TRIPP BULLETIN
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TRANSPORTATION RESEARCH & INJURY PREVENTION PROGRAMME
INDIAN INSTITUTE OF TECHNOLOGY DELHI

Excerpts from: "The Jubilee Seminar on Road Traffic Safety Learning from International Experience."

These proceedings bring together the contributions of five road safety professionals who participated in the Jubliee Seminar on Road Traffic Safety held at the Indian Institute of Technology Delhi on the 2md December, 2010. Over the years the course has benefited from collaboration with our colleagues from INRETS (France), SWOV (Netherlands), TRL (UK), University of North Carolina (USA), University of Virginia (USA), Karolinska Institute (Sweden), Chalmers University of Technology (Sweden), University of Twente (Netherlands), University of Adelaide (Australia), Jawaharlal Nehru University (Delhi), and St. Stephen's Hospital (Delhi). We understand from this seminar that transportation policies that may result in reducing the adverse health impacts of road transport will require sophisticated inter-disciplinary research efforts. And, a great deal of cross-disciplinary communication. At present there are no educational or research institutions in India or other low and middle income countries that have given adequate importance to developing this expertise. The expertise that exists works mostly on individual initiative without enabling institutional frameworks and funding machanisms. The purpose of publishing this collection of articles is to demonstrate that such work can only be done in an interdisciplinary set-up involving a very high level of scientific expertise. This will need policy decisions at the highest level in each country.

Beyond "best practice" road safety thinking and systems management – a case for culture change research. ***Ian Johnston, Monash University Accident Research Centre, Australia.***

Transport policies: how and why safety has been neglected. ***Hermann Knoflacher, Vienna University of Technology, Austria***

Road Traffic Safety: A View from India. ***Dinesh Mohan, Indian Institute of Technology, Delhi.***

How safe is vehicle safety: the contribution of preventive and passive safety to saving lives on european streets and roads. ***Yves Page, Renault, France.***

Traffic calming: the way ahead in mixed traffic, ***Christer Hyden, Department of Technology and Society Lund University.***

Urban Mobility and Health Effects Research Collaboration Workshop under MoU between IIT Delhi and Chalmers University of Technology and University of Gothenburg, Gothenborg, Sweden, 18-19 November 2010

A memorandum of understanding (MoU) has been established between the two universities, to promote common interest in establishing bilateral relations in 2009. Four areas of relevance have been identified. Transport; Climate Change; Air Quality and Health; Urban Futures. It is stressed that all areas should incorporate aspects on socio-economic development and also include policy recommendations. The first research workshop under this MOU was held on 18-19th November 2010 at IIT Delhi with the following specific objectives.

Objectives

1.To establish structures for both medium and long term collaborations.
2.To identify opportunities for shared curricula in the following areas:

Climate Change Gothenburg Atmospheric Science Center (GAC) is a joint center between Chalmers and University of Gothenburg (GU). The Center for Atmospheric Modeling is located at IITD. Between these two centers shared curricula can be developed based on the master programs already offered to international students at the universities respectively.

Transport Opportunities for shared curricula will be investigated within the following subtopics: Safety, Urban Transport Planning, Biomechanics and Transport efficiency.

Urban Futures The Sustainable Built Programme in the Department of Architecture in the Chalmers University of Technology and the activities of at the Indian Institute of Technology, Delhi, concerning land use and transportation in urban areas would benefit from cooperation between the universities. Possibilities for shared curricula will be investigated.

It was agreed by the participating institutions that the collaboration should focus on the area of transport. In this way, transport will function as an overarching umbrella theme. Sustainability is considered an important component and should be integrated in all areas, thus it will not be suggested as a specific topic. Within the umbrella theme, a wide range of activities and topics can be covered:

- Adverse helath effects of traffic
- Air pollution
- Safety
- Information and communication technology
- Urban Futures
- Biomechanics

The **Transportation Research and Injury Prevention Programme (TRIPP)** at the Indian Institute of Technology Delhi, is an interdisciplinary programme focussing on the reduction of adverse health effects of road transport. TRIPP attempts to integrate all issues concerned with transportation in order to promote safety, cleaner air, and energy conservation. Faculty members are involved in planning safer urban and inter-city transportation systems, and developing designs for vehicles, safety equipment and infrastructure for the future. Activities include applied research projects, special courses and workshops, and supervision of student projects at postgraduate and undergraduate levels. Projects are done in collaboration with associated departments and centres at IIT Delhi, government departments, industry and international agencies.

Energy, Mobility and Safety#

Ian Roberts is Professor of Epidemiology and Public Health at the London School of Hygiene and Tropical Medicine

Thanks to Henry Ford and the mass production of automobiles, walking and cycling, the usual modes of human transportation went into a tailspin, slowly but inexorably reducing the amount of bodily energy people expended getting about.
In the 1940s, petroleum ignited an agricultural revolution that resulted in massively increased food yields. The energy intake of the population became higher than its energy output, and, although the imbalance was slight, the population of planet earth started getting fatter.

Global fatness and global warming are different aspects of the same energy problem.

Obesity and climate change are political issues and we need to take political action in response to them.

Far from being a personal failing, obesity is a normal human response to a sick environment, the bodily consequence of living in a world flooded with cheap energy. As a result of petroleum-powered transportation and the road danger it creates, we walk and cycle less than ever before in the history of the world and our personal energy output has plummeted.

Tackling climate change could be the next great advance in human development.

A vehicle driving down a residential street at 40 miles per hour packs more destructive energy than a bullet. If a child is unlucky enough to be hit, a single shot can kill and crossing a busy main road is like making a dash through machine-gun fire. Epidemiological studies reveal associations. In this case, the association is between the volume of traffic and pedestrian injury risk.

The oil crises has revealed another link in the chain of causation, that between the price of fossil fuels and the amount of danger on the roads. When petrol prices rise, fewer children die; when they fall, more children die. To a physicist this connection would seem obvious. Petroleum is chemical energy and the petrol in the fuel tank is the source of the energy that kills and injures.

Enrique Penalosa, the former mayor of Bogota, Colombia, mused that children are like an indicator species for urban safety in the way that the presence of fish indicates whether or not a river is polluted. By taking children off the street, traffic increases our fear of violence.

The motor industry and the car lobby attempt to personalize road danger. It is better for them that road death is seen as an errant act of a deviant driver or a 'jaywalking' child than the expected outcome of an unsafe system that kills 3,000 people everyday, most of them, pedestrians and cyclists.

Studies have found that people who regularly walk and cycle are less likely to be overweight or obese, and that acquiring a car significantly increases the chances of getting fat.

Cheap petrol means more vehicles and more miles driven. The resulting road danger means higher injury risks for pedestrians and cyclists, which over time drives them off the streets into their homes and into their cars. Population energy output is slashed as petroleum replaces food as the primary source of energy for human movement.

Thanks to motorization and mechanization there has been a proliferation of machines that reduce personal energy use, from escalators and moving pavements to machines that blow the leaves off the path. The amount of food energy that we need to consume to balance our reduced energy output is less than at any other time in history.

The main reason why car travel is annihilating human movement and putting our planet in peril is that motor vehicle travel is highly subsidized. Motorized transportation depends on three essentials: roads, oil and vehicles. Although most of the world's population will never own a car, road building is invariably funded by public funds, in rich and poor countries alike.

Motorized transport causes a mountain of suffering. Who pays for the road traffic crashes that kill 1,000 children per day and permanently disable ten times as many? Who pays for transport-related air pollution and the cardiac and respiratory diseases it leads to? Who pays for physical inactivity and the obesity, diabetes, heart disease, stroke and cancer it causes? And who will pay for climate change? These are the real social and environmental costs of motorized transport, but it is the public and the global environment, not the people who benefit from motor vehicle use, who pay.

Global business revolves around resources, factories and markets. Raw materials are transported to factories where workers produce manufactured goods.

Making a profit is what business is about. Cheap transport is good for profits because it reduces the cost of production and the costs of getting goods to markets. It also enables companies to take advantage of the lower wages of workers in poor countries. Indeed, cheap labour is one of the main reasons why the captains of industry are so excited about transnational trade.

In India, trucks are involved in half of the crashes in cities and two-thirds of the crashes on highways. The victims are mostly pedestrians and cyclists. Their experiences are part of the real social cost of international trade.

In his book The Open Veins of Latin America, The Uruguan journalist Eduardo Galeano wrote how the continent's transportation infrastructure

Excerpts from The Energy Glut: The Politics of Fatness in an Overheating World by Ian Roberts with Phil Edwards (Zed Books Ltd., London, 2010)

was developed to drain its wealth into the ports and then out to the colonial economy. Nevertheless, publicly funded road building is only one of the three essential elements of a profit-centred transportation system. Cheap transport runs on cheap oil, and keeping oil prices within profitable limits entails huge public subsidies and masses of misery for a great many people.

Once an extensive, publicly funded road network is in place, studded with tens of thousands of petrol stations selling fossil fuels at bargain prices, with millions of rent-free parking places expropriated from the civic space, the scene is set for the ascendancy and dominance of the motor vehicle. Car-making is now the main industrial employer in the world.

It is for this reason that World Bank economists are sent out from Washington like missionaries, going to Africa, Asia and Latin America, spreading the gospel of road building.

The car lobby's favourite road safety policy is pedestrian education. Despite decades of evaluation research, safety education has never been shown to reduce road injury rates.

Road user education is favoured by the car lobby because it places the responsibility for road traffic injury squarely on the victim and has no impact on industry profits. Its primary purpose is ideological. It sends the message that the road space belongs to drivers and that pedestrians and cyclists must look out or die.

Wealthy countries will have to make cuts even as emissions from poorer countries will have to make cuts even as emissions from poorer countries are increasing. However, once per capita emissions converge, rich and poor alike will have to reduce their emissions together. The policy also allows for emissions entitlements to be traded, which should help to ease the transition to equal shares whilst ensuring that the safe upper limit is not exceeded. Wealthy countries with high carbon dioxide emissions will have to buy the unused entitlements of poor countries, resulting in a transfer of wealth from the rich world to the poor.

The first article of the Universal Declaration of Human Rights is that 'all human beings are born free and equal in dignity and right'. No individual or society can legitimately claim a greater right to pollute the atmosphere.

Greater use of bicycles could improve access to education and health facilities. The infrastructure needed would be much less expensive than for motorized transport. A 2 metre-wide unpaved bike trail would cost less than 10 per cent of the cost of a 6 metre-wide rural road for motor vehicle use. I have already referred to the research conducted by University College London that concluded that there was no evidence that road building promotes economic development or poverty reduction.

Cycle-based transport should benefit the citizens of rich and poor countries alike. Unlike the demand for food and shelter, there is no intrinsic demand for transport. Instead, transport is a 'derived demand', arising from our need for access. We demand access to employment, education, health care and recreation, and in cities everywhere cycling can provide this access in a healthy and sustainable manner. Because cycling is a far more energy-efficient method of transportation than walking and can make carrying heavy loads much less exhausting, it can help the undernourished in poor countries to gain weight. On the other hand, because cycling consumes more food energy than driving a car, it can help fat people in rich countries to lose weight. Cycling is liberating, fun and healthy, and by replacing motor vehicle use it will reduce greenhouse gas emissions.

The transition to cycling will represent 'development' for rich and poor countries alike. Development does not mean squandering the earth's ecological capital to maximize the financial returns of corporate elite. Development means the expansion of human freedom within ecological bounds.

Cyclists are now beginning to assert themselves. More and more cities hold car-free days when parts of the city are closed to motor vehicle traffic and the streets fill up with bicycles and pedestrians.

Fifty years ago 'exercise' as a concept did not exist. Physical activity meant walking or cycling, and work was remunerated activity not passivity. But motorization and the deluge of cheap oil changed everything. Once the street space had been taken over by the motoring classes, the vicious circle of increasing car use and decreasing walking and cycling became entrenched technically, the streets were only licensed to motorists.

It is vital for the motor manufacturers that road safety efforts do not get in the way of car sales in developing countries and some road safety strategies present a serious threat. For example reducing the need for car travel by better town planning or by building better infrastructure for walking and cycling could greatly reduce road deaths and injuries. However, such an approach would not be in the best interest of the car companies, which are facing a serious problem of manufacturing overcapacity and oversupply.

Slowing down motor vehicle traffic is the first and most important step in reclaiming the streets. Clawing back street space from motor vehicle traffic is the second. Widening pavements, installing cycle lanes and planting trees and green plants make a safer and more pleasant environment for pedestrians and cyclists and send a clear message that this is a low-energy setting.

What is needed is an ambitious decarbonization programme that will cut across all the major areas of fossil fuel energy use. This would include the decarbonization of our energy supplies, increasing the energy efficiency of our homes, the creation of an urban infrastructure for safe walking and cycling and the greening of our cities. Renovating towns and cities for walking and cycling will require architects, artists, arboculturists, builders, carpenters, engineers, ecologists, educators, planners, planters, street performers and urban farmers. Their job description would be to ensure that walking and cycling provide the most enjoyable, the most satisfying, the safest and the most direct means of getting around.

Professor Ian Roberts delivered the 4th Annual TRIPP Lecture on 11th March 2011 at Indian Institute of Technology Delhi. The lecture has been established to honour professionals of international repute for work on sustainable transport. The lecture receives partial funding from Volvo Research and Educational Foundations.

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News

Guest editorial - Transportation and social interactions

There are a number of policy perspectives advanced by the papers in this issue. The case of slugging represents perhaps one of the clearest illustrations of a situation where sociologically uninformed planning failed to anticipate the emergence of a system that essentially subverted the intent of the original policy. Instead of the HOV (High Occupancy Vehicle) policy contributing to bring people out of their cars, it enabled a practice of slugging that emerged by chipping away from transit ridership. The perverse effect was to undermine two public policies at once. While it would be unfair to say that decision-makers should have anticipated this, since the policy predates the interest in the social dimension of transportation by decades, it provides a striking cautionary tale of the potential consequences of ignoring social context in transportation policy making...We live in an age characterized by demographic transitions with potentially important impacts on transportation systems, including large scale migration and population aging. These phenomena should be of interest from a policy perspective in the sense that future transportation policies will have to take into account potential changes in subsequent travel needs and patterns. Indeed, one can expect an increase in travel that will not fall into the home-to-work category and that will be strongly influenced by social context such as leisure trips, as well as demand for alternative modes of mobility that will rely on broader social support.

At the same time, we feel that transport policy has an important, if somewhat understated, impact on social interaction and social networks. The need for social contact generates demand for travel. As the demand for travel increases, more opportunities emerge where social interaction is generated. Mobility can thus help to satisfy and promote social interactions. These interactions, in turn, are believed to be instrumental in sustaining healthy societies and communities...We suggest that moving forward, a focal point for discussion should be on measures intended to modify the travel behavior of the public, and how various social aspects could influence them. Substantial room remains for discussing various measures, using two types of approaches, so-called hard and soft measures. The former are related to public transport development, road pricing and other more or less direct approaches that aim at alleviating the extensive reliance on private car use. Soft measures on the other hand are related for example to mobility management – e.g. car pooling, ride sharing – and information provision – including the leveraging social media. One difficulty in trying to implement some of these measures is that there is limited theory of balancing among changing behavior and changing norms, for instance introduced by new technologies.. We anticipate that the convergence of themes from various disciplinary perspectives will lead to greater interaction between researchers in various fields to the enrichment of all. ..On the one hand, it seems clear that there is value in using methodologies that are strongly grounded in travel behavior research (such as travel surveys and econometric modeling) when trying to make sense of the social dimension of travel, and transportation researchers can make valuable contributions along these lines. On the other hand, the intrinsic difficulty of the phenomenon studied poses challenges that require developing new tools to enrich our current theoretical and methodological approaches. Modeling the spatial and social context altogether is still very much work in progress and will need a mix of concepts developed in the disciplines of geography and sociology, and perhaps others that we cannot fully anticipate now...Establishing connections between various disciplines will pose interesting challenges and opportunities as we try to overcome current limitations to data acquisition, analysis, and simulations...Although not there yet, somewhere down the road these developments will need to be included in operational models, which we hope will enhance the behavioral richness and policy sensitivity of our current models, becoming more relevant by linking travel and aspects of social contact, social capital and social context explicitly.
Elenna R. Dugundji, Antonio Páeza, Theo A. Arentzea, , Joan L. Walkera, , with contributions from, Juan A. Carrascoa, Fabrice Marchala, and Hitomi Nakanishia. Transportation Research Part A: Policy and Practice, Volume 45, Issue 4. 239–247

International Course

The Transportation Research and Injury Prevention Programme (TRIPP) at the Indian Institute of Technology, Delhi organized a seven day International Course on Transportation Planning and Safety from November 29-07 December 2010 at the Indian Institute of Technology Delhi. The course was co-sponsored by the Volvo Research and Education Foundations, INRETS, France, Ministry of Urban Development, World Health Organisation, Ashok Leyland Ltd., Bajaj Auto Ltd. TVS Motors Ltd., Tata Motors Ltd. and the Ministry of Road Transport and Highways. The course (an annual feature for the last 20 years), was attended by 64 participants from 7 countries. The faculty members included Anoop Chawla (IIT Delhi), Christer Hyden(Lund University, Sweden), Dinesh Mohan (IIT Delhi), Farida Saad (INRETS, France), Geetam Tiwari (IIT Delhi), Harald Zellmer (Autoliv, Germany), Hermann Knoflacher (Technical University of Vienna, Austria), Janusz Kajzer (Chalmers University, Sweden), K N Jha (IIT Delhi), Mathew Varghese (St. Stephen's Hospital, Delhi), Nicole Muhlrad (INRETS, France), Puneet Mahajan (IIT Delhi), R.R. Kalaga (IIT Delhi), Shrikant Bangdiwala (University of North Carolina, USA), Sudipto Mukherjee (IIT Delhi), Sylvain Lassarre (INRETS, France).

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Transportation Research and Injury Prevention Programme
Room MS 808 (Main Building)
Indian Institute of Technology
Hauz Khas, New Delhi 110016, India
Phone: 91-11-26596361, 26596557
Fax: 91-11-26858703, 26851169
Email: ird8541@cbme.iitd.ernet.in
Www.iitd.ac.in/tripp

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Excerpts from the proceedings of The Jubilee Seminar on Road Traffic Safety: Learning from International Experience [A TRIPP Bulletin Insert]

Beyond "best Practice" Road Safety Thinking And Systems Management – A Case For Culture Change Research

Ian Johnston
Monash University Accident Research Centre, Australia

In most western motorized nations from the mid 1950s through the early 1970s road safety strategic thinking and planning was the province of government-appointed coalitions ("councils") of concerned citizens; police forces; and road and traffic, particularly traffic, engineers. Crashes tended to be viewed simplistically as having one primary cause, blameworthy human behavior, and the countermeasures were reactive, small-scale, isolated, directed largely at symptoms and with a clear tendency to be punitive.

Gradually road crashes became the subject of scientific study. Ironically however, the early in-depth, crash research, while profoundly influencing the thinking of the researchers, appears to have helped perpetuate the simplistic view of the public and the bureaucratic and political decision makers and a generation of road and traffic engineers. The public catch cry was – and still is – that 95% of crashes were caused by error or misbehavior, which is, of course, the principal finding of these pioneering studies. Not surprisingly in an open loop system where the human is, in effect, the only active element, it was indeed rare to investigate scientifically a crash in which no operator behaviours could be found among the multiple causal elements identified. However, the importance of the interactions between road, traffic and vehicle features and particular types of behavior never featured in public discussion of the research and rarely appeared in briefings to policymakers. Further, the concept of latent conditions within the road transport system rendering certain types of error more likely had not found its way from the study of industrial safety (Reason, 1997).

It is important to establish acceptance by both politicians and the public of the rationale for the road safety strategy to be implemented. Where folk lore and official strategy are at odds – as is the case with speed moderation across the entire speed distribution – public understanding is vital (Johnston, 2004). There can be no clearer example of a mismatch between strategic thinking and cultural mindset.

There is total lack of action by governments worldwide and by the automobile industry to limit the power, top-speed and acceleration capability of cars and trucks. Injury reduction is a matter of limiting the (potential) transfer of kinetic energy to the human body to a level which can be borne. Industry has certainly made great progress in reducing energy transfer through seat belts, air bags, collapsible steering columns, improved side door strength and so on across a long list of crashworthiness measures but impact speeds are frequently above human tolerance levels. The principal determinant of the amount of kinetic energy to be managed in the event of a crash is impact speed and speed control has never been on the vehicle design or regulatory agenda. There is not one vehicle safety design rule that pertains to top-speed capability or acceleration performance. Moreover, the speedometer through which the driver manages his speed of travel contains a scale that displays speeds of double or more than that permitted on all but a handful of the world's roads. A manufacturer can get a five star rating for a model that can exceed 250 km/h!

Road Traffic Safety: A View From India

Dinesh Mohan
Indian Institute of Technology, Delhi

Official road traffic crash data do not include fatalities by road user category in India. Such data are only available from a few cities and research studies done on selected locations on rural highways. Table 4 shows traffic fatalities by category of road users in Delhi (capital city of India) and selected locations on national highways (Tiwari et al. 2000; Mohan et al. 2009). These data show that car occupants were a small proportion of the total fatalities, 3 percent in Delhi and 15 percent on rural highways. Vulnerable road users (pedestrians, bicyclists, and motorized two-wheeler riders) accounted for 84 percent deaths in Delhi and 67 percent on highways. This pattern is very different from that obtained in all high-income countries. The low proportion of car occupants can be explained by the low level of car ownership at 7 per 100 persons as compared to more than 50 per 100 persons in most high income countries. At present levels of growth in vehicle ownership in India, vulnerable road users are likely to remain the dominant mode for the next few decades. The incidence of road traffic fatalities can only be controlled in the coming years if road safety policies put a special focus on the safety of vulnerable road users.

India has a total road network of 3.3 million km. The total length of access-controlled highways is less than 600 km at present. Although national highways constitute only about 2% of the total road network, about 40% of the total road traffic moves on these roads. The Minister of Road Transport and Highways a ministers the national highway system, while state highways 21 and other state roads are maintained by state public works departments; and other, more local roads are maintained by municipalities, districts, and villages. Detailed data are not available at the national or state level for crashes on national highways. A study collected data on modal shares, vehicle speeds, and traffic crashes on selected locations on national and state highways around the country in the late 1990s (Tiwari et al. 2000). The study reported that trucks were the striking party in 65% of fatal crashes. Other studies report that majority of the crashes involved buses, 25 percent of the victims were pedestrians, rear-end crashes comprised 40 percent of total crashes and that crashes were increasing at a rate of 3.9 percent per year percent of total crashes and that crashes were increasing at a rate of 3.9 percent per year (Kumar et al. 2004; Saija and Patel 2002; Saija et al. 2000; Shrinivas 2004; Shaheem et al. 2006). A study of road traffic crashes on a National Highway in the southern state of Kerala reported that heavy vehicle had a high involvement, and pedestrians and cyclists were 28% of the victims (Shaheem et al. 2006). The most important finding of this study is that the fatality rate per volume is more than three times higher on the four-lane section than on two-lane sections. The construction of four-lane divided highways (without access control) does not seem to have reduced fatality rates, and vulnerable road users still account for a large proportion of fatalities. There is a clear case for redesign of intercity roads with separation of slow and fast modes. The need of road users on local short distance trips will have to be accounted for.

The presence of slow modes on highways creates serious problems, as speed differentials can account for significant increases in crash rates (Koornstra, 2007). High incidence of fatal rear-end crashes suggests a general lack of visibility with a possible contribution of poor conspicuity of parked vehicles. There is a clear case for redesign of intercity roads with separation of slow and fast modes. The needs of road users on local short distance trips will have to be accounted for to reduce the probability of head-on crashes (due to drivers going the wrong way on divided highways) by provision of continuous service lanes and safe road crossings at convenient distances. Solutions for many of these issues are not readily available, and research studies are necessary for the evolution of new designs.

How Safe Is Vehicle Safety: The Contribution Of Preventive And Passive Safety To Saving Lives On European Streets And Roads

Yves Page
Renault

The very general statistics obviously hide complex phenomena. Road users (vehicle operators or pedestrians) are constantly interacting with their environment and can deteriorate their own safety and other.' Understanding

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Continued from overleaf:

these conditions is a prerequisite to correct them or to be create new ones which ultimate goal is to improve road mobility and its safety. The analysis of the traffic system shows that it comprises motorized and non motorized users travelling along roads, often within vehicles. These travels are organized in a general environment under certain traffic conditions which may not be under the users control (traffic and weather conditions, temporary road signs, road works….). Traffic system components show easily that the user is not responsible for it. He/she does not construct roads and vehicles, has no control over weather or traffic conditions, traffic density, road works, missing signs. On the other hand, the user shall make decisions depending on road conditions. Vehicle sold or road network, even traffic control, should improve the users' safety and participate in optimizing their decisions and even forgive them if proved wrong.

A first step of analysis qualitatively defines and quantitatively assesses the Drivers' Needs as they are expressed in accident situations (Van Elslande et al., 2008). The analysis of these needs is based on the characterization of human functional failures (perceptive, cognitive or active) found in accidents. Most accidents reveal a difficulty that the driver was not able to compensate for. These human difficulties reversely show, as in a mirror, the needs of the drivers to be helped. Though, these needs are be defined from a diagnosis of the real problems that drivers come across in accidents. (Example: a need in detecting the slowing down of a vehicle ahead).

A third step stresses the potential contextual limitations which could lessen the optimal functioning of the safety systems. These potential limitations are defined from the parameters characterizing the contexts in which real accidents occurred, showing some essential constraints to take into account in order to optimize the adaptation of the systems to effective accident situations. These potential limitations encompass the whole characteristics of both the drivers (internal context) and his driving environment (external context). (Example: driver looking backward toward a passenger at the rear).

A last step of analysis gives a comprehensive result of all the previous ones. It stresses the Safety Effectiveness of the safety functions, i.e. their capacity to compensate for drivers' needs. This safety effectiveness is defined as the combination of the adaptation of the safety functions to the needs and their response efficiency in compensating for the contextual limitations found in accident situations. The results allow defining which functions are the most promising in a safety purpose but also which drivers needs are more or less compensated.

Accident analysis and evaluation of the (expected or actual) safety benefits of safety applications are only one aspect in one decision to invest in such or such safety applications for a vehicle manufacturer. Legal or consumerist pressure, costs of the technologies, competition with other vehicle manufacturers, value for the client, liability issues, expected economic benefits, (technical, social and usage) acceptance by the road users, externalities, technical performance of the technology, brand identity, etc…. are also major issues that should be looked at with high care before proposing a safety feature in the market.

Traffic Claming: The Way Ahead In Mixed Traffic

Christer Hyden
Department Technology and Society Lund University

Motorised traffic is a strong contributor to low quality of life for many people in our cities. Volumes are big and speeds are often very high. Even if safety still is of prime concern in every country I dare to say that the issue to-day in developed countries has shifted from being a question about survival of the pedestrian to survival of the city while in developing countries the question still is surviving of the pedestrian. One main ingredient in survival of the city is to produce liveable conditions for pedestrians, which of course include the elimination of the physical threat. So, even though the perspective is different the main question to-day, as it "always" has been, is how to reach decent living conditions for pedestrians so that they can be safe and also feeling safe, being comfortable enough, not having to live with noise and emissions etc.

It is quite clear that there is a great potential in introducing Traffic Calming measures. And it is also necessary. However, the important thing is to ensure the low speeds that one is targeting on. There are many attempts that more or less have failed. The Zebra crossing is a typical example. It has become obvious that it is not sufficient "just" to introduce strict yielding rules or any other measure without ensuring low speeds at the same time. One big problem is that many measures are introduced without actually safe guarding the effects. Assessment of effects is lacking to a very high extent. The result is that theories which measures are based on often are vague or non-existing. The result is therefore that the evaluation of effects will be "arbitrary" in the sense that there is no guarantee that measures are targeting the right kind of behavior. I have indicated the lack of holistic solutions that can safe guard pedestrians and also make the life of pedestrians more attractive. As both parts are of importance for the attractive and sustainable city, there is a strong need to put more efforts in demonstrating holistic solutions on a large scale, and to assess their effects. This is valid both for High Income countries together with the experience from India, should be the final "Go" for a much more comprehensive approach to the Traffic Calming scope in India and, I imagine, in other Low and Middle Income countries.

Tranport Policies: How And Why Safety Has Been Neglected

Hermann Knoflacher
Vienna University of Technology, Austria

How people act and react depends on the built environment. Structures determine behavior and with special methods we can derive data about this human and system behavior. The nature of data is dependent on the methods of observation and perception of the people who gather these data. Professionals in transport science and transport administration collect data sets, which reflect their world view. The education and training they received and their experiences shaped their perception of reality. Therefore each kind of data has a certain background of information, specification, limits of perception and methodologies. From the same real event different data sets can be derived depending on these differences in view and methodology. "Traditional" educated transport experts have been trained to see only car traffic and neglect all other road users. Even within this narrow world view there are restrictions concerning the definitions of observed data. One example is the definition of killed people in accidents. The number is dependent how a society defines "killed in traffic accident," on "the spot", "within one day", "within three days" or "if the death is caused from the effects of these accidents" without any time limit.

This shows how careful we have to be in interpreting these data. Statistics provide use with a dataset compiled under a certain perception of reality, which reflects just a specific picture of reality, which reflects just a specific picture of reality. Beside these problems in collecting data, it enables us to look at the behavior of the transport system, if we use them in the proper way. If we have time series from accident indicators we can derive information about the underlying system mechanisms.

Instead of fulfilling the basic need of traffic safety, the main aim of the experts in the transport field was the uninterrupted flow of cars and not primary the safety of people. Safety aspects are incorporated only after special types of accidents safety reasons. Traffic safety was a side effect, which cost money for investments, operation and time, if travel speed had to be reduced. If traffic safety would not be ignored, the traffic system would have followed a totally different path of evolution.