



KÖZLEKEDÉSBIZTONSÁGI
SZERVEZET
TRANSPORTATION SAFETY
BUREAU

FINAL REPORT

**2010-308-5
Railway accident**

**Pécs station
19 July 2010**

Collision of locomotive with its carriages (train no. 8015)

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

This present investigation was carried out on the basis of

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

Under the aforementioned regulations

- The Transportation Safety Bureau of Hungary shall investigate serious railway accidents.
- The Transportation Safety Bureau of Hungary may investigate railway accidents and incidents which - in its judgement - would have resulted in serious accidents in other circumstances.
- The technical investigation is independent of any administrative, infringement or criminal procedures.
- This present final report shall not be binding, nor shall an appeal be lodged against it.
- Incompatibility did not stand against the members of the IC. Persons participating in the technical investigation did not act as experts in other procedures concerning the same case and shall not do so in the future.
- The IC shall safe keep the data having come to their knowledge in the course of the technical investigation. Furthermore, the IC shall not be obliged to make the data – regarding which the owner of the data could have refused its disclosure pursuant to the relevant act – available for other authorities.

This present final report

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

The following organisations were represented at the closing discussion which was held on 22 March 2011:

- National Transport Authority
- MÁV Zrt.
- MÁV-Trakció Zrt.

The participants did not make any comments in connection with the draft report.

ABBREVIATIONS

EÉVB	Egyesített Éberségi és Vonatbefolyásoló Berendezés, Unified Vigilance Warning and Train Control System
IC	Investigating Committee
Kbvt.	Act CLXXXIV of 2005 on the technical investigation of aviation, railway and marine accidents and incidents
KJK	Regional Vehicle Maintenance Centre Körzeti Járműfenntartási Központ,
MÁV Zrt.	Hungarian State Railways Plc Magyar Államvasutak Zártkörűen Működő Részvénytársaság
MET	Ministry of Economy and Transport
METRA	Electronic speedometer and logger
NTA	National Transport Authority
R	High-Powered Brake
Sz	Passenger Train Brake
TGR	Software for downloading data from electronic speedometer and logger
TSB	Transportation Safety Bureau
V	daily check
V1	periodical check

SUMMARY

Type of occurrence	railway accident
Character	shunting locomotive collided with its train
Time of occurrence	12:19 hrs on 19 July 2010
Location of occurrence	Pécs station
Type of railway system	national
Type of movement	shunting
Fatalities/injuries	0/0
Infrastructure manager	MÁV Zrt.
Extent of damage	locomotive reg no. V43-3224 and 3 carriageriages of train no. 8015 sustained damage
Registration number of the involved train(s)	8015
Operator	MÁV Start Zrt., MÁV Trakció Zrt.
State of Registry	Republic of Hungary

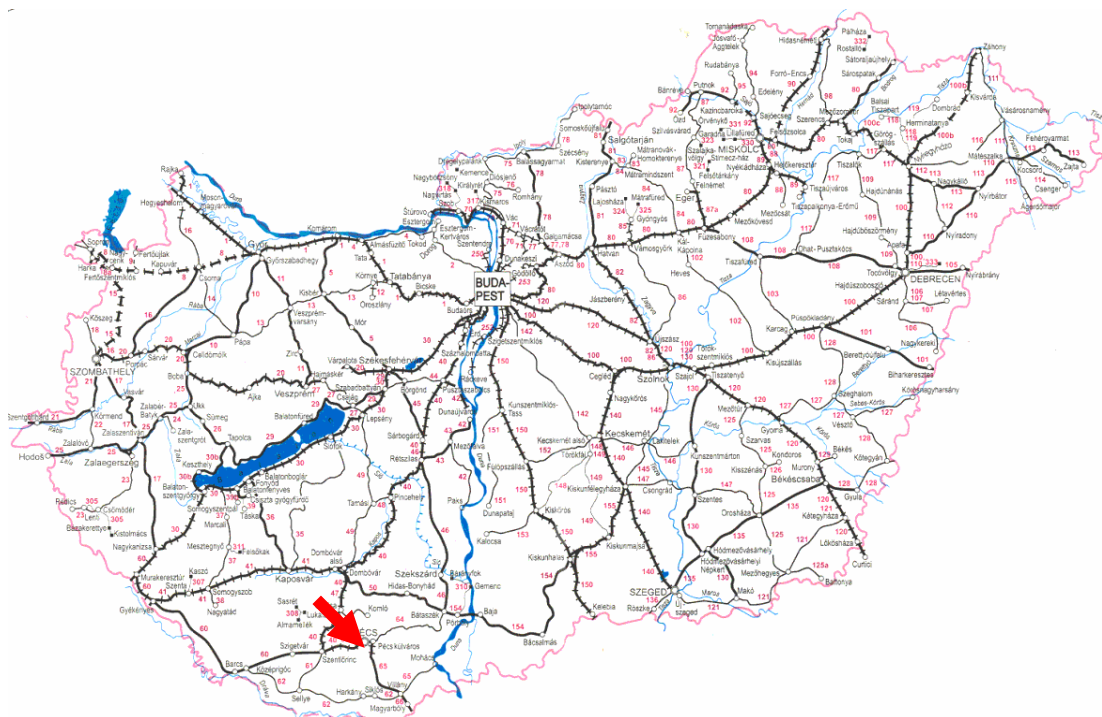


Figure 1: The location of the accident on the railway map of Hungary

The location of the occurrence

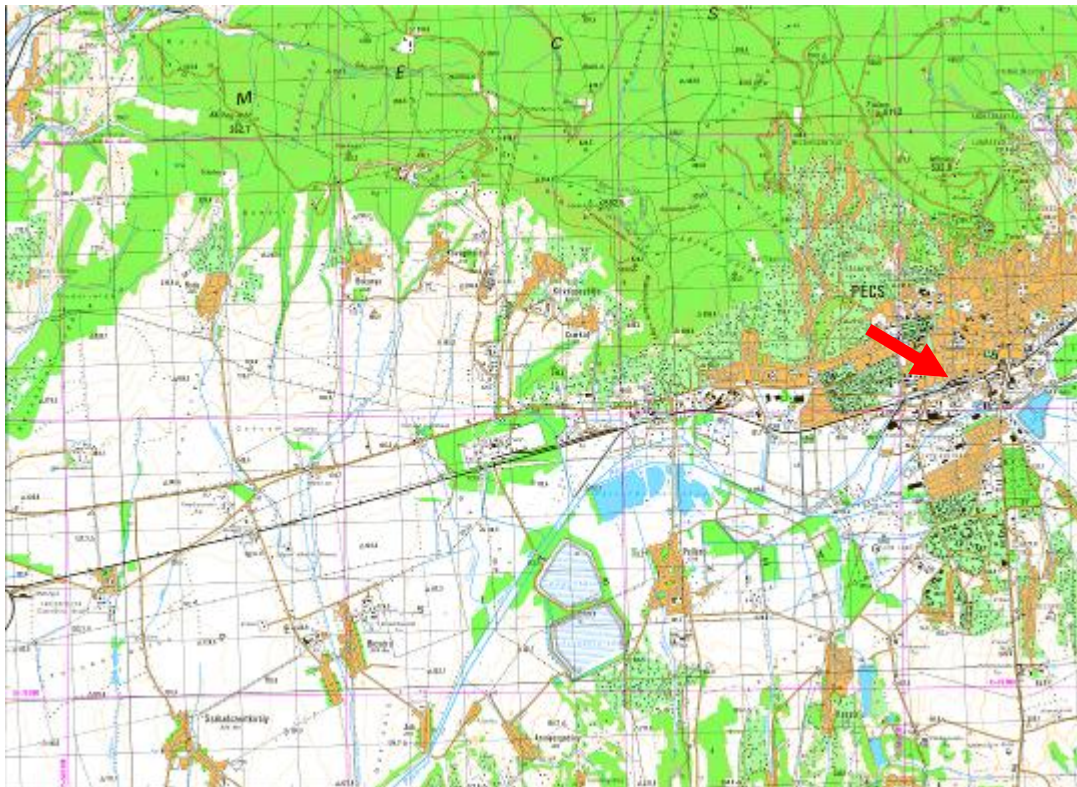


Figure 2: the location of the accident on a more detailed map

Reports and notifications

The head of traffic operations control of MÁV Zrt. reported the occurrence to the TSB duty services at 12:50 hrs on 19 July 2010 (25 minutes after the accident).

The on duty personnel of TSB reported the occurrence to the TSB's head of department on duty at 12:52 hrs who notified the on duty accident investigator at 12:54 hrs on 19 July 2010.

Investigating Committee

The Director-General of TSB appointed the following Investigating Committee (hereinafter referred to as IC) to investigate the railway accident on 19 July 2010:

Investigator-in-charge	András Mihály	accident investigator
Member of the IC	Róbert Karosi	accident investigator

Overview of the investigation

The IC

- conducted a site survey,
- requested and received the necessary documents,,
- evaluated the strip chart recorder,
- measured brake cylinder strokes on various locomotives.

The brake system of the locomotive was examined by MÁV Zrt. on 20 July.

Overview of the occurrence

On 19 July at 12:25 hrs, locomotive V43-3224 collided with its train (no. 8015 consisting of 3 carriageriages) standing on platform III of Pécs station. As a consequence of the collision, the locomotive and 3 carriageriages sustained damage. Two passengers on board fell over and suffered injuries. They did not request medical assistance and continued their journey.

Following the accident, the whole brake system of the locomotive was examined at the site and later on 20 July 2010 in the workshop of Pécs KJK in the presence of the accident investigators of MÁV Trakció Zrt. Pécs and MÁV Zrt. Regional Railway Safety Department.

The IC established that at the time of the accident the strokes of all brake cylinders of the involved locomotive were well above the required upper limit (120 mm), however the brakes had one-third of their daily usage allowance time left. Due to the long stroke the braking effect of the locomotive was severely degraded and its braking distance significantly increased while running solo.

The IC issues the following safety recommendations:

- The IC recommends that in order to ensure adequate braking effect of locomotives which move short trains (containing xx55 or "By" series carriages) until the end of revision cycle, either the stroke of braking cylinders should be set accordingly or the revision cycle shortened.
- The IC recommends equipping the V43 series locomotives with mechanical or electronic brake cylinder stroke indication.

1. FACTUAL INFORMATION

1.1 Course of events

On 19 July 2010 train No. 8012 arrived at platform III of Pécs station on schedule. A locomotive was to be coupled to the train to form train No. 8015. During the coupling the locomotive (reg. No. V43 3224) collided with the 3-carriage train (see Fig. 3). Two passengers of the train were injured in the collision.

As a result of the collision, the collision plates located on side 2 of the locomotive got damaged. Carriages No. 50 55 21-55 561-3, 50 55 21-55 628-0 and 50 55 21-55 957-3 also sustained external and internal damage (see Fig. 4).

The engine-driver told the operator's investigators on the scene that he was using the auxiliary brake while approaching the train with approx. 26 kph. He realised that the braking effect was unsatisfactory and applied fast brake using the D12 braking valve. The fast brake did not slow down the locomotive either therefore the collision was unavoidable. The locomotive was moving with 15 kph at the moment of collision.

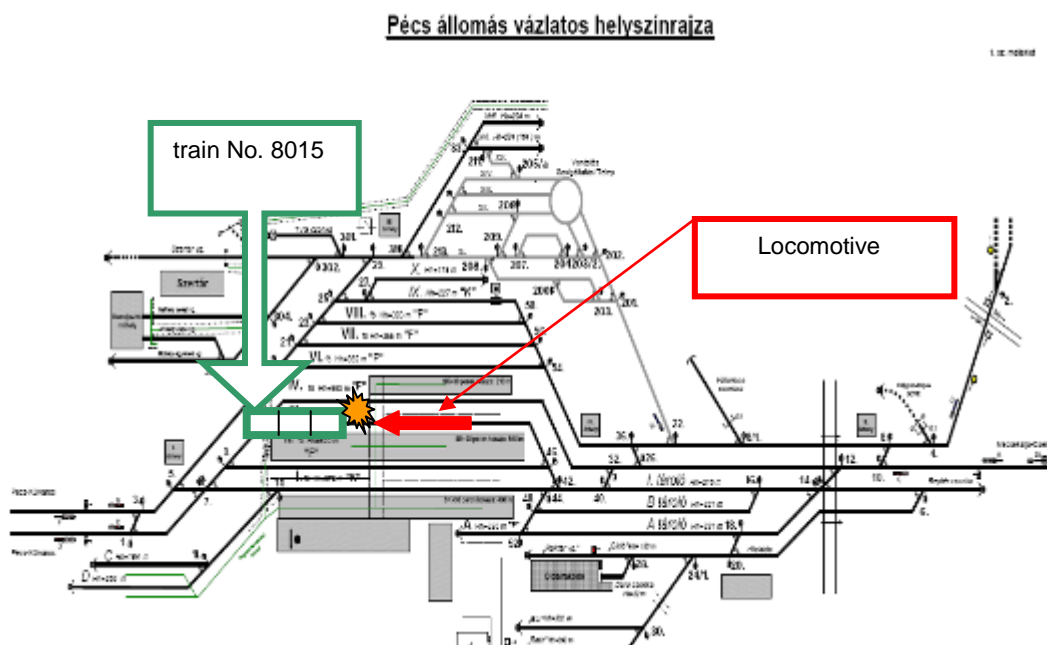


Figure 3: The scheme of the accident site (location of collision is marked)

1.2 Injuries to persons

Two people on board the train fell and got injured. They did not ask for medical assistance at Pécs station, proceeded with their travel plans, and went to their family doctor later. Eventually one of them suffered a cracked nose bone, while the other person received elbow and knee injuries. There was no direct life-threatening situation in the course of the accident.

1.3 Damage to railway vehicles

The involved V43-3224 locomotive's collision plates got deformed on side 2. Train No. 8015 sustained various damages (see Fig. 4). Carriage No. 5055 21-55 957-3 was pulled into a repair shop, lifted and examined, during which no additional damage was found.



Figure 4: external and internal damage of the carriages

1.4 Other damage

The collision caused delays in railway traffic. Train No. 8015 (containing a different locomotive and carriages) departed 46 minutes late from Pécs station.

1.5 Personnel information

1.5.1 Engine-driver (train No. 8015):

Age	43 years
Gender	male
Qualification(s)	engine-driver
Engine-driver since	16 October 2003
Medical certificate valid	December 2010
On duty since (on the day of the occurrence)	11:32, 19 July 2010, Pécs station

1.6 Train information

1.6.1 Train No. 8015

Registration number	8015
Route	MÁV-Start Zrt.
Train type	passenger train
Type of traction	CSM
Registration number of locomotive	V43-3224
Owner of locomotive	MÁV-Trakció Zrt.
Registration number of carriages	50 55 21-55 957-3 By 50 55 21-55 628-0 By

	50 55 21-55 561-3 By
Length of train	88 m
Tonnage	138 t
Prescribed braked weight percentage	105%
Actual braked weight percentage	118%

1.6.2 Locomotive information

Type of electronic speedometer / logger	METRA
Date of last shop repair	19 December 2008
Date of last „V1” inspection	6 July 2010
Time of last daily „V” inspection	19:00, 16 July 2010
EÉVB setting at the time of the accident	”reverse”
Type of train type selector switch setting at the time of the accident	„R”
Brake valves used	side 2 Zbr and D12
Side 2 D12 brake valve passed major inspection on	1 December 2008
Side 2 Zbr brake valve passed major inspection on	21 November 2008

The V.43-3224 locomotive passed the last daily inspection prior to the accident at 09:00 on 16 July 2010 in Dombóvár station. The locomotive logged 41 hours, 1685 kilometres and 260 scheduled stops between the daily inspection and the accident.

1.7 Pécs station

The station is at a junction of the Dombóvár-Pécs-Magyarbóly main line. It is at the end of the Nagykanizsa-Pécs and Pécs-Bátaszék side lines. The station is used for marshaling, there is no shunting slope.

The station is equipped with a keylocker complemented with light signals. The affected rail track is a no-gap type, with 48 kg/m concrete sleepers and geo reinforcing in ballast chips. The track is straight, its length is 588 metres.

1.7.1 Signal box at Pécs station

Not relevant to the accident.

1.8 Data recorders of railway vehicles

The V43-3224 locomotive was equipped with METRA electronic speedometer and logger. The METRA data were downloaded using TGR software. The strip chart recorder is presented in Figure 6.



Figure 6: strip chart recorder of V43-3313 locomotive

1.9 Communications

The communications equipment had no effect on the accident therefore their analysis was not required.

1.10 Meteorological information

Visibility was good. The weather conditions had no effect on the course of events therefore their analysis was not required. .

1.11 Survival aspects

Due to low speed, there was no life-threatening situation. The passengers stood or moved around in the carriage, without holding to the handrails, and the collision was unexpected, therefore they fell and got minor injuries.

1.12 Tests and research

Following the accident, the IC of the railway operator conducted low-speed braking tests with the involved V43-3224 locomotive on platform III of Pécs station. The IC established the following:

- When braking from No.2 cab using the automatic and the auxiliary brake valves, braking distance was 70-75 metres at a speed of 15-18 kph.
- When braking from No.1 cab, using only the auxiliary valve, the braking distance was 35 metres, at a speed similar to the above.

It was found that the brakes at No.1 cab were more effective than in the No.2 cab. The measured brake cylinder strokes were above the upper limit (130-140 mm, see 2.4).

The whole brake system of the locomotive was examined at Pécs KJK on 20 July 2010.

Following the accident, the IC of the operator conducted checks on several V43 type locomotives to determine the post-daily check brake cylinder stroke offset due to usage. It was found that in some cases the stroke reached the 120 mm upper limit after 30 hours. The current requirement is 48 hours.

1.13 Organisational and management information

Between September 2008 and July 2009 there were 20 cases when cracks were discovered on the monobloc wheels of xx-55 type carriages. The operator made efforts to find the causes and to prevent similar occurrences. In particular, the maintenance and inspection regulations have been modified.

1.14 Rules and regulations

(see Regulation E.2, section 5.3.6 - available in Hungarian only)

1.15 Additional information

The IC does not wish to add further information

1.16 Previous occurrences of a similar character

The IC has no knowledge of any similar occurrence.

2. ANALYSIS

2.1 The course of the accident

After train 8012 arrived at Pécs station, the engine-driver – since his duty ended - locked the locomotive on platform III and reported at the locomotive watch. He did not file either a verbal or a written report on problems.

The engine-driver of train 8015 reported on duty at 11:32 at the locomotive watch. He took over the locomotive, and acknowledged that it logged 41 hours since the last daily check. The operations log did not contain any information on previously detected problems. The engine-driver switched on the MFB and METRA, checked the train type selector switch, which was in „R” position. The driver then tested the auxiliary and the D12 brakes. He also checked the brake blocks (wear, alignment with wheels) and found no problems.

The shunting supervisor then informed the engine-driver on the task ahead. The first movement was of short length and with low speed on platform IV, including passing a switch and changing cab. The locomotive was stopped by the auxiliary brake. The driver accelerated to approx. 30 kph then switched to neutral. As the locomotive approached the train on platform III, the driver applied brake at a safe distance. He quickly realised that the deceleration was not adequate therefore he applied full auxiliary brake plus set the D12 valve in Fast position. Nevertheless, the locomotive did not slow down enough to avert the collision.

The brake cylinder strokes measured following the accident were in the range of 130-140 mm.

The analysis of METRA data showed the following:

- There were 5 movements between the moment the driver switched on the system and the accident. None of the movements was done with speeds above the allowed 40 kph.
- The collision occurred at 12:19'28" at a speed of 15 kph. When the driver started the braking the speed was 26 kph, at this moment the locomotive was 115 metres from the train. He applied fast brake when the locomotive was 28 metres from the train. The selection of braking distances refers to a cautious driver.
- The braking effects for the two sides of the locomotive were not identical. The driver used the same cab (No.2 cab) at the very first and the last movement. Initial speed and average deceleration values for the above movements are: 18 kph and 0,294 m/s² for 1st, 26 kph and 0,1389 m/s² (to 15 kph) for the 5th.
- The engine-driver also applied fast brake prior to the collision. The deceleration, however, was only 47% of the deceleration rate calculated for the first normal braking.

2.2 Description of the locomotive's dynamics (with data)

- 1st movement: decoupling, passing switch No.13 (No.2 cab used)
 $V_{\max}=20$ kph, $s=194$ m
- 2nd movement: pulling to the level crossing (No.1 cab used)
 $V_{\max}=13$ kph, $s=161$ m
- 3rd movement: to the safety zone marker of platform IV (No.1 cab used)
 $V_{\max}=21$ kph, $s=574$ m
- 4th movement: from the safety zone marker of platform IV to just past switch No.32 (No.1 cab used)
 $V_{\max}=15$ kph, $s=87$ m
- 5th movement: from switch No.32 to the train (collision) on platform III (No.2 cab used)
 $V_{\max}=29$ kph, $s=527$ m

Movements 1 and 5 are very different. In the first case the deceleration is more intense. One reason is that the speed and the kinetic energy of the locomotive was less, therefore it was easier to stop it even with the brakes of reduced effectiveness.

1st movement:

Braking from 18 kph to zero.

$$v_0=18 \text{ kph}$$

$$v_1=0$$

$$dv= -18 \text{ kph}= -5 \text{ m/s}$$

$$t_0=12:01:51$$

$$dt=17\text{s}$$

$$a=dv/dt= -0,294 \text{ m/s}^2$$

Average deceleration: 0,294 m/s²

5th movement

Braking from 26 kph to 15 kph (collision speed).

$$v_0=26 \text{ kph}$$

$$v_1=15 \text{ kph}$$

$$dv= -11 \text{ kph}= -3,0555 \text{ m/s}$$

$$t_0=12:19:28$$

$$dt=22 \text{ s}$$

$$a=dv/dt= -0,1389 \text{ m/s}^2$$

Average deceleration: 0,1389 m/s².

2.3 Observations by the engine-driver immediately after the accident:

- The train was moved about 1 metre from its original position by the collision.
- All brake blocks were tight on wheels (unmoveable by a kick) except wheel J2 where the brake did not function at all.
- Brake cylinder strokes were substantial at both trucks.

2.4 Observations by the IC of the railway operator:

- The pneumatic brake system of the locomotive have been checked and certified.
- The brake controls were functional.
- Brake cylinder strokes were larger than the requirement. The IC initiated more exact measurements.
- All brake blocks were tight on wheels (unmoveable by a kick) except wheel J2 where the brake did not function at all.
- Thickness of brake blocks was within required limits.
- The IC conducted low-speed braking tests to check the validity of the engine-driver's account:
 - When braking from No.2 cab using the automatic and the auxiliary brake valves, braking distance was 70-75 metres at a speed of 15-18 kph
 - When braking from No.1 cab, using only the auxiliary valve, the braking distance was 35 metres, at a speed similar to the above
 - Neither result was in compliance with the relevant regulations.
 - After the brake problems were fixed the IC repeated the tests and measured 8 metres / 9 metres of braking distance respectively.

2.5 Results of the brake system check done at repair shop:

- The pneumatic parts of the locomotive's brake system were in good condition.
- Heat marks on the brake blocks as well as their glossy surface indicated that the brakes had been used.
- The brake cylinder strokes were 130 mm at J1 cylinder and 140 mm at all other cylinders. The upper limit is 120 mm.
- The thread of the brake regulator screw was found damaged. As a result, wheel J2 ran without braking, the gaps between the wheel and the brake blocks were 20-25 mm.
- The mechanical brake of the locomotive was inoperative. During a test the locomotive was able to move with its movement selector set to „1” while the mechanical brake was applied.
- Following the above test the damaged regulator screw was repaired and brake cylinder strokes set to 80 mm. During the repeated braking test the braking distances were within the required limits.

2.6 Additional measurements

Further examinations were conducted with the V43-3224 locomotive, including a reconstruction of the operational conditions and load of the period prior to the accident. Three different series of measurements were completed. These measurements proved that the cylinder strokes previously set to 80 mm reached 120 mm after 30 hours of operation. Based on these results, the IC believes that the brake cylinder strokes were set to 80 mm during the last „V” check prior to the accident.

2.7 Operating conditions of locomotive brakes

In order to ease the load, wear and tear on carriage brakes, a number of rules have been implemented. As an unintended side effect, the load on the brakes of the locomotives has increased.

Examples of regulation are:

- prohibition of releasing the brakes on the traction vehicles (see 1.14),
- prohibition of using the „express” setting of the train type selector on rail carriages (see 1.13).

As a consequence, the brake pad wear of the locomotives became more intense and experience showed that the brake cylinder strokes could easily go offset even by the end of the daily cycle. A written opinion by MÁV-Trakció Zrt. states: **„As of 9 July 2010 the daily check validity period is modified for those V43 locomotives that move trains with maximum 20 axles. In accordance with the modified rule, the daily check cycle period tolerance is no longer in effect. In practice, the cycle period changes from 48+12 hours to 48 hours.”**

As the above text shows, MÁV Trakció Zrt. had realised the problem before the accident but the measures taken proved to be inadequate.

2.8 Regulatory background

Between the last daily check and the accident the involved V43-3224 locomotive moved passenger trains for which the allowed maximum speed is 120 kph. The trains were generally short and mostly made of „xx55” (By) series carriages.

The above carriages had a notorious problem with their monobloc wheels. A number of cracks and breaks have occurred due to thermal overloading of the outer ring of the wheels.

In order to lower the thermal load on the wheels (due to frequent stops from high speed), the MÁV Zrt. Logistics general deputy director and the MÁV Zrt safety director in their joint decree Gy.94-436/2010 prohibited to set the train type selector switch to „Gy” when moving the above mentioned carriages. As a result, the braked weight changed from „Gy”=67 tons to „Sz”=48 tons. The train type selector of the locomotive is to be set to „R” (unchanged).

The E.2. Regulation (1.14) states that the locomotive’s own automatic brake shall not be released if the train has less than 20 braked axles. Therefore the locomotive’s own brakes must be used, and consequently, the wear and tear of the locomotive brake parts increases while the carriages brake with less braking pressure.

A written note from MÁV Trakció Zrt. states that **„E.2. Regulation 3.1.29 will authorise the operator of the railway vehicle to decide in which cases engine-drivers can select train type selector settings other than the one ensuring maximum braking effect. The safety of operation is determined by the result of the braking effect calculations to be done prior to departure (unchanged) at all settings, including „Sz”.**

In the IC’s opinion, the above solution is problematic because in accordance with the above information the operator is authorised to overwrite a regulation that has been approved by the relevant authority. Another concern is the application of a rule in practice before it comes into effect.

2.9 Observations of the IC concerning the brake cylinder check

The IC conducted several targeted and random checks concerning the brake cylinder strokes of V43 series locomotives. In all cases the measured strokes were not above 120 mm. At locomotives used in a 3-carriage train with xx55 series carriages and operated in regional traffic (frequent stops from high speed) the IC found that the strokes got increased more quickly compared to regular, long-haul operation.

Furthermore, the IC established that in order to do the visual checking of the strokes the engine-driver has to open a cover plate (using a tool) located in the engine room passage. The check should be done at 4 different places. Lack of proper lighting and measuring tools mean further difficulties. Stipulations of the E.2. regulation 5.1.2 concerning the check of brake cylinder strokes are difficult to comply with due to the location of the parts in question and the time limits.

The MÁV-Trakció Zrt. stated that **„It is not expected from the engine-drivers of V43 series locomotives to complete the visual stroke check because it is a lengthy and difficult procedure.”** In this case, however, it is necessary to ensure that the stroke is checked regularly by using another method or installing an automatic indication device.

3. CONCLUSIONS

3.1 Factual statements directly connected to the occurrence of the accident

The brake cylinder stroke was above the upper limit (120 mm) although the brakes had one-third of their daily usage allowance time (7+12 hours) left. Due to the long stroke the braking effect of the locomotive was severely degraded and its braking distance significantly increased while running solo.

At wheel J2 the thread of the brake regulator screw was found damaged. As a result, wheel J2 ran without braking, the gaps between the wheel and the brake blocks were 20-25 mm.

3.2 Factual statements indirectly connected to the occurrence of the accident

The **E.2. Regulation 5.1.2.** requires visual checking of the brake cylinder strokes if possible. In order to do the visual checking of the strokes the engine-driver has to open a cover plate (using a tool) located in the engine room passage. The check should be done at 4 different places. Lack of proper lighting and measuring tools mean further difficulties. Stipulations of the E.2. regulation 5.1.2 concerning the check of brake cylinder strokes are difficult to comply with due to the location of the parts in question and the time limits.

The IC and the operator agreed that it is not realistic to expect from the engine-drivers of V43 series locomotives to complete the visual stroke check because it is a lengthy and difficult procedure. In this case, however, it is necessary to ensure that the stroke is checked regularly by using another method or installing an automatic indication device.

Between the last daily check and the accident the involved V43-3224 locomotive moved passenger trains. The trains were generally short and mostly made of „xx55” (By) series rail carriages. The total number of axles was below 20 in all cases therefore the locomotive's own brakes had to be used.

3.3 Other risk factors

N/A

4. SAFETY RECOMMENDATIONS

BA2010-308-5-01 The IC established that the braking distance of the locomotive was much longer than the usual due to a damaged brake regulator screw and an abnormally large (well above the upper limit 120 mm) break cylinder stroke. As a consequence, the locomotive was unable to stop and collided with the braked train.

The IC therefore recommends the NTA to oblige locomotive operator undertakings to ensure adequate braking effect of locomotives which move short trains (where the total number of axles are less than 20) until the end of revision cycle, either by appropriate setting of the braking cylinder strokes or by shorter revision cycles.

The IC believes that the implementation of the recommendation would lead to a greater safety margin which in turn would lower the probability of another similar accident.

BA2010-308-5-02 The **E.2. Regulation 5.1.2.** requires visual checking of the brake cylinder strokes if possible. In order to do the visual checking of the strokes the engine-driver has to open a cover plate (using a tool) located in the engine room passage. The check should be done at 4 different places.

The IC therefore recommends MÁV-Trakció Zrt to equip the V43 series locomotives with mechanical or electronic brake cylinder stroke indication.

The IC believes that that the implementation of the recommendation would make the compliance with **E.2. Regulation 5.1.2.** possible and the engine-drivers would also be able to prevent similar occurrences.

4.1 Observations and opinions

MÁV-Trakció Zrt. agreed with BA2010-308-5-01. They had the MÁVSZ 2757:1995 company standard modified. The new regulation changed the required stroke for V43 locomotives from 80 mm to 70 mm.

MÁV-Trakció Zrt. agreed with BA2010-308-5-02. They launched the installation of mechanical stroke indicators on V43 series locomotives, starting with those engines that are operated in the most critical conditions.

Furthermore, NTA directed MÁV-Trakció Zrt. (KU/VF/3541/3/2010) to complete the following tasks:

- compile a report on operation experience regarding the sinter metal brake blocks,
- inform the engine-drivers about the usage rules regarding the new brake blocks and about the content of safety recommendation BA2010-308-5-02,
- pay special attention to the tracking and implementation of safety measures.

MÁV-Trakció Zrt. reported in its written notice (2-45/2011) that they comply with NTA instructions. They also stated that a new, softer brake block is being manufactured to replace the C952 type blocks because of their unfavourable characteristics. The new blocks will be fitted on the locomotives operating on lines requiring frequent braking.

Budapest, 6 June 2011

András MIHÁLY
Investigator-in-charge

Róbert KAROSI
IC member

