

**High Level Road Safety Seminar
Paris, 25-26 September 2008
Achieving Ambitious and Realistic Road Safety Targets: The Safe System Approach**

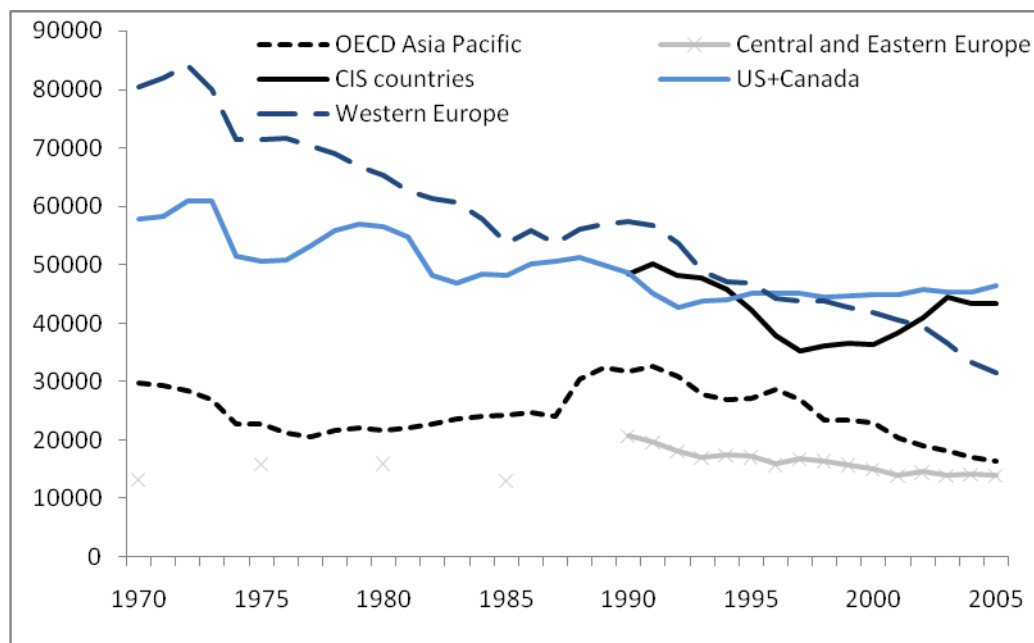
**Introductory Paper
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Road Safety Performance in OECD/ITF Countries

Road crashes account for around 180 000 deaths every year in OECD and ITF countries, i.e. on average one fatality every 3 minutes. Worldwide, the WHO estimates the annual road death toll at 1.2 million.

Important progress has been accomplished in ITF countries to improve road safety, but performance has not been evenly spread. Over the period 1970-2005 the greatest regional reductions in fatalities were recorded in the countries of Western Europe and the Asia-Pacific region (declines of 61% and 45%, respectively). In North America (United States and Canada), fatalities decreased by 20%, with reductions generally greater during the 1980's than in subsequent years. Central and Eastern European Countries (CEEC) and the Commonwealth of Independent States (CIS) achieved considerable annual reductions in the 1990's but since 2000 fatalities have stabilised in the CEEC and have increased in the CIS.

Figure 1. Change in the number of annual fatalities for the main OECD/ITF regions 1970-2005



Ambitious Targets

Targets for the reduction of road deaths and injuries have been set by both individual countries and internationally. At the international level, the European Council of Ministers of Transport (ECMT) set a common target in 2002 for all member countries to reduce the number of fatalities 50% between 2000 and 2012. As illustrated in Table 1, few Member countries will achieve the ECMT target by 2012 without substantial additional

effort in the remaining years. However, the fact that some countries are on track to meet the target demonstrates that targeted reductions in trauma can be achieved with adequate political will, institutional organisation and sufficient allocation of resources.

Ambitious long term vision

Countries with different levels of performance will have different ambitions in terms of road safety improvement. For some industrialised countries, a target fatality rate of 6 fatalities per 100 000 inhabitants will be seen as an ambitious target. Other countries have already reached this level and will aim at a higher level of ambition. Zero deaths and serious injuries represent the extreme level of ambition, based on the belief that any level of serious trauma arising from the road transport system is unacceptable. This view is expressed formally in the road safety policies of the Netherlands and Sweden known as Sustainable Safety and Vision Zero respectively. This approach is common in other transport systems and has determined safety programmes in aviation, rail and shipping for several decades.

This is an aspirational vision in that it may be impossible to specify all the interventions required to achieve it and road safety managers and policy makers are required to go beyond the limits of projected good practice. It therefore requires a strong commitment to innovation and challenges road safety professionals and government to develop the institutional capacity to achieve the desired results, to form new partnerships, and seek new effective approaches.

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Progress amongst ECMT member countries in achieving the ECMT target
of 50% reduction in fatalities 2000-2012

Country	Fatalities in 2000	Fatalities in 2006	Average of the annual variation in fatalities since 2000	Average annual reduction from 2006 onwards required to reach the -50% targets in 2012
Luxemburg	76	36	-11.7%	Target reached
Portugal	1 860	969	-10.3%	-0.7%
France	8079	4 709	-8.6%	-2.5%
Denmark	498	306	-7.8%	-3.4%
Switzerland	592	370	-7.5%	-3.7%
Netherlands	1 082	730	-6.3%	-4.9%
Germany	7 503	5 091	-6.3%	-5.0%
Latvia	588	407	-5.9%	-5.3%
Norway	341	242	-5.6%	-5.7%
Spain	5 776	4 104	-5.5%	-5.7%
Czech Republic	1 486	1 063	-5.4%	-5.8%
Belgium	1 470	1 069	-5.2%	-6.1%
Austria	976	730	-4.7%	-6.5%
Sweden	591	445	-4.6%	-6.6%
Greece	2037	1 657	-3.4%	-7.8%
Poland	6 294	5 243	-3.0%	-8.2%
Slovenia	313	263	-2.9%	-8.3%
Finland	396	336	-2.7%	-8.4%
Italy	6 649	5 669	-2.6%	-8.5%
Serbia & Montenegro	1 048	900	-2.5%	-8.6%
FYR Macedonia	162	140	-2.4%	-8.7%
Ireland	415	368	-2.0%	-9.1%
Bosnia	302	270	-1.8%	-9.2%
United Kingdom	3 580	3 298	-1.4%	-9.7%
Croatia	655	614	-1.1%	-9.9%
Moldova	406	382	-1.0%	-10.0%
Slovak Republic	628	608	-0.5%	-10.4%
Estonia	204	201	-0.2%	-10.7%
Albania	280	277	-0.2%	-10.8%
Romania	2 499	2478	-0.1%	-10.8%
Bulgaria	1 012	1043	0.5%	-11.4%
Hungary	1 200	1303	1.4%	-12.1%
Russia	29 594	32724	1.7%	-12.4%
Ukraine	5 984 (in 2001)	6 867 (in 2005)	(between 2001 and 2006)	-12.9%
Lithuania	641	759	2.9%	-13.4%
Georgia	500	581 in 2005	3.0%	-11.3% from 2005
Azerbaijan	596	1027	9.5%	-18.6%
Liechtenstein	3	2 in 2005		
Malta	15	11	Figures too small for analysis	
Iceland	32	31		
Total	89 481	7 9159	-2.0%	-9.1%

Progress amongst other OECD countries in reducing road fatalities

Country	Fatalities in 2000	Fatalities in 2006	Average of the annual variation in fatalities since 2000
Korea	10 236	6 327	-7.7%
Japan	10 403	7 272	-5.8%
New Zealand	462	391	-2.7%
Australia	1 817	1 598	-2.1%
Canada	2 927	2 892	-0.2%
United States	41 945	42 642	0.3%

Interim targets to move systematically towards the vision

The long term vision of eliminating deaths and serious injuries needs to be complemented with robust interim targets for specific planning terms up to a decade or so. This will help ensure the delivery of benefits over the shorter term, essential if the longer term vision is to remain credible. A results focus is critical to an effective road safety programme and equally requires setting targets and identifying the institutional means and interventions to achieve them. The targets relate to outputs (e.g. level of enforcement), intermediate outcomes (e.g. mean travel speeds, seatbelt wearing), final outcomes (e.g. number of fatalities and serious injuries) and social costs savings.

A relatively small number of countries now use empirically derived targets, based on quantitative modelling of intervention options. In this approach, targets are based on empirical evidence relating to the selected interventions' previous effectiveness combined with best estimates of future effectiveness, using a model linking inputs and outcomes. This approach to setting targets is recommended. It bases targets on the achievements that can be expected from successful implementation of the interventions that make up the road safety strategy adopted. It promises immediate safety benefits through a known battery of interventions. This helps secure community support, and linking targets to an agreed strategy of interventions strengthens political support.

As noted, exceptional efforts will be required in most ITF countries to achieve the targets set by Transport Ministers in 2002. Accordingly, it is recommended that targets based on expected outcomes from specified interventions now be established, as a means to move more systematically towards the level of ambition established by the 2002 targets.

Main road safety problems and countermeasures

In the course of work on the report *Towards Zero: Ambitious Road Safety Targets and the Safe System Approach*, a survey¹ was undertaken of leading road safety experts to identify the main road safety problems in their respective countries, identifying speeding, drink driving, and the lack of seatbelt wearing as recurrent problems. Other key issues include young drivers, who are heavily overrepresented in road fatalities and whose crash involvement also imposes high risks on their passengers and other road users. Insufficiently safe infrastructure for current travel speeds, as evidenced by the high fatality risk on many rural roads was and insufficient motor vehicle crash protection for occupants were also identified as important issues.

These issues and key countermeasures are discussed briefly in the following paragraphs. The interventions discussed are the starting point for road safety policy in all countries.

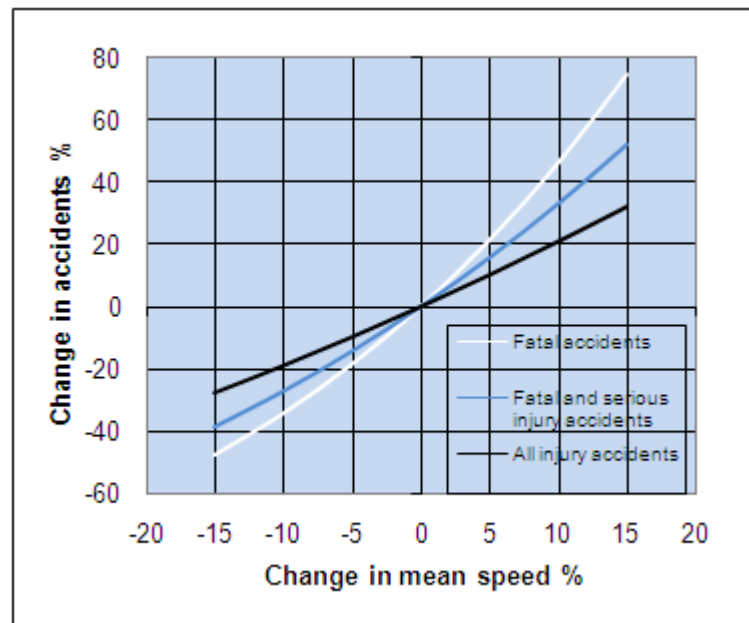
¹ <http://internationaltransportforum.org/jtrc/safety/targets/Performance/performance.html>

- Speed

Speeding, i.e. inappropriate speed and excessive speed, is the major road safety problem in a majority of member countries, often contributing to as much as one third of fatal accidents and being an aggravating factor in the frequency and severity of all crashes. Speeding is a widespread social problem as typically, at any time, 50% of drivers are above the speed limits. Enforcement of existing speed limits can provide immediate safety benefits, perhaps more quickly than any other single safety measure.

Effective speed management also requires that speed limits are appropriate for the standard of the road, the roadside risks, road design, traffic volumes and mix and presence of vulnerable road users. Public support for reduced speed limits needs to be fostered, as there is generally little understanding that small reductions in speed produce substantial reductions in trauma (see figure 2). Other essential components of speed management are infrastructure improvement and the use of new technologies, such as intelligent speed adaptation, to modify behaviour.

Figure 2. Relationship between change in mean speed and accident rates



Source: Nilsson (2004)

- Drink Driving

In many countries, 20% or more of driver fatalities involve a blood alcohol content (BAC) level in excess of the legal limit. Drink driving remains a blight upon road use in these countries despite many years of active countermeasure application including quite severe penalties. However, despite its importance, many countries are unable to provide comprehensive data on alcohol-related fatal crashes and knowledge of drink driving crash involvement and trends is often unavailable. Best practice experience indicates that highly visible policing using random breath testing is needed to enforce blood-alcohol limits that should not exceed 0.5g/l for the general population. Enforcement is most effective when backed by extensive publicity, with tough sanctions for repeat offenders. Alcohol interlocks fitted to all vehicles are a future option, subject to successfully increasing public acceptance.

- **Seatbelts**

In many countries, around 50% of the people killed in road crashes were not wearing a seatbelt. Many of these lives could have been saved had they done so. Compulsory use of seatbelts was introduced in the first countries well over 25 years ago. Today, in some countries, seatbelt wearing is still only compulsory in the front seat and child restraint systems are neither mandatory nor regulated. Legislation with firm police enforcement backed by intensive mass-media programmes and penalties is the most effective strategy to improve seatbelt wearing. Technologies such as seatbelt reminder systems and seatbelt ignition interlocks could almost completely counter the non-wearing of seatbelts if introduced universally but would require a high degree of community and vehicle industry acceptance for universal deployment.

- **Safer infrastructure**

Appropriate measures include targeted road improvements that identify and treat the highest crash locations with specific treatments such as audible edge-lining, shoulder sealing, clearing of roadside vegetation and the construction of passing lanes. For longer term, a systematic, proactive approach to road infrastructure design and renewal is needed.

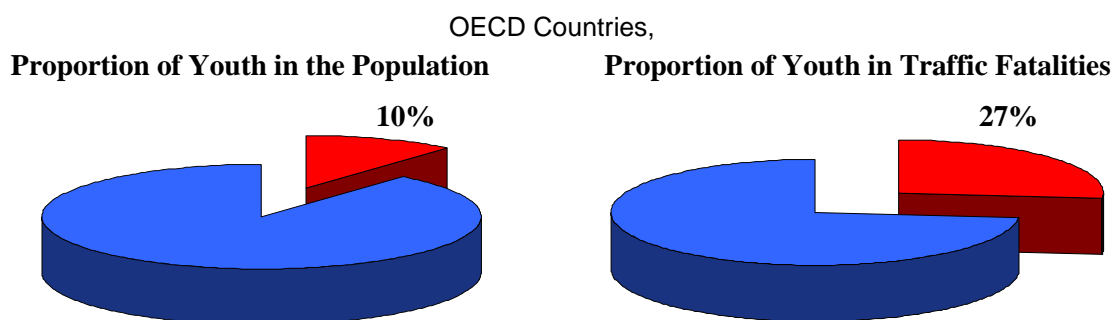
- **Enhanced vehicle safety**

The safety of vehicles has improved significantly in recent years, due to technological development of passive (crash protection) and active (crash avoidance) systems. In particular, Electronic Stability Control systems represent a major recent advance in active safety, with collision avoidance and lane departure warning systems examples of other promising technologies.

- **Reduced young driver risk**

Young drivers, who are heavily overrepresented in road fatalities and whose crash involvement also imposes high risks on their passengers and other road users. Graduated licensing schemes in tandem with extended training during the learner period have been effective in reducing deaths among young drivers. Components of a graduated licensing can include night-driving and peer-passenger restrictions, graduated demerit points while on probation, zero blood-alcohol content tolerance and extended learning periods while under supervision to provide for driving in a variety of road and weather conditions.

Figure 3. **Proportion of Young People in Traffic Fatalities and Population,**



2004

Source: IRTAD

More holistic policies: the safe system approach

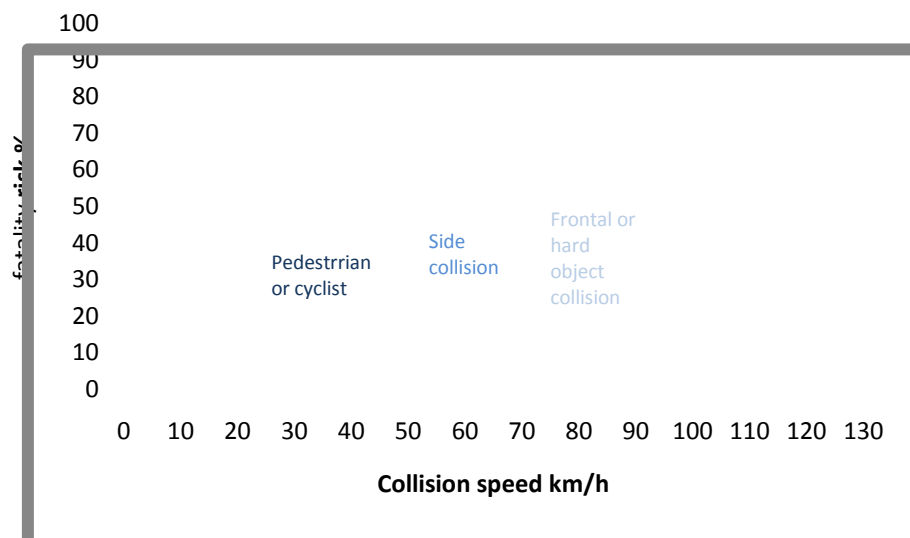
Effective implementation of the interventions described involves management processes that include analysing data to identify key problem areas, setting targets for achievement, choosing effective interventions, building

community and political support, allocating sufficient resources to implementation and to monitoring and evaluating performance. Results focussed management and adequate funding for these proven measures achieves major improvements in road safety performance. Nevertheless, raising the level of performance to meet the challenge of the vision of zero road deaths requires a shift to a more comprehensive, *Safe System* approach to road safety.

The Safe System approach builds on existing interventions but reframes the way in which road safety is viewed and managed in the community. It addresses all elements of the road transport system in an integrated way with the aim of ensuring crash energy levels are below what would cause fatal or serious injury. It requires acceptance of shared overall responsibilities and accountability between system designers and road users. It stimulates the development of the innovative interventions and new partnerships necessary to achieve ambitious long term targets.

The basic strategy of a Safe System approach is to ensure that in the event of a crash, the impact energies remain below the threshold likely to produce either death or serious injury. This threshold will vary from crash scenario to crash scenario, depending upon the level of protection offered to the road users involved. For example, the chances of survival for an unprotected pedestrian hit by a vehicle diminish rapidly at speeds greater than 30km/h, whereas for a properly restrained motor vehicle occupant the critical impact speed is 50km/h (for side impact crashes) and 70 km/h (for head-on crashes).

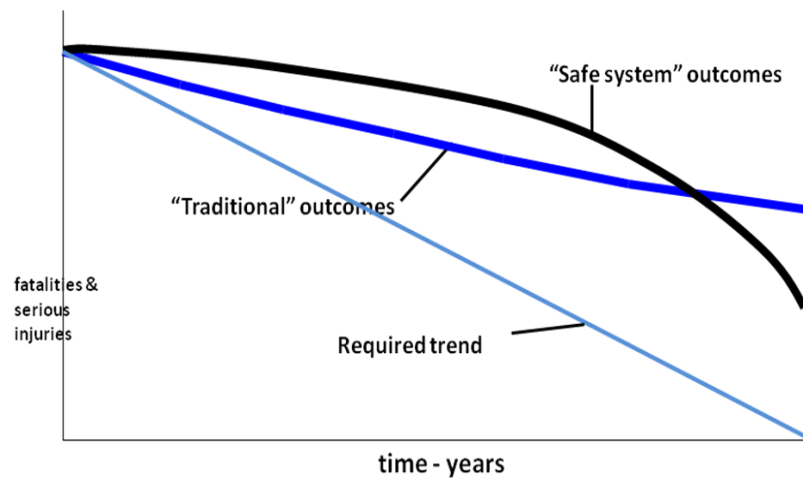
Figure 4 Fatality risk



Source: Wrangborg, P. (2005). *A New Approach to a Safe and Sustainable Road Structure and Street Design for Urban Areas*. Paper presented at Road Safety on Four Continents Conference, Warsaw Poland.

The elimination of all deaths and serious injuries represents a long term goal that can be combined with traditional interventions used in the interim to achieve immediate safety benefits. Figure 5 illustrates the association between long term Safe System outcomes and interim outcomes based on traditional interventions.

Figure 5 Interim and longer term performance through the adoption of a Safe System



Source: Howard Eric

Several countries are currently using a Safe System approach in developing and implementing their road safety programmes. Sweden has developed a 'Vision Zero' approach, the Netherlands has developed a closely related 'Sustainable Safety' approach, and several jurisdictions in Australia are establishing similar programmes. While the specific details vary, Safe System approaches typically:

- Aim to develop a road transport system better able to accommodate human error. This is commonly achieved through better management of crash energy, so that no individual road user is exposed to crash forces likely to result in death or serious injury.
- Incorporate many strategies for better management of crash forces, with a key strategy being road network improvements in conjunction with posted speed limits, the latter set in response to the level of protection offered by the road infrastructure.
- Rely on strong economic analyses to understand the scale of the trauma problem, and direct investment into those programmes and locations where the greatest potential benefit to society exists.
- Are underpinned by comprehensive management and communication structures incorporating all key government agencies and other organisations which have a role in determining the safe functioning of the transport system.
- Align safety management decision making with broader societal decision making to meet economic goals and human and environmental health goals, and to create a commercial environment that generates demand for, and benefits the providers of, safe road transport products and services.
- Embrace the ethos of "shared responsibility" for road safety among the various actors of the road transport system, such that there is a shared vision amongst citizens, public, private and not for profit organisations regarding the ultimate safety ambition, and how to achieve it.

Vision Zero is based on an ethical imperative to eliminate death and serious injury from the transport system. *Sustainable Safety* takes elimination of preventable accidents as the starting point and attaches greater weight to cost-effectiveness in determining interventions but argues that the utmost efforts must be made in building and maintaining road systems to ensure that future users, including in generations to come, are protected from harm.

The changed view of road user responsibilities is a key feature of a Safe System approach. *Sustainable Safety* describes the road user as the weakest link in the transport chain, unpredictable and not to be relied upon to behave safely, education and information efforts notwithstanding (Wegman *et al.*, 2005). Both *Sustainable Safety*

and *Vision Zero* argue that for as long as inappropriate behaviours are likely, those individuals and organisations with system design responsibilities need to strive to protect all road users from the impact of those behaviours.

Knowledge Transfer

Research and knowledge transfer will play a pivotal role in the design and delivery of interventions aimed at achieving a *Safe System* approach and in attaining results that go well beyond what has been achieved so far. Our understanding of why and how crashes occur is based on very limited research. A more complete picture would provide the basis for more effective interventions. High-income countries will rely increasingly on innovation to work towards the ultimate goal of eliminating road deaths and serious injuries. Low and middle-income countries will benefit from these advances.

By promoting best practices and leading research work, the JTRC has an important role to provide member governments with tools to implement effective road safety policies. Recent research work of the Centre has focused on the following topics:

- Ambitious road safety targets and the safe system approach
- Speed management
- Young Drivers
- Motorcycling safety

The High Level Seminar is designed to disseminate the results of this work and in particular to discuss with policy makers implementation of the safe system approach to achieve much higher levels of road safety performance.

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