Translation of an excerpt of the investigation report

"Train collision Munich North marshalling yard on 23/05/2020"

Status as of 07/01/2025, version 1.0.

Note:

In accordance with Article 3 of Implementing Regulation (EU) 2020/572, points 1, 5 and 6 of Annex I of an investigation report shall be written in a second official European language. This translation should be available no later than three months after the delivery of the report.

The following English translation is a corresponding excerpt of the investigation report. The German language version is authoritative.

Excerpt translation:

1 Summary

The first section contains a brief description of the event, as well as information on the consequences, primary causes and safety recommendations provided in the individual case.

1.1 Brief description of the event

On 23/05/2020 at around 10:19 pm, in Munich North marshalling yard in the area of the northern bypass of the set of sorting sidings on non-public, internal operational railway crossing 6 at km 16.0, the goods train DGS 50214, which was travelling from Munich East marshalling yard to Meimersdorf, collided with a truck with a dumper set-up, which was crossing in the direction from the left.

1.2 Consequences

During the train collision, the truck driver was initially seriously injured and died ten days later in hospital as a result of the accident.

No other people were injured or killed.

The truck was dragged along by the goods train for around 25 m, knocking down main light signal X2, and was severely damaged when it came to a standstill.

The leading electric locomotive of the goods train was damaged in the left front area, but it remained fit to drive.

The material damage amounted to around EUR 163.000.

1.3 Causes

During the investigation of the event, the following actions, failures, incidents or circumstances were identified as safety-critical factors. These are differentiated into causal or contributing and systemic factors according to Implementing Regulation 2020/572. Identified shortcomings in the emergency management are also addressed.

A system with designations in square brackets is used to provide better clarity about the factors and aspects of emergency management.

A detailed assessment of the event with classification as safety-critical factors is provided in the sections below.

On 23/05/2020, construction companies were carrying out construction work in Munich North marshalling yard on the direct instruction of the railway infrastructure company or via subcontracts. The contractors were responsible for observing the obligation to only use appropriately instructed workers. A truck driver who was scheduled to provide transport services was working in the operational facility without the obligatory instruction. At 10:19 pm, he crossed an internal operational railway crossing in his truck. When he did so, the collision with train DGS 50214 occurred.

What happened: Date/time, and action/failure/circumstance/incident	Causal factor	Contributing factor	Systemic factor
(Initial situation) Delegation by the railway infrastructure company to the contracting construction companies of the obligation to only use instructed workers.		Inspection-free delegation of instruction to the contractor [F4]	Procedure for inspection by the railway infrastructure company of the results of the services provided by the contractors [S4]
23/05/2020, before 10:19 pm. Use of the truck driver without prior instruction.	Instruction obligation applying to all workers [F2]		Ensuring the performance of safety tasks [S2]
23/05/2020, around 10:19 pm. Failure to follow the restricted maximum speed of 10 km/h at railway crossing 6.		Care when driving the truck [F3]	
23/05/2020, at 10:19 pm. Collision between the truck and train DGS 50214.	Visibility conditions at railway crossing 6 [F1]		Risk control via rules on design and operation [S1]

Table 1: List of influencing factors

1.4 Safety recommendations

The following safety recommendations are issued to the national safety authority, the German Federal Railway Authority, in accordance with Section 6 of the EUV [German railway accident investigation regulation] and Article 26(2) of Directive (EU) 2016/798.

No.	Safety recommendation	Relates to company
02/2025	It is recommended that the railway infrastructure company should examine and, if necessary, improve the planning and operational rules for railway crossings in relation to sufficient risk control as per Regulation (EU) 2018/762 Annex II, criterion 3.1.1 a), including with effect for existing railway crossings.	Railway infrastructure company
03/2025	It is recommended that the effectiveness of concepts for monitoring commissioned contractors in accordance with Regulation (EU) 2018/762, Annex II, criterion 5.3.3. a) and 6.1.1. a) should be examined in order to ensure that their workers know about rules affecting railway safety, independently from occupational health and safety rules.	Railway infrastructure company

5 Conclusions

The following section contains a summary of the identified causal, contributing and systemic factors. In addition, two further subsections are provided containing information about measures already taken, and additional comments.

5.1 Summary and conclusion

Due to the nature of the event and the findings gained, it was possible to identify that influencing factors such as the control and safety system, the physical structure of the track infrastructure and the actions of the signaller were not relevant for the event. It was possible to deduce the following factors from the investigations. In relation to individual factors, the Federal Authority for Railway Accident Investigation believes there is a need to increase railway safety and is issuing recommendations to that effect:

In relation to the causal factor "Visibility conditions at railway crossing 6" [F1]:

The situation found at railway crossing 6 in terms of topology and operating conditions indicated that, due to the existing visibility conditions, a rail vehicle approaching at up to 60 km/h would not be seen by the driver of a road vehicle to the extent that conflict-free, safe crossing of the railway crossing could be expected. This risk also existed if vehicle drivers had been instructed about the "white number plates" procedure for the railway crossing, i.e. driving across after checking for approaching rail vehicles. These risks, which were not controlled by the railway infrastructure company in the initial situation either by design or on an organisational basis, contradict the statutory requirements for safe operational management according to Section 4(3) AEG [German General Railway Act]. This obligation must be fulfilled even when own operational facilities are crossed with road vehicles based on direct or indirect orders from the railway infrastructure company.

Corresponding obligations relating to safe operation already existed at the time of the event and can also be deduced from the legal regulations applicable for the railway infrastructure company in relation to the safety management system at the time of the publication of this report; in relation to this, see remarks below on the systemic dimension of this factor [S1].

In relation to the systemic factor "Risk control via rules on design and operation" [S1]:

The fact that no plausible planning and design rules had been included in the railway infrastructure company's safety organisation or been applied in relation to the deficiencies at railway crossing 6 was stipulated as a systemic factor in the investigation of the event. These rules should have meant that travelling across railway crossing 6, for example, with the locally known "red number plate" procedure should only have taken place in agreement with the responsible signaller. The railway infrastructure company was also not able to present the assignment of the railway crossing into the different local procedure.

For example, the planning and design rules for railway crossings crossed by trains in operating facilities can be oriented towards the specialist and recognised principles for public railway crossings as per Section 11 Eisenbahn-Bau- und Betriebsordnung [Railway Construction and Operating Regulation]. Basic conditions such as the restricted visibility conditions for vehicle drivers from road vehicles cannot be changed and must be given identical consideration in terms of the safety of procedures for risk control at the railway crossing. If necessary, as a result of this the topology and operating conditions at the railway crossing should also have been changed. During this process, in relation to human factors it would have been necessary to consider the compatibility with the behaviour at railway crossings that external workers are familiar with from public railway crossings and their appearance. It would also be necessary to include the extent to which the effectiveness of orders only to cross a railway crossing with the consent of the responsible infrastructure personnel is increased if, for example, the behaviour of the local "red number plate" procedure could be seen directly and clearly at the site.

The processes and procedures of a safety management system to be established must meet the statutory requirement for safe railway operation. In the meantime, these statutory requirements have been updated via new legal acts. According to this, the "Commission Delegated Regulation (EU) 2018/762 of 8 March 2018 establishing common safety methods on safety management system requirements pursuant to Directive (EU) 2016/798 of the European Parliament and of the Council and repealing Commission Regulations (EU) No 1158/2010 and (EU) No 1169/2010", which is even identified as the successor to previous requirements in the title, is now relevant for a safety management system for the railway infrastructure company. In accordance with criterion 3.1.1.1. a), all operational, organisational and technical risks relevant to the character, extent and area of operations carried out by the organisation must be identified and analysed, and according to c) safety measures must be developed and put in place, with identification of associated responsibilities.

Due to the severity of the present event, the repeated occurrence of events in this operating facility and the deficiencies identified in the safety measures at this railway crossing, the Federal Authority for Railway Accident Investigation recommends that the railway infrastructure company examines and, if necessary, improves the planning and operating rules for railway crossings in relation to sufficient risk control, including with effect for other railway crossings (safety recommendation 02/2025).

In relation to the causal factor "Instruction obligation applying to all workers" [F2]:

The investigation showed that even deficiency-free safety rules on using the railway crossing would not have reached the driver involved in the accident because he had not received instruction on work at Munich North marshalling yard station.

In relation to this, in accordance with Section 3 ArbSchG [German Occupational Safety and Health Act], his employer Penzenstadler GmbH had a basic obligation and in accordance with

Section 8 ArbSchG there was a shared obligation for DB Netz AG, Swietelsky AG and Penzenstadler GmbH in relation to the cooperation of several employers. In relation to DB Netz AG, this cooperation had been defined in relation to the health and safety hazards for all people working in the operating facility with the contracting company Swietelsky AG and responsibilities had also been delegated, but this was not done in relation to the driver involved in the accident in the sub-relationship between Swietelsky AG and Penzenstadler GmbH.

In itself, this deficiency should not be assigned to the safety of railway operations as per Section 4(3) AEG, and instead is an aspect relating to the bodies and authorities that are in principle responsible for the company Penzenstadler GmbH and its cooperation with other employers in relation to the monitoring of the ArbSchG.

As the construction work has since ended, this aspect will therefore not be discussed further, but refer to the following statements on the presence of a systemic factor [S2]:

In relation to the systemic factor "Ensuring the performance of safety tasks" [S2]:

In the present case, the effectiveness of instruction to employees working within operational facilities of the railway infrastructure company had a repercussion on railway safety. The failure to carry out safety tasks included in the instruction, as well as the failure to observe authorisations or bans, posed a danger to train journeys in Munich North marshalling yard station. In the present case, the collision with the truck resulted in material damage to the infrastructure equipment of the railway involved and to the vehicles because it was not ensured that the truck driver was aware of the effective rules for railway safety.

For the construction work, the railway infrastructure company had selected the procedure that in all cases the instruction of workers would be carried out independently by the contracting company Swietelsky AG. The subject of the instruction included rules on occupational health and safety, and also implicit rules for railway safety. The railway infrastructure company did not implement any requirements to ensure this for the contractor or have its own additional organisational procedures to support the reliability of this delegation principle. Conceivable examples for this kind of support can include knowledge to be imparted at all levels about the group of people to be qualified, or procedures according to which instruction is always carried out by the railway infrastructure company itself. It canrequire prior approval for people to be able to work in order to ensure that knowledge is imparted, for example, including with specific implementation as part of access to the operating facility.

Also in accordance with the currently relevant Regulation (EU) 2018/762, Annex II, according to criterion 4.4.3 f), it is the responsibility of the railway infrastructure company to ensure in its safety management system that safety-relevant information is communicated before it takes effect. This also includes the rules for the conduct of commissioned external workers at a railway crossing within the operating facility, for which, according to criterion 4.2.1 f) of the

stated Regulation there must be specific training in relevant parts of the safety management system.

In relation to this, the railway infrastructure company must consider the organisation of rules for construction contracts and the principle of delegating instruction identified in this case. In relation to the commissioning of companies to perform construction and maintenance services, in accordance with Regulation (EU) 2018/762, Annex II, criterion 4.6.1 b), the railway infrastructure company must also adopt a systematic approach in order to address risks associated with the design and use of equipment, tasks, working conditions and organisational arrangements. In this process, risk control measures, including instructions on conduct must be consciously differentiated from concerns relating to occupational health and safety and the significance for railway safety.

Ensuring the communication of safety-relevant information is closely associated with monitoring and, if necessary, correcting the handling of the communication, see below on point [F4]. The Federal Authority for Railway Accident Investigation is therefore not issuing a separate safety recommendation on the systemic factor [S2].

In relation to the contributing factor "Care when driving the truck" [F3]:

It was not possible to subsequently determine the reason why the truck driver involved in the accident slightly exceeded the maximum speed at railway crossing 6, which was restricted by traffic sign 274-10. From the perspective of human factors, beside a lack of care on the part of the driver, it could also be suspected that the driver consciously exceeded the speed limit in order to cross the dangerous area of the railway crossing as quickly as possible because it gave him a false sense of security or because he did not trust that he would reliably see rail vehicles approaching in the dark. The statements above on the required risk control via rules on design and operation [S1] are therefore deemed to be more important.

In relation to the contributing factor "Inspection-free delegation of instruction to contractors" [F4]:

In relation to the procedure selected by the railway infrastructure company in association with the event, that the instruction of all workers, including those of subcontractors, was imposed on Swietelsky AG, it was not possible to identify a corresponding procedure to examine the quality of performance or fulfilment at any level. With the help of established procedures for random testing, a lack of instruction could be corrected if necessary in individual cases. Established full testing procedures, for example via permanent access controls, would have prevented uninstructed workers from driving in the operating facility. As the construction work has now ended, improving the individual case is now irrelevant; however, refer to the points below in relation to the systemic significance [S4].

In relation to the contributing factor "Procedure for inspection by the railway infrastructure company of the results of the services provided by the contractors" [S4]:

The deficiency described above, according to which the railway infrastructure company did not inspect the results of the services performed by the contractors, including the delegated tasks relating to instructing external personnel on the rules relating to railway safety, had systemic significance. Based on the now-updated requirements, in accordance with Regulation (EU) 2018/762, Annex II, criterion 6.1.1. a), the railway infrastructure company must perform monitoring in accordance with Regulation (EU) No 1078/2012 in order to check the correct application and the effectiveness of all the processes and procedures in the safety management system, including the operational, organisational and technical safety measures. In accordance with Section 5.3.3. a), in detail this includes monitoring the commissioned construction companies in terms of their safety performance for all activities and operations. In this case they must comply with the contractual requirements. If it must be ensured that external workers have been instructed on the rules that influence the safety of railway operations, in accordance with criterion 4.4.3 f), it is the responsibility of the railway infrastructure company to ensure in its safety management system that safety-relevant information is communicated before it takes effect or, in the event of delegation, that this is reliably performed. This applies independently alongside meeting statutory obligations resulting from occupational health and safety by one or more employers.

Due to the lack of examination identified here, the Federal Authority for Railway Accident Investigation believes that it is necessary for the railway infrastructure company to examine the effectiveness of its monitoring concepts in relation to commissioned construction companies in accordance with Regulation (EU) 2018/762, Annex II, criterion 6.1.1 (safety recommendation 03/2025). In relation to the effectiveness of the concepts, it is necessary to distinguish that rules to be communicated to external personnel relating to conduct in the operating facility may be significant for the safety of the railway, and simultaneously also for the occupational health and safety of the person. As a result, within the broadly understood concept of "instruction", a distinction must be made in terms of content and organisation. This safety recommendation has consciously been left formulated broadly due to the conceivable variety of organisational approaches to improvement.

5.2 Measures taken since the event

Structural alterations have not been carried out at railway crossing 6.

Safety guards are used at the railway crossing, and they only allow the railway crossing to be crossed by external vehicles following agreement with the signaller. Barriers with guards have been set up at the vehicle access to the marshalling yard. The guards only allow external vehicles to proceed following consultation with the railway crossing safety guard.

5.3 Additional observations

None

6 Safety recommendations

The following safety recommendations are made in accordance with section 6 of the EUV and Article 26(2) of Directive (EU) 2016/798:

No.	Safety recommendation	Relates to company
02/2025	It is recommended that the railway infrastructure company should examine and, if necessary, improve the planning and operational rules for railway crossings in relation to sufficient risk control as per Regulation (EU) 2018/762, Annex II, criterion 3.1.1 a), including with effect for existing railway crossings.	Railway infrastructure company
03/2025	It is recommended that the effectiveness of concepts for monitoring commissioned contractors in accordance with Regulation (EU) 2018/762, Annex II, criterion 5.3.3. a) and 6.1.1. a) should be examined in order to ensure that their workers know about rules affecting railway safety, independently from occupational health and safety rules.	Railway infrastructure company