OTIF/RID/CE/GTDD/2015/6

26 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: **Expected benefits – findings of the final DNV report, additional comments**

Information from Italy

1. At the last meeting of the RID Committee of Experts' working group on derailment detection held in Berne from 24 – 26 February 2015, Italy was asked to provide additional comments on the DNV report.

2. Italy considers that in document OTIF/RID/CEGTDD/2015/2, Switzerland provided comments and support for solutions to all the "drawbacks" left open by ERA's Final Report and the DNV reports (ref. to Part B Final Report – 0.0 Executive Summary – 0.4.3 Technical Mitigation Measures: "We consider the following mitigation measure as potentially efficient if the significant identified drawbacks could be solved").

3. Italy does not believe that the ERA and DNV reports can be considered as an assessment of mitigation measures. This is based on subject reports where, for instance, several statements can be found, such as the following:

   ◊ *DNV Reports part A:page 74 – 75 8.2.3.3.3 Measure Effectiveness:*
   There are four cases where the driver has known or suspected a derailment but has not taken appropriate action leading to further wagons derailing. It is not known whether this further derailment led to an escalation of severity. (Comparable with M-1a.) ***Given these data, it is not possible for us to conclude or differentiate between these two measures in terms of which may be the best option from a safety point of view****. In the absence of information to separate the measures from an effectiveness perspective, the only parameter that we re-model (with reference to our event tree, [7])* ***is the detection probability****. We assume that for wagons fitted with a device of this type (M-1a, M-1b) that 95% of derailments will be detected as soon as they occur.*

◊ *ERA FINAL REPORT – page 28/84*

c) *Nevertheless the Agency requested DNV to identify other potential mitigating measures. DNV identified 13 mitigating measures (M-2 to M-13 and F-9) in addition to the detection of derailments, as reported in [25],* ***but did not assess these measures in detail in line with the specification of the study****.*

◊ *ERA FINAL REPORT – page 33/84 – paragraph 4.6*
Therefore the present impact assessment report ***does not consider the question of risk acceptability****. The results of the present impact assessment are only based on facts, estimations and* ***forecast of risk reduction potentials*** *in combination with the potential costs of associated measures.*

4. As DDD have not been assessed as a mitigation measure, but only in terms of their ability to prevent derailments, Italy considers that a specific detailed assessment focussing on the damage limitation should be carried out, involving not only mechanical DDD, but also including the others measures identified by DNV.

5. Italy considers that the assumptions concerning various issues should be reconsidered in terms of values relating to the average cost per train derailment. With reference to the list of derailments presented at the RID Committee of Experts in October 2013 in Copenhagen and set out in annex 1 of this document, Italy has obtained following data:

◊ an average distance of 2887 m in terms of damage to infrastructure,
◊ an average cost of 440,000 €/km,
◊ an average cost of about 1,232,000 € per freight train derailment,
◊ an average of 3.2 derailments per year,
◊ an average cost of about (3.2 x 1.232 mln€) 3,942,400 € per year.

The fact that the above data differ from the costs estimated in DNV's reports *(DNV part B Final Report: 7.3 Impact Model Usage, Summary and Outputs (page 59) states: – Average cost per freight train derailment = Euro 1.01 million. (Ranging between Euro 390,000 and Euro 1,402,000 using minimum and maximum values defined in [1, section 8.2].)* should lead to considering the possibility of re-checking whether DNV's cost/benefit analysis on mechanical DDD is sound, even if this component is considered as a "preventive" measure.

6. Annex 1 contains comments from the Italian NIB and NSA based on investigations conducted in recent years.

Annex 1

1. The purpose of DDD is not to avoid derailments, but to reduce the consequences that derailment can cause, which in some cases can be quite catastrophic, both from the point of view of deaths and injuries and the considerable economic damage to railway infrastructure.

2. The economic impact should also take into account the cost savings in terms of avoiding damage to the infrastructure caused by derailments.

3. Experience shows that many derailments of freight trains have caused considerable damage to the railway infrastructure. In particular, once the first wheel has derailed from the track, the train may continue moving until it comes to a stop, in some cases after many kilometres, perhaps travelling over points (usually at the entrance to railway stations or at a junction along the railway line), damaging several infrastructure components (sleepers, rail fastening, point mechanism, etc.).

4. Furthermore, it has only been as a result of luck that there have not been any collisions with trains coming from another direction (e.g. the train has derailed and continues running with a wheel off the track and moves into the path of a train coming from another direction). This would have catastrophic consequences, not least for people waiting at stations (many derailed trains have stopped at station platforms and it has only been because of the time when the incidents have happened, generally late at night or early in the morning, that there were no people at the station).

Operating concepts

5. There is no doubt that immediate braking reduces the distance travelled in conditions of instability of the wheelset.

6. This can reduce the probability of impact against elements along the railway (i.e. points) that can lead to the overturning of wagons, and if there is an impact, it reduces the kinetic energy at the time of the impact.

7. On the Italian railway network, the average distance between places where there are points, for example, is 7.5 km, so the expected distance to be covered by a wagon travelling in unstable conditions until the next element along the railway (i.e. points) that can lead to overturning is approximately 3.8 km.

8. This distance (3.8 km) is certainly more than an average rapid braking distance (i.e. 250 m at 80 km/h).

9. The effectiveness of DDD is self-evident and is at a maximum (complete stop) when the derailment starts on a straight section of track away from points, crossings, etc.

10. It is easy to assess the likelihood of a wagon being completely stopped (with DDD intervention) before impacting a rail element that can amplify the nature and consequences of the impact.

11. The following is a list of derailments (total 33) that have occurred in Italy in the last 7 years (five concerning wagons transporting dangerous goods – red text).

Date	**Place**	**Distance before stop [m]**
20/07/2004	Sommacampagna (hazard identification numbers 33 and 30, UN	256

	Nos. 1090 and 1886)	
26/05/2004	Genova Brignole (hazard identification number 30, UN No. 3256)	470
27/04/2004	Maddaloni Marcianise	700
16/01/2005	Sesto Calende	140
05/05/2005	Omignano (hazard identification number 90. UN No. 3082)	5000
12/09/2005	Verona P.N. Scalo	660
10/11/2005	Villa S Giovanni Bolano	300
13/02/2006	Artegna	9000
01/03/2006	S. Arcangelo Di Romagna-Savignano Sul Rubicone	2000
22/11/2006	Secugnago	12000
04/01/2007	Bivio Pantani-Paola	20000
11/02/2007	Cassano Spinola-Stazzano Serravalle	500
26/02/2007	Domo Ii	200
08/03/2007	Bari Lamasinata	100
17/04/2007	R.Emilia-Rubiera	400
24/07/2007	Arona	250
31/08/2007	Brennero	250
27/11/2007	Oleggio	227
19/12/2007	Domodossola-Bivio Toce	130
21/06/2008	Vipiteno	200
25/05/2009	Robilante	3013
06/06/2009	Torre Del Lago-pisa San Rossore	5053
22/06/2009	Vaiano-pba87-133-4 (hazard identification number 886, UN No. 1052)	5105
29/06/2009	Viareggio (hazard identification number 23, UN No. 1965)	334
09/10/2009	Maddaloni Marcianise	220
15/10/2010	Cuneo - Bivio Madonna Dell`olmo	520
26/03/2011	Genova Voltri	150
23/08/2011	Cervignano	130
22/12/2011	Domodossola	200
19/04/2012	Bologna San Donato	250
18/05/2012	Calolziocorte	18000
06/06/2012	Bressanone	500
25/06/2013	Formia	9000

12. The average distance covered by the train between the derailment and stopping (no DDD installed) is about 2887 m.

13. This result is certainly consistent with the theoretical approach just described (3750 m).

14. The Italian NIB launched an investigative analysis of derailments that have occurred on the Italian railway network in the last ten years. The initial results have shown that using DDD makes it possible to optimise the cost/benefit ratio. This is the case because where the derailment occurs on the line, the damage to infrastructure and rolling stock is minimised, and in fact, for a number of cases, the system leads almost 100% to a complete stop of the derailed train before it impacts particular features of the network (points, platforms, crossings, etc.).

15. These results (even partial) are briefly summarised by the principle that the braking distances following activation of DDD are at least an order of magnitude lower than the average distances travelled by a train that has derailed (without activation of DDD).

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