International Transport Forum

The Safe System Approach in Action

Sustainable Safety in the Netherlands

Case study

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Introduction

This case study was prepared by a joint International Transport Forum–World Bank Working Group convened in 2020–2021. The case study forms part of a package of materials accompanying the Working Group's final report, *The Safe System Approach in Action* (ITF, 2022a).

The Safe System approach to road safety takes as its starting point the ethical position that there is no acceptable level of road deaths and serious injuries. The report proposes a framework for designing, implementing and assessing projects with a Safe System focus. It draws on lessons from real-world case studies to offer guidance on implementing Safe System interventions.

The Working Group analysed 17 case studies in total, paying special attention to their Safe System content. While not every case study was a perfect example of the Safe System approach, all contained valuable lessons. In addition, several common themes emerged. A separate ITF Working Paper (2022b) sets out the thematic analysis.

This case study contains four parts. First, it provides context for the specific intervention and the road-safety problems it aimed to solve. Second, it outlines the interventions implemented to solve these problems and the results. The analysis is structured according to the five key components of the Safe System framework outlined in the main report (ITF, 2022a), namely:

1. **Establish robust institutional governance.** Permanent institutions are required to organise government intervention covering research, funding, legislation, regulation and licencing and to maintain a focus on delivering improved road safety as a matter of national priority.

2. **Share responsibility**. Those who design, build, manage and use roads and vehicles and provide post-crash care have a shared responsibility to prevent crashes resulting in serious injury or death.

3. **Strengthen all pillars.** When all road-safety pillars are stronger, their effects are multiplied; if one part of the system fails, road users are still protected.

4. **Prevent exposure to large forces.** The human body has a limited physical ability to tolerate crash forces before harm occurs; the system should prevent those limits from being exceeded.

5. **Support safe road-user behaviour.** While road-user errors can lead to serious harm, the Safe System focuses on roads and vehicles designed for safe interaction with road users. It supports humans not to make mistakes and tune their tasks as much as possible to their competencies.

Third, the case study identifies lessons from the project, again structured according to the five key components of the Safe System framework. Fourth, it offers conclusions.

Access the full set of case studies on the ITF website: https://www.itf-oecd.org/safe-system-in-action.

Context

The Netherlands' Sustainable Safety approach is built on co-operation between Dutch road authorities (national, provincial, municipal), the public and elected officials, and a steering group. While the key focus is on vulnerable road users, Sustainable Safety embraces the different functions expected from a Safe System approach. This case study also shows that there are multiple ways to reduce road errors.

Road-safety themes: Road-safety strategies, Infrastructure interventions

The Netherlands has been implementing its *Duurzaam veilig* [Sustainable Safety] approach to road safety since 1998, and it is therefore considered a predecessor to today's Safe System approach. Seeking early gains, the Netherlands chose to focus on the human factors in the road-safety system – in other words, the needs, competencies, limitations and vulnerabilities of people – in order to achieve significant reductions in deaths and serious injuries from road crashes.

However, the Sustainable Safety approach in the Netherlands did not start from zero in the 1990s. In fact, in some ways it was already an example of an emerging Safe System implementation at that time. As an example, Dutch provincial 80km/h roads generally did not have separate cycling infrastructure in the early 1970s, but an extensive network of bicycle paths was built in the 20 years thereafter.

Furthermore, although the term Safe System was not then embedded in road-safety management, many of the measures adopted by the Netherlands prior to the introduction of the Sustainable Safety approach complied with what today would be considered good Safe System practice. These include the Dutch *woonerf* [living street] concept, 30 km/h zones, separate facilities for different road user groups (e.g. cycle paths, pedestrian zones and paths), grade separation and high geometric design standards (e.g. forgiving road design) on national highways. There was also ongoing funding for road safety projects, road-safety analyses and scientific research.

The Sustainable Safety approach has built on these early interventions and has gradually moved through the stages of Safe System development. It recognises that leadership, funding, knowledge sharing and stakeholder partnerships are critical to success. Communication to garner support is necessary to achieve a common vision and drive implementation forward. It also acknowledges the need for supporting guidelines and recommendations on the categorisation of streets to achieve consistency in road design.

Funding

The funding sources of Sustainable Safety in the Netherlands have changed over time. Political support and financial arrangements have provided national funds in addition to local funds (Schermers, 1999; Schermers and van Vliet, 2001).

Actors and leadership

The main stakeholders include all Dutch road authorities at the national, provincial and municipal levels, as well as the public and elected officials. An overall national steering group was chaired by a provincial representative, demonstrating that this was not a top-down process.

Interventions and results

Establish robust institutional governance

In The Netherlands, implementing the Safe System consisted of a large set of interventions, designed in co-operation between many actors. The implementation of 30km/h zones is an example of such an intervention. It was supported by all municipal, provincial and national road authorities in the Netherlands. As part of this effort, partners developed a set of recommendations for traffic provisions in built-up areas that described how to design roads and intersections for different road functions to avoid severe crashes, especially those involving vulnerable road users. This document is now widely accepted as a reference in everyday practice. New roads are built according to the latest road design concepts, recommendations and occasional standards. This has led to the categorisation of roads and the redesign of the network accordingly (Wegman et al., 2006). The coherence of road *function* – its *form/layout* – and its *use* is extremely useful as a basis for safe road design.

The Dutch Safe System vision was new and innovative for its time. Therefore, practical experience using these principles was needed. Several demonstration projects were set up and each of these projects served as proof of concept. For example, a redesign of the rural road network categorised low-volume 60km/h roads with an access function (i.e. providing farms, houses and other destinations safe access). Similarly, a redesign of routes through a city downgraded access roads to 30km/h zones and created 50km/h roads with separate bicycle lanes and other interventions to avoid crashes between motorised traffic and bicycles.

The 30km/h traffic separation and speed-lowering interventions show how the Netherlands progressed through the stages of Safe System development: first, from an emerging to an advancing stage (i.e. from the basic formulation of plans and strategies to a multisectoral road safety plan and strategy); and then from an advancing to a mature stage (in which road safety objectives are based on an overall vision).

The Dutch Sustainable Safety approach is, nevertheless, a work in progress. Work continues on data, and on setting goals using safety performance indicators (SPIs). Homogeneity in road design is still organised via manuals and nearly none via compulsory standards. As this case study points out, the journey towards a full Safe System is a long one. But the steps along the way have delivered substantial savings in terms of lives and serious injuries.

Share responsibility

The national, provincial and municipal road authorities are the primary stakeholders for road infrastructure in the Netherlands. They may request the help of other stakeholders such as the police (enforcement), the central government (co-funding, feasible requirements for measures, legislation), provincial and municipal road-safety bodies (analyse, regional funding priorities, communication with road users). Access zones (30km/h in urban and 60km/h in rural areas) fall under the jurisdiction of regional road authorities.

The enforcement of speed limits is a large but cost-ineffective task if systematically applied to all roads; focused speed enforcement can have better outcomes. The police focus on high-volume roads only. This implies limited or no enforcement on low-volume 30km/h roads, and has been agreed to by different partners. The policy in the Netherlands regarding shared responsibility shifted to the advancing stage of Safe System development with the intersectoral policy and could move further with decentralised

interventions. A next step to the mature stage would be if the current risk-based approach is used to implement a mechanism to hold specific stakeholders (e.g. road authorities) accountable for crashes whose occurrence can be related to incorrect road design.

Strengthen all parts

Lowering speeds in access streets (to 30km/h) requires an examination of the road network and a determination of function (i.e. flow versus access). The Dutch refer to this as "categorisation of the road network". Categorisation occurs before operational design criteria are set. This results in a uniform design within and between categories. Access roads encourage low speeds and road-user interaction whereas roads with a clear traffic flow function and segregated features for different users have high geometric design standards and safe rapid movement of traffic. Self-explaining road design, road signs and education focus both on what is expected of the user and what the user can expect from the road system. Through this categorisation process, policy makers moved from an emerging to an advancing stage of Safe System development. High-volume road speeds could be efficiently enforced with cameras, while speeds on low-volume roads were efficiently enforced by design (e.g. speed humps).

Prevent exposure to large forces

30km/h zones are an effective measure to reduce the severity and outcomes of crashes. Not only do they directly reduce crash risk and severity, but they also aim to minimise speed differences between road users and divert non-local traffic to designated higher order roads in the network. This speed-lowering reduces conflicts between light and heavy traffic (e.g. pedestrians and heavy goods vehicles). It also supports the principle of homogeneity in traffic (i.e. it prevents large differences in speed, mass and direction). Focusing on 30km/h zones, the Netherlands is somewhere between an advancing and a mature stage of Safe System development. Most well-designed 30km/h roads take the vulnerability of users into account for different road functions, although some older roads could benefit from lower-cost, low-speed design elements.

Support safe road-user behaviour

Ideally, 30km/h roads are built to ensure correct road-user behaviour. Road surfaces have an open structure (generally composed of paved brick), short tangent lengths and restricted cross-sections to encourage lower speeds (i.e. speeds are self-enforced). In situations where there are longer tangents on turns and near intersections, speed reductions are applied. To prevent non-local traffic using these roads, other interventions (e.g. mid-block chokers and diagonal diverters) are applied.

This example demonstrates that for this Safe System component, the Dutch implementation improved from emerging to advancing, with some elements being mature. The current road-design philosophy incorporates the latest knowledge by facilitating and supporting roads that use self-explaining road concepts and associated network structures. Maintenance is at a high level, but safety audits and inspections are not yet often applied on low-order roads; addressing this gap could lead to further improvement.

Lessons

Lessons from the Sustainable Safety start-up programme

A number of lessons can be drawn from the original Sustainable Safety start-up programme (1998–2002). First, it is important to start with a charter or covenant signed by stakeholders and to plan interventions in phases with clearly defined goals if necessary. National and regional funding splits can be helpful but overall funding still needs to be sufficient to ensure progress. Funding may also need to be combined with other grants and programmes to provide sufficient sustainable actions within organisations.

Second, funding can vary over time. It may take more time or other programme actions to implement the remaining infrastructural interventions, and these are essential elements. In the Dutch context, it was decided to combine road-safety interventions with regular road maintenance and interventions implemented to increase roadway capacity and improve traffic flow. In the case of major road reconstructions, relevant safety recommendations had to be applied. In this way, road safety interventions became more affordable, since they can be funded from budgets in other policy areas (e.g. maintenance) and through efficiencies achieved by the simultaneous delivery of safety and maintenance engineering programmes. This is an example of an activity that demonstrates development from the advancing to the mature stage of Safe System implementation.

Third, politics can create barriers. While well-reasoned funding proposals can be made, political attention may shift from road safety to other societal issues. This may nevertheless signal the growing maturity of a Safe System intervention. For example, the liveability of cities, health and the environment are high priorities today. Addressing these priorities may indirectly lead to more attention being paid to pedestrians and cyclists. When designing a road network, safety and balance are improved by deciding how much space is needed for pedestrians and cyclists rather than for cars. This kind of intervention helps create a safe environment for vulnerable road users, and signals a shift from an advancing to a mature stage of Safe System development.

Finally in terms of the road-safety policy development cycle, the Sustainable Safety start-up programme could be seen as a transition from the emerging to the advancing stage, with some first elements of a mature stage (in the sense that it started with a national vision based on the Safe System key components *avant la lettre*) also present. However, despite these developments, the Netherlands still needs to improve on certain aspects before road-safety management can be defined as being in the mature stage of development as defined in the Safe System framework (ITF, 2022).

General lessons from the Dutch example

In addition, a number of general lessons can be drawn from the approximately 25 years during which the Netherlands has been implementing its Sustainable Safety approach. First, it is important to ensure that road-safety knowledge (i.e. knowledge of content and process) is anchored both in the organisations responsible for road safety and within the political environment. Continuity remains a challenge since the road-safety environment is changing: people within organisations come and go and policies and political aspirations shift over time. To overcome the effects of this volatility, it is helpful to embed road safety in (road traffic) laws and regulations. Consider continuing education of professionals; make sure that road designers understand the rationale behind guidelines for safe road design. The triangle *function–*

form/layout–use is extremely useful. It helps if road safety professionals learn what is not safe, for example by allowing them to carry out road safety audits.

A second (related) lesson is that people are important, and it is therefore important to ensure key personnel have the energy, desire and time to introduce changes. Additionally, it is crucial to involve other organisational units so that knowledge about the entire Safe System process is disseminated throughout the organisation. Change is difficult, and in the Dutch context it helped that the stakeholders were convinced they needed to do it together. In this way, they were committed and intrinsically motivated to make a change and had no intention to shift responsibility to other stakeholders. It is also good to make use of initiatives by citizen groups, but check whether these initiatives fit within a Safe System.

Third, communicate, lobby and build showcase examples based on facts. Show that these examples work, and combine benefits for multiple policy domains. Try to find win-win situations with other policy areas. To take one example, one-way streets and separate bus lanes improve accessibility and can also improve road safety. Include all stakeholders in the process. A practical example might be engaging with employers to ensure they are able to get their employees safely to work.

Fourth, create a sense of responsibility among all stakeholders. To maintain political and societal support and support of stakeholders, allow compromises. This might involve low-cost solutions, such as implementing 30 and 60km/h zones, as well as speed limits of 60km/h instead of 40km/h outside urban areas. Policy makers are not very eager to limit people in their freedom of travel choices and travel behaviour. So encourage people towards safe behaviour.

Fifth, develop a complete plan and vision as a starting action and implement interventions step by step to ensure the process remains comprehensible to all involved. Make the story solid and show examples of interventions and how they can be integrated and serve multiple goals.

Sixth, start with the roads where the public and road authorities experience the most severe problems (e.g. locations with a high incidence of speeding) and involve stakeholders during the early stages in the development and implementation process. Again, present the full story built on scientific insights. Explain to stakeholders why measures are necessary and which impacts they will mitigate.

Finally, establish guidelines for safe road design. Explain the basic principles of a coherent approach, addressing the entire road network and its use. Provide guidance on interventions and their effects. Regular safety audits prevent duplication and help improve safe design of roads.

Conclusions

The Netherlands has long been a leader in Safe System implementation. It has an impressive safety record reflecting the extensive successes of its long-term Sustainable Safety programme. However, the country's journey towards Safe System maturity is not yet complete.

Nevertheless, some of the key ingredients for successful Safe System implementation demonstrated in this case study include leadership, planning, stakeholder engagement, sustainable funding, managing

political decisions, showcasing successes, and persistence. The combination of these has delivered a wealth of experience and key lessons that are relevant in all contexts.

References

ITF (2022a), *The Safe System Approach in Action*, Research Report, OECD Publishing, Paris, https://www.itf-oecd.org/safe-system-in-action.

ITF (2022b), "Safe System Implementation in Practice", ITF Working Paper, available on request.

Schermers, G. (1999), *Sustainable Safety: A preventative road safety strategy for the future*, 1st edition, Transport Research Centre, Ministry of Transport, Public Works and Water Management, Rotterdam, https://www.researchgate.net/publication/261324555_Sustainable_Safety_-_A_preventative_road_safety_strategy_for_the_future (accessed 24 June 2022).

Schermers, G. and P. van Vliet (2001), *Sustainable Safety: A preventative road safety strategy for the future*, 2nd edition, Transport Research Centre, Ministry of Transport, Public Works and Water Management, Rotterdam, https://puc.overheid.nl/rijkswaterstaat/doc/PUC_63102_31/ (accessed 24 June 2022).

Wegman, F. et al. (2006), "Sustainable Safety in the Netherlands: Evaluation of National Road Safety Program", *Transportation Research Record*, 1969, pp. 72–78, https://doi.org/10.1177%2F0361198106196900110.

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This case study details lessons from the implementation of the Sustainable Safety approach in the Netherlands, which is generally considered a precursor to the Safe System approach.

The case study is part of a package of materials accompanying the final report of a joint International Transport Forum–World Bank Working Group, entitled The Safe System Approach in Action.

The Safe System approach to road safety takes as its starting point the ethical position that there is no acceptable level of road deaths and serious injuries. The report proposes a framework for designing, implementing and assessing projects with a Safe System focus.

The report also draws on lessons from real-world case studies to offer guidance on implementing Safe System interventions. While not every case study was a perfect example of the Safe System approach, all contain valuable lessons for policy makers and road-safety actors.