Fire safety requirements for railway stations in Germany

(SUB-THEME 2: Safety taken into consideration as a key input
for the management of passenger flows)

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Overview

Numbers, types and features and of stations in Germany are shortly presented.

General requirements

Stations have to fulfil the requirements for public safety and order as well as those relevant for safe railway operation. Concerning railway safety the requirements are fulfilled if structural works and facilities are designed, built, renewed and maintained in a way that especially the emergence and expansion of fire and smoke obscuration is prevented. In case of fire or other accident, rescue of humans as well as effective fire-fighting must be possible.

Fire safety requirements

Essential fire safety requirements result from:

- European: Interoperability Directive, TSI and
- National: “Eisenbahn-Bau- und Betriebsordnung”, “Musterbauordnung”,
  EBA Guideline for fire safety requirements,
  Technical building regulations (DB AG rules 813, 123)

technical regulations.

Fire safety requirements are divided into:

- preventive: structural, plant-specific, operative / organisational,
- defensive: fire brigade, rescuers.

The defined safety objective has to be achieved.

Fire safety conception

The fire protection concept includes all fire safety verifications needed to prove achievement of the safety objective. Key aspects:

- safe self-rescue / third-party rescue,
- accepted fire-safety engineering methods (design fire for urban and mixed passenger train traffic),
- fire-safety technical assessment by EBA-accepted inspection engineers (“4-eyes-principle”).

Analysis of passenger flows

Analyses of passenger flows are an important part of fire protection concepts. They are based on mathematic calculations.

The following principal requirements need to be fulfilled:

- safe usability of escape routes for a defined time period,
- safety for persons against heat and smoke gas,
- safe construction and brick partition of the escape route for the time needed for self-rescue and third-party rescue,
- restriction of fire action to the area in use,
- ensurance of adequate visibility conditions by smoke extraction.

Two main groups for models of passenger flows exist:

- hydraulic (current) including network model and
- individual (microscopic) models.

In practice, i.a. the models „Building EXODUS“, „PedGo“ or „ASERI“ are used.

Approval procedures

Infrastructure managers need a safety authorization and must implement a safety management system (Directive 2004/49/EC, EU-Regulation 1169/2010). Within the authorization for placing into service (Directive 2008/57/EC), besides EC-verification for TSI of the infrastructure subsystem, the examined fire protection concept for compliance with national technical rules is an important part of verification. German law defines which measures of upgrade and renewal are subject to authorization for placing in service by EBA.

Example

Current experience with there the evacuation (passenger flows) during the construction phases are demonstrated on example: “Berlin-Gesundbrunnen”.

Conclusion

An integral fire protection concept for stations has to comprehensively reproduce the requirements for use and the verifications of the defined safety objectives. It is the base of verification for safe construction and operation safe during the lifetime of a station. Self-rescue is an important part. Analyses of passenger flows are a usable and important tool for the verification of the final state and also for construction works in process. Infrastructure managers must possess an up-to-date fire protection concept for each railway station during the design, construction and operating phase.