crossing, and to take action as necessary to provide continuous visibility of the warning lights.

In the case of accepting and implementing the above recommendation, the risk of accidents occurring due to similar causes may be reduced significantly in the opinion of the IC.

5.22 2015-0757-5

Overview of the occurrence

On 28 July 2015, at 18:12, the 8th, 9th and 10th wagons of the train № 42200 (approaching Komárom marshalling yard) derailed (each with one bogie) on the 'b' part of the switch number 22.

Due to the occurrence, the traffic on the main line № 1 was suspended until 20:20 o'clock, which caused total delays of 1918 minutes to 23 passenger trains and 1488 minutes to 11 freight trains.

During the investigation of the occurrence, the IC found that the wagons of the train approaching the station jammed after emergency braking caused by erroneous signal detection from the track side.

Due to the curve geometry of the track, some lighter wagons in the middle of the train were lifted by the heavier, yet unbraked wagons running behind them, which made the lighter wagons derail.

A contributing factor to the occurrence was that the buffers of the vehicles involved in derailment were unlubricated and made the sliding of the surfaces more difficult, thus increasing the willingness of the wagons to derail.



Factual statements directly related to the occurrence of the event

Based on available data, the IC concluded that the event had occurred as the resultant of the combined effects of various factors which were independent of one another. None of those contributing factors would have been sufficient in itself to produce the event, but their combined effect was.

According to the position of the IC, the following factors might have played a role in the occurrence:

- Automatic application of the brakes occurred due to erroneous signal output,
- the lubrication of the buffer spring disks of the trains was inadequate,
- The train type switch of the brake equipment of the locomotive was set to passenger train position instead of freight train position.
- Several wagons with low total mass were set directly one after the other to the first part of the train.
- While approaching the station, the train was moving on switches set to diverging position.

Factual statements indirectly related to the occurrence of the event

The IC added no such comment.

Other risk factors

The IC added no such comment.

5.23 2015-0813-5 AND 2015-822-5

Overview of the occurrences

09 August 2015

On 09 August 2015, at 17:37, the train № 3543 performing service between Gárdony and Kőbánya-Kispest stations passed the signal at Danger! (K3) without authorisation after a scheduled stop at Kápolnásnyék station, and then burst the number 8 switch (which was in wrong position) open.

No one was injured due to the occurrence. No trains were using the same track simultaneously as a consequence of the signal overrun.

21 passenger trains had a total delay of 611 minutes on the affected railway due to the occurrence.

During the investigation, the IC found that the train № 3543 departed from Kápolnásnyék station the exit signal K3 unhandled for it. The locomotive driver detected the 'Stop' display on the exit signal when he was right in front of it, and he applied emergency braking, but was not able to stop the train already. After bursting the number 8 switch (which was in wrong position) open, it stopped on the route set for the train № 18505.

The train № 18505 was at such a large distance at the time of the occurrence that its safe movement was not directly endangered by the occurrence.

11 August 2015

On 11 August 2015, at 14:25, the freight train № 94880 passed the individual exit signal 'P' at Danger! at Nagykanizsa station, while going through the station according to schedule. After the signal overrun, it burst the switch number 43 open, and finally stopped upon manual signal displayed by the station crew.

The affected switch was part of the route set and separated for the passenger train number 8253-2, but the passenger train had not started departure yet.

No one was injured due to the occurrence but train traffic suffered a total delay of 317 minutes. The switch number 43 had insignificant damage.

During the investigation, the IC found that the train № 94880 failed to stop in front of the individual exit signal 'P' despite its 'Danger' position but overran it without authorisation, so it entered the exit route separated for the passenger train number 8253-2 by bursting the switch number 43 open. The locomotive driver did not detect anything, he only stopped his train upon the 'Stop' signal given manually by the pointsman located at his workstation.

The train number 8253-2 had not started departure yet at the time of the event, so the safe movement of this train was not endangered directly.

The IC attributes the occurrences to human factors. The trains Nos. 3543 and 94880 departed from the respective stations with danger signal displayed on the individual exit signals on their routes, and without authorisation to pass such signals.

A contributing factor to the case was that, although the traffic management crew had at hand the communication channels suitable for providing the affected train crews with extra information on the current traffic situation immediately before the occurrences, they did not do so, despite the fact that it is required by the train Loading and Running Regulations. Such information on the cause and expected duration of staying at the station could have contributed to reduction of the probability of the occurrences.

During the investigation, the IC found that similar occurrences can be prevented by observing the rules in the relevant railway regulations in effect, so the IC proposes no safety recommendation relating to the investigation of the events, but the IC finds it necessary to remind the parties involved that the probability of similar occurrences may be reduced by improving the safety-critical communication competences of the personal involved.

Factual statements directly related to the occurrence of the events

Based on data available, the IC attributes the occurrences to human factors.

Due to human error, the trains Nos. 3543 and 94880 departed from their respective stations with danger signal displayed on the individual exit signals on their routes, and without authorisation to pass such signals.

Factual statements indirectly related to the occurrence of the events

09 August 2015 (Kápolnásnyék)

The decision to have the train overtaken was made too late, due to which the overtaking operation was performed differently from the usual practice, which made it easier to the train crew to make a mistake.

The chief train inspector of the train № 3543 issued a 'Ready to start' signal to the locomotive driver despite the fact that the exit signal was set at danger.

Other risk factors

In both cases, the traffic management crew had at hand the communication channels suitable for providing the affected train crews with extra information on the current traffic situation immediately before the occurrences, which could have contributed to reduction of the probability of the occurrences. The train Loading and Running Regulations requires that information be given on the cause and duration of staying at the station.

5.24 2015-0895-5

Overview of the occurrence

On 27 August 2015, at Fertőboz station, during a crossing of routes, the train № 9912 continued its travel after the arrival of the train from the opposite direction, overran the exit signal at Stop without authorisation, then burst the switch number 1 (not set for this train) open. No one was injured due to the occurrence.

The IC found that the event occurred in relation to the attention of the locomotive driver and the chief train inspector.

Factual statements directly related to the occurrence of the event

Prior to departure, the locomotive driver, probably due to an error of attention, did not detect that the exit signal was at 'Stop'.

Factual statements indirectly related to the occurrence of the event

The chief train inspector issued a 'Ready to start' signal without checking the exit signal position. The signal given by the chief train inspector worked as false confirmation to the locomotive driver.

Other risk factors

The traffic manager included such additional information (not relevant for traffic) in the authorisation to continue travel which had an adverse effect on the locomotive driver's peace and attention.

5.25 2015-0928-5

Overview of the occurrence

On 06 September 2015, at dawn, the locomotive of a freight train approaching Békéscsaba station, with signal handling, through a separated route, crashed with the trailing wagon of a freight train which had arrived shortly before, and was staying on the adjacent track with its trailing wagon left outside the shunting limit signal.

During the investigation of the scene, the IC found that the occurrence was possible due to a lateral protection error of the new safety installation put into use two days before; such error was a consequence of an error in the dependency diagram.

The IC found that the mistake made during the preparation of the diagrams was not revealed by the inadequate plan inspection process. However, the overcrowded traffic at the station with decreased capacity (due to construction works) also contributed to the occurrence.

As the quality of organisation of implementing a safety installation plays a decisive role in revealing possible mistakes in the design plans, the IC proposes that a safety recommendation be issued relating to a more accurate regulation of the certification process.



Factual statements directly related to the occurrence of the event

The train № 44463-2 stopped with its tail remaining outside the shunting limit signal

During the setting of the route, the safety installation failed to check properly (due to a planning mistake) whether the vehicles on the adjacent tracks were staying within the shunting limit signals.

The locomotive driver of the train № 44471-2 did not realise the obstruction in time (2.2.11).

Factual statements indirectly related to the occurrence of the event

The Station Instructions and the orderly book in effect at the time of the accident contain uncertain information relating to the available track length; the data available is inaccurate.

The train № 44463-2 was received in a crowded traffic situation, at a station with decreased capacity, on a track which was short for the train due to the available length of the overhead wire.

The train crew did not detect that the tail of the train had stopped outside the shunting limit signal, but it is not their responsibility, regarding that there is a safety installation.

There was a designing error during the design phase: the designer was not fully aware of the design requirements as regards form and contents.

The inspections did not reveal the designing error: no specific review was performed; no design review methodology is available or it was not applied.

The certification auditor of the main contractor detected the disorganised nature of the design reviewing, but it had no reaction to the finding of the mistake made before.

The necessary capacity of the station was not specified properly during the preparation of the project.

Locomotive Driver 2 applied weaker braking effect than expected.

Other risk factors

The train № 44463-2 was received with a subsidiary signal through a track route which contains a long section where the overhead wire carries no voltage.

The headlight of the locomotive dims when the pantograph is retracted.

The skills required of the personnel include knowledge of certain signals which are not available and will not even be introduced in the foreseeable future. There is no procedure to check the up-to-date knowledge of railway traffic of the designer of the safety installation.

The written instructions handed over contained unnecessary items of data, and were practically uninterpretable due to the large quantity of information.

During the design approval process, the design may change in such manner that such change is not performed by the authorised designer who may not even be aware of such change. The development of the design review processes of the contractor shows slow progress.

The necessity and contents of certification is not specified adequately in the relevant legislation.

The investment project is performed by large, complex, organisations with slow administration. Works had to be reorganised during the implementation and more design alternatives had to be prepared than expected initially, with short deadlines.

The legal and financial preparations took unproportionally long time during the implementation of the project.

5.26 2015-1067-5 and 2015-1277-5

Overview of the occurrences

On 07 October 2015, at 10:51, the train № 7726, providing service between Sopron and Wiener Neustadt (AT) stations, collided with a car at the level crossing AS270 protected with warning lights between Sopron station and the state border.

The driver of the car died on the spot due to the accident; none of the occupants of the train was injured. The self-propelled railcar of the train set derailed with one axle, and became unserviceable.

On 30 November 2015, at 14:58, the train № 7737 collided with a car at the level crossing AS270 protected with warning lights between the state border near Sopron and Sopron station.

The driver of the car had light injuries, while the passenger of the car died after being carried to hospital.

During the investigation of the scene, the IC found that the level crossing is properly signposted for the users of both the railway and the road. The signals displayed by the warning lights can be observed by the road users clearly from a safe distance.

In both cases, the reduced sight triangle was provided from the direction of approach of the car to the direction of approach of the trains involved in the accidents.

The trains involved in the accidents were travelling at the speeds specified in the timetable, and the drivers of the locomotives of the trains did their best to avoid collision, according to the position of the IC.

During the investigation of the scene after the second event, the parties involved decided to take actions beyond existing requirements in order to increase the safety of the affected level crossing.

According to the position of the IC, the occurrences can be attributed to human factors on the part of the users of the level crossing. Similar accidents can be prevented by observing the relevant rules of the Highway Code.

For the aforesaid reasons, the IC proposes no safety recommendation relating to the occurrences.

Factual statements directly related to the occurrence of the event

On the basis of the findings of the investigation of the scene, analysis of the documents obtained and photographs taken, the IC concluded as follows:

The drivers of the cars started to cross the level crossing despite the red lights of the warning lights, and the lights were visible from a sufficient distance.

The cars got into the structure clearance, and were not able to leave it by the time the train arrived there, which resulted in a collision of the train and the car in each case.

The trains involved in the events did not exceed the speed limits specified in the timetable, and the drivers of the locomotives of the trains did their best to avoid collision, according to the position of the IC.

Factual statements indirectly related to the occurrence of the event

The IC added no such comment.

Other risk factors

The IC added no such comment.

5.27 2015-1126-5

Overview of the occurrence

On 21 October 2015, at 14:04, the 14th wagon in the shunting movement Cargo 1 consisting of 25 loaded wagons derailed with both axles of its leading bogie on the switch number 3 of Délegyháza station while the train set was approaching on the separated route on Track IV, with signal handling. The derailed wagon damaged the railway track.

According to the findings of the IC, the occurrence was caused by asymmetric distribution of the load in the wagon. The load was not checked at the site of loading, which contributed to the occurrence.

As similar accidents can be prevented by observing existing rules and the relevant rules in the modified Operation Instructions valid for the railway network of Kiskunlacházi Kavicsbánya Kft., the IC proposed no safety recommendation.

Factual statements directly related to the occurrence of the event

Derailed was the consequence of the asymmetric wheel loads of the freight wagon, which was due to asymmetric distribution of the load in the wagon.

Factual statements indirectly related to the occurrence of the event

RCH provided a wagon with properties other than those specified in the order form.

Neither the forwarder, nor the loading organisation raised any objection when confirming the order or when such wagons were delivered which cannot be loaded in a compliant manner using the equipment available.

The steps of inspection of the load in terms of transport safety as specified in Section 3.1.3, RCH Manual 2 were not performed at the site of loading.

The self-discharging wagons were loaded from one side, using a loading machine which almost fully excluded the possibility of even load distribution due to its structural shortcomings.

The acceptance of the loaded wagons for haulage and the inspection of compliance with the rules of loading are performed in places other than the site of loading, which implies taking the risk of an accident on the way to the point of acceptance (which means a distance of 5 to 6 km in the case investigated).

The executive order for the private railway network of Délegyháza-Újbánya supports acceptance of goods to be received for the purpose of haulage at locations other than the site of loading.

Other risk factors

The IC added no such comment.

5.28 2015-1181-5

Overview of the occurrence

The passenger train № 36628 travelling from Debrecen to Tiszalök collided with a car at the level crossing № AS46; the driver of the car died on the spot. According to the IC, the factors contributing to the occurrence were the thick fog formed due to unfavourable weather, the dark environment of the road barrier caused by malfunction, and human factors on the part of the driver of the car. The IC proposes a safety recommendation for modification of the procedures to be followed in cases of failure mode of level crossings in the open line sections, and for the technical layout of level crossings without signals.

Factual statements directly related to the occurrence of the event

Prior to the accident, the road barrier AS46 got into failure mode, which the locomotive driver of the train № 36628 was not aware of, so he did not lower the speed of the train.

Due to thick fog, visibility decreased to 30-50 metres at the time of the accident.

The driver drove his car to the level crossing without stopping and making sure that crossing would be safe.

Factual statements indirectly related to the occurrence of the event

The road barrier system used at the site of the occurrence does not comply with the requirements of the National Railway Regulation (OVSZ), because in the case of a failure mode condition arising after the start of its closing, the warning lights go out, so they do not continue giving signal until the train leaves the level crossing.

The regulations currently in effect (OVSZ, FMSZ, Instructions for the National Railway Network, Highway Code) passes all responsibility of using a level crossing on the drivers of road vehicles in cases where the road barrier gets into failure mode and the first train cannot already be notified of it, despite the fact that the driver of a road vehicle cannot make sure in each case that crossing is safe.

Other risk factors

The F.1 Signalling Regulation does not require giving a warning audio signal in cases where visibility is limited.

When closing the safety investigation, TSB Hungary issues the following safety recommendations proposed by the Investigating Committee:

BA2015-1181-5-1 During its safety investigation, the IC of TSB Hungary found that in the case that a train is approaching and the level crossing on the open track gets into the break-down state, the section № 3.1.2.2.3. of Volume 1 of National Railways Regulation (hereinafter: "OVSZ") published as Annex to Decree № 103/2003. (XII.27.) of the Minister of Economy and Transport GKM will not prevail because the level crossing warning lights go out immediately. In the case of a break-down state, the regulations currently in effect (OVSZ; Technical Rules of Traffic Regulation published as Annex to Decree № 20/1984. (XII.21.) of the Minister of Transport on traffic regulation and placement of traffic signs; Instructions for the National Railway Network; and the Joint Decree № 1/1975. (II.5.) of the Minister of Transport and Postal Services and the Minister of the Interior) passes the responsibility of crossing exclusively on to the driver of the road vehicle when the track is occupied by moving trains which cannot be warned already, despite the fact that the driver of the road vehicle cannot check in each case whether crossing is safe. For this reason,

TSB Hungary recommends National Transport Authority to require the installation a 3-minute prolongation of the red light ('red extension') as a condition of issuing authorisation for placing in service of railway crossing barriers where the locomotive driver is provided no information (neither direct, nor indirect) on the state of the level crossing.

In the case of accepting and implementing the above recommendation, a 3-minute prolongation of the red light ('red extension') would provide sufficient time for the train to pass the level crossing in the case of an error during the detection of the approaching train, in the opinion of the IC. In the case of other errors, the train will probably be able to cross with the railway crossing barriers in closed position, and the traffic managing personnel will have 3 extra minutes to notify the train which is approaching a level crossing in break-down state. Accordingly, the number of accidents could be reduced significantly in the case of malfunction of railway crossing barriers.

BA2015-1181-5-2 During its safety investigation, the IC of TSB Hungary found that in the case that a train is approaching and the level crossing on the open track gets into the break-down state, the section № 3.1.2.2.3. of Volume 1 of National Railways Regulation (hereinafter: "OVSZ") published as Annex to Decree № 103/2003. (XII.27.) of the Minister of Economy and Transport GKM will not prevail because the level crossing warning lights go out immediately. In the case of a break-down state, the regulations currently in effect (OVSZ; Technical Rules of Traffic Regulation published as Annex to Decree № 20/1984. (XII.21.) of the Minister of Transport on traffic regulation and placement of traffic signs; Instructions for the National Railway Network; and the Joint Decree № 1/1975. (II.5.) of the Minister of Transport and Postal Services and the Minister of the Interior) passes the responsibility of crossing exclusively on to the driver of the road vehicle when the track is occupied by moving trains which cannot be warned already, despite the fact that the driver of the road vehicle cannot check in each case whether crossing is safe. For this reason,

TSB Hungary recommends the transport supervision organisation of each Government Office in Hungary to consider the necessity of prolongation of the red-light period ('red extension') at the level crossings in a joint effort with the operating organisation during the periodical inspection of the road barriers at the level crossings, taking into account the layout and traffic of such level crossings, and to take action as necessary.

In the case of accepting and implementing the above recommendation, a 3-minute red extension would provide sufficient time for the train to pass the level crossing in the case of an error during the detection of the approaching train, in the opinion of the IC. In the case of other errors, the train will probably be able to cross with the railway crossing barriers in closed position, and the traffic managing personnel will have 3 extra minutes to notify the train which is approaching a level crossing in break-down state. Accordingly, the number of accidents could be reduced significantly in the case of malfunction of railway crossing barriers.

5.29 2015-1252-5

Overview of the occurrence

On 24 November 2015, at 13:35, the trains Nos. 28258 and 28299 moved opposite each other between the stations Kaposmérő and Kiskorpád. Detecting each other visually, the drivers of the vehicles applied emergency braking, and stopped at a distance of 197 metres from each other. There was no personal injury or damage to property due to the occurrence.

The IC attributed the occurrence to human factors related to the traffic manager at Kaposmérő station, who authorised the train of locomotives № 28258 to move out to the single-track line prior to the arrival of the inbound train from the opposite direction. The IC identified several organisational and operational factors which increased the risk of that malfunction.

One of the organisational factors was that, following the installation of the voice recording system, the witnesses were omitted from the process of requesting and giving authorisations, which is against the rules in the Train Loading and Running Regulations.

Similar occurrences can be avoided by observing the rules, so the IC does not propose a safety recommendation; however, the IC advises that the event offers lessons to learn.

Factual statements directly related to the occurrence of the event

The IC attributes the occurrence to human factors on the part of the traffic manager at Kaposmérő station, who authorised the train of locomotives № 28258 to move out to the interstation track prior to the arrival of the train № 28299 approaching from the opposite direction.

Factual statements indirectly related to the occurrence of the event

The IC revealed the following indirect causes which had contributed to the occurrence:

termination of inclusion of a witness after the introduction of a voice recording system, which terminated the checking and preventing functions;

the design of the safety installation: lack of a technical solution for contra-flow exclusion;

the presence of electricians in the traffic control office and the conversation with them which did not belong to traffic control but evoked a conflict situation and distracted the traffic manager's attention;

the practical training kept by the supervisors which influenced the concentration of attention and the level of stress unfavourably;

The log-books were used inaccurately at Kaposmérő station, and contained incomplete, contradictory and implausible entries, both in the traffic control office and at the switch operator workstation number 1.

Other risk factors

The IC added no such comment.

5.30 2016-0027-5

Overview of the occurrence

On 06 January 2016, a passenger intended to get off the leading wagon of a passenger train. The passenger jumped off the moving train, fell on the platform, and suffered an injury.

The IC found that the train was moving at a speed of ca. 19 km/h when the passenger left it, which was possible because the speed-dependent locking (lockout) of the door of the wagon did not work.

The train is equipped with a system which allows remote control and check of the locked state of the wagon doors from the locomotive but it was not in use on the train affected. Quite generally, that system is not used or is not even serviceable in many other trains of that network.

The IC proposes that a safety recommendation be issued in order to enforce proper maintenance and continuous use of the safety installations integrated in the vehicles, such as the remote control function of the central door control system, for the sake of protection of passengers.

Factual statements directly related to the occurrence of the event

The passenger jumped off the moving train wilfully.

Factual statements indirectly related to the occurrence of the event

The speed-dependent door locking of the wagon did not work, and, due to the construction of the wagon, it cannot be checked by the operating personnel.

The controlling of the wagon doors and inspection of their locked state by the locomotive driver does not work and/or that function is not in use.

Other risk factors

The wagon door control buttons were replaced with buttons of incorrect colouring.

The railway company provided no information on the defect of the wagon.

BA2016-0027-5-01: The IC found that, although a lot of wagons and locomotives are equipped with the technical equipment for locking and checking the wagon doors by the locomotive driver, such equipment is often not serviceable and/or not in use.

TSB Hungary recommends National Transport Authority to include the inspection of the operability and use of wagon door control from the locomotive during their reviews, and to take action as necessary to enforce proper maintenance and use of this transport safety equipment where it is integrated in the vehicles.

In the case of accepting and implementing the above recommendation, the risk of accidents resulting from jumping up or down the moving train right after departure or later on.

6. SAFETY RECOMMENDATIONS

SUMMARY OF RECOMMENDATIONS

In 2016, the addressee of the safety recommendations was primarily the National Transportation Authority, as National Safety Authority (NSA). TSB deviates from this practice only when it issues safety recommendations to organisations which are not under the scope of authority of the NSA (e.g. rescue services), or the supervision rights are at a regional authority (e.g. supervision of level crossings). This way it could be achieved that when the addressee of the recommendation is a railway undertaking, the response would 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 NSA has the possibility to oblige the relevant parties with deadlines to take action, which would increase efficiency in the implementation of recommendations. Disadvantage of this process – laid down in the RSD – is that it brings delay in the implementation process, and there are some cases, when the NSA has no legal right to take action in topics, which could be solved easily by the IM or RU.

In 2016 the Railway Department of TSB published 30 final reports, including 11 safety recommendations. 2 of these recommendations have been implemented, implementation of 8 recommendations is in progress, in 1 cases we did not get any reply.

On 5 further occasions, TSB issued 5 safety recommendations suggesting immediate preventive actions before the completion of the investigation, based on the initial findings. All of these recommendations have been implemented.

	2012	2013	2014	2015	2016
Accepted and implemented	15	9	9	1	7
Accepted and partially implemented	-	-	-	-	-
Accepted, implementation in progress	8	4	6	8	8
Accepted, no information on implementation	-	-	-	-	-
Rejected	1	2	1	8	-
No answer	0	0	2	-	1

Overview of the safety recommendations issued: 2012-2016

THE SAFETY RECOMMENDATIONS

BA2016-0808-5-01A: During the investigation of the scene, the IC found that the vehicles entering the level crossing from the direction of Tánicsics Mihály Road have no right of way before the traffic arriving from the direction of the industrial sites, and thus, Subsection (6) Section 9 of Decree 20/1984. (XII.21.) of the Minister of Transport is not enforced. Trucks with trailers or semi-trailers often use the level crossing on a regular basis and may get jammed on the rail tracks while they give way to other vehicles as required.

TSB Hungary recommends Roads Department, Somogy County Government Office to examine the design and environment of the level crossing № AS695 on Railway Line № 60 between Barcs and Babócsa stations from the aspect of traffic organisation, and to take action as necessary to make the layout of the level crossing as safe as possible.

In the case of accepting and implementing the above recommendations, the traffic at the level crossing could be made safer in the opinion of the IC.

BA2016-0706-5-01A: During the investigation of the scene, the IC found that the level crossing and the related road signs are difficult to see to those using the road.

TSB Hungary recommends Department of Roads and Transport, Pest County Government Office, to review the design and environment of the level crossing involved in the accident, and to take action to make access to the level crossing as safe as possible.

In the case of accepting and implementing the above recommendations, the risk of accidents occurring due to similar cause may be reduced significantly in the opinion of the IC.

BA2016-0602-5-01A: During the investigation of the scene, the IC found that the level crossing and the related road signs are difficult to see to those using the road.

TSB recommends the Department of Roads and Transport, Pest County Government Office to review the design and environment of the level crossing involved in the accident and to take action as necessary to provide the safest possible access to the level crossing.

In the case of accepting and implementing the above recommendations, the risk of accidents occurring due to similar causes may be reduced significantly in the opinion of the IC.

BA2016-0534-5-01A: During the posterior investigation of the scene, the IC found that the level crossing and the related road signs are difficult to see to those using the road.

TSB Hungary recommends Department of Roads and Transport, Pest County Government Office, to review the design and environment of the level crossing involved in the accident and to take action to make access to the level crossing as safe as possible.

In the case of accepting and implementing the above recommendations, the risk of accidents occurring due to similar cause may be reduced significantly in the opinion of the IC.

BA2016-0490-5-01A: During the investigation of the scene, the IC found that the visibility of the level crossing is not provided as required in Decree № 20/1984. (XII. 21.) of the Minister of Transport. Investigation of the environment of the accident explored that the visibility of the unprotected level crossing located in Railway Section 100, only 200 m of the scene of the accident is also poor, which largely impairs the safety of those moving on both the road and the railway.

TSB Hungary recommends the Inspectorate of Transport of Jász-Nagykun-Szolnok County Government Office to review the environment and design of the level crossings near the

level crossing involved in the accident, and to take action as necessary to provide visibility of the rail track as specified in the relevant rules of law.

In the case of accepting and implementing the above recommendations, the risk of accidents occurring due to similar causes may be reduced significantly in the opinion of the IC.

BA2016-0027-5-01: The IC found that, although many wagons and locomotives in the national network have the necessary technical equipment for locking the trains by the locomotive driver, however, such equipment is often not operable and/or in use.

TSB Hungary recommends National Transport Authority to add the operability and use of the door control from the locomotive in trains to their inspection program, and to take appropriate actions to enforce adequate maintenance and normal use in rail traffic of this equipment on the vehicles where it is installed.

In the case of accepting and implementing the above recommendation, the accidents occurring due to jumping on or off the moving train right after departure or while the train is in motion could be reduced substantially.

BA2015-1181-5-2 During its safety investigation, the IC of TSB Hungary found that in the case that a train is approaching and the level crossing on the open track gets into the break-down state, the section № 3.1.2.2.3. of Volume 1 of National Railways Regulation (hereinafter: "OVSZ") published as Annex to Decree № 103/2003. (XII.27.) of the Minister of Economy and Transport GKM will not prevail because the level crossing warning lights go out immediately. In the case of a break-down state, the regulations currently in effect (OVSZ; Technical Rules of Traffic Regulation published as Annex to Decree № 20/1984. (XII.21.) of the Minister of Transport on traffic regulation and placement of traffic signs; Instructions for the National Railway Network; and the Joint Decree № 1/1975. (II.5.) of the Minister of Transport and Postal Services and the Minister of the Interior) passes the responsibility of crossing exclusively on to the driver of the road vehicle when the track is occupied by moving trains which cannot be warned already, despite the fact that the driver of the road vehicle cannot check in each case whether crossing is safe. For this reason,

TSB Hungary recommends the transport supervision organisation of each Government Office in Hungary to consider the necessity of prolongation of the red-light period ('red extension') at the level crossings in a joint effort with the operating organisation during the periodical inspection of the road barriers at the level crossings, taking into account the layout and traffic of such level crossings, and to take action as necessary.

In the case of accepting and implementing the above recommendation, a 3-minute red extension would provide sufficient time for the train to pass the level crossing in the case of an error during the detection of the approaching train, in the opinion of the IC. In the case of other errors, the train will probably be able to cross with the railway crossing barriers in closed position, and the traffic managing personnel will have 3 extra minutes to notify the train which is approaching a level crossing in break-down state. Accordingly, the number of accidents could be reduced significantly in the case of malfunction of railway crossing barriers.

BA2015-1181-5-1 During its safety investigation, the IC of TSB Hungary found that in the case that a train is approaching and the level crossing on the open track gets into the break-down state, the section № 3.1.2.2.3. of Volume 1 of National Railways Regulation (hereinafter: "OVSZ") published as Annex to Decree № 103/2003. (XII.27.) of the Minister of Economy and Transport GKM will not prevail because the level crossing warning lights go out immediately. In the case of a break-down state, the regulations currently in effect (OVSZ; Technical Rules of Traffic Regulation published as Annex to Decree № 20/1984. (XII.21.) of the Minister of Transport on traffic regulation and placement of traffic signs; Instructions for the National Railway Network; and the Joint Decree № 1/1975. (II.5.) of the Minister of Transport and Postal Services and the Minister of the Interior) passes the responsibility of

crossing exclusively on to the driver of the road vehicle when the track is occupied by moving trains which cannot be warned already, despite the fact that the driver of the road vehicle cannot check in each case whether crossing is safe. For this reason,

TSB Hungary recommends National Transport Authority to require the installation a 3-minute prolongation of the red light ('red extension') as a condition of issuing authorisation for placing in service of railway crossing barriers where the locomotive driver is provided no information (neither direct, nor indirect) on the state of the level crossing.

In the case of accepting and implementing the above recommendation, a 3-minute prolongation of the red light ('red extension') would provide sufficient time for the train to pass the level crossing in the case of an error during the detection of the approaching train, in the opinion of the IC. In the case of other errors, the train will probably be able to cross with the railway crossing barriers in closed position, and the traffic managing personnel will have 3 extra minutes to notify the train which is approaching a level crossing in break-down state. Accordingly, the number of accidents could be reduced significantly in the case of malfunction of railway crossing barriers.

BA2015-0320-5-01: Some of the provisions in "Station Instructions for traffic management on the Malé Straciny/Nógrádszakál – Ipolytarnóc/Lucenec shared (peage) railway line used by MÁV Ltd. and ŽSR intended to regulate the managing of the traffic of trains have become outdated, have not been adapted to changes with time, and due to that, daily practice has developed procedures differing from those provisions.

TSB Hungary recommends National Transport Authority to review the harmony between "Station Instructions for traffic management on the Malé Straciny/Nógrádszakál – Ipolytarnóc/Lucenec shared (peage) railway line used by MÁV Ltd. and ŽSSK CARGO a.s." and the F.2. Train Loading and Running Regulations in effect in Hungary, and to call MÁV Ltd. to update the Station Instructions.

According to the position of TSB the implementation of this recommendation would contribute to making the rules of the traffic management of the international freight trains transparent easy to comply with and to interpret uniformly for all of the parties concerned.

BA2015-0315-5-01: The IC found that the maintenance of the narrow-gauge tracks takes place on the basis of outdated, incomplete, and too strict MÁV D.56 Instruction. The Instruction does not cover all existing track structures, and the dimension limits cannot always be observed during operation, so the maintenance crew works using subjective dimension limits.

TSB Hungary recommends National Transport Authority to initiate the updating of the D.56 Instruction with the operator of the railway network, including the dimension limits which should be as permissive as justified by the level of safety risks.

In the case of accepting and implementing the above recommendation, track supervision will become regulated in a feasible manner, with objective technical conditions.

BA2015-302-5-1 During its safety investigation, the IC of TSB Hungary found that the design of the buffer stop at the end of Track 12, Budapest Keleti Station is dysfunctional when the buffer stop is hit by a vehicle equipped with a coupling head or centre buffer.

TSB Hungary recommends National Transport Authority to review whether at those points of the national railway network where the use of bumper stops is required such bumper stops (with regard to their design) are functional in the case of motor train sets, and to send the findings of their review to the railway companies which operate the affected infrastructure.

According to the position of the IC, in the case of accepting and implementing the recommendation, the infrastructure operators (relying on the findings of such review) may find and implement technical

solutions which meet the requirements of the mixed vehicle park on the one hand, and the force of the impact generated during the bumping of the vehicles equipped with a coupling head to the buffer stop can be distributed symmetrically on the other. Higher levels of safety may be achieved by introducing such technical solutions during renovations, reconstructions or specific development projects.

BA2014-1357-5-01: When exploring the circumstances of the event, the IC found that, as regards the management of train traffic, not all the tasks are consistently regulated between the stations Istvánteleki Főműhely and Rákosrendező. In practice, the personnel managing daily train traffic bypass such inconsistencies, and perform their activities according to a locally evolved practice. This circumstance implies a potential danger situation from the aspect of organising train traffic.

TSB Hungary recommends National Transport Authority, and indirectly to the railway undertakings affected, to revise the procedures applied currently in order to bring the traffic of the train sets moving as trains between the stations Rákosrendező and Istvánteleki Főműhely in harmony with the instructions which are parts of the safety management system.

In the case of implementing the recommendation, the potential danger situation currently implied in the system could be eliminated, as a result of which the general level of safety of train traffic would increase on the given line section.

BA2014-1089-5-01: During its safety investigation, the IC found that the design of the level crossing № AS36 located between the stations Tatabánya and Környe complies with the laws in effect, however, the drivers of the vehicles arriving from the bus turn-around located next to the level crossing have to concurrently ensure their chance to return to the main road safely and their chance to enter the level crossing safely.

TSB Hungary recommends the Mayor's Office of Tatabánya City of County Rank as operator of the road infrastructure to reconstruct the bus turn-around in Környei street, as well as its pattern of traffic in such manner that the drivers of the vehicles arriving from there should not be forced to check the conditions of safe crossing of the main road and the level crossing concurrently.

In the case of accepting and implementing the above recommendation, the safety of the level crossing № AS36 can be improved.

BA2014-720-5-1 During its safety investigation, the IC of TSB Hungary found that “the Government Degree № 203/2009. (IX.18.) on the health requirements for employees in positions related to the safety of railway transport and the order of their medical evaluation” requires no psychological evaluation as part of the mandatory periodical medical evaluation for locomotive drivers: it entrusts the evaluating physician with the judgment of the need for psychological evaluation. Regarding that the evaluating physician only meets the employee at the evaluation session, they will not be familiar with the employee's personality or working habits, and may not perceive the necessity of psychological testing; accordingly, the changes in the psychic state of a locomotive driver may not always be revealed, although they may influence the driver's work. Therefore,

TSB Hungary recommends the owner of the legal provision to modify the text of the Government Degree № 203/2009. (IX.18.) on the health requirements for employees in positions related to the safety of railway transport and the order of their medical evaluation in such manner that psychological evaluation should always be part of the periodical medical evaluation of the locomotive drivers.

The position of the IC is that in the case of accepting and implementing the above recommendations, locomotive drivers would also undergo a psychological evaluation every third year as a minimum as part of their periodical medical evaluation. As a result, possible changes to their psychic state could be

detected and demonstrated. Thus, the evaluating physician could detect and manage any possible negative tendencies.

BA2014-720-5-02 During its safety investigation, the IC of TSB Hungary found that the more frequent vigilance signals of the Train Warning and Protection System used in the locomotive of the train № 2135 can be cancelled exclusively by operating the control pedal/button, regardless of the speed of the vehicle. With regard to the fact that handling of the vigilance pedal may become automatic in the case of locomotive drivers, the device does not always drive the driver's attention to the necessity of reducing the speed. Therefore,

TSB Hungary recommends National Transport Authority to cause the railway companies operating such devices to perform a risk analysis relating to the operation of such devices, and to take action as necessary to apply devices which reduce such risks.

The position of the IC is that in the case of accepting and implementing the recommendation, the risk of events occurring for similar reason could be reduced substantially, and the possible consequences of such events could be mitigated substantially.

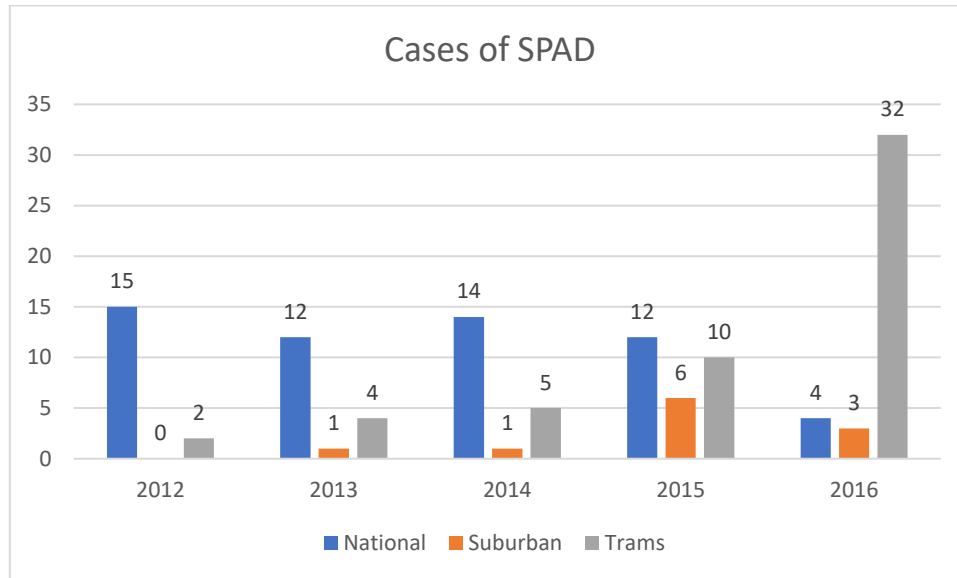
BA2014-720-5-03 During its safety investigation, the IC of TSB Hungary found that the Station Manager of Dunakeszi Station misjudged his role and did not require regular work from his colleagues, which contributed to the occurrence. When he was appointed to the station manager position, his employer only took into consideration his professional qualifications. The station manager position, however, also requires leadership attitude and patterns of behaviour. The candidate was not able to acquire these competences during his tertiary education or at the railway training courses because neither form of training includes such subjects. Therefore,

TSB Hungary recommends National Transport Authority to review (in the Safety Management System of MÁV) the rules and practice of the training and appointing of managers who supervise operative work, and to take action as necessary to really enforce those personal requirements during the selection process which had been introduced in order to reduce risks.

In the case of accepting and implementing the above recommendation, the risk of accidents occurring due to a similar cause may be reduced significantly in the opinion of the IC.

7. HIGH PRIORITY TOPICS IN 2016

Signal Passed at Danger (SPAD)



Signal Passed at Danger (SPAD) is one of the most dangerous incident type in railway transport. The numbers of such incidents in the national and suburban networks have dramatically decreased in 2016 in comparison to 2015; what is more, it has never been that low for the national network since 2008.

At the same time, the number of SPAD incidents has tripled in the tram networks. One of the underlying causes is the putting into operation of such nodes and terminals in Budapest where signal devices were installed, and the other is that latency has decreased owing to an increase of willingness to report. It must also be mentioned that, owing to the relatively low speeds, better visibility and the road traffic lights, the SPAD cases committed by tram drivers imply significantly lower risks than the SPAD cases in the large railway networks.

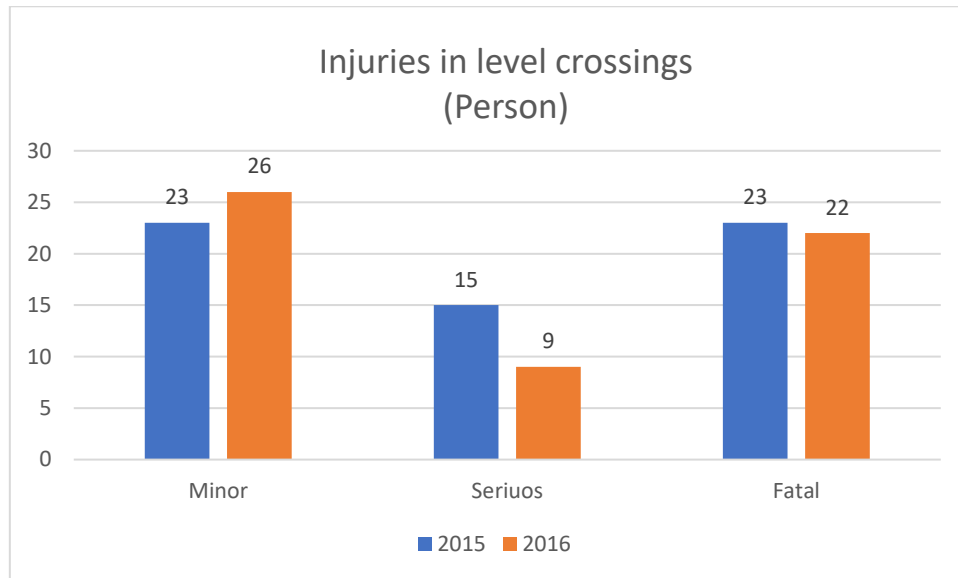
Human and organizational factors

During our investigations performed in 2016, we laid significant emphasis on investigating into human and organizational factors including elements of the Safety Management System.

During our investigations, we identified 42 direct causes in total, of which 24 were human or organizational factors, while 44 of the 53 indirect causes belonged to this category.

Such causes included fatigue, the loss of situational awareness, and dangerously low levels of safety critical communication.

Level crossings



The number of accidents at level crossings increased by 2 (from 87 to 89) in 2016 in comparison with 2015, which practically indicates no change. The number of severe injuries decreased with an increase in minor injuries, and a minimal decrease in the number of fatalities (by 1 person). This shows that, although the figure of the accidents at level crossings hardly changed, such accidents had less serious consequences. However, this fact in itself cannot be regarded a success because the consequences of a collision of a road vehicle and a railway vehicle are influenced by a lot of random factors as well.

There was no accident at level crossings due to malfunction of warning lights at a level crossing protected by warning lights or warning lights plus half-barriers; each occurrence was attributed to human factors on the part of the driver of the road vehicle involved.

8. OTHER ACTIVITIES

Trainings

In order to maintain and improve the professional knowledge of the investigators, the trainings organised based on our training plan continued in 2016.

1 colleague participated in the Fundamentals of Accident Investigation course and successfully passed the exam in Cranfield University (UK).

Upon invitation from the investigating body of Belgium (as fellow organization), 3 of our investigators took part in a 5-day course held by them in a joint effort with the British Railway Accident Investigation Branch in Brussels. The topic of the course embraced the professional and investigation knowledge related to the railway track.

One person obtained a certificate at the senior accident investigation course of the KELVIN-TOPSET company in Greenwich, UK.

Three investigators obtained an additional degree in the investigation expert specialty at Széchenyi István University, Győr.

A colleague of ours completed the 160-hour investigator course of Adult Education Centre, Széchenyi István University, Győr.

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.

International Cooperation

In 2016, the international practice was similar to the previous years, namely that the investigating bodies contact each other in relation to concrete accidents when more Member States are concerned (from the operator's, manufacturer's, maintenance's side or staff, etc.), or to discuss any actual topic, and ask for each other assistance.

During our investigation of an occurrence involving a runaway locomotive type VECTRON, we cooperated with the German transport authority (as the authority issuing the type-approval of the vehicle) and with the technical top management of the SIEMENS Company (manufacturer of the vehicle) in 2016. During the investigation, TSB Hungary issued a Europe-wide safety alert through the ERA SIS system, directing the operators' attention to the hazard.

TSB continued to participate actively in the work of the European Railway Agency (ERA) The cooperation with ERA (with its costs covered by the EU) offers the opportunity for TSB to participate in compiling the system and methodologies of the assessment of National Investigation Bodies, The possibility to participate the Human Factor Network was very useful, because the human factor plays a role in an overwhelming majority of the occurrences but we have the least investigation experience in this area.

Outside of the ERA, some of the European investigating bodies (e.g. Germany, Austria, Switzerland, Czech Republic, The Netherlands, Luxemburg, Denmark, Estonia etc) established a regional cooperation forum whose work TSB also participates in. Within the framework of this forum – besides discussing local problems and making recommendations towards 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.

International Activities

The personnel of R&DD took part in various international activities in 2016.

The European Union Agency for Railways (ERA) brings together the national investigating bodies into a working group. The head of Railway and Dispatcher Department attended the plenary session of the working group on three occasions.

One of our investigators is member of the ERA Human Factors Working Group. Our colleague attended the session of the WG twice. On one occasion, he held a workshop at the human factors seminary in Brussels.

Two of our investigators attended an international conference of railway investigators held in London in the autumn of 2016.

The Regional Conference of Central & Eastern European Investigating Bodies is held twice a year; last year it was held in Germany and Switzerland, and was attended by one and two of our colleagues, respectively.

International conferences, meetings and working group sessions offer excellent opportunities to establish good professional contacts, share experiences, and acquire new methods to be used in our own activities.