



Policy memorandum

Risk mitigation strategies for rail transport of dangerous substances

This memorandum has no formal status. It was written as part of a demonstration test for the PRISMA project. No rights can be derived from the PRISMA documents or the information therein. This memorandum is based upon the 'virtual assumption' that a political decision has been made along the lines of the recommendations for the political risk evaluation and the setting of objectives (see risk assessment report). However, an actual political consultation of the risk assessment and of this policy memorandum was no part of the PRISMA project and has not been performed.

1. Introduction

On the basis of the risk profile the safety region has indicated in its policy plan the intention to develop a risk management plan for the Spoorzone, with a time frame going beyond the currently ongoing Spoorzone project. The concrete objectives for the long term have yet to be determined. The safety region overall goal is to optimize safety by preventing and reducing risks and by properly preparing the actual assistance as well.

2. Objectives resulting from the risk assessment

A detailed risk assessment for the Spoorzone has been developed. This has resulted in the following objectives:

Short term

1. Improvement of disaster relief: already part of project "Spoorzone"
2. Risk communication: already part of project "Spoorzone"
3. Vulnerability reduction of new buildings: the formal "societal risk" policy
4. National rail safety measures to decrease probability:
 - Safety breaking system: implementation of ATB-vv and ERTMS
 - Hot BLEVE prevention policy (no flammable liquids next to flammable gas)

Middle term

5. Vulnerability reduction in spatial planning (in combination with their consequences for preparation like early warning, protocols etc.)
6. Probability reduction through re-routing (rail junction Meteren)

Long term

7. Proaction through alternative routes around the Spoorzone Dordrecht-Zwijndrecht: the national government and the municipalities of Dordrecht and Zwijndrecht have already agreed a research will be performed in 2018 to investigate options for a structural solution of the Spoorzone bottleneck (alternative routes).



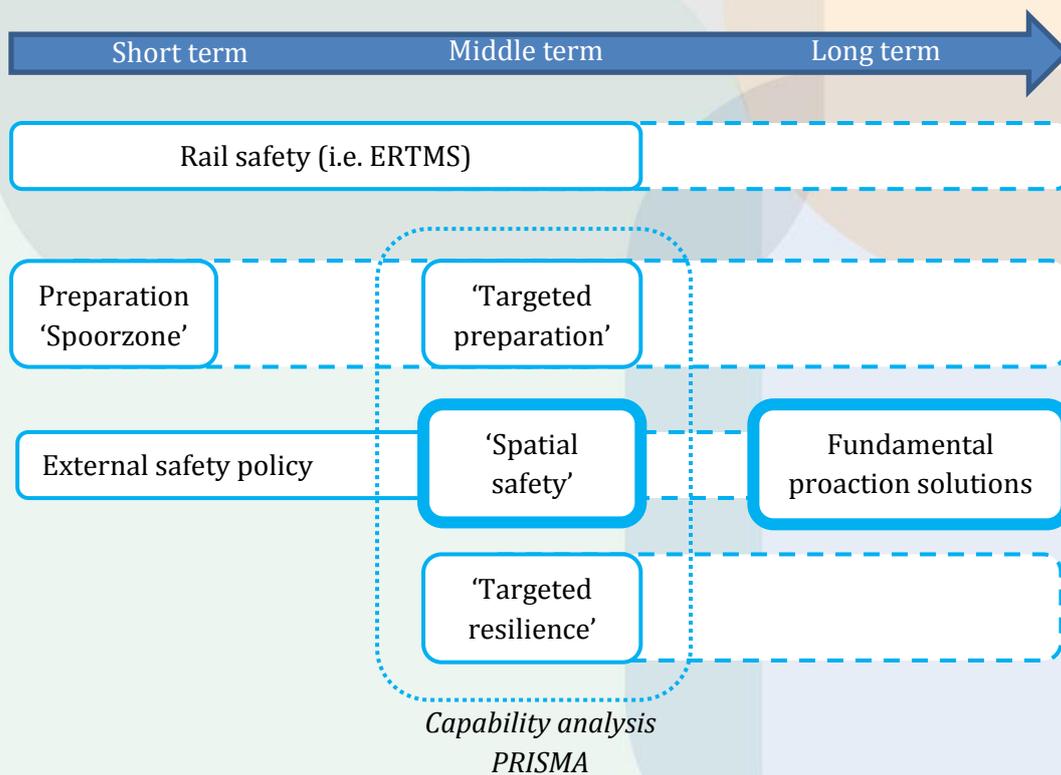


3. Capability assessment

The focus of the risk management plan of PRISMA is the vulnerability reduction on the middle term. To identify potential mitigation strategies a so-called capability assessment has been performed. This included an expert based scenarios analysis to find potential measures and a cost-benefit analysis to gain insight in their added value. As a final step, these objective analysis have been compared to potential political evaluation perspectives, in order to select the ‘most fitting’ mitigation strategies.

4. Recommendations for the risk mitigation strategies

In the figure below the full extent of mitigation strategies is shown.



For the middle term, in addition to national policies mainly focused on the risk source itself, the proposed regional/local mitigation strategy consists of 3 paths.¹

¹ The measures that “did not make it” are left out, so some numbers are missing in this list.





1. Spatial safety

- 1.1 Develop an assessment tool spatial safety ('afwegingskader ruimtelijke veiligheid'), test and implement it.² Invest from the start in a shared development process of the safety and spatial planning sectors in order to find the interconnections, the mutual interests, mutual understanding and a shared language. On the basis of this tool, invest in the quality of the 'supra-legal' advice tasks of the safety regions and secure these tasks in an updated policy plan of the safety region.
- 1.2 Perform further research into reasonable and acceptable safety distances and implement these in the assessment tool.
- 1.3 Perform further research into the options and costs of zoning and protection measures for critical infrastructures, as a basis for further political choices.
- 1.4 Implement increased zoning of vulnerable objects as part of the assessment tool for spatial safety.
- 1.5 Expand closable mechanical ventilation.
- 1.6 Integrate defence against toxic fumes in housing isolation subsidies.
- 1.7 Perform further research with the water boards to see if compartmentalisation of the sewage system is possible.

Targeted resilience

- 2.1 Implement targeted risk communication in correlation with the safety zones of the assessment tool.
- 2.2 Strengthen local networks to increase community resilience.
- 2.3 Advocate for additional preparation (procedures, training) of the "internal office assistance" (bedrijfshulpverlening - BHV), to increase the self-reliance of organizations and to expand the internal focus with an external one.

Targeted preparation

- 3.1 Research and implement further options for improved early warning.
- 3.2 Improve the crisis communication.
- 3.3 Improve the preparation of decontamination.
- 3.5 Improve the preparation of public health reviews.
- 3.6 Discuss with the primarily responsible partners whether a joint preparation with the safety region for the containment of ecological spills fits with their own priorities.

² The assessment framework for external safety in the Spoorzone ("toetsingskader externe veiligheid Spoorzone Dordrecht/Zwijndrecht", TNO, 2004) could be a starting point for this.





Long term proaction

The middle term strategy cannot be considered as *the* fundamental mitigation option that provides a full and complete reduction of the current high risk levels. It only decreases the vulnerability and should certainly be accompanied by policies to decrease probability and primary effects at the risk source and improve the preparation. For the long term a research into the fundamental proaction and prevention options is still needed. This research has earlier been announced by the Ministry of Infrastructure and Environment for the year 2018. The municipalities and safety region have the opinion that this research should include an alternative railway line around the urban city centres of Dordrecht and Zwijndrecht. Another option would be a so-called 'on the ground tunnel'. Taking in account the amount of time needed for this research, the decision making and implementation, it is recommended to start this research at an earlier moment than 2018. An important argument for this is the potential economic damage of incidents. Discontinuity of rail infrastructure might result in big damage to the national economy. It is important to raise awareness with the national government and the industry and transport sector about this potential economic impact of local incidents and the need to prevent this.

Epilogue: warning about risk substitution

Within the Dutch legal framework there is a very important inherent risk which might nullify the positive benefits of the proposed *spatial* mitigation measures, namely the assessment tool spatial safety (1.1), increased safety zoning (1.2) and zoning of vulnerable objects (1.4). These measures aim to decrease the vulnerability through clever use of the available space. Whenever this results in 'less people' or 'people at a greater distance' this will lower the localised risk and the societal risk, as calculated according to the legislation (BTEV – Decree transport routes external safety). In itself this is very positive. However, a decreased localised and societal risk automatically creates a legal 'room to increase' the transport. The reason for this, is that in the localised and societal risk the probability (transport volume) and the impact (only calculated in number of fatalities) are combined into one single number. This method creates "communicating vessels", potentially resulting in risk *substitution* instead of risk mitigation: if the impact is diminished (less casualties due to spatial measures), the probability can be increased (more transport), still resulting in the same level of localised and societal risk.

In itself the use of spatial planning to enable extra room for transport could be a valid strategy (if it is decided transparently and democratically accountable). However, this is a completely different responsibility. If the aim is to increase transport, this is a national economic interest, for which the national government is responsible and therefore should pay the costs. The legal responsibility of the municipalities (Law on Safety Regions and Decree transport routes external





safety) is *safety* and any of their investments to decrease the vulnerability to incidents should therefore benefit the safety of their inhabitants and not the transport on the railway.

Because the Law on transport safety allows and the prognosis for the year 2020 predicts a substantial increase of transport, this whole discussion is certainly not unimaginable (although for the moment the economic crisis slows down this increase). To prevent such a perverse effect, a national agreement is needed between the municipalities on the one hand and the Ministry of Infrastructure and Environment and the (rail) transport sector on the other hand. This should comprise an agreement not to “use up” any of the increased safety levels created through clever municipal spatial planning by means of an increase of the transport itself. If such an agreement cannot be reached, the whole municipal effort to increase spatial safety could be nullified (or in other words “misused”) by the national government.

Resources

For each of the recommended middle term actions the following use of resources is suggested. Because PRISMA is a testing project not aimed at actual implementation, no concrete budget is presented. The proposed resources are mainly to be found in cooperation and forming alliances.

1. Spatial safety

1.1 Develop an assessment tool spatial safety ('afwegingskader ruimtelijke veiligheid'), test and implement it.

The development of the assessment tool and research into safety distances requires a strong coalition between the municipalities and the safety region. The required time investment of the partners can be quite substantial, as this tool is very fundamental for the future cooperation.

1.2 Perform further research into reasonable and acceptable safety distances and implement these in the assessment tool.

It is recommended for the future to look more detailed into the municipal policy for 'ground exploitation' (abbreviated as GREX). If you want to implement concrete measures in buildings you have to know which of them you could formally demand and which the municipality could take into account in the financial valuation of grounds in the GREX. The same is also valid for the implementation of water supply for the fire brigade in the spatial plan. Ideally one should also try to assign value of 'increased attractiveness' of an area if the risks are reduced (economic benefits and increased





	ground value). Relatively cheap mitigation measures could easily be incorporated in the GREX, because in building projects very often big sums of money are involved.
1.3 Perform further research into the options and costs of zoning and protection measures for critical infrastructures, as a basis for further political choices.	For this action an alliance is suggested with the critical infrastructures. This action fits within the proposed EU project FRENDS, of which the safety region will be one of the main participants if it is awarded.
1.4 Implement increased zoning of vulnerable objects as part of the assessment tool for spatial safety.	See 1.1 and 1.2.
1.5 Expand closable mechanical ventilation.	The annual costs for an organization to be connected to the automated system are around 1,500 euros. The main aim should be to convince organizations and citizens about the necessity of the system.
1.6 Integrate defence against toxic fumes in housing isolation subsidies.	The costs of actual measures are part of the existing subsidies. Some costs will have to be made to adapt the current advices to the guidelines for defence against toxic fumes. This might be possible within the current policy capabilities (personnel) of the municipalities.
1.7 Perform further research with the water boards to see if compartmentalisation of the sewage system is possible.	The recommendation is to perform research in alliance with the water boards. This might be possible within the current policy capabilities (personnel) of the safety region and the water boards.
2. Targeted resilience	
2.1 Implement targeted risk communication in correlation with the safety zones of the assessment tool.	This action might be possible within the current policy capabilities (personnel) of the risk communication department of the safety region. However, a prioritization of activities might be needed.
2.2 Strengthen local networks to increase community resilience.	For this public participation is key. The current capabilities of the safety region to address such an approach are limited. The implementation of this action might be seriously impeded if no solutions are found.





<p>2.3 Advocate for additional preparation (procedures, training) of the “internal office assistance” (BHV), to increase the self-reliance of organizations and to expand the internal focus with an external one.</p>	<p>For this action an alliance could be formed with Falck. The required investment of the safety region might be limited to some conservations and the drafting of some general principles about what would be expected of BHV in case of an (external) rail transport incident.</p>
<p>3. Targeted preparation</p>	
<p>3.1 Research and implement further options for improved early warning.</p>	<p>Research into the options could be done with the existing personnel of the safety region. The costs and required capacities for actual implementation of the outcome of this research cannot be forecasted beforehand.</p>
<p>3.2 Improve the crisis communication.</p>	<p>This fits within the existing policy priorities of the safety region and will have to be done in close cooperation with the 2 municipalities.</p>
<p>3.3 Improve the preparation of decontamination.</p>	<p>This probably requires quite a substantial investment of time and resources. An alliance should be made between GHOR (medical emergency management), fire brigade, ambulance service and hospitals. Recently a national guideline has been presented for ‘small decontaminations’. This might be an incentive for the partners to invest in the decontamination for Spoorzone scenarios. Perhaps national partners could be found (RIVM, IFV).</p>
<p>3.5 Improve the preparation of public health reviews.</p>	<p>In many aspects the preparation of public health reviews is a national responsibility of the RIVM. However, also locally preparations have to be made. With the experience of 2 Moerdijk incidents the safety region might be able to improve the preparation in close cooperation with RIVM.</p>
<p>3.6 Discuss with the primarily responsible partners whether a joint preparation with the safety region for the containment of ecological spills fits with their own priorities.</p>	<p>This starts with just a dialogue. An alliance can be formed with water boards, Rijkswaterstaat and the water police. The actual investment in case the partners really want to prepare, is not very large and might be solved within the existing working programs.</p>





Long term proaction

Research into long term fundamental solutions

Taking in account the amount of time needed for this research, the decision making and implementation, it is recommended to start this research at an earlier moment than 2018. An important argument for this is the potential economic damage of incidents. Discontinuity of rail infrastructure might result in big damage to the national economy. The first required resource for this action is to lobby with the national government and the industry and transport sector to raise awareness about the potential economic impact of local incidents and the need to prevent this.

National agreement to prevent risk substitution

The required first step is to lobby nationally for an agreement not to “use up” any of the increased safety levels created through clever municipal spatial planning by means of an increase of the transport itself. For this lobby a shared vision of Dordrecht and Zwijndrecht is needed. Furthermore the lobby should be facilitated by juridical advice about the formulation of the agreement and its relation to the formal legislation of the Law on transport safety and the Decree transport routes external safety.

Annex

Report capability assessment VRZHZ, PRISMA

