

Summary:

Road Safety Programme for Stockholm

An analysis of potential targets and measures

The existing road safety programme (2005-2010) for Stockholm is due for revision. For the 2009-2020 programme, TØI's recommended target is a 40 % reduction in the numbers of road users killed or severely injured.

We further recommend to base the new programme on eight different safety performance indicators and targets: four behavioural targets and four infrastructure targets. By fully or partly realising these eight performance targets, it is possible to obtain a 40 % reduction of the number of killed and severely injured road users in Stockholm by 2020.

New road safety programme for Stockholm

The traffic office in the City of Stockholm is to prepare a new road safety plan for the period 2009-2020. This plan will replace the present plan for 2005-2010.

TØI has been asked to contribute to this task. This report recommends an overall target, eight safety performance indicators and targets designed to reach the overall target, and possible measures to reach these targets.

Road safety target

We recommend that the overall target for improving road safety in Stockholm consists of a target combining the number of killed and severely injured road users. We do not advise to have an independent target for traffic fatalities. This is due to the relatively small number of traffic fatalities in Stockholm. The number of traffic fatalities is therefore random influenced by fluctuations, and it is not meaningful to base a target on such an uncertain number. At the same time we do not recommend to base the future on the number of persons slightly injured. The target should be based on the Vision Zero, where the main focus is on the number of people killed or permanently injured.

The main target should be based on accidents reported by the police in the official statistics. In the long run when the statistics is improved, accidents reported by hospitals and emergency clinics may be included in the target.

We recommend the following main target for traffic safety in Stockholm for 2020:

- *A reduction of 40 % in the number of killed and severely injured in road users.*

The recommendation is based on a review of the national target for Sweden, the current target for Stockholm, present targets in eight other major Nordic cities, a trend analysis, and a calculation of the possible potential for reduction when fulfilling or partly fulfilling eight different safety performance targets. If all the recommended eight performance targets are fulfilled or partly fulfilled it is possible to obtain a 40 % reduction in the number of killed and severely injured road users.

A target based on 33-50 % reduction is also realistic. A target value of 40 % will be even more realistic if the road safety programme is supplemented with other traffic measures than just the ones suggested together with the eight performance targets, and if the development in society is favourable in the coming years.

Eight safety performance indicators and targets

Road safety performance indicators are stepping stones that will help to fulfil the main target.

TØI recommends management by safety performance indicators in future traffic safety policy in Stockholm. This is due to the fact that traffic accidents to some degree are random events, and changes in the number of accidents from one year to the next is partly random. The number of injured road users one specific year will therefore not always give a good indication of progress in improving road safety. The use of safety performance indicators can more easily be used to evaluate annual changes. Management by safety performance indicators is already used in the Swedish national road safety programme.

The safety performance indicators and targets in the road safety programme for Stockholm should refer to both infrastructure and road user behaviour, and be based on factors that the Traffic office in Stockholm are able to influence.

We recommend to base the programme on the following eight performance indicators: 1) speed, 2) safety belts, 3) cycle helmets, 4) alcohol, 5) the standard of the main roads, 6) the standard of the local roads, 7) management and maintenance and 8) strategy for heavy goods vehicles. Table I gives an overview of these indicators, and the proposed target values for each of these indicators.

Reducing speed is the performance target with the highest potential for reduction in the number of persons killed and severely injured. If the performance target for speed is realised, a 29 % reduction in the number of persons killed and severely injured is possible. The performance targets: safety standard on main roads, increased use of safety belts and reduction of driving under influence of alcohol all have a potential to reduce the number of killed or severely injured road users by 6-9 %.

In our analysis, just the accidents in the official statistics are included. Since the official statistics do not include all accidents, the actual potential for reductions can be somewhat higher than indicated in table 1.

Table I. Recommended safety performance indicators and targets for Stockholm, and their potential to reduce the number of killed and severely injured road users in 2020. Parentheses indicate the result of a sensitivity analysis.

Indicator		Current condition	Target: 2020	Potential: 2020
Speed	Proportion in compliance with the speed limits	20-70 %	98 %	29 % (26-33 %)
Safety belts	Belt use in front seat	92 %	98 %	7 % (5-9 %)
Cycle helmets	Helmet use all ages	≈ 65 %	80 %	2 % (1-2 %)
Standard main road	Proportion of safe crossings	Presumed 20 %	80 %	9 % (5-13 %)
Standard local road	Proportion of safe crossing for cyclists and pedestrians	Presumed 25 %	75 %	2 % (1-3 %)
Management and maintenance	Management and maintenance of tracks for cyclists and pedestrians	Current standard	Optimal standard	1 % (1-2 %)
Alcohol	Proportion of traffic consisting of sober drivers	99,76	99,9	6 % (5-7 %)
Heavy goods vehicles	Safety strategy for heavy duty vehicles	No strategy	Strategy	2 % (1-3 %)

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Combined potential for reduction

The combined potential for reduction cannot be found just by adding the estimated potentials for each of the performance indicators, because one accident cannot be “prevented more than once”. The combined potential for reduction is estimated as one optimistic estimate, one conservative estimate, and one estimate combining the optimistic and the conservative estimate. The optimistic estimate indicates a reduction of the number of killed and severely injured road users by 48 %. The conservative estimate indicates a 37 % reduction. The best estimate based on these results probably is a reduction of 42 %.

These estimates are based on different assumptions regarding the present situation in Stockholm. The exactness of the estimates therefore depends on how correct the assumptions are.

To evaluate the quality of the original estimate, we also have performed estimation of 13 other cases:

- *Sensitivity analysis*: Two cases (pessimistic and optimistic)
- *External effects*: Three cases (different degrees of reduction combined with the effect of the road safety programme)
- *Different scenarios*: Eight different scenarios (different degrees of fulfilment of the performance targets and different degrees of external effects).

For each of the 13 cases an optimistic, a conservative and a mean estimation were performed. The mean estimate varies between 30-57 %.

Two of the scenarios were made in dialogue with the Traffic office in Stockholm. They were asked to indicate which level of achievement for the performance indicators they found realistic to achieve by 2020 in Stockholm. In one of these

two scenarios external effects are excluded, and in the other scenario the external effect were set to 25 %. The estimated potential for reduction in these two scenarios was 36 and 50 %. If we reduce the external effect in the second scenario to 11-12 %, the new estimate will be 42 %.

Based on this the combined potential for reduction is estimated as follows:

- Combined effect, pessimistic estimate: 30-35 %
- Combined effect, "best" estimate: 35-45 %
- Combined effect, optimistic estimate: 45-50 %.

Measures to reach the targets

Table II gives an overview of the most relevant and effective measures to reach the eight performance targets.

Table II. Possible measures to reach the recommended safety performance targets.

Indicator	Measures	
Speed	– Increased enforcement – Speed humps e.g.	– Reduced speed limits – Information and campaigns
Safety belt	– Increased enforcement – Information and campaign	– Automatic belt-reminders
Bicycle helmets	– Obligatory by law	– Information and campaign
Standard main road	– Grade-separated junctions – Bypasses – Improvement of complex junctions – Speed reductions	– Separation of the traffic lanes – Separation of different road users – Footpath and cycle path/lanes – Securing pedestrian crossings
Standard local road	– Improvement of complex junctions – Separation of different road users – Footpath and cycle path/lanes	– Raised pedestrian crossings – Crossing/sub passage – Speed reductions
Management and maintenance	– Increased standard on winter maintenance	– Increased maintenance in general – Increased lightening
Alcohol	– Controls and sanctions – Alco- lock	– Information and campaign
Heavy goods vehicles	– Heavy goods vehicle road network (routes) – Traffic management by ITS – Speed plan	– Green supplying of goods – Campaign – Black-spot analyses – Safety standard on road network

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Need to improve the quality of data

It is not possible to quantify the extent to which the different measures need to be implemented to realise the recommended performance targets for 2020. To make these kinds of evaluations further improvements in the accessibility of data dealing with road network, traffic and road user behaviour is necessary.

We recommend that the road safety plan for 2009-2020 also include a target to increase data collection and accessibility especially concerning the eight recommended performance indicators. This is absolutely necessary to make it possible to implement a management by safety performance indicators in Stockholm. At the same time improved data quality will make it possible in the future to evaluate to which extent different measures needs to be implemented to realise the different performance targets in Stockholm.