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Urban planning and rail transport risks: Coping with deadlocks in Dutch urban development projects

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ABSTRACT

Due to recent disasters and near misses, society has become more aware of the risks involved in the production, storage and transport of hazardous materials. In the Netherlands, this has led to more attention for the institutionalisation of risk management approaches in order to prevent disasters and improve the safety of people in areas adjacent to risky activities. However, this institutionalisation of risk management concerning rail transport of hazardous materials has led to a number of problems for urban planning and even deadlocks in decision making. In order to unlock these situations, an unfreezing and reframing of decision making is necessary. This article explores the potential impact of an adapted institutional view on decision making, based on empirical research.

1. Introduction

The general debate on involuntary risks has intensified since the 1980s. In the Netherlands, this is due to some large incidents among which the crash of a Boeing aircraft in a large apartment building in Amsterdam in 1992 with 43 casualties among residents and the explosion of the SE Fireworks production plant destroying a complete neighbourhood in the city of Enschede in 2000, killing 23 people. Risks related to rail transport of hazardous materials received particular public attention after several near misses with freight trains in the cities of Tilburg (2007) and Barendrecht (2009, 2011) for example. Moreover, De Wilde (2006) argues that more than in other European countries, rail transport of hazardous materials in the Netherlands is organised right through city centres, creating a strong interaction between rail transport, urban planning and the (re)development of real estate near railways. However, this growing Dutch awareness is not unique. Other disasters involving hazardous materials have occurred internationally in recent years. The city of Viareggio (Italy) experienced a so-called vapour cloud explosion after a derailment discharged liquefied petroleum gas (LPG) from a tank wagon in June 2009, causing 27 casualties.

Due to these disasters, society has become more aware of the risks involved in the production, storage and transport of hazardous materials. In the Netherlands, this has led to more attention for the institutionalisation of risk management approaches in order to prevent disasters and improve the safety of people in areas adjacent to risky activities. This is formalised in what is known in the Netherlands as external safety policy. External safety policy aims to control the risks related to the production, storage and use of hazardous materials (for instance: fireworks, liquefied petroleum gas, ammunition), the transport of hazardous materials by road, rail or water and through pipelines, and the use of airports (Ministerie van VROM, 2006). The basis for the Dutch external safety policy is constituted by generic norms for acceptable external safety levels.

The first way to describe risk is in terms of individual risk (IR) (see Fig. 1). This is the annual probability that an unprotected person will die as a result of an accident involving hazardous materials at a certain spot if that person resides there for a full year. The risk is visualised on a map by dots interpreted as spatial contours. The maximum allowed risk for 'new' situations as laid down in Dutch law is $1 * 10^{-6}$.

The second way to describe risk is in terms of group risk (GR) (see Fig. 2). This is the cumulative probability for each year that at least 10, 100 or 1000 people die as a direct result of their presence in the influence area of an establishment or transport route if an incident happens with hazardous materials. This is visualised on a logarithmic scale by using the *fN* curve, where *f* represents the frequency of an accident and *N* the number of people expected to die as a result of that accident.

It should be noted that there are of course more ways to conceptualise risks, such as in economic loss, catastrophic potential or the number of potential injuries. Dutch safety institutions

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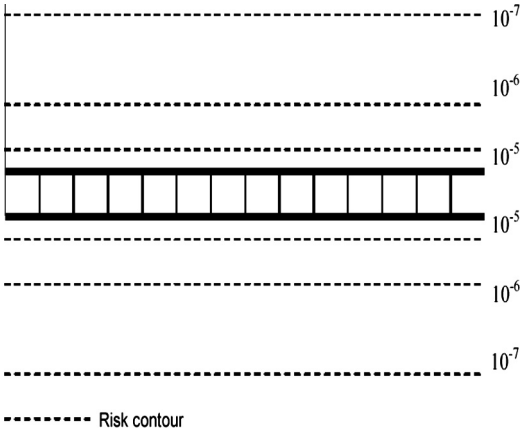

Fig. 1. Schematic visualisation of individual risk near a track.

however, have a very strong emphasis in the number of potential casualties. Therefore, in the following we will also elaborate on the number of potential casualties instead of other potential risk criteria.

In the Netherlands the issue of rail transport of hazardous materials in interaction with urban planning receives relatively much attention. According to an Environmental Resources Management (ERM) study (2005), the approach to risk management in the Netherlands is unique to some extent due to its strong focus on the fore mentioned generic standards. Moreover, Dutch authors stress the differences between the Netherlands and other countries due to some unique spatial characteristics. Perhaps because of this somewhat distinctive position of the Netherlands in this respect, almost only Dutch authors seem to explicitly address external safety in relation to urban planning. Suddle (2004, 2006, 2008), van der Vlies and Suddle (2008), for example, focuses on measures to reduce the possible impact of disasters on the built environment, whereas research performed by Ale (2002, 2003, 2005) focuses more on the performance of risk institutions in the Netherlands. In contrast, authors from a variety of nations focus on quantitative aspects of release of toxins or quantitative aspects of routing. Examples of the latter are Glickman and Rosenfield (1984), Verter (1998), Leonelli et al. (2000), Høj and Kröger (2002) and Verma and Verter (2005). Also, this does not imply that there are no similarities concerning risk management. In Europe, the Seveso directive aims to improve the safety of sites containing large quantities of dangerous substances and strategies for urban planning to improve safety (see for example Cahen, 2006 or Basta, 2009).

The considerable attention to the issue of transport and external safety resulted in a unique document published in 2003 by the Dutch National Advisory Boards on Transport and Spatial Planning on the (problems with the) integration of external safety policy, transport policy and urban and regional planning (Raad voor Verkeer en Waterstaat en de Vromraad, 2003). In this report an analysis is given of the trends, the complex institutional contexts and the problems of integrated policy development at different governmental levels. The report warns for future incidents and calls for innovative (mainly institutional) solutions. In a recent study (van der Vlies, 2011), initiated in reaction to this 2003 report of the advisory boards, some possible approaches for improvement were explored. The study mainly focused on the structure and impacts of relevant institutions in relation to the rail transport of hazardous materials in connection with local urban developments. It was hypothesised that the present institutions to some degree create an obstacle for finding good solutions for the tensions between the transport domain and the urban planning domain, tensions that often result in policy deadlocks in decision making in day-to-day reality. Changing the institutions might be helpful for unfreezing these deadlocks, reframing the local debate and finding attractive and widely supported solutions.

This article aims to present some of the findings of this study. The structure is as follows. In Section 2, the main problems with decision making in relation to the institutional setting are summarised, based on the exploration using different methods by van der Vlies (2011). In Section 3 an adapted view on rail transport risks

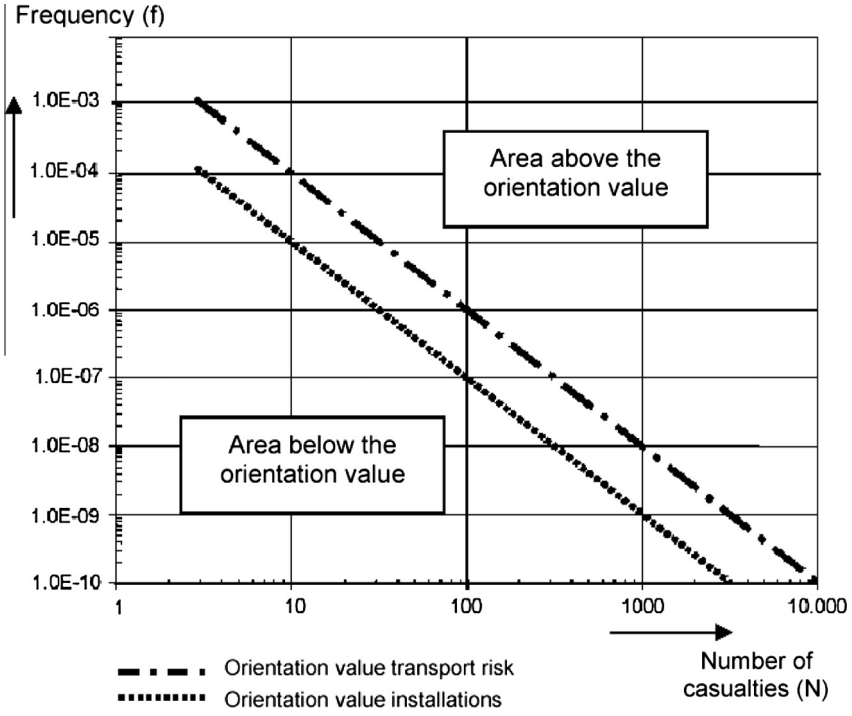

Fig. 2. Schematic visualisation of group risk.