

**Summary:**

# **A comparative analysis of elements of the normative foundations of transport safety policy**

This report presents a comparative analysis of elements of the normative foundations of transport safety policy. The term “normative foundations” refers to any element of policy that defines what the objectives should be, what ought to be done, how things should be – in other words any statement about what ought to happen.

## **Elements of the normative foundations of transport policy**

The normative foundations of transport policy consist of several elements. In this study, the following elements were included:

1. Visionary targets, in particular Vision Zero, which states that the long term ideal for transport safety is a transport system in which nobody is killed or permanently impaired as a result of transport accidents,
2. Numerical targets and systems of management by objectives, with a focus on a system of road safety management by objectives proposed by the Public Roads Administration,
3. Notions of optimal safety, in particular the idea that by setting priorities for safety measures strictly according to cost-benefit analysis, the resulting level of safety can be regarded as optimal,
4. Notions of acceptable risk, according to which transport risk is compared to the risks involved in other activities of daily life, in order to determine an acceptable level of risk,
5. Regulations and standards, comprising legislation and technical standards prescribing technical design, performance and permitted behaviour,
6. Incentives and mechanisms for allocating resources in the public sector, in particular determining the size and allocation of budgets for transport safety measures.

Each of these elements is described and compared with respect to a set of standards that the normative foundations of public policy ought to fulfil.

## **Standards for comparing the normative foundations**

While it is beyond the scope of science to determine the contents of the normative foundations of public policy, it is clearly within the realm of science to compare various elements of the normative foundations of public policy in terms of criteria that are widely regarded as standards that public policy should strive for. More specifically, the analysis is based on the assumption that the normative foundations of transport safety policy should conform to standards of:

1. Rationality, which in a weak sense means that the normative foundations of transport policy should not involve logical inconsistencies, and in a stronger sense means that they should be well-justified and based on sound knowledge,
2. Fairness, which in this report has been defined in terms of the principles of justice as fairness proposed by John Rawls,
3. Ethical appropriateness, which in a weak sense means that they should not lead to ethical dilemmas and in a stronger sense be better ethically justified than any alternative formulations of the normative foundations,
4. Democratic legitimacy, which implies that the normative foundations should be developed according to the rules of democratic government and enjoy the support of citizens and policy makers,
5. Simplicity and transparency, which means that any statement of the normative foundations of transport policy should be simple and easy to understand and that it should be possible to determine when reality conforms to the ideal and when it does not.

By combining the elements of the normative foundations (6 in total) and the standards for comparing these elements (5 in total) a table of 30 cells can be formed. The following section summarises the main results of the analysis.

## **Results of the comparative analysis of normative foundations**

### **Vision Zero**

Vision Zero has been adopted as the long-term ideal for transport safety policy in Norway. Vision Zero gives priority to transport safety as an objective of transport policy and explicitly rules out any tradeoffs against other policy objectives that imply more than zero fatalities and permanent impairments as a result of transport accidents. Such an uncompromising stance is generally not regarded as rational in modern normative theories of rational decision making, which emphasise the fact that human value systems are complex and that public policy often pursues several objectives that are partly conflicting and call for intelligent compromises to be made. Moreover, it is questionable if the scientific basis of Vision Zero has been fully developed. Its proponents have suggested a set of speed limits that are intended to be consistent with zero fatalities, but it is highly dubious if this is indeed the case, at least if the use of mopeds and motorcycles continues to be permitted.

If Vision Zero were to be fully realised, it would result in a more fair distribution of accident risk among modes of transport and groups of road users.

Vision Zero has been marketed as an ethically more defensible foundation of transport safety than any foundation that permits a certain number of fatalities and serious injuries to occur. In principle, however, the possibility cannot be ruled out that even Vision Zero can lead to ethical dilemmas, although – at least in the short run – these potential dilemmas are unlikely to occur.

Vision Zero explicitly rejects the use of cost-benefit analysis to set priorities for transport safety measures, but supports the use of cost-effectiveness analysis. Vision Zero enjoys wide support among policy makers in Norway. Less is known about public support, but it is reasonable to assume that even that is high. Vision Zero is a very clear and easily understandable ideal for transport safety, although there may be some room for different interpretations of the concept of “permanent impairment.”

### **Quantified targets and management by objectives**

An elaborate system of quantified targets and management by objectives has been proposed for road transport by the Public Roads Administration. The system consists of a main target referring to the number of fatalities and serious injuries in 2020 and a total of 21 sub-targets referring to the state of road user behaviour, vehicle safety features and safety management of roads. The system is, at the time of writing, still a proposal only and has not been implemented or obtained approval from politicians.

A quantified target, or set of targets, satisfies the criterion of rationality if the targets do not contradict each other and may in principle be realised. As far as the targets proposed by the Public Roads Administration are concerned, realism is doubtful for many of them – they appear more like wishful thinking than realistic objectives.

The targets proposed by the Public Roads Administration do not imply a more fair distribution of risk among groups of road users.

In theory, a complex set of targets may have ethically troublesome implications. However, this does not appear to be the case for the targets proposed by the Public Roads Administration.

Democratic legitimacy is a problem, since quantified safety targets have so far not had any political support in Norway. Unless the targets obtain political support, no effective system of management by objectives will exist.

An overall target for reducing the number of fatalities and injuries is very simple and transparent, although allowance should be made for randomness in the count of fatalities and serious injuries when assessing target fulfilment.

### **The notion of an optimal level of safety**

The notion of an optimal level of safety is based on modern welfare economics, which forms the theoretical foundation for cost-benefit analysis. An optimal level of safety would be realised if all safety measures whose marginal benefits are

equal to or exceed their marginal costs are realised, but no safety measures are realised if marginal benefits are smaller than marginal costs. The optimal level of safety has been estimated for road transport, but not for the other modes of transport. An optimal level of road safety implies a reduction of the expected number of road accident fatalities in 2020 by slightly more than 50 %.

An optimal level of safety is a perfectly rational solution to transport safety problems, given that the normative foundations of welfare economics are accepted. The optimal level of safety will, according to the estimates made, not result in a more fair distribution of accident risk. Providing safety according to the individual demand for it may entail ethical dilemmas. Most of these are related to the non-linearity of willingness-to-pay for safety with respect both to the level of risk, the size of risk reduction and income.

The notion of an optimal level of safety does not have much political legitimacy in Norway. Nor can this ideal be regarded as simple and transparent. It is actually a very complex notion and it may, in practice, not be possible to determine when an optimal level of safety has actually be reached.

### **The notion of acceptable risk**

The notion of acceptable risk originates in comparisons that have been made between the risk of a fatal accident in various activities of daily life. Such comparisons have invariably found that transport, in particular by road, involves a considerably higher risk of fatal accident per 100 million person hours of exposure than nearly all other human activities. Based on this observation, it has been argued that the current level of risk in transport is unacceptably high.

It has, however, turned out to be extremely difficult to get beyond this and define, in sufficiently precise terms, an acceptable level of transport risk. Psychometric research suggests that judgements about the acceptability of risks are influenced by a large number of characteristics of risk, such as the voluntariness of exposure, the degree of individual control of the risk and its potential for catastrophic events. Integrating the relevant characteristics into an overall judgement has, however, never been attempted and is very difficult, as the various dimensions of risk point in different directions.

It is concluded that no particular level of acceptable risk can be rationally justified. Moreover, it is not clear what the notion of acceptable risk implies with respect to fairness in the distribution of risk. Ethical implications of acceptable risk have hardly been studied, and the few studies that were identified do not clarify these implications. Democratic legitimacy is unknown. The notion of acceptable risk is complex.

It is suggested that the notion of acceptable risk is too nebulous to constitute an element of the normative foundations of transport safety policy.

### **Regulations and standards**

Transport is subject to a very extensive set of legal regulations and technical standards. Most of these regulations and standards are intended to improve safety.

There is little doubt that many regulations make an important contribution to safety. For a few regulations, however, their contribution to safety can be questioned.

Rational regulation of risk means that regulations are targeted at risk factors that make a significant contribution to accidents and that are amenable to regulation, i. e. can be modified by means of legal statutes that will be effectively enforced. Some current transport safety regulations fail this requirement, such as driver health regulations and mandatory driver training.

In principle, some safety regulations may promote fairness in the distribution of risk, but actual effects are largely unknown. Some current regulations are ethically troublesome, in particular those relating to driver health and driver training. Some regulations enjoy a high legitimacy, others are widely disregarded. Regulations as a whole are very complex, but it is not likely that this complexity can be greatly reduced, as the factors contributing to accidents are also very complex.

### **Incentives and mechanisms for resource allocation**

The term incentives denotes any motivational factor that induces a certain action or that predisposes individual or public bodies to favour certain procedures at the expense of others. Resource allocation mechanisms refers to any institutional arrangement that influences the size and allocation of public budgets. Resource allocation mechanisms are always embedded in a certain structure of incentives that strongly influence outcomes.

Public resources allocation in Norway is strongly influenced by game-like negotiations between different levels of government, in particular between the central level of government and local and regional bodies. Incentives favour a wide geographic dispersion of resources; this serves to minimise conflicts as the geographic distribution of public investments in Norway is widely perceived as a zero-sum game, in which an investment made in municipality A is treated as an equivalent loss by municipality B.

The current system of public resource allocation in Norway results in strategically rational behaviour at all levels of government. The outcome of the process departs widely from normative criteria of rationality. Thus, resources continue to be spent on highly ineffective projects in sparsely populated areas; the benefits of these projects are far smaller than in more densely populated areas of the country. While there is definitely a certain rationality to the political logic that leads to this outcome, it cannot be regarded as normatively rational.

The wide geographic dispersion of transport safety investments in Norway may be regarded as a contribution to regional fairness. Allocation according to economic criteria of efficiency would imply a greater concentration to the more densely populated areas of the country.

Ethical principles for the allocation of public resources with respect to transport safety have not been developed in moral philosophy; several mutually contradictory guidelines can be imagined and it is likely that moral philosophy can give limited guidance in this area.

As far as democratic legitimacy is concerned, it must be rated as fairly high. Although the central areas of Norway have tried to obtain a larger share of

funding than they have been given in the past, they have not been able to upset the equilibrium of the allocation game, and have been forced to adopt toll financing to fund major investments.

The mechanisms of resource allocation are not simple and transparent. Resources are allocated as a result of a very complicated process that the general public is only dimly aware of.

Table S.1 summarises the main findings of the analyses.

*Table S.1: Results of the comparative analyses of elements of the normative foundations of transport safety policy*

Elements of normative foundations	Criteria for comparison				
	Rationality	Fairness	Etical appropriate-ness	Democratic legitimacy	Simplicity and transparency
Vision Zero	Rules out tradeoffs against other policy objectives	Will result in a more fair distribution of risk	Ethical dilemmas cannot be ruled out, but are hypothetical	High	High
Quantified targets	Complex goal structures may contain inconsistencies	Depends on the content of the targets	Ethical dilemmas cannot be ruled out, but are hypothetical	No political support for quantified targets at this time	Targets can be both simple and complex; depends on content
An optimal level of safety	Is based on a very precise and stringent notion of rationality	Will not necessarily lead to greater fairness	Ethical dilemmas may occur	Low	The notion of optimality is complex
An acceptable level of risk	Any particular level is difficult to justify rationally	Will not necessarily lead to greater fairness	Ethical implications have hardly been studied	Not known; has not been very much discussed	A complex notion
Regulations and standards	Rational if risk factors are regulated	Not a very good policy instrument to ensure fairness	Varying; some regulations are ethically troublesome	Varying; high for some; low for others	Very detailed and complex
Incentives and resource allocation mechanisms	Is characterised by game-like situations	Geographic fairness may be promoted	Not well known; many norms may be invoked	High	Low; complex negotiations

## **Improving the normative foundations of transport safety policy**

It is beyond the scope of this analysis to propose changes in the normative foundations of transport policy. However, certain changes can be made in these foundations without altering the basic rules of the game for transport policy making in Norway. Table S.2 shows how various elements of the normative foundations of transport policy may be linked in a hierarchical manner in order to form a consistent system. It should be noted that the target proposed is intended as an example only and not as a serious proposal.

*Table S.2: Elements of the normative foundations of transport safety policy stated as a hierarchy*

Basic ideal	The long term ideal for transport safety is that nobody is killed or permanent impaired as a result of transport accidents.
Intermediate target	In the period before 2020, the target is to reduce the number of people killed or permanently impaired in transport accidents by 50 % compared to the annual mean number during 2003-2006.
Sharing of responsibility	Government and producers of vehicles (including airplanes) should design the system in a way that ensures that everybody will survive and avoid permanent impairment if they comply with the rules for use of the system.
Allocation of resources	The amount of resources allocated to transport safety should be sufficient to realise the targets set for improving it.
Use of resources	The criteria guiding priority setting in using resources allocated to transport safety should be explicit.

An overall quantified safety target can be adopted as a supplement to Vision Zero. Such a target would make policy makers more accountable for the results of policy. It could also serve as the basis for determining the size of budgets. Once an overall target has been set, the costs of the measures that are needed to realise the target can be estimated, serving as input in the budgetary process. If safety measures are introduced strictly according to cost-effectiveness, a smaller budget will be needed than if other considerations are to be included. If regional balance is to be maintained, a larger budget will be needed.

The point is that decisions regarding policy objectives and policy instruments will become more successful if taken together than when taken in isolation.