



OTIF/RID/CE/GTDD/2015/5

22 May 2015

(English only)

RID: 3rd Session of the RID Committee of Experts' working group on derailment detection
(Berne, 27 and 28 May 2015)

Subject: Summary of the benefits of the DDD and the economic implications of the 2009 DNV report "Impact Assessment on the use of Derailment Detection Devices in the EU Railway System"

Transmitted by UIP

Principle

1. The primary safety benefit of installing the derailment detection device lies in its potential for preventing an initially non-severe derailment from evolving into a more serious derailment, because it is not timely detected early enough. According to studies (Switzerland), 40% of severe or potentially severe freight train derailments are not initially detected. The other 60% correspond to cases where the derailment is immediately or swiftly detected by staff, due to the severity of the derailment. This situation arises typically in the following cases:
 - The derailment is initially so severe that the brake pipe is ruptured, triggering an emergency brake.
 - The derailment is otherwise swiftly detected by the driver or some other staff and the emergency brake is applied.
2. This means that the DDD would bring some benefits only in those cases where the device can detect a "non severe" initial derailment and brake the train before a more serious accident might occur, for example when running over a switch. From a safety point of view, it is therefore expected that a system with DDD installed will reduce the number of severe derailments potentially resulting in the release of dangerous goods when a dangerous goods train derails.

3. Further to the safety benefits, another potential benefit of the DDD in those cases where the derailment is not immediately severe is to reduce the damage to the track caused by the derailed train running on until it is eventually stopped. Other expected benefits include potential savings in damage to rolling stock, savings in operational disruption caused by severe derailments, as well as savings relating to damage to the environment following the release of dangerous goods.

Scenarios

4. The following specific DG scenarios (SC) were considered to be representative of the main potential impacts of dangerous good substances:
 - Pool fires,
 - Vapour Cloud Explosion (VCE),
 - Boiling Liquid Expanding Vapour Explosion (BLEVE),
 - Jet fires of Liquefied Petroleum Gases (LPG),
 - Chlorine releases,
 - Ammonia releases,
 - Solid fires (Class 4),
 - Environmental pollution.

Overall cost of derailments

5. Following these results, the overall cost of the 27 EU States' freight wagons derailments is estimated to be 471 million Euros per year for the reference year 2008. This is based on an estimated number of accidents (no real figures).

Advantages

6. Advantages are
 - Fewer fatalities or injuries,
 - Less damaged track,
 - Fewer wagons to be repaired or replaced,
 - Fewer number of hours of traffic disruptions (or potential line closure),
 - Smaller extent of environmental damage.

For example:

- Value of preventing fatality: 1,500,000 €,
- Value of preventing injury: 200,000 €.

Wagon costs

7. According to DNV, the costs per wagon are 1400 € for purchasing the detector, 135 € for installation and 310 € for maintenance (maintenance every 6 years).
8. According to DNV, the current value costs per wagon are 1780 € (10 years), 2418.70 € (40 years), 2562.90 € (60 years).

Options

9. Different options, which type(s) of wagon(s) should be equipped with DDD were examined:

A group of RID wagons, wagons for certain products (option 2a): 17,000 wagons, all RID wagons (option 2b): 100,000 and all freight wagons (option 3): 719,000.

Net benefits

10. Net benefits are calculated taking into account all the advantages referred to above. Bearing in mind the advantages of avoiding direct accident costs, the DDD costs are higher: No net benefits.

Cost/benefit analysis

11. The costs of DDD fall completely to the wagon and very few of the advantages are of benefit to the wagon. The majority of accidents are caused by infrastructure or operations.
 12. DDD have a positive impact on infrastructure and railway undertakings, because they benefit from most of the advantages. In the current structure, it is the owner/wagon keeper that has to bear all the costs.
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