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Measures to protect railway bridges against impacts from road vehicles, and to protect rail traffic from road vehicles fouling the track

Mesures pour prévenir les chocs des véhicules routiers contre les ponts-rails et visant à empêcher la pénétration de véhicules sur la voie ferrée

Maßnahmen zum Schutz der Eisenbahnbrücken gegen Anprall von Straßenfahrzeugen und des Schienenverkehrs vor abirrenden Straßenfahrzeugen



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Summary

From the railway operating standpoint, the collision of vehicles with railway bridges represents a danger, especially if the route is used by high-speed trains. Such collisions have already resulted in serious accidents to trains. A further danger is the fouling of the track by road vehicles falling from road bridges or straying off course from roads running parallel to the railway.

This leaflet must be read in conjunction with any relevant statutory or responsible supervisory authority requirements in the zone of intended application.

1 - Collision of road vehicles with the piers of railway bridges

1.1 - Equivalent loads

1.1.1 - New or reconstructed bridges

If the pier or the supporting part of a railway bridge lies within a certain distance from the outer edge of the road, as defined by the responsible supervisory authority, it should be designed for static equivalent loads.

The static equivalent loads for the ultimate limit state are:

- 1000 kN in the direction of movement of the road traffic (1),
- 500 kN at right-angles to the direction of movement of the road traffic (2).

The point of application of the loads lies 1,25 m above the level of the road.

Loads (1) and (2) do not act simultaneously.

Instead of the equivalent loads calculation described above, passive measures of protection may also be adopted, when these are capable of preventing a collision.

When the distance between the outer edge of the pier and the outer edge of the roadway is $< 1\text{ m}$, the static equivalent loads should be taken into consideration for design purposes even if passive measures of protection have been adopted.

1.1.2 - Existing bridges

If piers of an existing bridge are unable to withstand the forces defined in this paragraph, passive measures of protection should be taken.

1.2 - Passive measures of protection

Passive measures of protection may be necessary to protect the pier against damage from road traffic when the bridge has insufficient redundancy to cater for the loss of the pier. The arrangement of passive protection is based on a risk analysis using the following criteria:

Road traffic	Rail traffic
Speed of road traffic	Speed of rail traffic
Road traffic density	Rail traffic density
Road curvature, alignment and gradient	Track alignment
Horizontal and vertical distance of piers from the road	
Dangerous goods traffic	Dangerous goods traffic
Heavy freight traffic	Heavy freight traffic
Single or multiples lanes	Route classification

Possible passive measures of protection are e.g.:

- earthworks: earth banks and ditches,
- means of protection: crash barriers and shock-absorbing beams,
- protective walls, cable barriers, deflecting kerbs and barriers.