OTIF

ORGANISATION INTERGOUVERNEMENTALE POUR LES TRANSPORTS INTERNATIONAUX FERROVIAIRES

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(Berne, 18 and 19 May 2010)

Subject: **Composition of dangerous goods trains to prevent a BLEVE and its effect on external safety**

Transmitted by the Netherlands

Introduction

1. In a densely populated country like the Netherlands there is continuous tension between interests of transport of dangerous goods and spatial planning. Large railway stations are used for the transport of dangerous goods by rail, but their nearness also means they are very attractive for people to work in or live near. This creates a safety risk.

2. The Dutch government wants to create a network[1] for the (rail) transport of dangerous goods, that is based on a risk approach and a spatial development strategy. By defining acceptable risk levels (individual risk and societal risk) a balance has to be reached between spatial planning and transport.

3. The goal of this document is:

   (a) to present information on this risk approach taking the composition of dangerous goods trains into account;

   (b) to ask the representatives in the meeting about their own experience with this safety risk problem, especially because of the international aspects connected to this topic.

[1] Called Basic (Rail) Network (also for the transport of dangerous goods by road and inland waterways).

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Risk

4. In different countries in Europe methods exist for the quantification of external risk from activities with dangerous goods. These methods are used to quantify:

   - the individual risk (see figure 1);

   - the societal risk (see figure 2).

5. For details about these methods we refer to the "Generic guideline for the calculation of risk inherent in the carriage of dangerous goods by rail" (approved by the RID Committee of Experts in Madrid in November 2005).

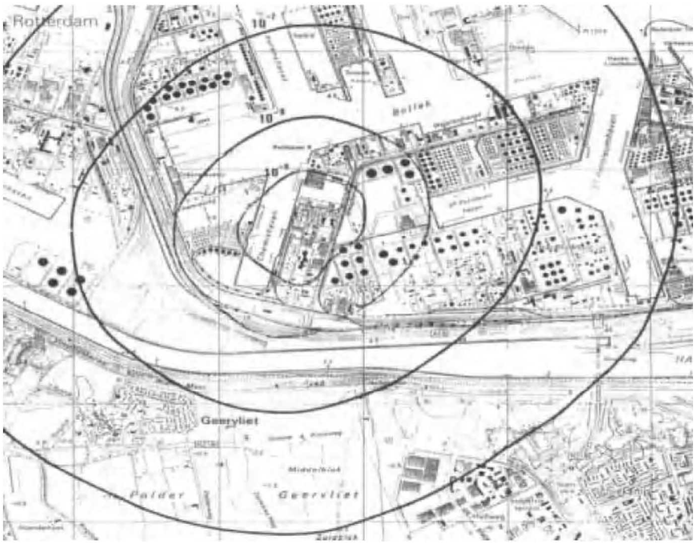

Figure 1 An example of individual risk (IR) contours

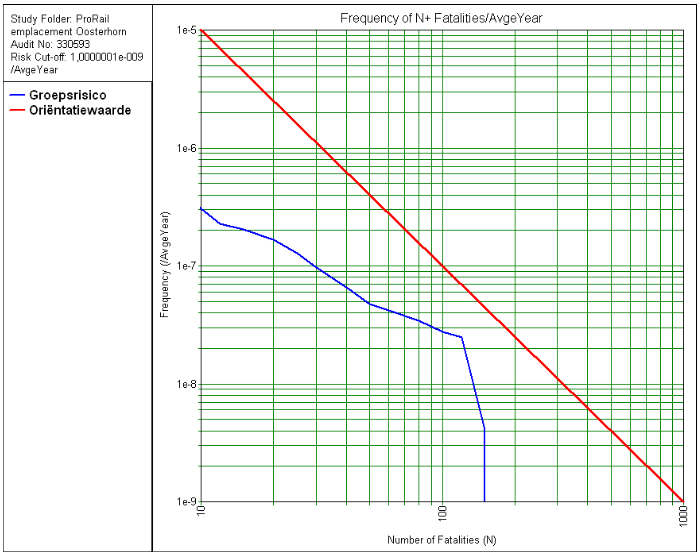

Figure 2 An example of societal risk (SR)

6. In the Netherlands (as well as in other countries) the authorities have defined acceptable values for the different risk aspects. During the preparation of the Basic Network the actual risk levels of rail transport, especially the societal risk, proved to be far beyond the acceptable level. So further investigation was necessary.

Analysis of the problem

7. Analysing the risk calculations, the conclusion was that the transport of liquefied flammable gases (Class 2, hazard identification numbers 23, 263, 239) in combination with the transport of highly flammable liquids (Class 3, hazard identification numbers 33, 333, 336, 338, 339, X323, X333, X338) is mainly responsible for this problem.

8. The most important incident scenario concerns the BLEVE (Boiling Liquid Expanding Vapour Explosion). However, such a scenario has rarely occurred in Europe.

9. In the Netherlands we distinguish two kinds of BLEVEs for the purpose of risk quantification:

   - a 'cold' BLEVE due to complete failure of a tank-wagon with liquefied flammable gas, caused by a derailment/collision, followed by an ignition;

   - a 'hot' BLEVE due to complete failure of a tank-wagon with liquefied flammable gas, caused by an external fire from a tank-wagon with highly flammable liquid. In the Dutch approach the tank-wagon with the flammable liquid has a higher probability of failure in a collision/derailment because of the lower design pressure of the tank-wagon.

   The effects of a so-called 'hot' BLEVE are more devastating for the surroundings than the effects of a 'cold' BLEVE, because of the higher burst pressure, leading to higher risk levels.

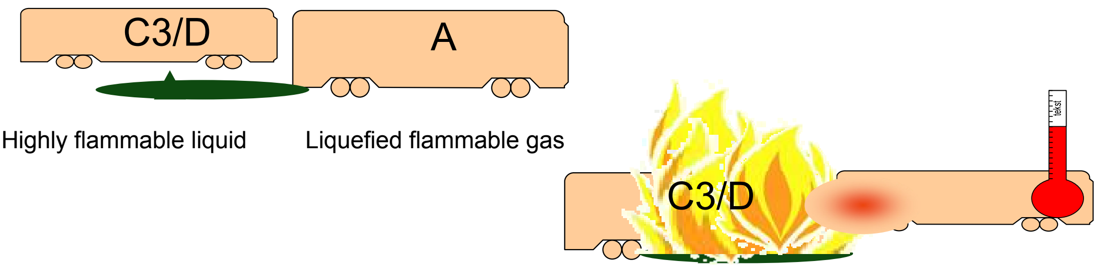

Figure 3 Development of a 'hot' BLEVE

10. As is known, the problem of preventing a 'hot' BLEVE got attention in Europe in recent years through a working group on this topic. Also the derailment in Viareggio got a lot of publicity. Although this was not a BLEVE, there was a growing interest in risk reducing measures.

11. In the Netherlands this led to extra effort on the development of measures, also because of the short term realisation of the Basic Network. In that respect the goal is: an inventory of all possible measures to reduce the risk in the short term. The result was to focus on the composition of trains.

Composition of dangerous good trains to prevent a BLEVE

12. As already stated, the largest contribution to high risk levels in large cities in the Netherlands comes from trains composed of tank-wagons with liquefied flammable gas next to tank-wagons with highly flammable liquids. Therefore a definition of such a train was introduced. A train with dangerous goods is deemed to have a 'hot BLEVE proof' composition if the distance between a tank-wagon filled with Class 2 substances and a tank-wagon filled with Class 3 substances is at least 18 m[2]. This distance was derived from RID regulations regarding Class 1 substances.

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[2] Such a train is in fact not completely 'hot BLEVE proof', but the probability of such an event is reduced significantly.

13. In the Netherlands this led to an initiative to ask for a commitment from parties involved to compose trains according to the above definition. These parties are: consigners, shippers and carriers. The Dutch Ministry of Transport, Public Works and Water Management facilitates the initiative.

14. Of course, there are some disadvantages connected to this measure. For instance there have to be extra shunting activities in the main shunting yards in the Netherlands. Ways of solving these problems (by taking extra measures or creating extra infrastructure) are being investigated.

15. At the moment the willingness to contribute to an agreement for a 'hot BLEVE proof train' is positive. About 16 companies, including industry, have given their consent.

16. But there is also an international aspect to this matter. According to the forecast for transport of dangerous goods for 2020, about 50% of the tank-wagons with liquefied flammable gas come from abroad. Without any additional measures only half of these trains in the Netherlands are therefore composed 'hot BLEVE proof' according to the definition.

17. Because of this significant contribution it is very important to pay attention to this aspect as well.

Questions

18. We ask representatives to inform us about:

    - their experience with this subject;
    - their view on our approach;
    - the possibilities for resolving the international problems connected to this problem.

    Your contributions will be highly appreciated.
