Collision of Eurocity train No. 108 with an obstacle (fallen bridge structure) in Studenka station

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The Rail Safety Inspection Office
Date and time:  8th August 2008, 10:30:27
Grade: serious accident
Location: Studenka station, track No. 101, km 243,576
          Bohumin – Prerov main track
          max. track speed for the EC train: 140 km/h

Occurrence description:
A road bridge above the station collapsed just in front of approaching Eurocity train No. 108. The train collided with the ruins of the bridge and derailed. 4 derailed carriages consequently collided with a stationary goods train, causing derailment of 3 wagons of the goods train.
Accident site

Prague

Studénka
Accident site

Studénka
accident site
km 243.576

approaching train EC 108

Direction Praha

Direction Ostrava
Accident site

km 243.576

Direction Praha

Direction Ostrava

approaching train EC 108
### Consequences

<table>
<thead>
<tr>
<th>Fatality:</th>
<th>7 + 1 passengers (1 died after 30 days)</th>
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</thead>
<tbody>
<tr>
<td>Injuries:</td>
<td>84 passengers</td>
</tr>
<tr>
<td></td>
<td>4 staff (engine driver + 3 train crew)</td>
</tr>
<tr>
<td>Damage:</td>
<td>CZK 62 458 840,11 (2 500 000 EUR)</td>
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<tr>
<td>Totally destroyed:</td>
<td>locomotive (class 151)</td>
</tr>
<tr>
<td></td>
<td>3 carriages (classes Bpee and Bee)</td>
</tr>
<tr>
<td></td>
<td>3 wagons (class Faccp)</td>
</tr>
<tr>
<td>Damaged:</td>
<td>1 carriage (class Bee)</td>
</tr>
<tr>
<td></td>
<td>2 wagons (class Faccp)</td>
</tr>
<tr>
<td></td>
<td>288 m of track (tracks No. 101-105)</td>
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<tr>
<td></td>
<td>982 m catenary (tracks No. 101-105)</td>
</tr>
<tr>
<td></td>
<td>steel concrete bridge construction</td>
</tr>
</tbody>
</table>
EC 108 „Comenius“

- locomotive 151.018-9
- 10 passenger carriages with the passengers
  (classes: Bpee, Bee, WRM, Ampz)
- length 266 m
- mass 539 t
- cca 400 passengers
- from Kraków (Poland) to Praha hl. n. (Czech Republic)
above the tracks

the bridge was under the reconstruction

should be replaced

steel concrete bridge construction weighing 500 t
Situation before the accident

Loc: Locomotive (151 018-9)
1 – 6: first 6 carriages behind the locomotive
Chronology of the accident – 10:30:08

- bridge construction falls down
- EC train is **638 m** from the bridge at speed of **134 km/h**
- time to collision is **19s**
- the engine driver notices the bridge structure falling down
Emergency brake was applied.

EC train is 452 m from the bridge at speed of 133 km/h.

Time to collision is 14s.

The engine driver escapes to the engine room.
Chronology of the accident – 10:30:27

- moment of the collision
- impact speed is **90 km/h**
- the train pushes the construction ahead for 33 m
**Dynamic process of the accident**

- the locomotive pushes the bridge construction ahead
- bridge construction collides with rear part of goods train
Dynamic process of the accident

Direction Přerov, Praha

Direction Studénka, Ostrava

the locomotive continues over the bridge construction
Dynamic process of the accident

- carriages jumped over the bridge construction
- carriage No. 2 collided with 2 wagons of goods train
Accident occurred at 10:30
RSIO was informed at 10:49 (19 min after the accident)
RSIO arrived at the accident site at 11:30
- 2 investigators of RI Ostrava
- Director of RI Ostrava
- Inspector General

Parties at the accident site:
- IM + RUs
- RSIO
- Emergency services (Police, firemen, air rescue service, psychologist...)

RSIO response
**Organisation of investigation process**

- The accident investigated by team of investigators of RI Ostrava

- Inspector General established commission of consultants (Directors of RI Brno and RI Praha)

- Cooperation with NIB Poland

- External cooperation
  - Technical University of Ostrava, Faculty of Mechanical Engineering (expertise)
  - Škoda výzkum (expertise)
  - Police + criminal police (witnesses)
Scope of RSIO's investigation

- Investigation in the IM area – **YES**
- Investigation in the RU area – **YES**
- Investigation of causes the bridge collapse – **NO** (out of the scope of RSIO)
- Investigation of ensuring safety during the construction works – **YES**

The RSIO investigated:
- the causes of a collision of the train with an obstacle (fallen bridge)
- deficiencies in system ensuring safety during the construction works
Real braking effort 137%
Reported br. effort 144%
Track speed 150 km/h not reduced

Construction works in progress

Not investigated by NIB (out of NIB’s scope)

Risks originating from interaction between railway and construction site not mitigated (procedure not defined)
Risks originating from interaction between railway and construction site not mitigated (procedure not defined)

Project documentation doesn't involve risk assessment, preventative measures, nor description of shifting of the bridge construction.

Czech Railways's position paper: "Clearance gauge mustn't be invaded."

NSA's position paper: PURE FORMAL

Property/land owner's position paper (Czech Railways)

Construction works permitted without risk assessment and preventative measures

Building Act requires property/land owner's position paper involving their ownership rights only.

Building Act requires the relevant Safety Authority to produce position paper which may get binding conditions.

Interaction between construction site and railway (road, aviation, water plant) not solved by Building Act using mandatory risk assessment but using the relevant Safety Authority's position paper.

Beginning of approving procedure

Project documentation completed

Construction works in progress

Risks originating from interaction between railway and construction site not mitigated (procedure not defined)

Building Act requires property/land owner's position paper.
**Causes**

**Direct cause (from the railway perspective)**

★ Third parties – disruption to clearance gauge of tracks No. 101 – 105b of Studenka station by bridge structure collapsing when EC train No. 108 was approaching

**Underlying cause (from the railway perspective)**

★ No effective measures eliminating safety risks originating from interaction of reconstruction works and railway traffic were required by results of mandatory procedures performed during preparations of the reconstruction.
1. It is recommended to ensure that the analysis of interaction of construction works and railway traffic is part of mandatory procedures required for obtaining allowance to start the works.

2. It is recommended to ensure that the allowance to start the works is issued only when effective measures are required in order to eliminate risks identified by the above analysis.

3. It is recommended to require presence of authorized specialist at the site (according to §149 Act No. 183/2006 Coll.) during construction operations identified by the above analysis as operations with higher level of risk; this specialist must be equipped with direct communication connection to person dispatching railway traffic in order to be able to require immediate cancel of traffic in case of emergency.

4. It is recommended to take own measure to ensure implementation of the below recommendation by IM.
**Recommendation**

Addressed to the IM (SZDC, s. o.)

1. It is recommended to ensure that person dispatching railway traffic can immediately take effective measures to ensure railway safety when canceling of railway traffic is requested by authorized specialist via designated communication channel (according to the above recommendation addressed to NSA)

RSIO reserves its right to amend this safety recommendation after identifying the causes of collapse of the bridge structure in order to ensure safe operation of railways and railway traffic.
Conclusion

Nobody knows exact condition of the bridge structure before the collapse.

Thus the investigation of causes of the bridge structure fall can take several years.

Question is whether the real causes will be found...

This tragic accident is also called “The fatal eights“

08. 08. 2008  EC 108
Thank you for your attention

Any questions?