



Ministero delle Infrastrutture e dei Trasporti

DIREZIONE GENERALE PER LE INVESTIGAZIONI FERROVIARIE

Italian National Investigating Body

Massimo Costa

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**Reducing the risk at level crossings,
optimizing the time of notice of the closure
of the barriers**



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**Specifically: optimization of the time of
notice between the turn on of the road
light signals and the beginning of the
motion of lowering of the barriers.**



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**In some recent accidents on the Italian railway network in 2012, road heavy vehicles have been trapped between the barriers.
The incoming trains impacted the obstacle with –
in one of these accidents - deadly consequences
for the engine driver.**



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In order to reduce the risk of similar accidents general strategic measures have already been recommended

- **improving the visibility of the level crossing for the road driver**
- **a correct behavior of road users**
- **explicit prescription to break down the barriers - as a last resort but sometimes necessary – when a vehicle gets stuck between them and providing to the drivers adequate training for this emergency procedure.**



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It has been also recommended - as a very low cost preventive solution - that the warning time between the lightning of the signals and the beginning of the lowering of the barriers should be optimized in its minimum value and should vary according to:



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- **The situations that may affect the movement of road vehicles such as the presence of intersections in the proximity of the LC**
- **The length of vehicles allowed to circulate on the road**
- **The exact distance between the barriers**



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This analysis refers to a condition in which the road driver - after seeing the “red light” - could not come to a complete stop in safety condition and specifically in case of road light signaling characterized by two states : on/off



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Basic assumptions often adopted describe the time between the start of the lightning of the signals and the beginning of the lowering of barriers:

- **7 seconds for roads without any limitation of the length of circulating vehicles**
- **5 seconds for roads with limitation of the length of circulating vehicles (longer than 11 meters)**



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First increment of the delay

It is recommended to assess an increase of these minimum values (5/7 sec) of the time lag, in those situations in which the approach speed of the road vehicle can be very low and when an unexpected acceleration time is also required to the vehicle before crossing the rail



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This happens in very particular conditions :

- **when the vehicle come from a slowdown at a road junction that immediately anticipates the level crossing but at the same time when it's impossible to brake the vehicle at the level crossing**
- **in high traffic situations in which the vehicle risks to cross the level crossing starting from a situation of very low or instable speed.**



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**In these specific circumstances it will be
evaluated an average increased time lag to be
adopted in each case.**

**5 seconds circa must be added to the above
mentioned basic values.**



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Further increase of the delay

Can be assessed and prescribed - depending on the length of crossing - an increment of 1 second every three meters exceeding the length of 15 meters of the distance between the first and the second barrier.



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Third possible increase

A last possible increase of 5 seconds could be assessed to consider in addition for an easier overcoming of the output barrier before its closure (also for the rear part of the vehicle) especially in case of traffic mainly consisting of particularly high vehicles, articulated lorries or road trains.



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Thank you

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