

TRANSPORT SAFETY ORGANISATION IN PUBLIC AND PRIVATE SECTORS

EXECUTIVE SUMMARY

Transport safety, traditionally, is seen a matter of engineering roads and vehicles, trains and aircrafts and their control systems, ships and their navigation, educating users and training experts as well as enforcing laws and regulations. Hence, the three “Es”, engineering, education and enforcing, are generally seen as the three pillars of transport safety policies. Whether they result in successful measures is first and foremost a question of how well they are designed and implemented. But even the most thorough design and implementation of individual engineering, education and enforcement measures is likely to have little impact without appropriate integration. Successful safety polices are then determined by how well this integrated approach is organised. They are essentially a matter of transport safety organisation.

It is therefore that this review is dedicated to the organisational problems and solutions that determine contemporary transport safety policies. The importance of organisational aspects cannot be stressed enough. Only if policy-makers are able to integrate their objectives, strategies and measures are they able to deliver the kind of safety solutions that a highly complex transport system requires. Within this complex transport system integration then is a product of the ability to organise the interplay of key functions such as engineering, education, enforcement and others. In other words, if it is not considered how these key functions impact upon each other, their genuine impact on the level of safety will be much lower than potentially possible.

Consequently, this review seeks to map the various organisational aspects of transport safety and address a number of them more specifically in terms of their role and function within an overall transport safety network. At the core of this network we find an agglomeration of interrelated functions. The most significant of them have been identified in Figure 1, “The Policy Cycle” (see next page).

The illustration in Figure 1 captures the interdependences between specific functions in the shape of a cycle. It thereby suggests that theses functions are often relating to each other in a sequential fashion. One function is followed by another. The cycle is refuelled with the results of the evaluation – starting the process anew. The figure, however, also takes account of the various “non-cyclical” links that exist between the listed functions, as well as those between the functions inside and outside the cycle. Mapping transport safety organisation in such a way reflects a genuine “systemic approach” towards safety. This kind of systemic approach frames the research results presented in this review.

In supporting the Policy Cycle, the notion of a systems approach is pivotal to implement transport safety organisation. It should be realised that, although the various modes comply with this systems concept, these modes have quite a different background regarding their origin, life cycle, design, operations and environment. These differences require a dedicated approach to successfully implement transport safety organisation in each mode. The modes differ with respect to:

- the coupling and interaction between components, life phases and the environment;
- the nature of the hazards and risk involved;
- the speed of technological development;
- the rate of interactions, based on numbers and traffic volumes.

Despite these differences, the modes have common perspectives regarding transport safety organisation. ETSC has highlighted several of these perspectives in its annual Transport Safety Lectures, focusing on visions, targets and strategies (1999), decision-making tools (2000) and independent accident investigation (2001).

Clearly, the cycle is not exhaustive. There are functions, such as the various “post-incident” aspects of transport safety which are left aside. The cycle must be seen as a way to simplify the complex interplay between all functions of transport safety organisation. Only with this kind of simplification are policy-makers receiving the framework within which political action becomes feasible. It transfers the obvious result of a systemic approach, i.e. that everything is related to everything, into a practical approach that identifies key areas for political action.



Figure 1: The policy cycle

Apart from leaving aside certain functions, the cycle also lists two very important aspects of safety organisation – safety policy planning, implementation and evaluation as well as enforcement, monitoring and inspection – which are not treated in a separate chapter. A brief overview of these two functions, however, is given in this executive summary. Presenting them at full length, and describing in detail what their features are, would duplicate part of the work published in former ETSC Reviews, such as the recent “Assessing risk and setting targets in transport safety programmes” and the one on “Police enforcement strategies to reduce traffic casualties in Europe” from 1999.

Policy planning, implementation and evaluation

Safety policy planning, implementation and evaluation are generally about the making of (inter-)governmental transport safety policies. They address the key actors of transport safety organisation, i.e. the policy-makers within the bodies of a local, regional, national and supra-national governments. Cotemporary planning, legislation and evaluation processes in transport safety assign crucial importance to the notion of “political leadership”. This notion reflects a growing concern about a vanishing political will to implement measures that without doubt will improve the level of transport safety, but are not necessarily receiving widespread popular support (this is particularly true in the case of road design where certain safety measures might be conflicting with other private or public goals). The consequence of viewing the overall State of Play within safety politics in such a way is to call for stronger political leadership – a leadership that grounds itself in democratic processes and is dedicated to improving the safety of all transport users.

The kind of political leadership that governs the planning of transport safety policies, however, depends upon “shared responsibilities”. Sharing responsibilities essentially means enhancing the individual responsibilities of all stakeholders. This approach, for instance, is followed by the Commission’s 3rd Road Safety Action Programme. The Programme seeks to involve all stakeholders by emphasising their unique responsibilities and competences in key areas of transport safety policy.

The principles of political leadership and shared responsibility are as well central to any implementation process. Based on the setting of challenging, yet achievable targets, a successful implementation comprises a number of tools such as legislation, education, design, etc. These tools require prerequisites. For example:

- Any kind of legislation needs public support and acceptance.
- Law enforcement requires legislation that is clear and easily understandable with little room for interpretation.
- Information requires well-defined target groups.
- Education needs suitable training facilities and well-trained teachers.
- Sustainable road safety requires the qualification and involvement of experts.

Many of the most relevant legislative decisions that frame the implementation of safety policies are increasingly taken on a supranational level. They are based on global and regional agreements between the national governments and other stakeholders that are

represented in, for instance, the International Civil Aviation Organisation (ICAO) or the International Maritime Organisation (IMO). In order to ensure that safety policies in all modes of transport are efficiently planned and implemented across Europe it is increasingly important that the European Union establishes itself as a key-actor in these organisations.

Finally, any transport safety policy must be subject to an ongoing monitoring and evaluation process. The success of the different planning and implementation phases of safety policies relies on the availability of appropriate evaluation techniques. Here, again, the visions, targets, sub-targets and performance indicators play a crucial role. They provide for the point of reference that monitoring and evaluation schemes have to take into consideration¹.

To summarise, the three steps of planning, implementation and evaluation undoubtedly simplify the complex process of sharing political leadership and responsibility in transport safety organisation. The virtue of this simplified structure, however, is that it allows a fairly clear identification of the roles of different actors. As a result of this pragmatic approach towards the politics of transport safety organisation the following policy recommendations can be made:

- The responsibility for transport safety should be a shared responsibility.
- The distribution of responsibilities between the actors should be clarified according to their competences and responsibilities.
- The creation and implementation of a policy should be thoroughly planned and should include a well considered target setting.
- Targets should be challenging but still realistic.
- Transport safety policies should make clear the means to reach a target.
- Policies and targets should be constantly followed up, monitored and evaluated.
- Transport safety performance indicators should be widely used in evaluating policies.
- The process and the results of the evaluation should be open and translucent.
- The evaluation should preferably be performed by external resources.
- The evaluation should result in recommendations for improvement.
- The leadership should consider the recommendations and react openly on them.
- The leadership should be responsible for the implementation of accepted recommendations.

To enable all stakeholders and actors to participate in this policy-making process, in particular transparency and independence are important conditions. Throughout the chapters of this review, these two conditions are becoming explicitly visible as leading issues in safety policy making. They are operationalised by instruments such as accident investigation during design and operation, training and education for experts and organisation of research by networking, funding and open access to knowledge and data. ETSC has already dedicated a first overview to the instrument of independent accident investigation with the report on “Transport accident and incident investigation in the European Union” (2001).

¹ For more information on monitoring and evaluation see also the ETSC Review “Assessing risk and setting targets in transport safety programmes”, 2003.

Having briefly summarised the most important overall aspects of planning, implementing and evaluating safety policies this executive summary now follows the policy cycle clock-wise and turns to the next function, the design and engineering of safety, which constitutes the first chapter of this review.

Safety Design and engineering

Chapter one unravels the role of safety design and engineering in transport safety organisation. It shows that the engineering of technical systems represents the core business of contemporary transport safety policies. The chapter then argues for a better integration of safety design and engineering into the other functions and activities of transport safety organisation. The need for such integration evolves from the changing practices of safety policies, where responsibilities are no longer centrally distributed but equally shared. Here again, emphasis is given to a “systemic approach” towards safety organisation.

Furthermore, this chapter highlights a changing mindset amongst transport engineers. It shows how “safety comes first” and is nowadays seen as a major initial component of any transport system design process, although this approach is less well recognised in the road and maritime modes than in aviation and rail transport². More and more, safety is a function inbuilt into newly emerging transport technologies. It plays an increasingly important role in transport planning and design. This process is reflected by the growing relevance of various impact assessments in transport safety organisation; it is mirrored by the general conception that a transport system has to be adapted to the needs and behaviour of its users in order to minimise safety risks, and it becomes apparent in training and education programmes, for experts and users alike, drawing attention to the importance of safety. Based on this analysis the chapter concludes with a number of recommendations all raising awareness for an integrated and systematic approach towards transport safety organisation:

- Addressing the entire transport system in engineering design. A systems approach has benefited transport safety to a high extent, most obvious in aviation. Engineering design approaches should incorporate higher systems levels and non-technical aspects in all modes of transport.
- Acknowledging different types of potential use. Based on a diversity in rationality, the engineering design process should incorporate users and other operational stakeholders in the design of transport systems. Participative design approaches facilitate user-friendly designs of complex transport systems. To facilitate sustainable and cost-effective countermeasures, the development of a multi-user design interface is encouraged.
- Cross fertilisation across modes and engineering design schools could provide a most cost-effective option to substantially reduce the overall number of casualties and injuries in European transport systems. Cross-modal

² The road design process very often has to face competitive goals which may force the designers to develop less safe solutions. As a result we still find high risk sites and conspicuous dangerous road sections in newly built roads. This is why an independent audit has to be organised in the design process as part of a quality management for road safety.

disseminating of best practices from engineering design experiences in aviation, shipping and railways towards the road safety system is required.

- Avoiding a lowest common denominator by introducing performance based regulations and transfer of generic scientific knowledge and engineering design principles across domains and modes of transport, such as in the areas of ergonomics, reliability, quality assurance, management, organisation and governance as well as incident handling, rescue, emergency and salvage aspects.
- Establishing an independent quality management for the design of transport infrastructure, such as road safety audits, in order to balance transport safety objectives against other competitive goals.
- Establishing professional and scientific agencies to organise the drawing up of guidelines and issuing of certificates in order to achieve a qualified level of expertise and safety performance throughout the modes of transport. In order to adequately assess the safety performance of a transport system, the assessment should be conducted on the integrated system instead of isolated components.

Organisation management and operation

The second chapter highlights how organisational processes are an intrinsic part of the safety of transport operation within any organisation. Whereas the previous chapter opened up the borders of safety engineering and technical design, this chapter explores the social aspects of safety beyond such borders. It argues that learning from accidents must involve an organisational learning that leads to necessary transformations within the organisation. This, first and foremost, entails that the logic of implementing safety measures must reflect the social dimension of safety. The lack of diagnostic techniques that take account of this social dimension convincingly illustrates how insufficient implementation processes often are.

By addressing this lack of “social thinking”, the chapter translates the systemic approach towards safety into a number of operational measures. It shows that organisational processes concerning planning, internal supply chains, personnel planning and rostering are all directly implicated in the safe functioning of organisations. Moreover, by scrutinising the situational setting in which incidents occur, the chapter highlights the need for thorough organisational changes in response to an accident. This may have far-reaching implications. Examples are contractual relationships, particularly those between prime and sub-contractor, which should be transparently compatible with safety requirements, and enforceable, at all stages of the transport chain. The Chapter leads to the following recommendations:

- Safety is implicated in everything that an organisation does. Safety is an aspect of the system as a whole – therefore a systemic approach to managing safety needs to be taken.
- Organisational processes concerning planning, internal supply chains, personnel planning and rostering are all directly implicated in the safe functioning of organisations. Critical issues for safety include the effective co-ordination of these functions across organisational boundaries, the provision of feedback and

flexibility to meet operational needs and the distribution of decision making to ensure that operational requirements can be fully addressed. The organisation of work, including rosters should respect human characteristics and limitations.

- Transport operations frequently involve the functional co-ordination of several organisations in the same transport system. Safety functions also need to be co-ordinated with specific administrative arrangements to allow a systemic approach to safety to be developed. Where large, often public, transport corporations are broken up, care needs to be taken that the active management of safety is not compromised by substituting formal legal requirements for active management processes, and by undermining a systemic safety management strategy. Contractual relationships, particularly between prime and sub-contractors, should be transparently compatible with safety requirements, and enforceable, at all stages of the transport value chain.
- Many transport operations exhibit a 'double standard' of performance in which the official operating or task procedures differ routinely from the way in which the operation is actually carried out. The safety implications of violations of procedures are hard to assess as such unofficial action is not normally open to official scrutiny. Such actions may represent appropriate ways of working or be symptomatic of organisational problems, as well as being implicated in incidents. It is important to find ways to adjust such procedures to actual user needs.
- Organisations are responsible for the transport activities of their staff associated with their work and should take active steps to reduce the risks of that transport activity and to promote safe and environmentally sound travel.
- The need for independent quality and safety systems is well recognised in regulations for the approval of transport organisations. Safety cases provide a more stringent requirement to demonstrate management capability. It is important to ensure that these requirements lead to active management through 'living' documents, despite the administrative burden of developing and maintaining them.
- Monitoring the actual operation of a transport operation or its maintenance is a difficult and elusive task, but necessary if the 'double standard' of task performance is to be addressed. Systems for auditing organisational processes, which assess their ability to deliver the requirements for a safe operation, need to be developed or adapted from other industries.
- It is also necessary to develop and implement 'ecologically valid' methods for auditing and assessing the way in which transport operations are actually carried out. Such systems require trust and the institution of measures to protect crew and operational staff from inappropriate blame and victimisation, if such staff are to be active partners in improving the safety of the operation.
- Incident management needs to be seen as an integrated process which delivers safety improvements in a transparent way. Procedures for reporting incidents need to be strengthened – in particular by making available systems for the confidential reporting of safety issues and events. Investigation and incident management processes need to be strengthened both through the creation of an organisational climate that fosters learning from in-depth investigation and through the development of professionally competent investigation teams in transport organisations. The transition from recommendation to implementation needs to be examined and strengthened as this appears to be a weak point of

the process. Transparent systems for the monitoring and evaluation of the implementation of recommendations from accident investigations should be developed both within organisations and, for public investigations, by national authorities.

Information, education and training

The organisational changes proposed in the second chapter will not happen without appropriate information, education and training programmes able to convey expert knowledge to practitioners and transport users. Consequently, chapter three addresses information, education and training as the three main categories for building a safety culture in and around organisations. The transfer of knowledge from one organisation to another (“Best Practice”) is the basis for improving the safety within organisations. The various learning and education processes that are described in this chapter are seen as the prerequisite for sound practice and behaviour, both amongst political-decision-makers as well as transport users. Without the generation and dissemination of knowledge amongst all stakeholders progress will not be possible. In order to ensure such progress, the chapter highlights the role of the European Union in supporting information, education and training programmes for safety experts. Due to their key roles in moving the above cycle of functions around, these experts deserve particular attention. The EU, therefore, should assist the Member States in building the educational infrastructure and competences that are required for maintaining and improving professional safety knowledge. The Chapter leads to the following recommendations:

- In relation to information, education and training Member States should consider to what extent the existing arrangements do fulfil a systemic approach.
- The European Union should act as a catalyst for the enhancement of an appropriate “training” infrastructure.
- The European Union should encourage the establishment of international standards with a generic accreditation and support a harmonisation of standardised qualifications.
- Aspects concerning management, administration and policy are not yet fully developed in each Member State in the educational and training sector. The EU could act as a platform to exchange information and experiences in that field in view of the development of “best practice” guidelines.
- A targeted approach is essential to address the users of the transport system, mostly in the road sector where the majority of the accidents occur. Furthermore, an appropriate communication approach is needed, to improve the effectiveness of the information received by the users. The EU should continue acting as a platform to collect and exchange experiences about effective information campaigns taking into account differences in culture and mentalities.
- School education, especially road safety education, should involve explicit time tabled curricula for each grade. Particularly important topics are walking to and from school, using school or public transport and training courses for cyclists and light motorised two-wheelers.
- The European Union should encourage the non-governmental sector to participate more actively in the educational process.

Enforcement, monitoring and inspection

While information, education and training are often considered as “soft measures”, enforcement, monitoring and inspection represent somewhat harder instruments to ensure that safety policies and measures have their impact. Therefore, the subsequent step in the policy cycle explicitly lists these three functions. Enforcement, in particular, represents the kind of function that holds the above cycle together: without proper enforcement – and also without monitoring and inspection – useful organisational measures will lose their effectiveness.

The crucial role of enforcement in transport safety organisation has been dealt with comprehensively in ETSC’s review on “Police enforcement strategies to reduce traffic casualties in Europe” of 1999, and will not be explicitly considered in this review.

Research and development

The final function in the policy cycle before it commences again and fourth chapter of this review is the one that addresses transport safety research and development. The chapter emphasises the role of sound data collection and public availability. With due consideration to the very nature of transport safety research as highly interdisciplinary, data on consistently recorded transport incidents should be freely available for independent transport research institutes across the European Union.

Moreover, the involvement of statisticians, doctors, engineers and behavioural scientists in multidisciplinary transport safety research makes it likely that the funding given to independent scientists comes from various private and public sources. The process of allocating funds, however, needs to balance the commercial interests of industries with those of independent transport researchers in terms of disseminating and publicising research results. The chapter leads to six cross-modal recommendations:

- Data should be easily and freely available for use by all independent research organisations.
- The responsibility of collecting the basic police, hospital, and exposure data at the national level should be separated from departments of transport and should be given to either an independent transport research institute, or a national statistical institute.
- In the road sector, at Community level, the EU should embark urgently and vigorously upon a timetabled and fully funded programme to achieve consistency across Member States in recording road traffic collisions involving personal injury, estimating the level and pattern of underrecording of collisions, and estimating the amount of use of the roads, together with the assembly of resulting data from all Member States in a common database accessible to all.
- To encourage independence, research should be kept separate from the operational aspects of transport safety. Research should encompass the evaluation of the operational aspects of transport safety but should remain outside those operations.

- Research findings should be publishable, and published in the open literature. From the organisational viewpoint this should lead to the active support of journals and reports with independent assessment of content from specialists outside of the organisations. At the EU level there is a clear opportunity for such activity to be supported.
- Research aims are best achieved by having independent specialists overseeing the funding arrangements, a multiplicity of research establishments, separation of those establishments from operational agencies, and open, peer reviewed publication of results.