



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



**Ing. Hana Pechačová
Ing. Michal Miklenda**

The Rail Safety Inspection Office

Accident basic data

Date and time: 8th August 2008, 10:30:27

Grade: serious accident

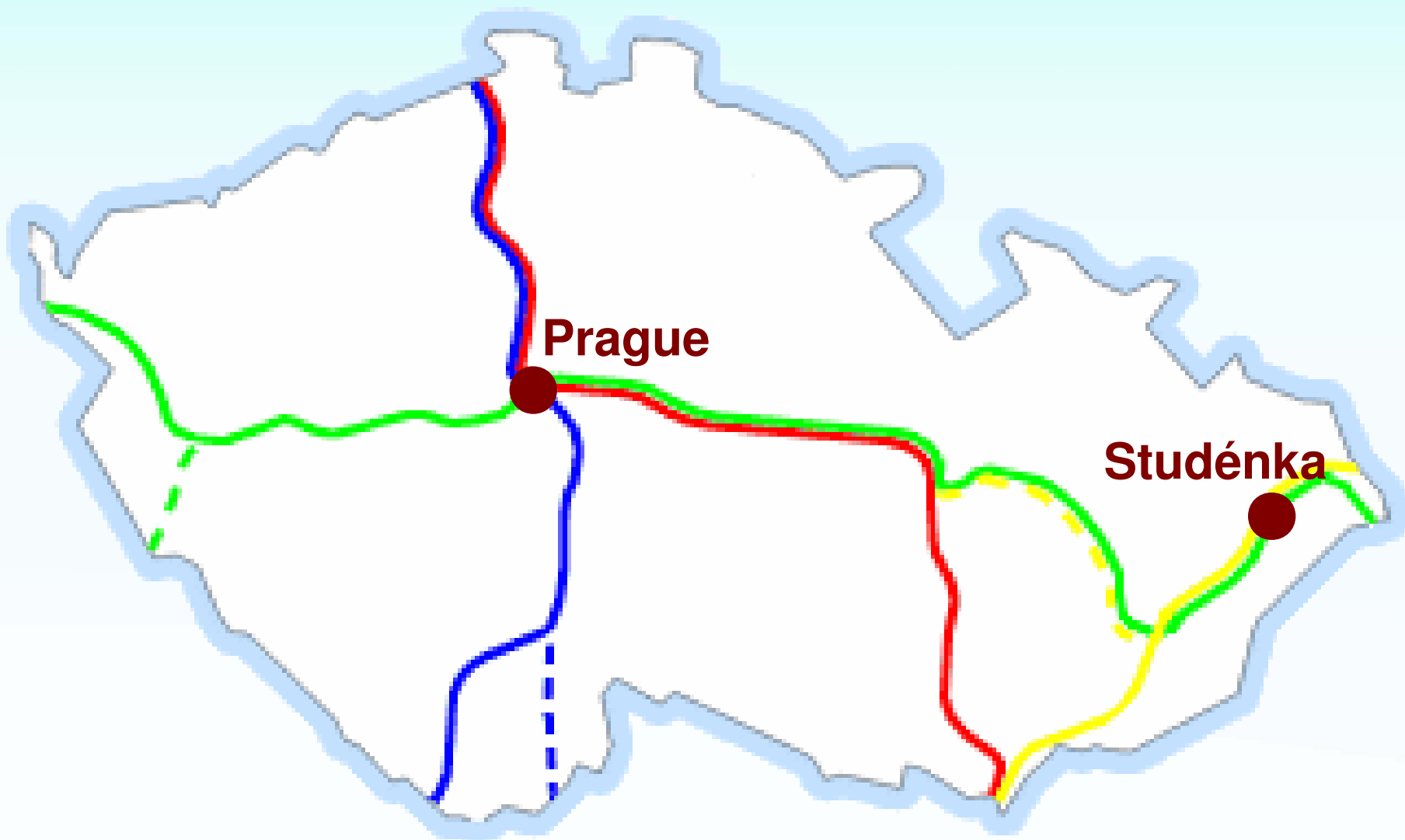
Location: Studenka station, track No. 101, km 243,576
Bohumin – Prerov main track
max. track speed for the EC train: 140 km/h

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.



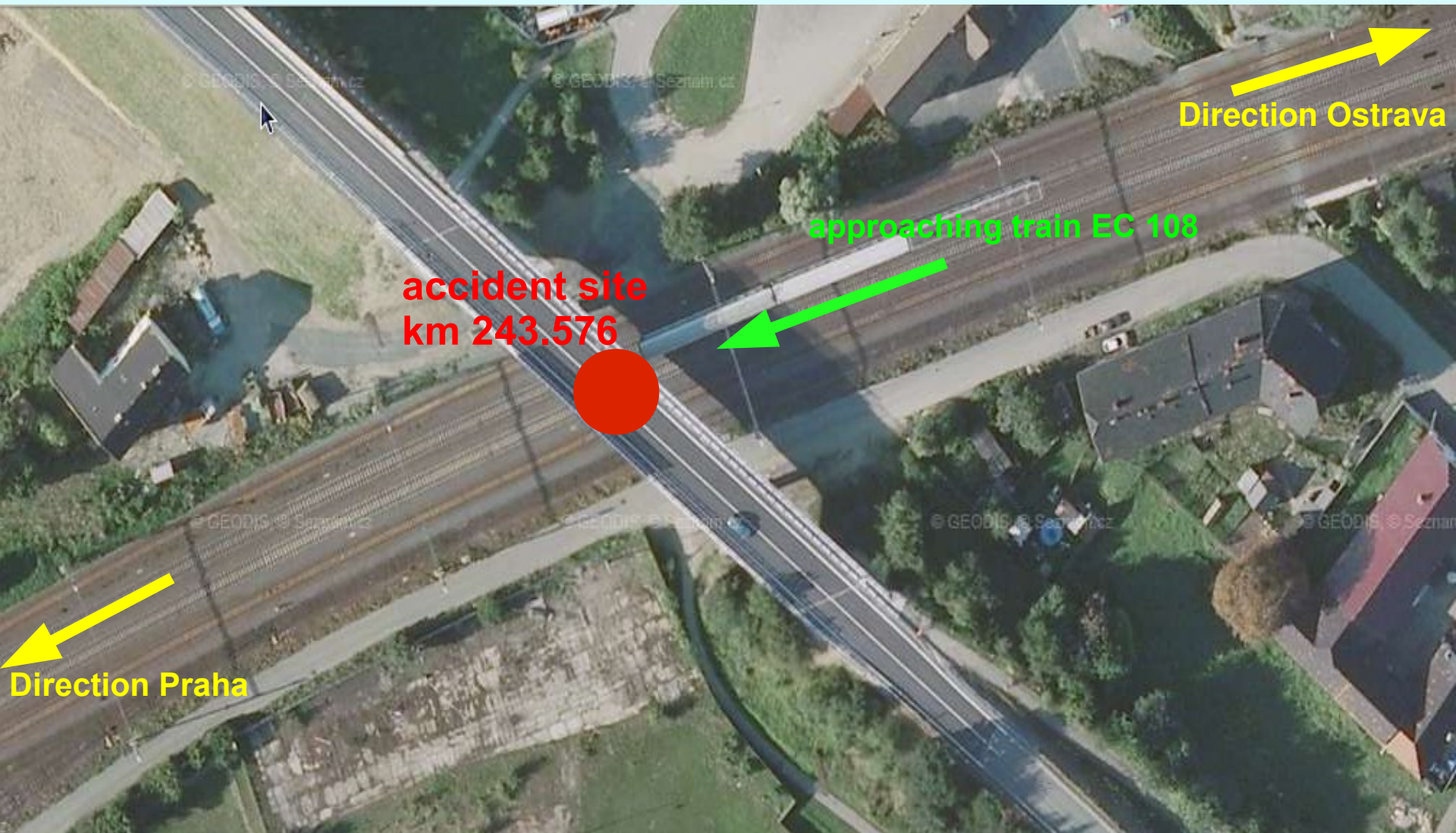
Accident site



Accident site



Accident site



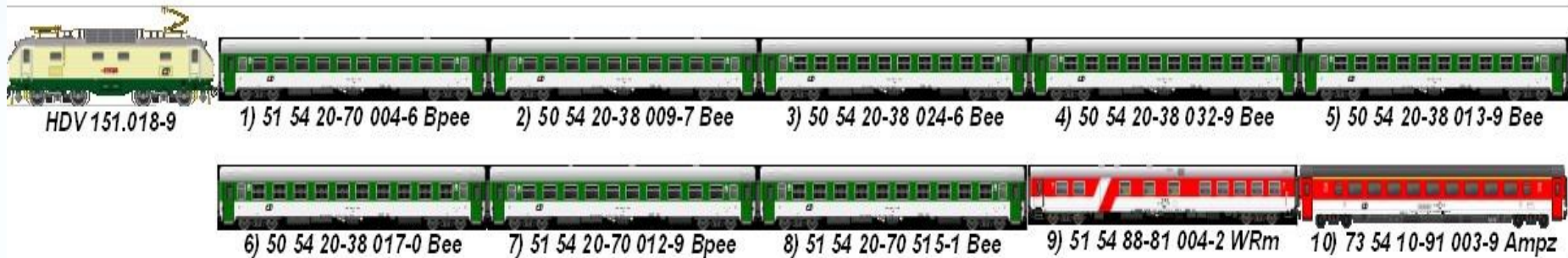
Consequences

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



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)



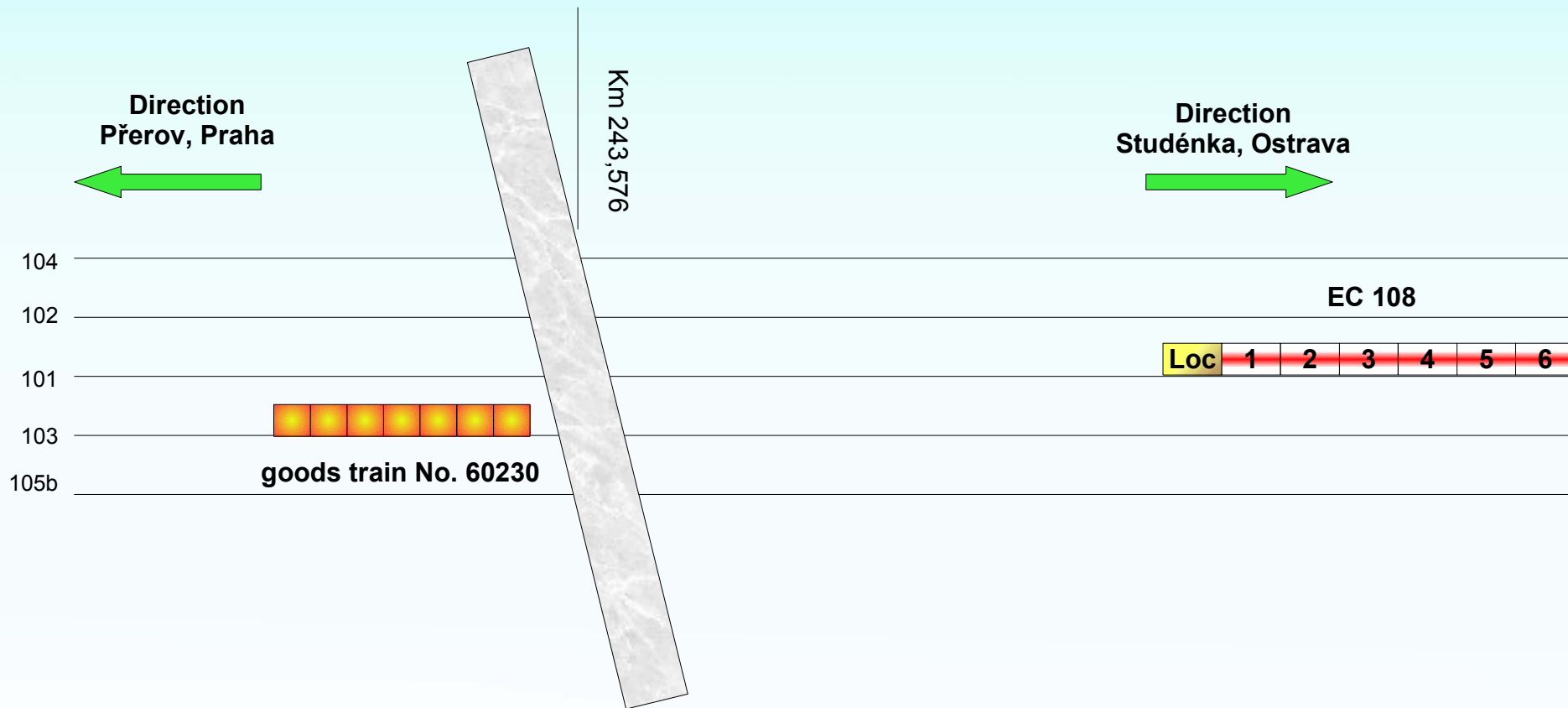
Road bridge



- above the tracks
- the bridge was under the reconstruction
- should be replaced
- steel concrete bridge construction weighing 500 t



Situation before the accident

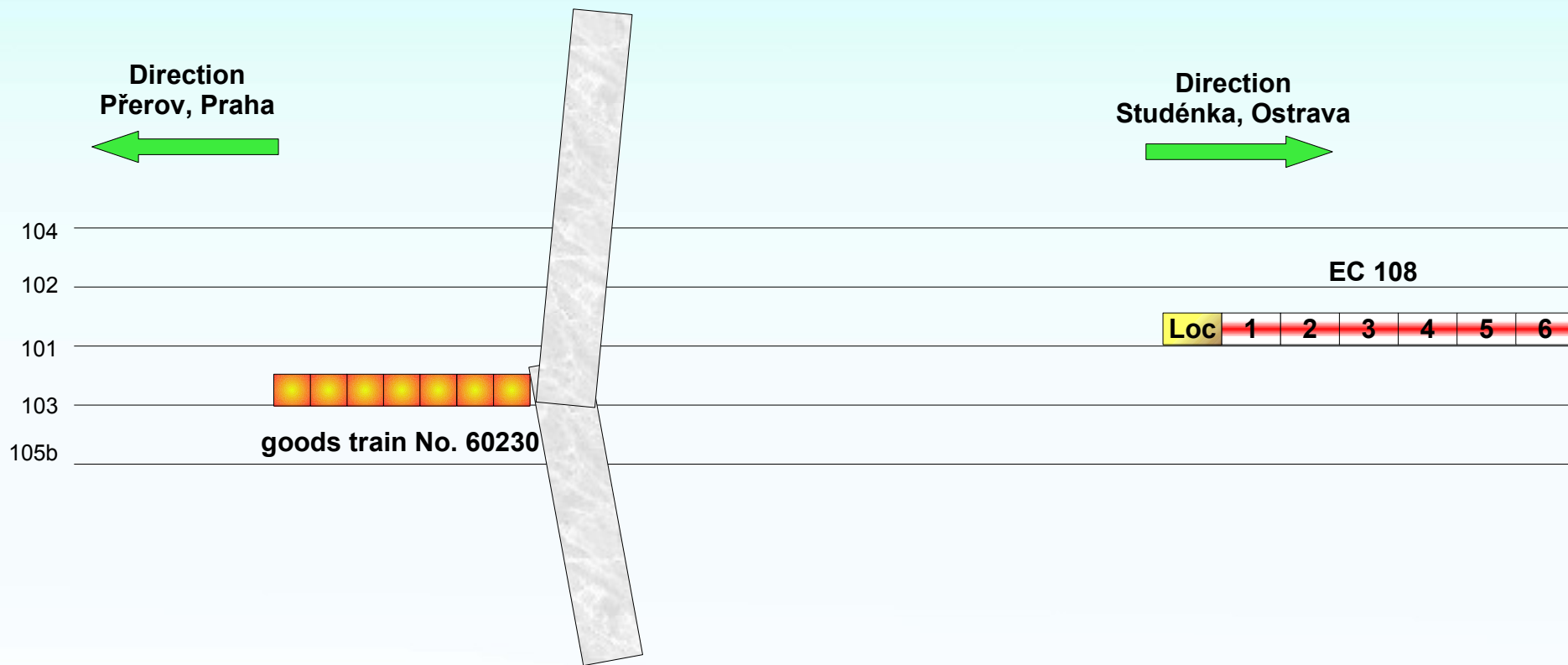


Loc: Locomotive (151 018-9)

1 – 6: first 6 carriages behind the locomotive



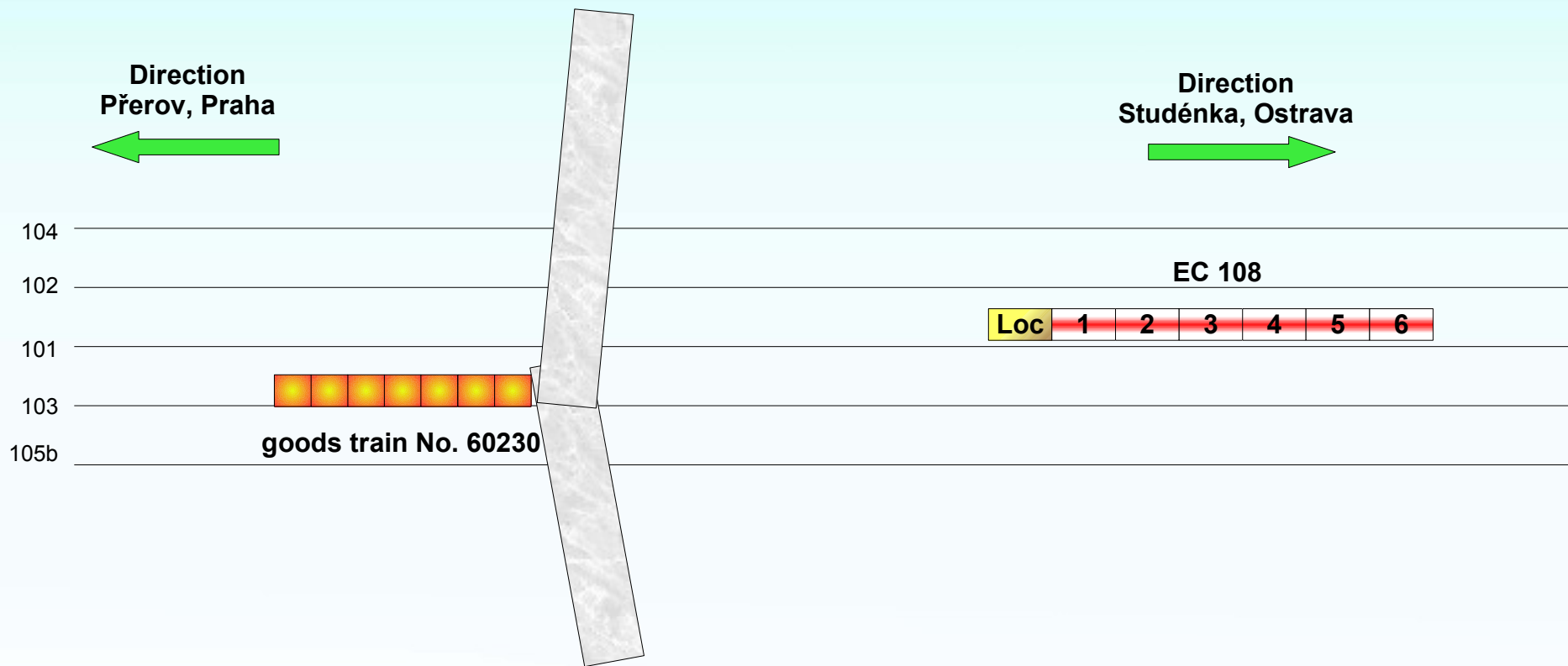
Chronology of the accident – 10:30:08



- 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



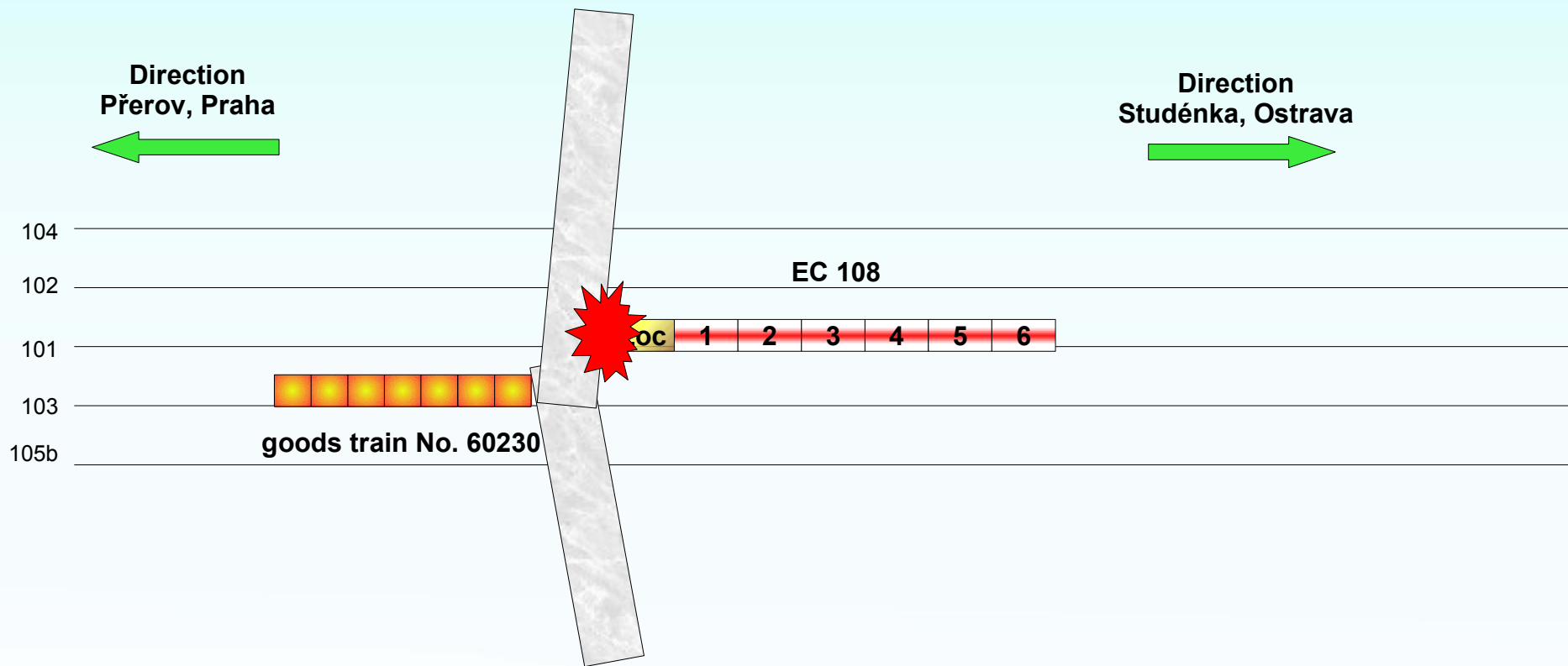
Chronology of the accident – 10:30:13



- 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



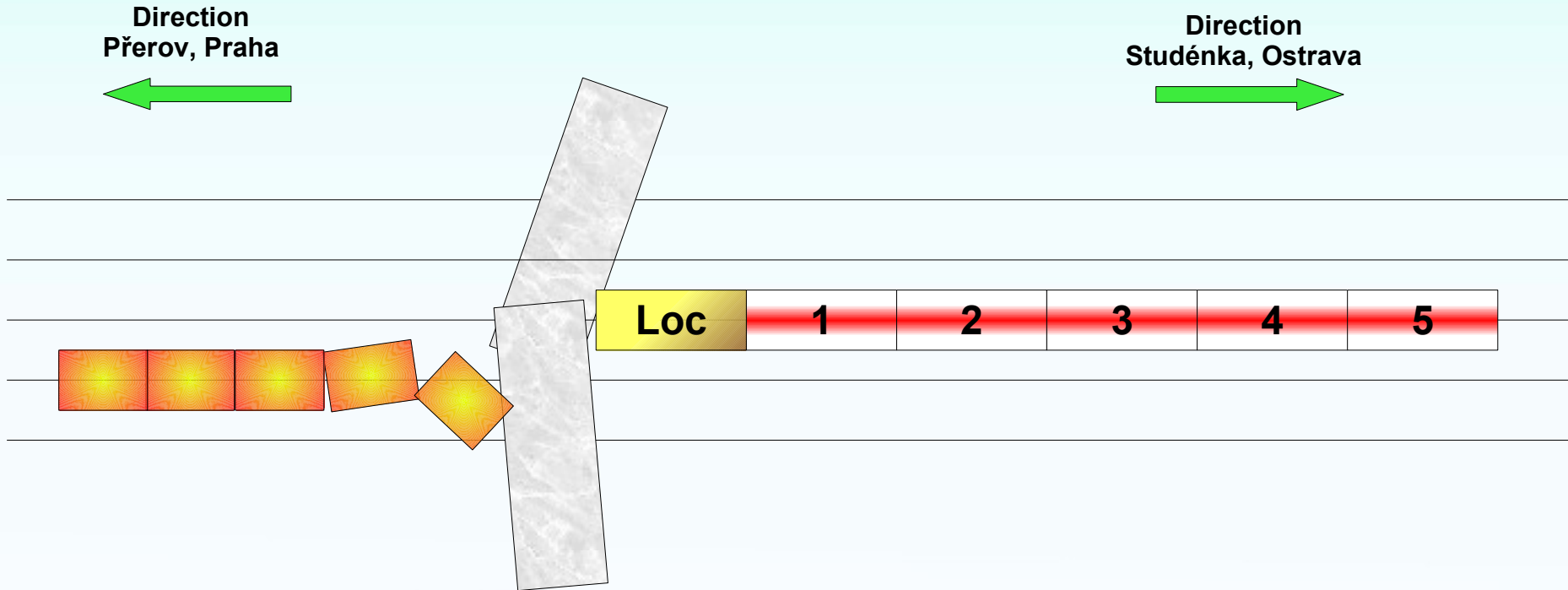
Chronology of the accident – 10:30:27



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



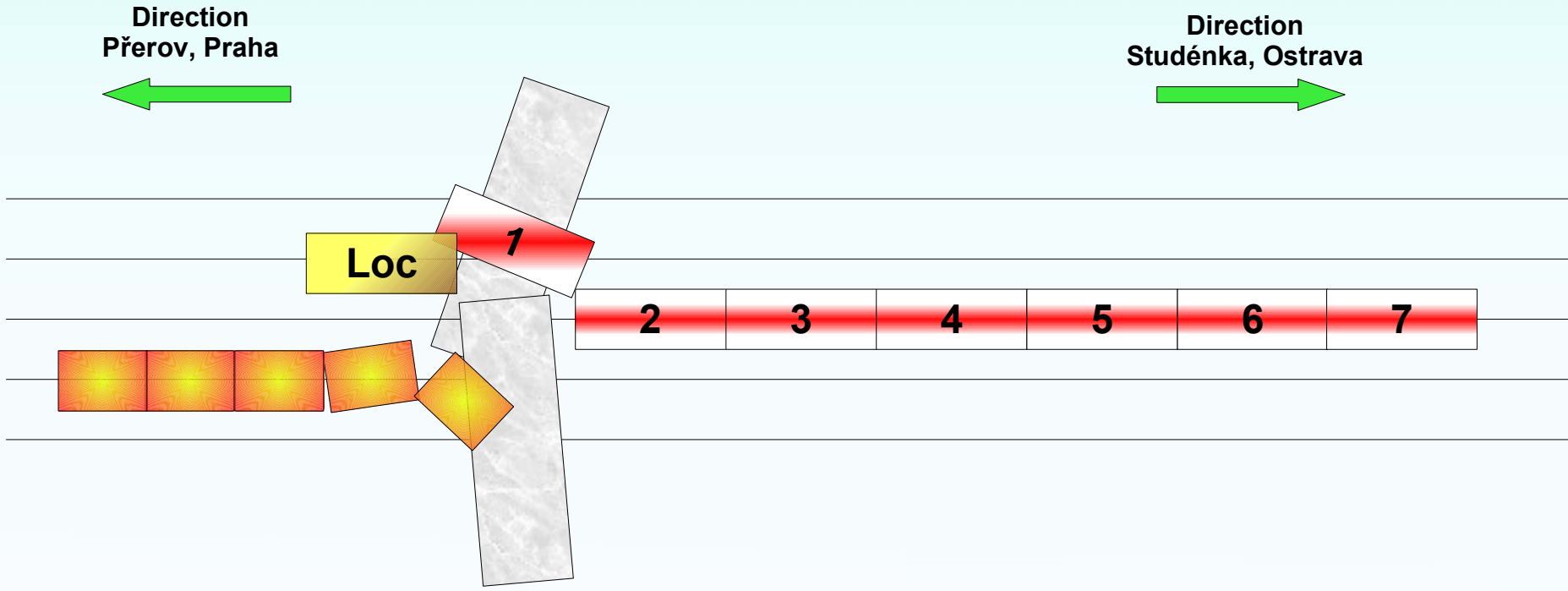
Dynamic process of the accident



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



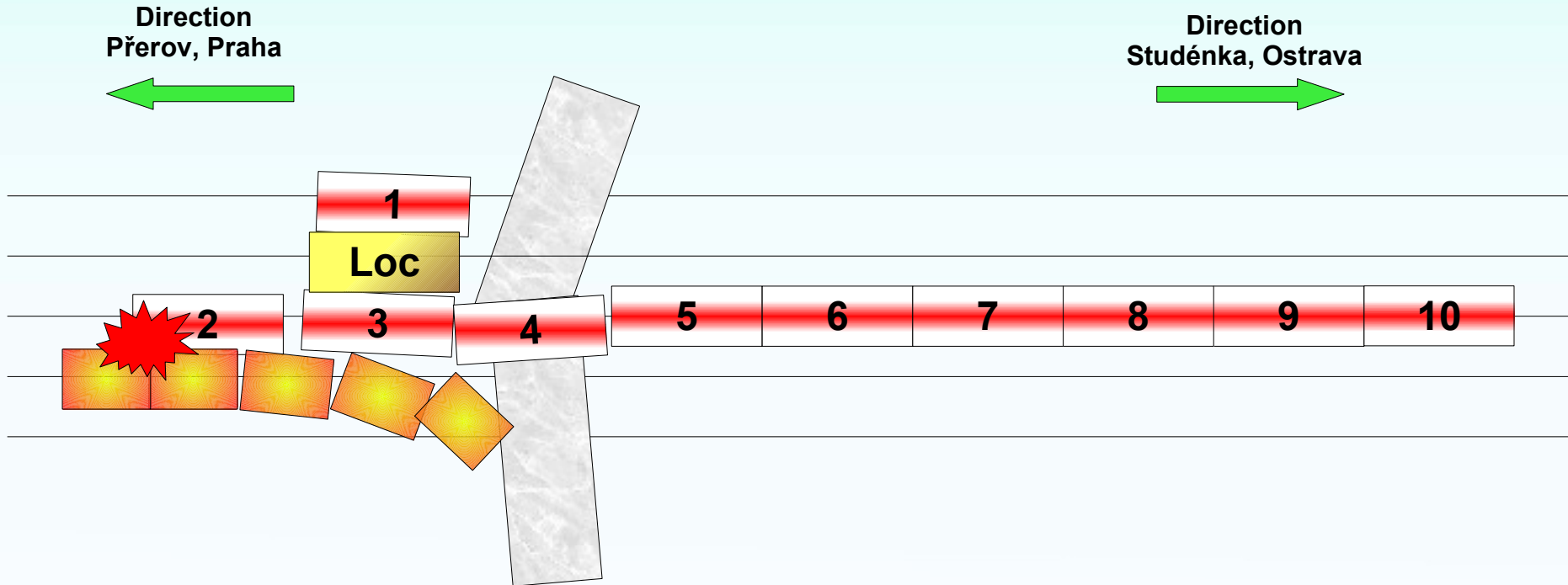
Dynamic process of the accident



→ 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

















RSIO response

- ★ 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...)



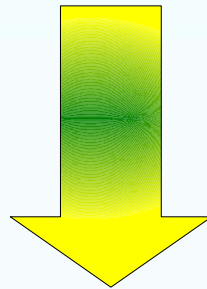
Organisation of investigation process

- ★ 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



Accidental process

Goods train

Train stopped on track 103
10:20:07

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

Cause of bridge collapse

Bridge collapse

Catenary grounded by falling bridge
10:30:08

Emergency brake applied by driver of train EC 108
10:30:13

Collision of EC 108 with obstacle (ruins of collapsed bridge structure)
10:30:27

Ruins of collapsed bridge structure pushed by EC 108 for 33 m

Derailment of train EC 108 (locomotive + 4 carriages)

Collision of derailed carriages of train EC 108 with last 5 wagons of goods train on track No. 103

Bridge

EC 108

Derailment of 3 wagons

Usual train route for train No. EC 108 set
10:21

Train passes route signal (green aspect)
10:30:03

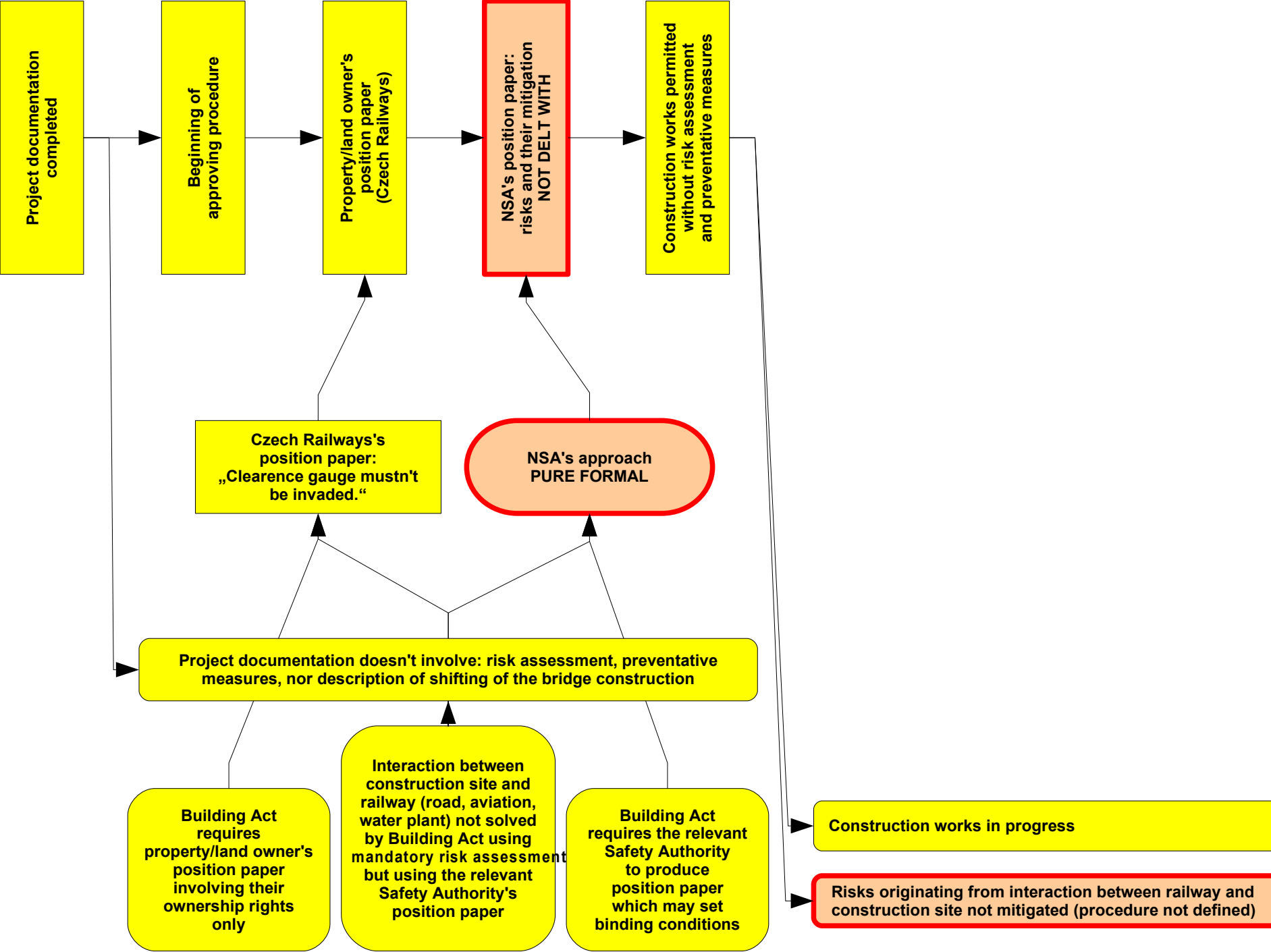
Unsafe condition of the bridge construction

Real braking effort 137%
Reported br. effort 144%

Track speed 150 km/h not reduced

Construction works in progress

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



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.



Recommendation

Addressed to the national safety authority

- 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?

