The 7th European Transport Safety Lecture

Europe and its road safety vision – how far to zero?

On the occasion of the 70th birthday of the Danish Road Safety Council (RFSF)

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The European Transport Safety Council (ETSC) is a Brussels-based, independent non-governmental organisation dedicated to the reduction of transport deaths and injuries in Europe. Once a year, ETSC, together with one of its members, organises the European Transport Safety Lecture. The Lecture is given by a high-level policymaker with a strong research record or interest in transport safety science.

The aim of the ETSL is to increase awareness of innovations and 'research-based' transport safety policy making amongst senior levels of government, parliament and the private sector. By mounting this annual event ETSC's objective is to stimulate a high level debate across the European Union, to exchange knowledge and experience and to help forge new commitment to efforts to reduce the risks and costs of transport crashes.

In 2005 the ETSL took place in Copenhagen on the occasion of the 70th birthday of the Danish Road Safety Council, which helped with the organisation of this important event.

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Europe and its road safety vision – how far to zero?

By Claes Tingvall
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1. Introduction

Undoubtedly, the road transport system is one of the largest contributors to health problems in global society. Pollution and crash injuries are the largest problems, and fatalities due to crashes account for the ninth most common cause of death in all categories. Within 15 to 20 years, the WHO predicts that road crash casualties will be the third or the fourth most common cause of premature death.[1] It is therefore obvious that the way the current road transport system operates is neither acceptable nor sustainable. Without doubt, the road transport system also offers benefits to society, but to a price that is unacceptable to all of us. Most people would not at all be willing to trade a person's life for some kind of benefit.

The road transport system is an open system with a large number of stakeholders, loosely connected to each other. There has not been any clear and shared idea of how the system should develop in safety terms. Instead, individual countermeasures have been implemented on an ad hoc basis and isolated from each other. Its components are not in alignment. While large parts of the system do not tolerate speeds higher than, say, 50 or 60 km/h, road users are allowed to drive at 100 km/h, and modern vehicles can easily do 200 km/h. The magnitude of the mismatch is one key factor explaining a low safety level.

The road transport system also seems to lack responsibility. While the individual user has a clear legal responsibility, other important actors of the system do not. Furthermore, the possibilities for the individual to take on these responsibilities have also been marginal. The fact that it has been illegal to crash in most countries since the 1920s has probably resulted in the legal and moral blame being put on the road user. Also, prevention of crashes and injuries has the individual user as the main target. To do so with a high-energy system with large gaps between human capability and the requirements to travel safely within the system is in itself a sign of lack of responsibility from the providers of the road transport system.

On the other hand, there is no one to blame among the stakeholders in the road transport system for deliberately making it unsafe. There is no winner when it comes to action or lack of action. It is however clear that there is no basic safety philosophy underlying the design and use of the road

1 The WHO makes use of DALY as a measurement - Disability-adjusted life year. A health-gap measure combining data on the number of years lost from premature death with the loss of health from disability.

transport system that can guide all the actors to do what is necessary. There has not even been a definition of what a safe road transport system is, only what is safer.

The driving mechanism for change of the safety of the road transport system has also been weak and slow. While stakeholders' time to act in epidemics, aviation, workplace safety and other areas has been relatively fast, the time gap between identifying a problem, theoretically solving the problem and then implementing the solution in the road transport system has been extremely long. In the case of an epidemic, the time to act is sometimes less than 24 hours. In the road transport system it can take 24 years or more. One reason might be that the actions that should be made require a complicated decision process. Here the mindset sometimes has been that society should not invest in prevention unless there is a gain and at the same time those citizens and stakeholders that have not seen themselves as a part of the problem should escape unaffected by the action. Given the situation that road crashes are caused by a small minority of the population that is acting irresponsibly, the willingness to act has been weak. Understanding that we are all at risk, to a varying degree, and cannot fully control this risk, has not been a favourite subject in the past.

In general, the road transport system and its stakeholders have been given the task of providing the citizen with mobility but have at the same time unintentionally generated one of the largest health catastrophes ever seen in the history of mankind. In a moral and legal sense, there has always been a citizen to blame.

2. Vision Zero

Vision Zero is a vision about safety for the future road transport system. It deals mainly with four factors important for redesigning the system within a framework that in the long run should make it safe, or in other words, not cause deaths or serious injuries. It is important to stress that this vision is not related to crashes or injuries that do not cause health losses. While these might be of importance from an economical point of view, or serve as a tool to reduce the number of fatalities and serious injuries, they are not a genuine threat to human health.

The *first element* of Vision Zero is the ethical approach to human life. In the vision, human life and health are paramount, and no long-term trade-off is allowed. While this has not been the case until now and while this seems to be an impossible statement, it is not unusual for other parts of society. The workplace, aviation and so on follow explicitly or implicitly such underlying principles. If, at present, mobility is the function of the road transport system for which safety is traded off, Vision Zero places mobility as a function of safety. In this approach no more mobility could be generated than that which is inherently safe for the system. This is close to the situation now in aviation with known (good) results. It is also close to the principles of work-place safety, where the effectiveness of the working

process cannot be traded off for health risks.

The *second element* is the responsibility chain. The chain has three steps. The first step is that it is the providers, professional actors and professional users who are responsible for the safety of the system. The users have the responsibility to follow rules and regulations – the second step. The third and final step says that if the road users fail to follow rules and regulations, the responsibility falls back on the providers of the system. At this point in time, no one has implemented this chain of responsibility in a legal sense, but the principle of shared responsibility has been picked up in many policies.

The *third principle* is about the safety philosophy. There are two elements to this philosophy. The first is that design and functionality should take human failure into account. This is clearly how other man-machine systems have been designed. Professional designers should predict situations in which the user does something unexpected, and thus take action prior to the event. As road crashes are not unexpected or not understood, this is in general not so much a problem as an underlying principle. The second element is that the limiting factor for the design and function of the system is the biomechanical tolerance of humans in relation to a fatality or a serious health loss. While these tolerances are fairly well known, they are not currently used system wide. The critical load limit should be understood in such a way that prevention of fatalities and serious health losses could be applied through the whole chain of primary and secondary prevention, but if something cannot be fully avoided through primary prevention, the critical load limit in an energy transition must not be exceeded. This is why speed, which is kinetic energy and the precursor for the energy exchange, is the key factor for controlling the safety of the system. This is indeed different from other man-machine systems, where the safety could be balanced with other factors, but it is very logical within the road transport system. "Safe" crashes could take place within the road transport system, whereas this is hardly conceivable in aviation.

The *fourth element* of Vision Zero is the driving mechanism for change. In the policy, it is stated that it is the legitimate right of the citizen to be able to use the road transport system in a safe way and that is the main driving force. In such overlying principle, all stakeholders are delivering safety to the citizen, which makes the stakeholders partners in prevention irrespective of the reasons for their existence. The political system, organisations and commercial actors all share "the customer", which is the citizen. This is well in line with the principles that govern modern society. The basic need for the citizen in terms of sustainable mobility does not of course exclude shared responsibility. In contrast, we are close to a social contract between the citizen and the stakeholders. One key factor in the delivery process is that all major stakeholders share the same philosophy and vision. Another key factor is that the citizen can see and follow the safety standard and development of the safety ingredients. This is why benchmarking and best practice are elements of the vision and citizens have full access to what stakeholders are doing to apply best practice. Euro-NCAP,

the consumer information programme on car safety, is one good example of where the citizen can compare what the car manufacturers are doing to enhance safety. In this specific case it also creates competition among car manufacturers.

Many countries, including the EU, have accepted and adopted parts of Vision Zero, in some cases most of the policy. The idea that the citizen has the right to a safe road transport system is one of the underlying principles of the Third Road Safety Programme, and many have picked up the principle of shared responsibility. The European Commission has gradually changed their mode of operation from the development of directives to best practice delivery to the European citizen.

3. Some examples of how a new policy can influence processes and practice

While it is sometimes not easy to link policy change to actual outcome, there are some clear changes in the way society and stakeholders deal with processes and products. Infrastructure design is one such example. While infrastructure design has merely been built on accident prevention, the new philosophy is built on kinetic energy management and injury prevention (secondary prevention rather than primary prevention). Speed is now more related to the outcome of an incident or crash rather than the driver's ability to keep the vehicle in control. This has led to more extensive use of roadside and median barriers, while intersections are redesigned to roundabouts. These are examples where the number of crashes might increase, but where the outcome is controlled so that human tolerance to serious health losses is not exceeded. In Sweden, a large part of the infrastructure has been modified with the addition of mid barriers with an approximately 80% reduction of fatal crashes. This has been done with low costs, and maintained or even increased the level of mobility. The cost for saving one life with infrastructure design has been reduced by 90%. The role of infrastructure design has been increased and the new design philosophy is now supported by the EuroRAP (European Road Assessment Program) and its Road Protection Score (RPS). The design and functionality of built up areas with traffic calming has the same basic principles, although the main goal is to reduce speed where conflicts with unprotected road users might occur.

Vehicle safety or at least car passenger safety has been subjected to market forces rather than regulation since 1996 through EuroNCAP. The outcome of this change in method to drive forward development in vehicle safety has been surprisingly successful. Whilst the automotive industry was negative in the beginning, they have reacted very quickly to the expectations of the market. When the programme was launched in 1996, four stars were considered almost impossible to reach. By 2005, all new cars are expected to be rated with five stars, and at the top end of the scale. The results in real life have been evaluated and the net effect between new cars and those leaving the car fleet has never been larger than now. The recent introduction of Electronic Stability Control (ESC or ESP) has been very successful with unexpected high effectiveness and a market penetration that is quicker than

any other system before. In Sweden almost 70% of the new car sales have ESC, while the corresponding figure two years ago was only 15%.

Support systems in vehicles now introduced on the market are also based on demand rather than regulation. Intelligent Seat Belt Reminders (SBR) is becoming common and currently more than 60% of new car sales in Sweden have SBR on the driver's seat. SAAB has just introduced an "Alcokey" which is a simplified alcohol interlock built into the car key and the immobiliser system of the car. This is likely to be a very common product among fleet cars.

The transport industry is becoming more interested in improving safety. The European Commission has, through the European Road Safety Charter, given stakeholders the possibility to openly declare how they will commit themselves to a safer operation of the road transport system and develop better products and services. The transport industry seems keen to adopt this possibility. Also in Sweden a number of corporations in transport service are now investing in quality programs to improve safety and reduce the environmental impact. Some of them have demonstrated reduced running costs. This is an example of how stakeholders take responsibility for their impact on safety. While the transport industry generates a high proportion of the traffic volume, an improved safety consciousness in this part of society should have a major impact on the general safety level and also serve as good example for the rest of the traffic actors.

The Swedish Occupational Health and Safety Authority has just changed its policy in that all travel between the employer and the employee is now under the OHS act. This is likely to be one of the biggest developments ever in the field of traffic safety having impact on a major part of the traffic volume and with strict responsibility for the employer to make sure that every transport is safe. It has also a major impact on the vehicles chosen and might influence something like half of the new car sales that are company cars, fleet cars or rental cars. Also HGVs and buses will be affected by this move in society. Support systems like alcohol interlocks might be one technological system that can give the employer the guarantee that the vehicle is used in a safe way. The WHO European report on road traffic injury prevention states that the health sector will act in a similar way by behaving as a responsible employer when the road system is used.

4. Barriers for implementation

There are of course a number of possible and actual barriers to the development of a safe road transport system, some of which are listed and commented below.

The belief that one agency can plan and implement a whole traffic safety programme.

It is becoming clear that improved safety in the road transport system must be an issue for society as a whole, whereas some would still think that a

"safety agency" is a key factor for success.

Myths rather than scientific knowledge are driving the implementation of safety in society.

Without doubt there is still a large number of myths and scientifically weak knowledge driving a number of stakeholders, while the knowledge of what works and the elements of a safe system are well known among experts in the field. With more stakeholders involved, it is essential that they share a common scientific platform and understand how individual elements are tied together. Otherwise, already trailed ideas with poor experience might be introduced again.

Safety is considered to be a restriction rather than a quality of mobility.

Safety is still considered by many to be in conflict with mobility. This is true only if the system is not developed further, and speed limits must be reduced as a consequence of poor design. It is also true that improved safety would be achieved by limiting access to the road transport system. The motorcycle community might see this as a risk for restrictions imposed by society.

"Hidden agendas" are counterproductive.

There might be issues of personal integrity, environment and so on that could be used against an improvement of the system. Some might work against better enforcement by arguing against an open system where the police know all users. Environmentalists might work against a better road transport system as this might be slowing down the shift to an environmentally sustainable road transport system. Some might also dislike the idea of the sharing of responsibility between stakeholders and the road user as this would lead to stakeholders becoming more accountable, also in a legal sense.

5. The way ahead

We can now clearly see the increased understanding that health losses in the road transport system are large, predictable and preventable, and that the relevant authorities must deliver a safer system to the citizen. More and more demanding targets are raised and implemented, and the push to use more evidence-based interventions is becoming stronger. The vision about a safer system is no longer laughed at and more stakeholders, especially from the commercial sector, are coming onboard as partners. It will become increasingly important not only to share a vision but also to build the vision on a number of cornerstones that are possible to translate to guidelines and action as well as best practice and benchmarking.

A few of these cornerstones are listed below.

Errors are absorbed - violations are not accepted at all.

It is becoming clear that there must be a distinction between errors and violations. Errors must be predicted and managed by the providers of the road transport system, either by eliminating them or by making sure that they are absorbed by the system. Violations, on the other hand, must be treated more seriously as regards the relationship between the provider and the road user. The three main factors today of violations that are simply not possible to cater for by the design of the road transport system are intoxication, non-use of seat belts and exceeding the speed limit. All stakeholders are responsible for making sure that these elements are treated and eliminated in all forms. The road user should be encouraged in all forms to stay within the limits of the system, through education, enforcement, technical support, responsible employers, transport industry behaviour and so forth.

The provider must guarantee the safety level of the infrastructure.

EuroRAP is a system in which infrastructure can be classified. With the Road Protection Score (RPS) the infrastructure design outside built up areas can be related to the speed limit. In reality, this means that the highest level of safety could be reached in two ways, either by investing in safety or by reducing the speed limit. The system is based on cars with high safety, seat belt use, compliance with speed limits and not driving under the influence of alcohol.

It is important that all infrastructure providers start the process to improve safety by gradually setting the right speed limits on the network. Within a few years, most roads and streets should have a four star rating, and in the meantime all stakeholders in infrastructure should communicate the level they are at. In reality this means that to increase the speed limit, safety must first be improved. This is why mobility is a function of safety and not vice-versa.

The automotive industry must compete more to deliver safety to the citizen and all stakeholders must commit to only buying safe cars.

There is a whole area of technology that is useful for improving safety. This technology will be brought to the market by market forces and competition. In some cases society will need to help by providing incentives and standardisation as well as minimum requirements. More importantly, society will have to ensure that innovations reach the customers in an effective way by allowing industry to demonstrate the value of innovations in a scientific way. Governmental bodies, consumer groups and so on should be more proactive in guiding the market. Governments, and the transport industry, amongst others should also commit to only buying cars fulfilling best practice, thus giving industry a larger market for innovation. At the same time, industry should take clearer responsibility for informing consumers about sensible ways to use cars and also to stop selling less safe versions of cars when safer variants are available. Cars without Electronic

Stability Control (ESC), for example, should be phased out as soon as a car with ESC is available.

The transport industry takes a lead in using the road transport system in a sensible and responsible way, buying the safest products and supporting the development of a sustainable road transport system.

The transport industry can only benefit from a safer road transport system. At the same time, they represent a large part of the traffic volume, with a major impact on the traffic culture. It has been demonstrated that the costs for acting safe are marginal, and that the reduced running costs, better OHS and so forth, are good incentives for changing the existing culture. Why this has not happened earlier is probably due more to culture and a general lack of leadership. The time is here for the transport industry to transform this culture and show some leadership. If the entire transport industry, including taxis, couriers and others, would obey all the key rules and set an example to the rest of the traffic flow, it is likely that the traffic culture as a whole would change. Furthermore, all other stakeholders in the road transport system, like road administrations, automotive industry, and so on, are expected to use the road transport system in a sensible way and to encourage the citizen to follow their example.

All stakeholders are accountable to the citizen.

Finally, we should make sure that the citizen can follow all the actions taken to improve the safety of the road transport system and to be able to follow how best practice is implemented. Independent bodies should be able to follow the process and scientifically sound methods should be used. New arenas should be shaped where stakeholders can cooperate in delivering a safer road transport system and where the definition of a safe system can be further developed and coordinated. The European Charter is a good tool for stakeholders at all levels to openly declare their contributions to society.

6. Conclusion

There is a great expectation from society to improve the most hazardous environments that more or less all citizens are forced to use. Without doubt, a proportion of citizens are misusing the system, but this is not an excuse to all those stakeholders that have dealt with the problem of an inherently unsafe system in a slow and uncoordinated way. Major stakeholders are also heavily involved in using the system in an irresponsible way, without having any commercial or other benefit from doing so. In general, there is a lack of corporate responsibility and good citizenship among many of the stakeholders.

With a clear vision, where accountability to the citizen is the leading motive, there is a good opportunity to dramatically improve the safety of the road transport system. In doing so, the citizen will be able to contribute to a safety culture that we will all benefit from.

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Response to the 7th European Transport Safety Lecture

By Prof. Richard Allsop
Centre for Transport Studies, University College London

A long way – but not all the way

The world has much to learn from the Nordic Countries. History has not spared them over the centuries from military conflict or from intellectual strife – yet they have led the way in the rational and largely peaceable implementation of social democracy. When the rest of Europe began to come to its senses in 1945, they provided the first two Secretaries General of the United Nations. The Nordic Union has provided an example for wider union in Europe.

The Nordic countries manage so many things well, and road safety is no exception. In Claes Tingvall, they have given the world one of its leaders of thinking and action to reduce death and injury on the roads, and through the *Vision Zero*, he and his colleagues have vastly inspired and encouraged all of us who are concerned for road safety – and lifted the sights of the opinion-formers and decision-makers who determine the policy context in which we work.

There is so much to endorse in the analysis his lecture has set out for us:

- Yes – the way the current road transport system operates is unacceptable – it is massively so!
- Yes – the providers of the system, not only the road authorities and those who make and maintain vehicles but also legislators, law enforcers, educators and trainers, have been slow to take full enough responsibility for the safety of users of the system.
- Yes – design and function should be based on the fallible human.
- Yes – we all need to strive for a philosophy and vision that all stakeholders can share.
- Yes – both market forces and informed democratic pressure have their part to play alongside regulation and standards in raising the protective performance of vehicles and infrastructure, and in bringing new technology into beneficial use.
- Yes – risks from using the roads in the course of work should be addressed like other risks in the workplace.
- Yes – transparency in benchmarking and public information have a big part to play in all this.

In these and many other ways, Claes has set out a visionary agenda for action for safer use of the roads in Europe for many years to come.

And yet it should be asked: is the ethical platform in the Vision Zero for this agenda sound, and if not, is there an alternative, and does it matter? In my view the answers are: no, for all the strength of many of its planks, the platform is not completely sound; yes, there is an alternative; and yes, it does matter.

Are human life and health paramount, or can they even in the long run be traded against other benefits? The cold socio-economic logic of the human mind and the warm aspiration of the human spirit join their voices to say: no, they are not paramount, and yes, they can be traded.

Safety is for living: living is much more than just keeping safe.

Risk of premature death, injury or illness is part of human life. Such risk does not make it unacceptable in European society, for example:

- for fire service personnel to tackle dangerous fires, floods and possibilities of explosion;
- for medical staff, relatives and friends to treat dangerously infectious patients;
- for fisherfolk to put to sea;
- for minerals to be extracted in mines and quarries;
- for workers to use potentially harmful materials and tools; or
- for all who wish it to climb mountains, ski, swim, play rugby football, cultivate their gardens or sunbathe.

All of these are undertaken to meet either social needs, or demands for goods, or desires for fullness of life.

Use of the roads meets all of these, and it does so not as a closed system in which everything can be defined as someone's contractual responsibility, but as part of everyone's day-to-day lives, which they expect to be largely free to lead. So neither in terms of rational socioeconomic policy nor in terms of human desire for fulfilment is it unacceptable in principle for use of the roads to involve some risk of death or serious injury – and recognising this does not imply blaming the victim, because we do not, for example, blame someone who drowns in an unforeseen incident while enjoying swimming. Risk of death or serious injury on the roads is instead a matter of degree.

With this starting point, it is for the following combination of fundamental reasons that the way the current road transport system operates is unacceptable in terms of safety:

- its use is an unavoidable part of everyday life for everyone;

- in use of the roads, the balance between satisfaction in life and the risk of death or injury is badly out of line with the balance in the rest of everyday life – the risk per hour in the former in Europe being roughly one order of magnitude greater than in the latter; and
- risk on the roads can be reduced substantially right now – as Claes has described – by known and cost-effective means which industry, road authorities and legislators are wilfully or negligently slow to apply.

When, but only when, these and additional future means of reducing risk have been and continue to be pressed to the limits of knowledge, and of social cost-effectiveness on the basis of behaviourally supported valuations of prevention of death and injury – then, but only then, will the way the road transport system operates be acceptable in terms of safety.

The exact definition of the ethical platform for road safety makes little or no practical difference to what we should be doing now to promote safer use of the roads, but it is potentially important for the future, when risk on the roads will have been made less disproportionate. This is because in Europe, like our counterparts in North America, we are living in societies in which risk aversion threatens to become, is indeed in some respects already becoming, life-denying.

If we are to take our fellow-citizens with us in our quest for safer road use – and we must take them with us because, as Claes has emphasised, they are all stakeholders – then we must distance our life-enhancing efforts for road safety from some other people's life-denying attempts to insulate everyone from every slightest risk regardless of cost and restrictiveness.

So my answer to the question "How far to zero?" is: a long way from where we are now, but not all the way!

Response to the 7th European Transport Safety Lecture

By Klaus Machata
Austrian Road Safety Board (KfV)

Dear Ladies and Gentlemen, Dear Claes,

Let me first thank you, Claes, for this brilliant and convincing presentation! The Swedish Vision Zero has been around for about 8 years now – and it has been taken up by some European countries – like Switzerland – as it has been actively rejected by others – like Denmark. Vision Zero has certainly not (yet) been taken up as a baseline philosophy by the European Commission.

Aside from Sweden and some other countries, Vision Zero seems to have certain communication problems that prevent it from large scale take-up in the EU.

What's in a name? Vision Zero is a slogan as easy to grasp as it is easy to misinterpret – and it possibly fails to unveil the comprehensive concept behind. Claes Tingvall's philosophy – probably one of the most outstanding contributions to Road Safety ever – is often reduced to the zero fatalities target – and sometimes even wrongly to a zero *accidents* target.

This is one reason why the Vision was subject to criticism at several levels, from the public to the political and even to the scientific. A very renowned scientist questioned Vision Zero also from an ethical point of view, arguing that striving for zero road fatalities would be so costly that the consequence could be an increase in overall mortality.

What's in a name? And what's behind a name?

As soon as we go just one step deeper into the Vision Zero Philosophy, let me immediately run into concepts which are nowadays very familiar:

- shared responsibility: this was taken up by the Commission;
- human failure tolerant systems: this is a basic principle in industrial processes – and in all modes except for road transport.

When we were setting up the Austrian Road Safety Programme, we incorporated some of these principles (e.g. "Every death and serious injury is one too many"), but we didn't mention the concept Vision Zero anywhere explicitly, in order to avoid public discussion about the impossibility of reaching a zero fatalities target. Were we cowards? Or were we just being pragmatic?

Talking about road safety programmes: in 1999, at the RoSPA conference in Kent, Jeanne Breen reported about only two countries that had set quantitative targets beyond the year 2000: Sweden and The Netherlands. Today, there is hardly any Member State without a reduction target and a more or less detailed action plan. However, when one looks behind the facade of the many glossy brochures, one finds many deficiencies in the execution of these programmes, such as in the areas of funding, monitoring of results, and allocation of responsibilities.

Whereas in Sweden we certainly do not run into glossy brochures, just a very broadly outlined 11 points programme. Still, road safety work has become a truly shared responsibility at all levels in Sweden – and the results can be seen from the Swedish fatality statistics. It is not by pure coincidence that Sweden has turned into one of the main exporters of new road safety developments, such as alcohol interlocks and "Intelligent Speed Adaptation".

Ladies and Gentlemen, let me leave you with the question: What is more important for efficient road safety work: Creating a road safety action plan or getting a sound safety philosophy across that penetrates everything that is done by all stakeholders in road traffic?

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