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Partnership on Sustainable, Low Carbon Transport
United Nations Economic and Social Commission for Asia and the Pacific, and
United Nations Office for Sustainable Development

TENTH REGIONAL ENVIRONMENTALLY SUSTAINABLE TRANSPORT (EST) FORUM IN ASIA,
14-16 MARCH 2017, VIENTIANE, LAO PEOPLE'S DEMOCRATIC REPUBLIC

Urban Road Safety – Guidelines for Policy Makers in Developing Cities

(Presentation for EST Plenary Session 10 of the Provisional Programme)

Final Draft

This presentation has been prepared by Mr. Manfred Breithaupt, GIZ for the Tenth Regional EST Forum in Asia. The views expressed herein are those of the author only and do not necessarily reflect the views of the United Nations.

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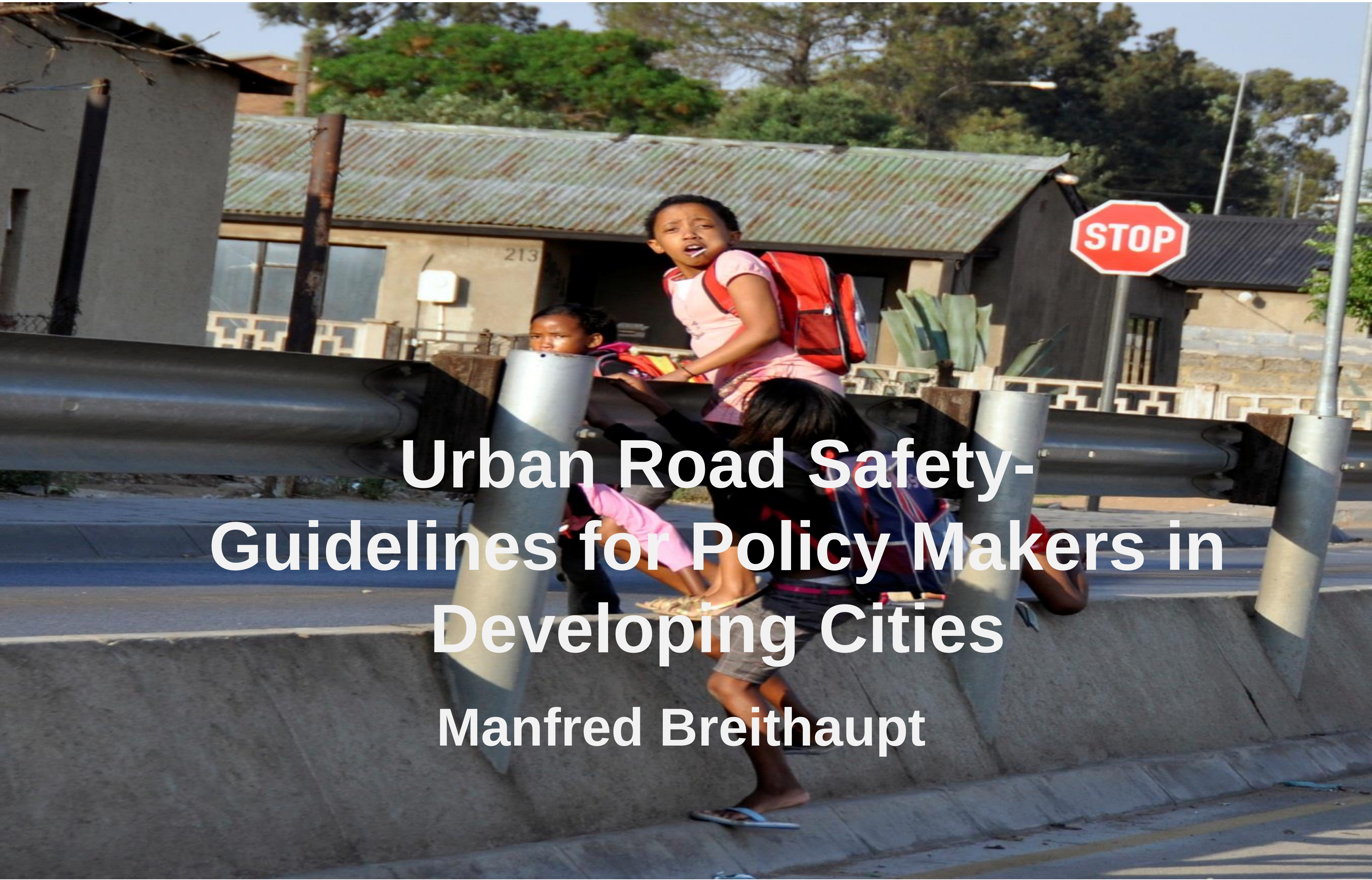
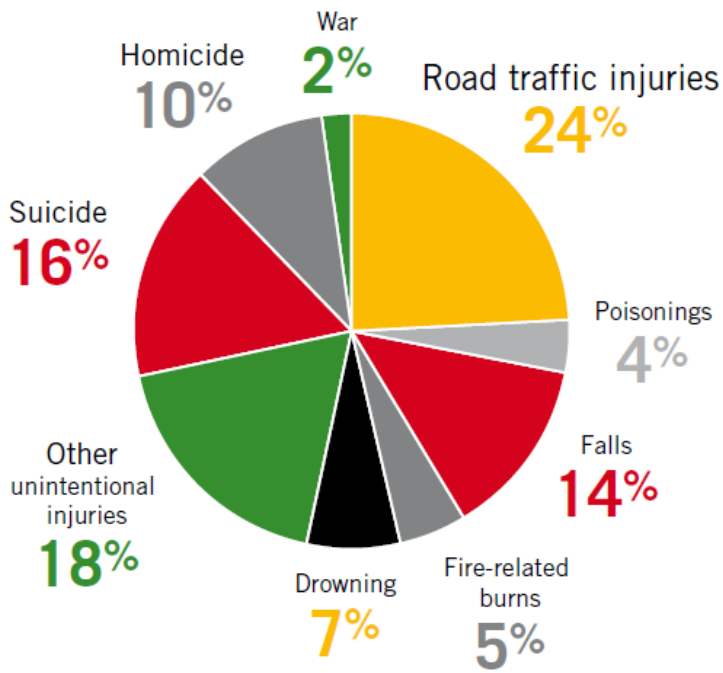


Urban Road Safety- Guidelines for Policy Makers in Developing Cities

Manfred Breithaupt

Facts Transport. Major driving forces

Road Traffic Crashes: An alarming concern



Source: WHO Global Health Estimates, 2014

- 1,3 million people die annually in road -accidents worldwide, thereof aprox. 700 000 in Asian EST region, highest figures in China and India
- 20 to 50 million people are injured
- In some of the EST countries more than 80% of deaths in road accidents are vulnerable road users (VRU)
- Average GDP loss in the Asian ESR region is 3,3%, and can be up to 5%

Estimated road traffic death rate per 100 000 population

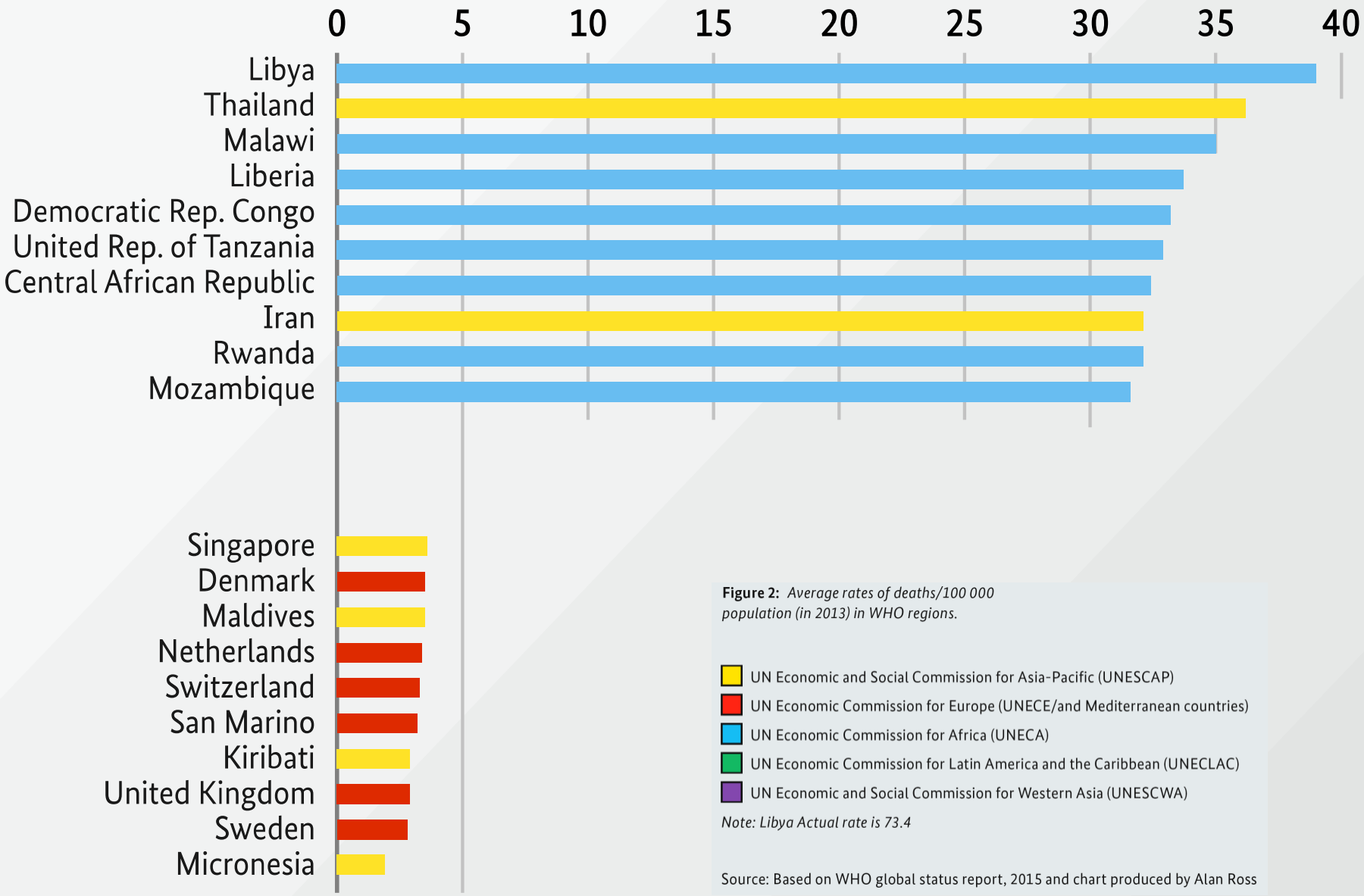


Figure 2: *Average rates of deaths/100 000 population (in 2013) in WHO regions.*

- UN Economic and Social Commission for Asia-Pacific (UNESCAP)
- UN Economic Commission for Europe (UNECE/and Mediterranean countries)
- UN Economic Commission for Africa (UNECA)
- UN Economic Commission for Latin America and the Caribbean (UNECLAC)
- UN Economic and Social Commission for Western Asia (UNESCWA)

Note: Libya Actual rate is 73.4

Source: Based on WHO global status report, 2015 and chart produced by Alan Ross

Risk factors

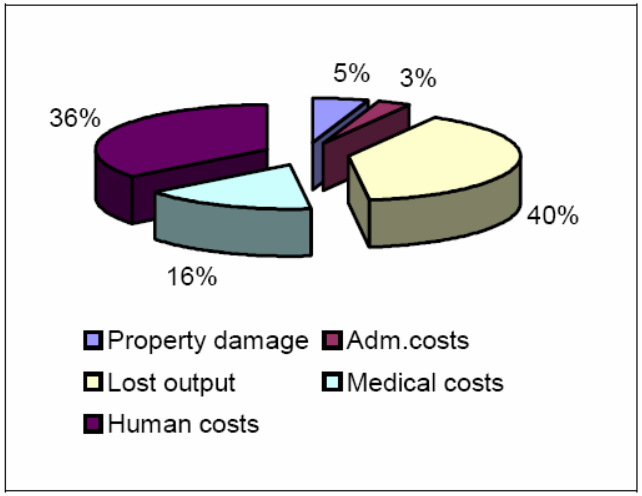
High Percentage of Traffic Law Violations and Driver Errors

Economic impacts of road accidents

Why is it so costly?

(Estimated 730 Billion USD in 2010 in EST countries)

Figure 3: Overall Costs of Road Accidents in Viet Nam (2003)



Source: Viet Nam data.

Hospital and Medical Costs

Loss of Productivity

- Average years lost
- Average income earned

Property Damage Costs

Administrative Costs

- Police, rescue unit, court proceeding, insurance, etc.

Physical and emotional pain

Source: ADB

Motorcycles: a big threat

Motorcycles in Asia are a great threat to road safety, when not well managed

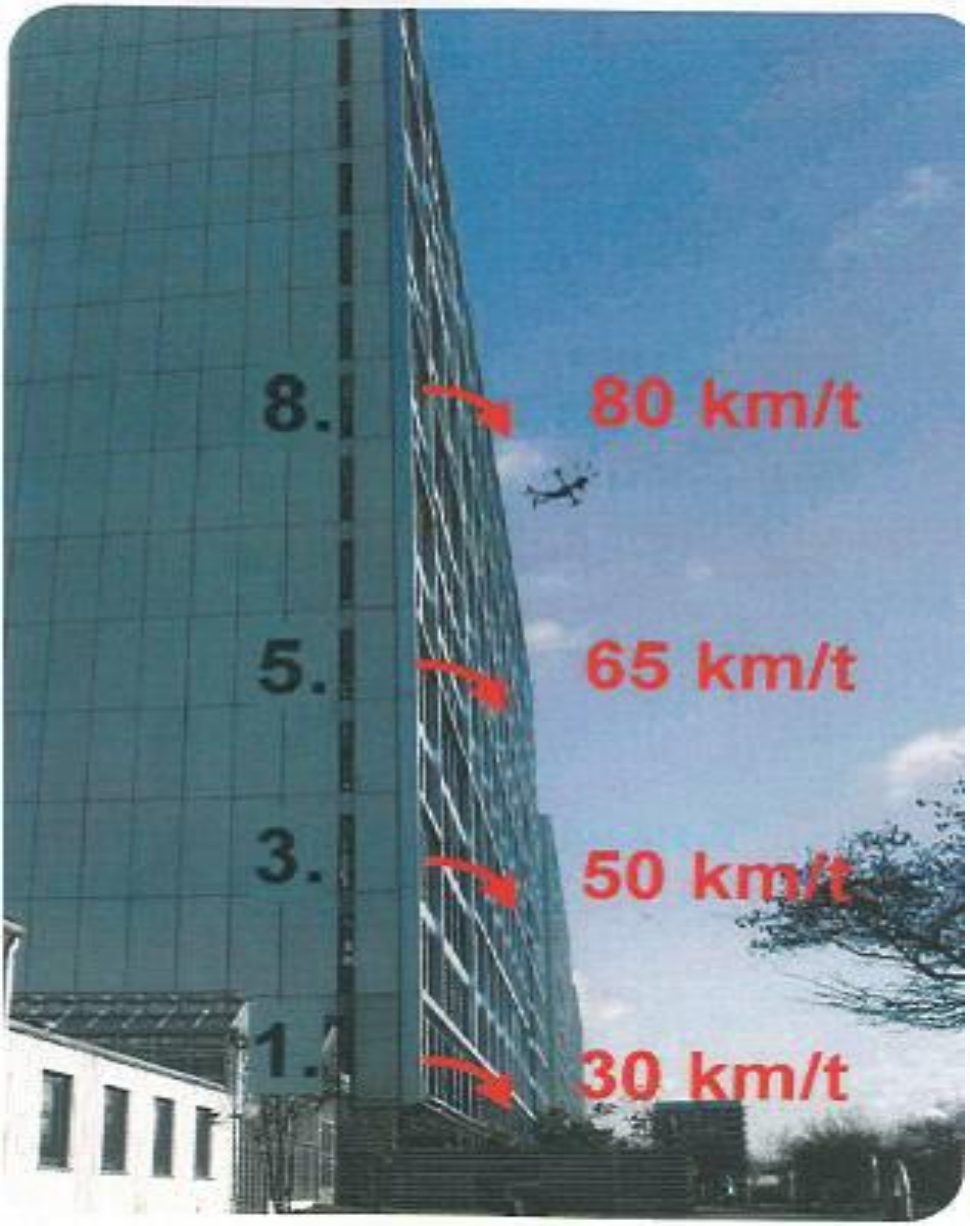
Image source: ADB

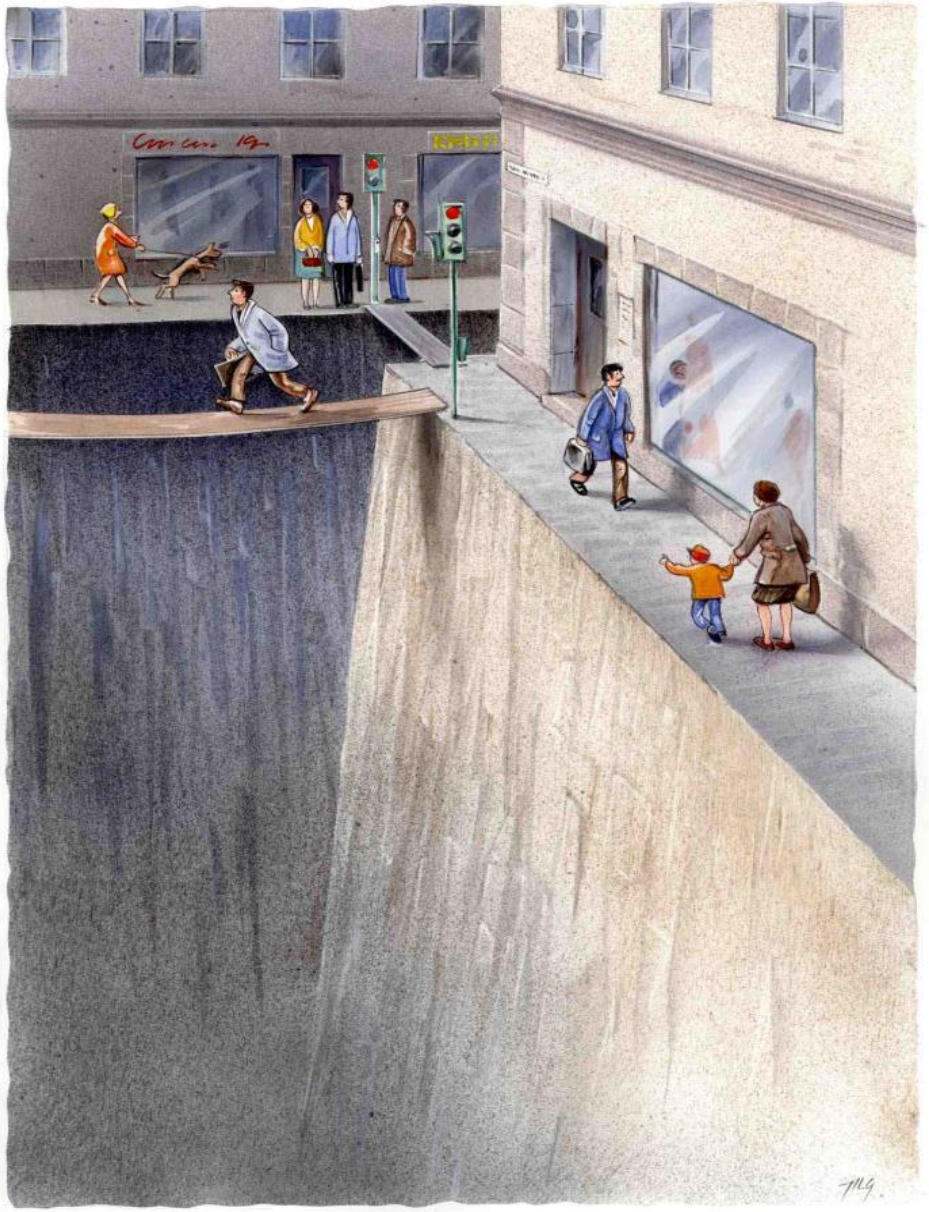
Speed: a second threat

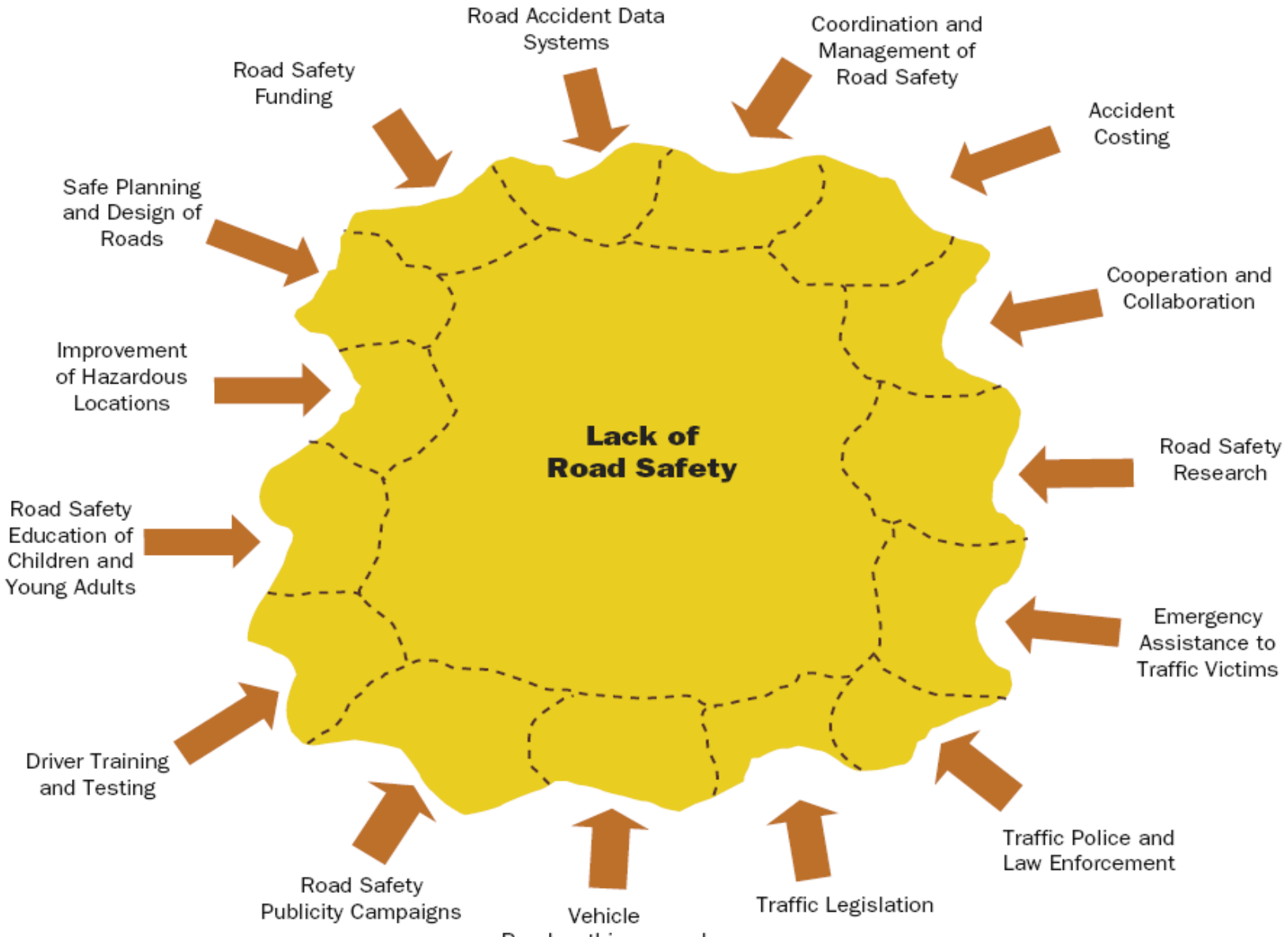
- Vehicle speed is directly proportional to accident risk
- Accidents at above 30 km/h have a very high risk of killing an involved pedestrian
- Reducing road speed is an effective tool to improve road safety. *Reducing the average speed by only 5 km/h reduces the number of injury crashes by 10–14 % and fatal crashes by 15–22 %.*

Residential areas (zone with traffic calming) in Belgrade, Serbia, where speed limit is 10 km/h.
© Krsto Lipovic, Belgrade, Serbia

Our perception of speed often does not match its impact in an accident






Road Accident Data Systems
Coordination and Management of Road Safety
Road Safety Funding
Accident Costing
Safe Planning and Design of Roads
Cooperation and Collaboration
Improvement of Hazardous Locations
Lack of Road Safety
Road Safety Research
Road Safety Education of Children and Young Adults
Emergency Assistance to Traffic Victims
Driver Training and Testing
Traffic Police and Law Enforcement
Road Safety Publicity Campaigns
Vehicle
Traffic Legislation

A comprehensive approach for road safety – The example of Germany

User Related Measures
(TRAINING AND EDUCATION, TRAFFIC LAW, INCENTIVES, ENFORCEMENT)

1966	Introduction of a 1.3‰ legal blood alcohol limit
1970	Introduction of the principle of defensive driving
1970	Compulsory use of turn signal (blinking) in urban areas
1973	Revision of legal blood alcohol limit to 0.8‰
1974	Accumulating credit system for traffic offenses
1974	Introduction of recommended speed limit on motorways (Autobahnen) – 130 km/h
1975	**Use of seatbelt and helmet becomes compulsory**
1976	**Introduction of 100 km/h speed limit outside of built-up areas**
1980	Introduction of fines for riding motorcycles without helmet
1984	Introduction of fines for driving without fastened seatbelt
1986	2-year trial period for new drivers
1986	Minimum age for driving heavy motorbikes raised to 20 years
1988	Introduction of minimum distance to trucks and buses
1993	**Mandatory use of child safety seats for children in cars**
1995	Compulsory speed limit for vehicles that drive past standing buses (walking speed)
1998	**Revision of legal blood alcohol limit to 0.5‰**
2001	Introduction of fines for using mobile phones while driving
2007	Blood alcohol limit of 0.0‰ for novice drivers and persons under the age of 21
2010	Introduction of accompanied driving from the age of 17

Organization
(PLANNING, FINANCING, CONTROLLING)

1956	Regular Road Safety Inspection for roads becomes obligatory in road traffic regulations (VwV-StVO)
1961	Regular vehicle safety inspections (TÜV) become mandatory
1969	The German Road Safety Council (DVR) is founded, bundling the efforts of all parties involved in road safety in order to achieve efficient action
1969	Publication of the German Road and Transportation Research Association (FGSV) bulletin on local transport plans (introduction of accident analyses, consideration of non-motorized transport)
1971	**Adoption of the Municipal Transport Financing Law, introducing federal financing schemes for urban transport and mandatory local transport plans**
1979	Introduction of target-oriented transport planning instead of supply-oriented planning in guidelines for local transport plans
2002	**Introduction of safety audits to avoid shortcomings with regard to road safety during the planning process**
2008	Directive 2008/96/EC of the European Parliament and of the Council of 19 November 2008 on road infrastructure safety management
1973, 1984, 2001 and 2011	**Road Safety Programmes of the Federal Government**

Infrastructure Related Measures
(ROAD DESIGN, ROAD CONSTRUCTION, MAINTENANCE)

1964	**Introduction of zebra crossings for pedestrians**
1973	Introduction of standards for geometric layout, gradients, cross sections and design speeds to be integrated into design guidelines
1977	**Introduction of general principles of road network design, classification of roads according to road categories (i.e. interstate, arterial, collector, local) and connection type (urban vs rural, expected volume etc.)**
1980	Introduction of zones with traffic calming („Spielstraßen", or play streets), designed to be oriented towards pedestrians
1981	Publication of German Road and Transportation Research Association (FGSV) recommendations on traffic calming in residential areas
1982	Introduction of guidelines on cross-sections for roads (RAS-Q) including determining the dimensions of the roadway components based on physical and volume characteristics
1983	**First trials for zones with 30 km/h speed limit in residential areas**
1990	Increasing use of roundabouts as alternative form of intersection
1993	**New design recommendations for urban main roads (including consideration of urban design and requirements of pedestrians and cyclists)**
1995	Revised guidelines on road alignment including updates on overtaking sight distance requirements
1996	Introduction of 2+1 lane road design for high level rural roads to prevent overtaking accidents
2006	**Introduction of concepts for self-explaining (i.e. standardized) roads and forgiving roadsides in design guidelines**
2007	Dedicated recommendations on improving road safety on popular motorbike routes through improved road design and enforcement measures
2008	First shared space project in Germany (City of Bohmte)
2011	Introduction of „Design for All" principle to provide accessible transportation facilities (HBVA)

Vehicle Related Measures
(ACTIVE SAFETY, PASSIVE SAFETY, TELEMATICS)

1959	**Introduction of three point seat belt**
1963	Introduction of energy absorbing steering column (avoiding excessive injuries to the driver in the event of a heavy frontal impact)
1978	Introduction of anti-lock braking system
1980	**First introduction of an air bag (in driver seat only) for a Mercedes car**
1990	Mandatory introduction of side guards on trucks above 3.5 tons to protect two-wheel drivers and pedestrians
1996	Introduction of Brake Assist System (BAS)
1996	**Introduction of Euro.NCAP testing procedures for vehicle passive safety devices**
1998	Increasing use of windowbags (protecting passengers from head injuries)
2004	Commitment by european car manufacturing industry to equip all new cars with anti-lock braking system
2011	**Mandatory introduction of Electronic Stability Control in all new cars and trucks in the EU**

Rescue Services
(ALERT, RESCUE)

1970	**First permanent HEMS (Helicopter Emergency Medical Services) base is established in Munich**
1971	Introduction of emergency telephones along highways and major roads
1973	Introduction of country-wide emergency call numbers 110 (police) and 112 (fire brigade), although regional numbers for EMS continue to exist
1974	**First EMS law introduced in the Federal State of Bavaria, outlining requirements for staff, equipment and response times. Other federal states follow soon.**
1998	**EU-wide mandatory introduction of emergency call number 112 for EMS**

The challenge of road safety

About 3,400 people die every day in road traffic accidents around the world. A further 50 million people are injured every year. Despite comparatively low levels of individual motorisation, emerging economies and developing countries in Africa, the Middle East and Asia are particularly affected, with more than 90 per cent of traffic-related deaths occurring in these countries. If current trends continue, road accidents will overtake HIV/AIDS and tuberculosis to become the world's third most significant health hazard by 2030.

By launching the Decade of Action for Road Safety 2011–2020, the United Nations have called on the member states to step up their efforts to improve road safety. This infographic illustrates the comprehensive approach that Germany has taken as a response to sharply-rising fatality rates since the 1950s. Along with many other European countries, Germany has succeeded in reducing fatalities significantly – thanks to a bundle of measures that can be replicated elsewhere.

Further information and the infographic as pdf

Imprint

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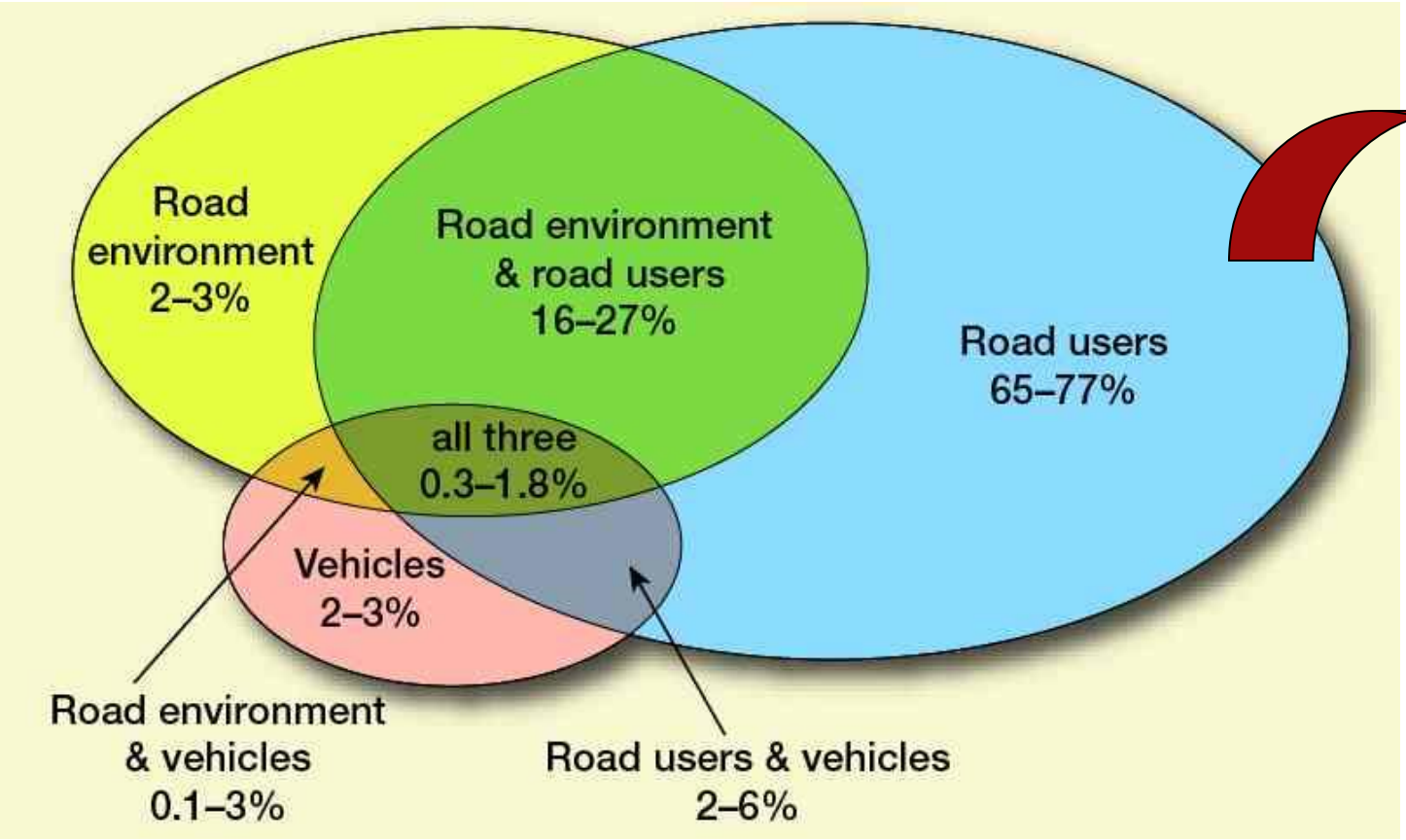
As of: August 2013

Published by giz

On behalf of Federal Ministry for Economic Cooperation and Development; Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

German Partnership for Sustainable Mobility

Road Accidents. Major Causes



Focus on Road Users and their Behavior is the Key for Success.

Improving Road Safety. Approaches

Areas of Intervention
4 EEEE

- Engineering
- Enforcement
- Emergency Response
- Education

Implementation Strategy

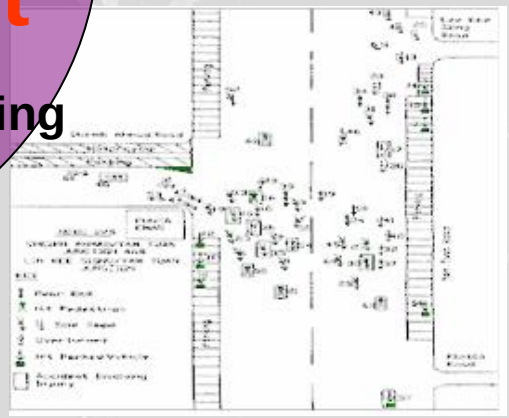
- The Road Safety Programme
- The Leading Agency
- The Enforcement Plan
- The Communication Strategy

4 E's approach

Enforcement **E**ducation

Road Safety is no Accident

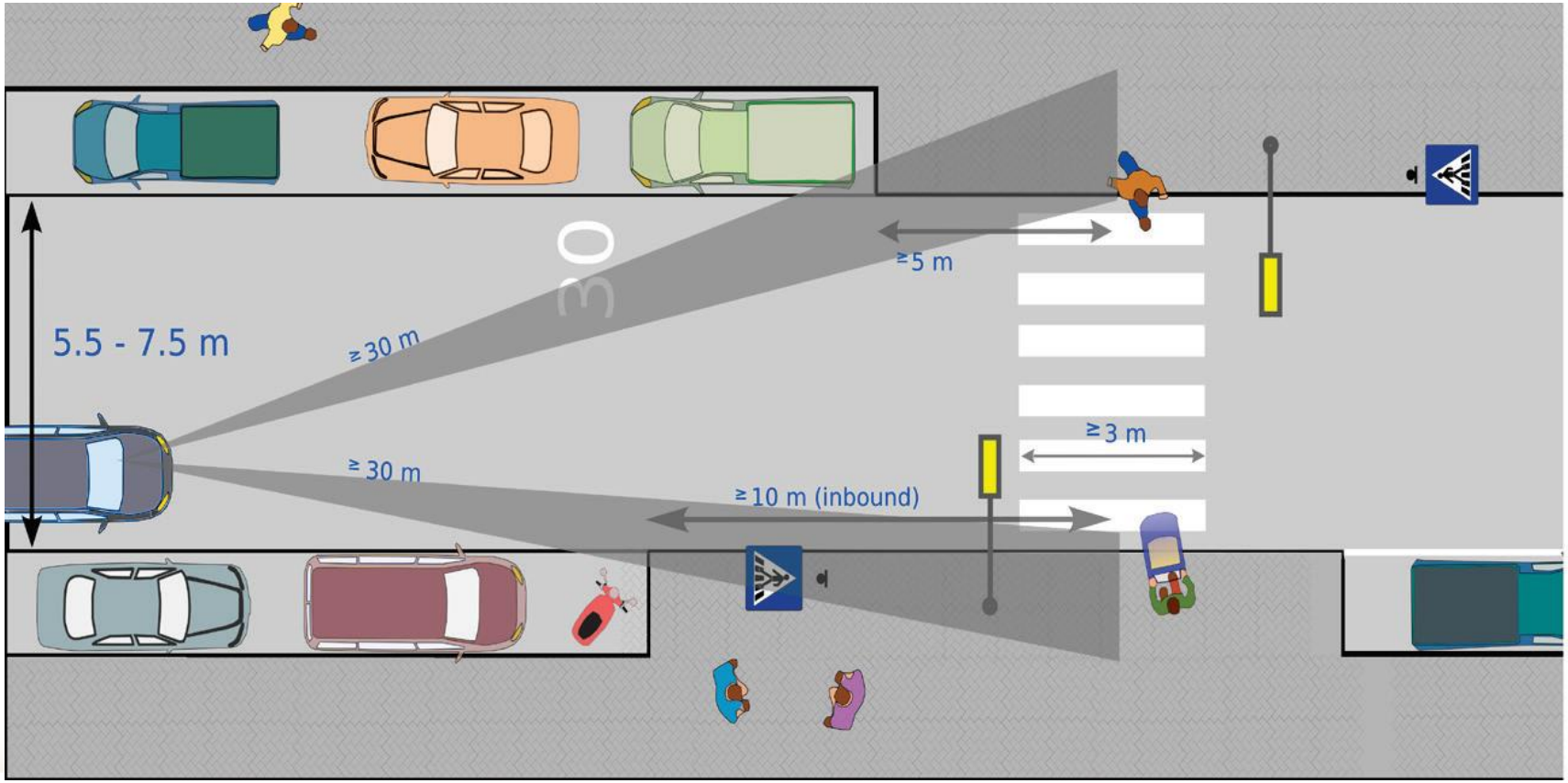
IEmergency **E**ngineering **R**esponse



Engineering

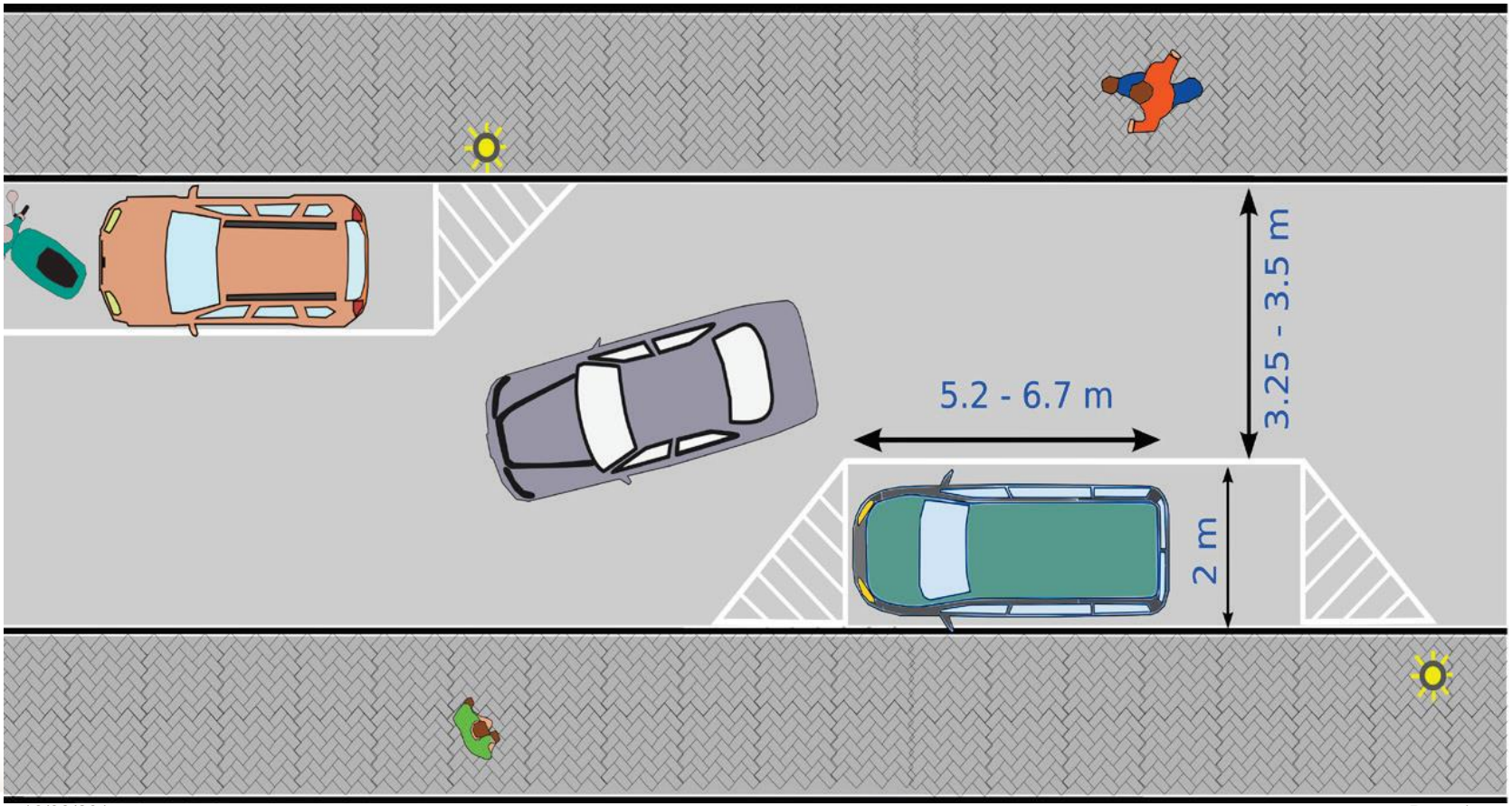
Engineering Works

- to design urban roads in such a way that all road users can travel safely and efficiently



Traffic Calming Measures

- to slow down or reduce traffic for the safety of pedestrians/cyclists/local residents



Engineering

Traffic Calming – Vertical Deflection

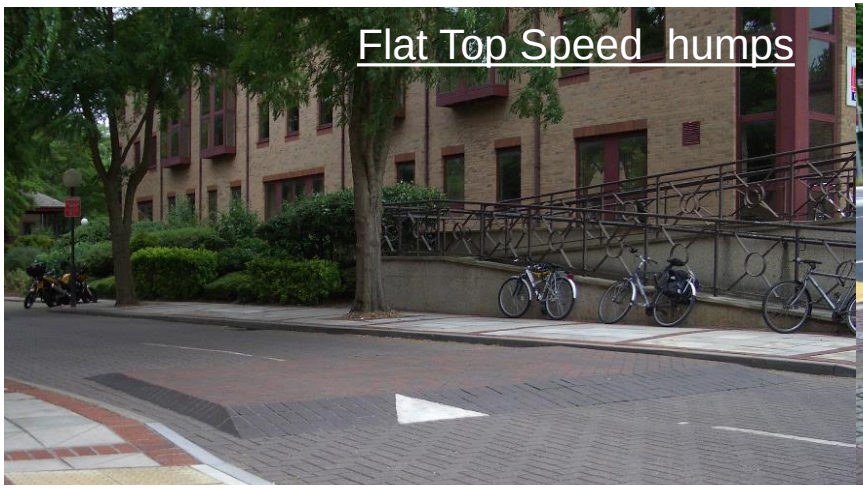
Speed Hump

Speed Table

Raised Crosswalk

Source: TrafficCalming.org

Traffic Calming - Paving Variations at Crossings, Stop Signs, Intersections


Flat Top Speed humps


Speed Table as raised crosswalk

Speed Table (vertical deflectors) - *Use of continuous Paving Materials or Colors at Crossings provides visual continuity to Pedestrians and also makes crossings clearly visible to drivers from a distance.*


Speed Table as bicycle crossing


Rumble Strips

Traffic Calming Devices

Vertical deflectors

Speed table in front of crosswalk

Traffic Calming – Medians, Refugee Islands and Chicanes

Medians and Refugee islands

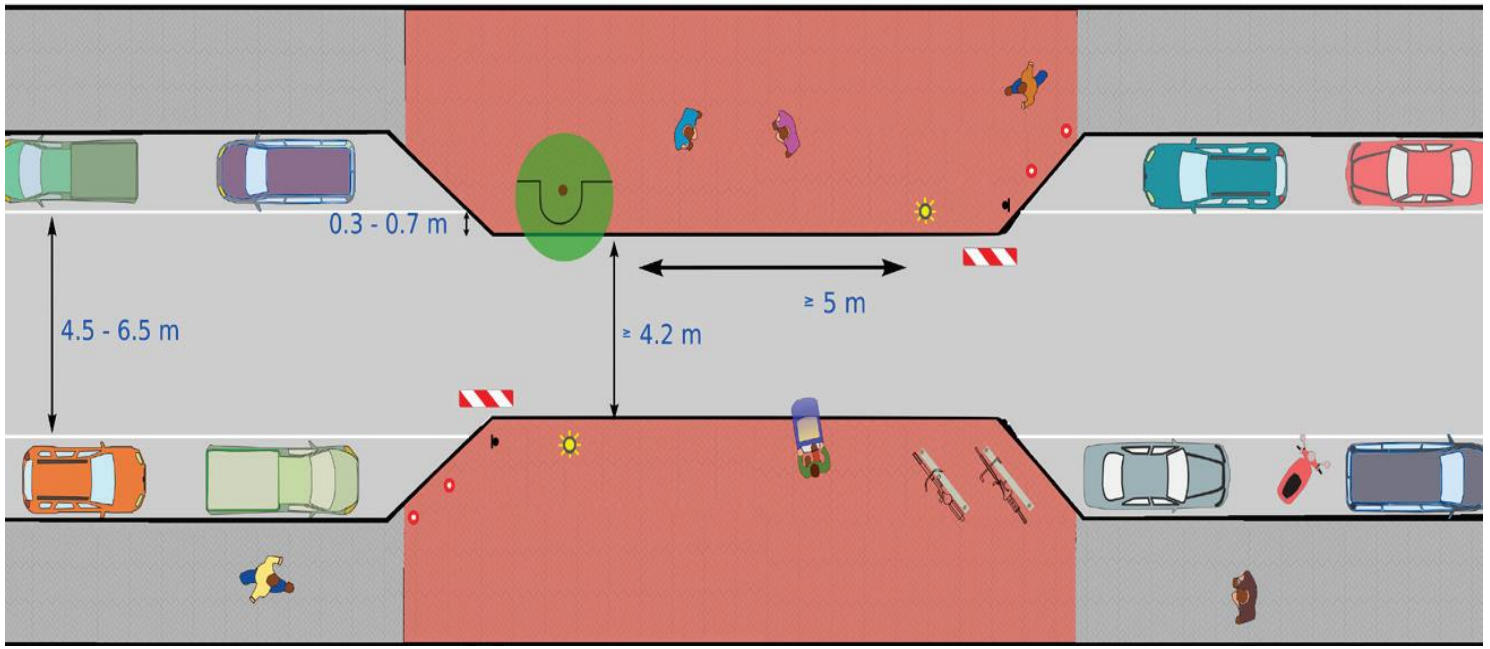
Medians and Refugee Islands– A median is the portion of the roadway separating opposing directions of the roadway, or local lanes from through travel lanes. An island is an area between traffic lanes used for control of traffic movements**.**

Chicanes - Where no median is present, raised islands can be used as traffic calming features to briefly narrow the travelled way, either in mid-block locations, or to create gateways at entrances to residential streets.

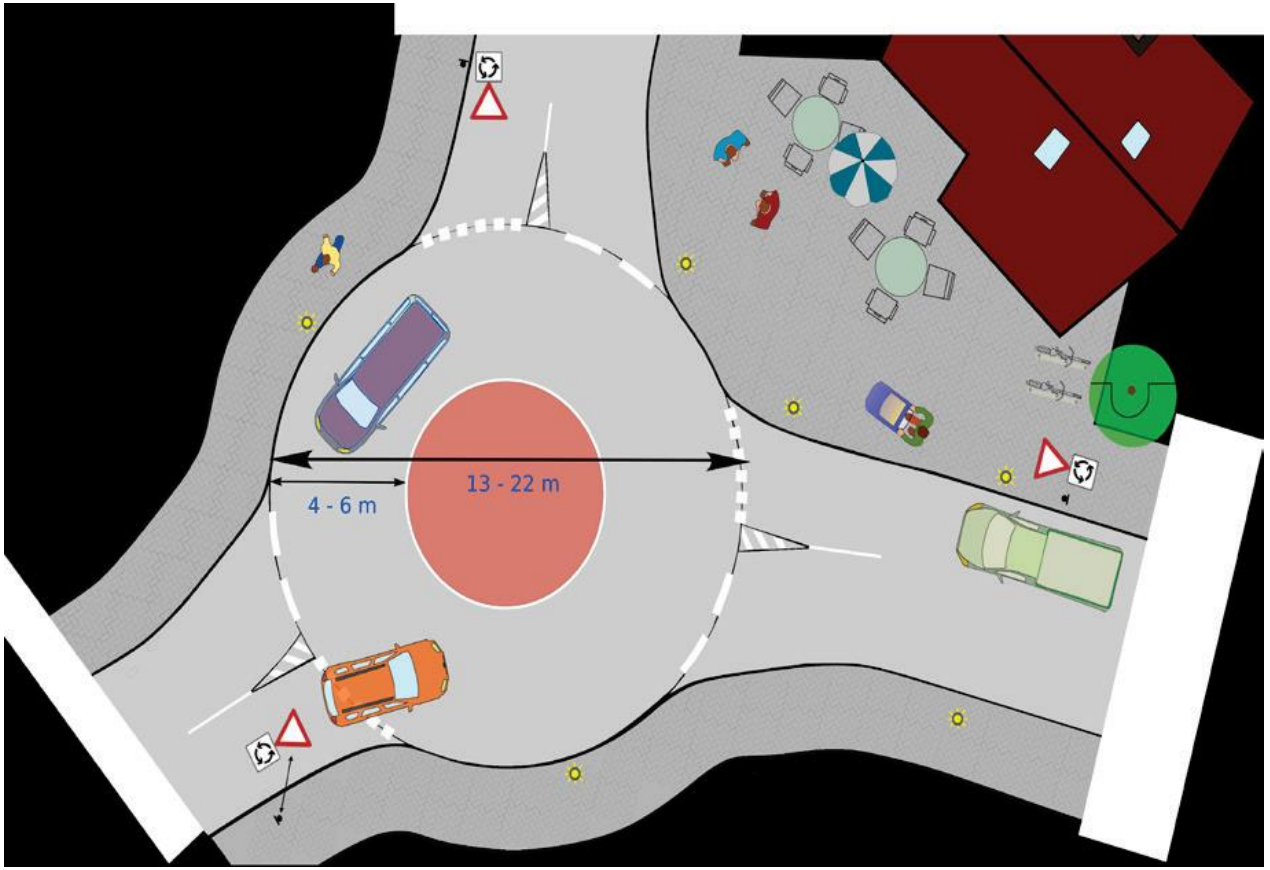
Chicanes

Pedestrian refugee islands (We seldom see them in DCs)

Road Narrowing



Small Roundabouts



Traffic Cells and Diverters

Car restrictions

Narrowed streets for cars by roadway barriers

Road safety related expenditures can be a very good investment….

Table 1: Local authority road safety schemes in the UK – first year rates of return by type of scheme

Rank	Measure	First year rate of return %
1	Bend treatment (revised signs and marking)	722
2	Priority junction	523
3	Route treatments	520
4	Cycle schemes	444
5	Overall link improvements	276
6=	Signalised junction	266
6=	General link treatments	266
8	Link traffic calming	260
9	Pedestrian facilities	246
10	Area-wide schemes	225
11	Roundabouts	176

Gorell and Tootill (2001) "Monitoring Local Authority road safety schemes using MOLASSES" TRL report TRL512,

This emphasizes that expenditure on road safety is an "investment", not a "cost" and that the "return" in savings is many times the expenditure made.

Enforcement

Enforcement

- Legal blood alcohol limit
- Cell phone
- Helmet, safety belt usage
- Speed limits

Enforcement – cell phone

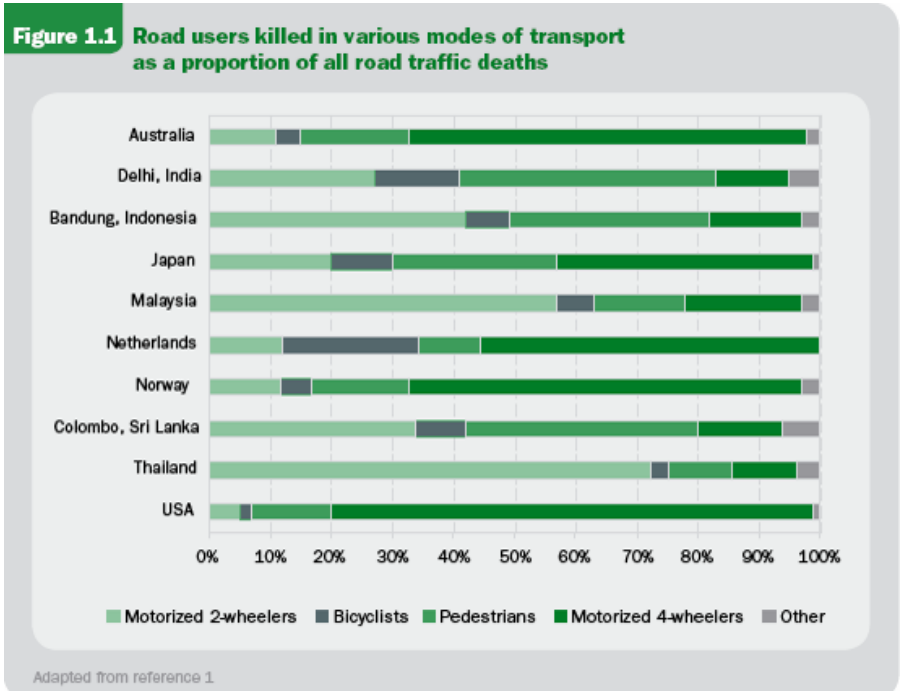
Driving While on Cell Phone can be worse than Driving While Drunk

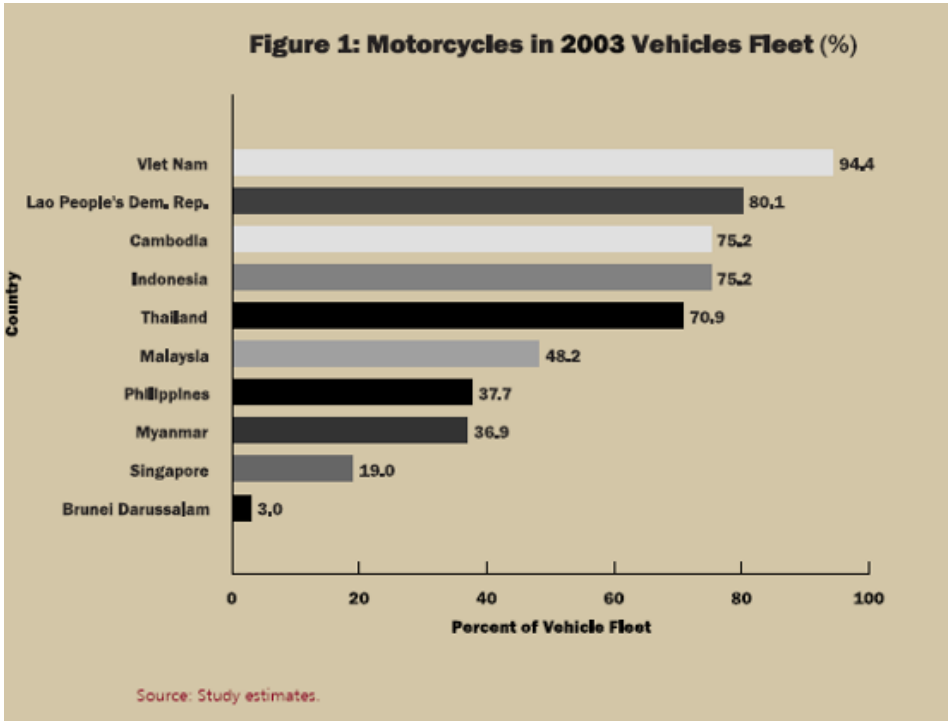
- Talking on the cell phone reduce reaction time by 9 percent in terms of braking and 19 percent in terms of picking up speed after braking
- “Drivers on cell phones were 5.36 times more likely to get in an accident than non-distracted drivers”
- "We have seen again and again that there is no difference between hands-free and hand-held devices, the problem is the conversation."

Asst. Prof. Frank Drews (U. Of Utah)

Enforcement - Helmet

- Motorcycles are increasing common means of transport in low-income and mid-income countries





Motorcycle riders are vulnerable

- High speed
- No or little protection

Enforcement – speed limits

Importance of Speed limits

Australia

Between 1997 and 2003, Australia states slowly changed the speed limit on residential streets from 60 km/hr to 50 km/hr.

Findings

- A reduction of 20% in casualty crashes was observed.
- Vulnerable road users (e.g. pedestrians) gained the most benefit from the project.

What if the speed limit is reduced to 30 km/hr??

Education

Education

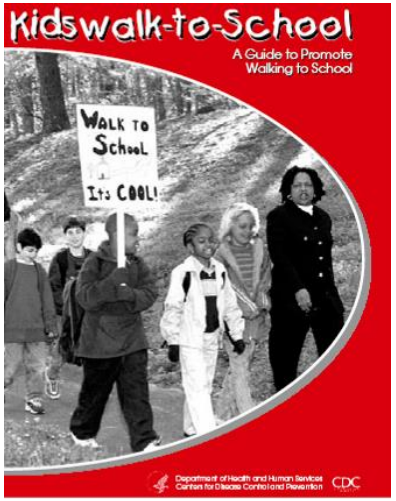
Who need education?

- Pedestrians
- Cyclists
- Parents of children and youths
- Transit riders
- **Motorists**

Education

Non-motorized transport

- Traffic Law
- Understand traffic control devices
- How to walk/ride with traffic
- Importance of protection gears (e.g., helmet)
- Use hand signals
- Importance of courtesy toward other road users, motorists



Education

Motorists

- Rights of pedestrians/ cyclists to use the roadways
- Motorists should have skills for sharing the road with pedestrians/cyclists
- Improper turning movements that endanger other road users
- Importance of courtesy toward other road users
- Proper maintenance and operation

Education – Public Awareness

Design Awareness Campaigns

- Select focus groups and tailor campaigns accordingly
- Involve private stakeholder (sponsoring)

Education – public awareness

- Car-Free Day
- Bike Day

Education – public awareness

- Public Representatives to promote bike usage and walking

Education – public awareness

Bogota – the Black Star Project

Emergency Response

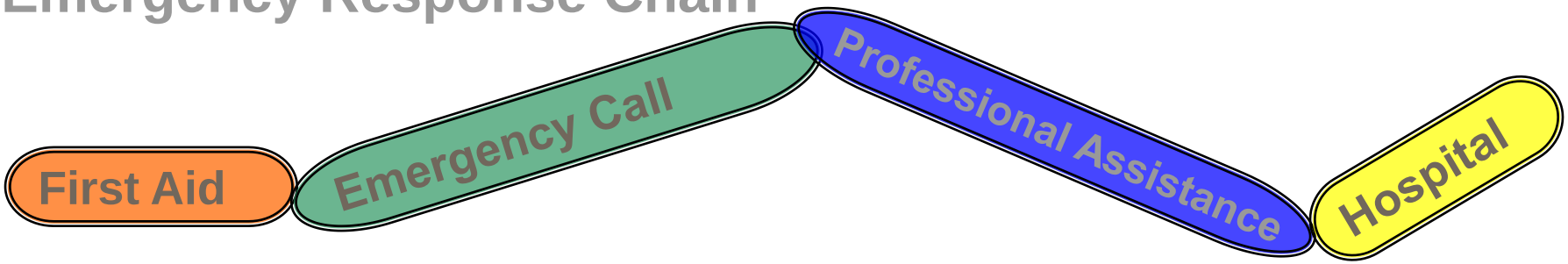
Emergency Response

Effective first aid at the crash site is crucial !

Each second counts!

Emergency Response

Emergency Response Chain



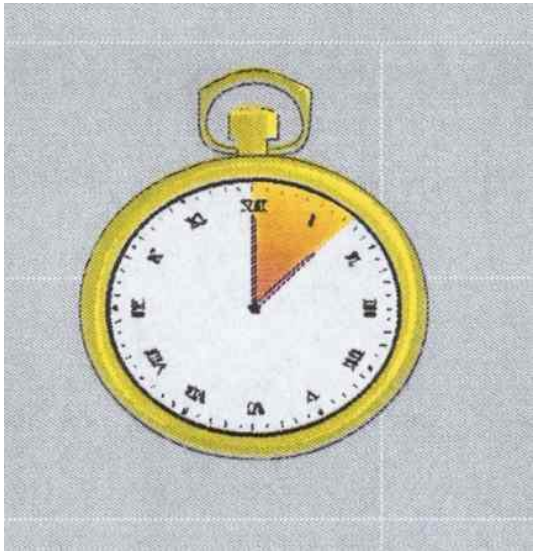
- Introduce mandatory first-aid courses for beginners (as conditionality for driving license)
- Maker refresher courses mandatory for professional drivers (truck, bus driver)
- Make first-aid kits mandatory

- Set maximum response times
- Introduce single emergency number

- Set maximum response times
- Close coordination of response efforts by emergency control room
- Enhance training of medical and non-medical staff involved in accident response

- Set up specific trauma units dealing with road accident victims
- Short distances from emergency vehicle to admission
- Early provision of information on accident

Emergency Response



Response Time (Germany 2000) (Time elapsed between incoming call at emergency center and arrival at accident scene; cumulated figures)

Up to 2 min: 9.7 %

Up to 5 min: 36.7 %

Up to 7 min: 57.6 %

Up to 10 min: 78.6 %

Up to 15 min: 93.0 %

Source: Federal Report on Accident Prevention/Germany – 2000/2001

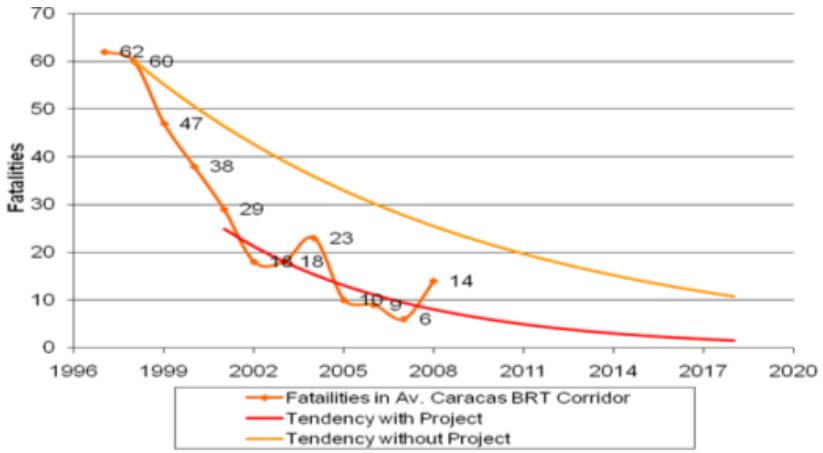
Strategies to improve road safety

10 Steps

- Formulate leading organization of local road safety and establish effective management and coordination of road safety activity
- Assessing the problems and setting targets for casualty reductions
- Develop an urban database to analyse and understand the problem
- Creating a safer road environment (engineering, safe road infrastructure)
- Raising public awareness and improve education
- Implement speed management and other measures to reduce risk to VRUs
- Traffic law enforcement to encourage safe road user behavior
- Promoting use of safer vehicles
- Sound and sustainable financing of road safety policies
- Integrating all elements into a “comprehensive road safety policy”

All steps have to be considered being part of an integrated policy

Strategy: Improve public transport



Potential road fatalities averted on account of the BRT

Source: EMBARQ study. Dario Hidalgo

A high quality public transport system can save lives

SAFEST

BRT

Open system

Curbside buslane

Counter-flow busway

LEAST SAFE

BRT is safer than other bus systems

Analysis: EMBARQ Mexico

Sound financing of road safety policies

Recommendation:
1 US-Cent per Litre

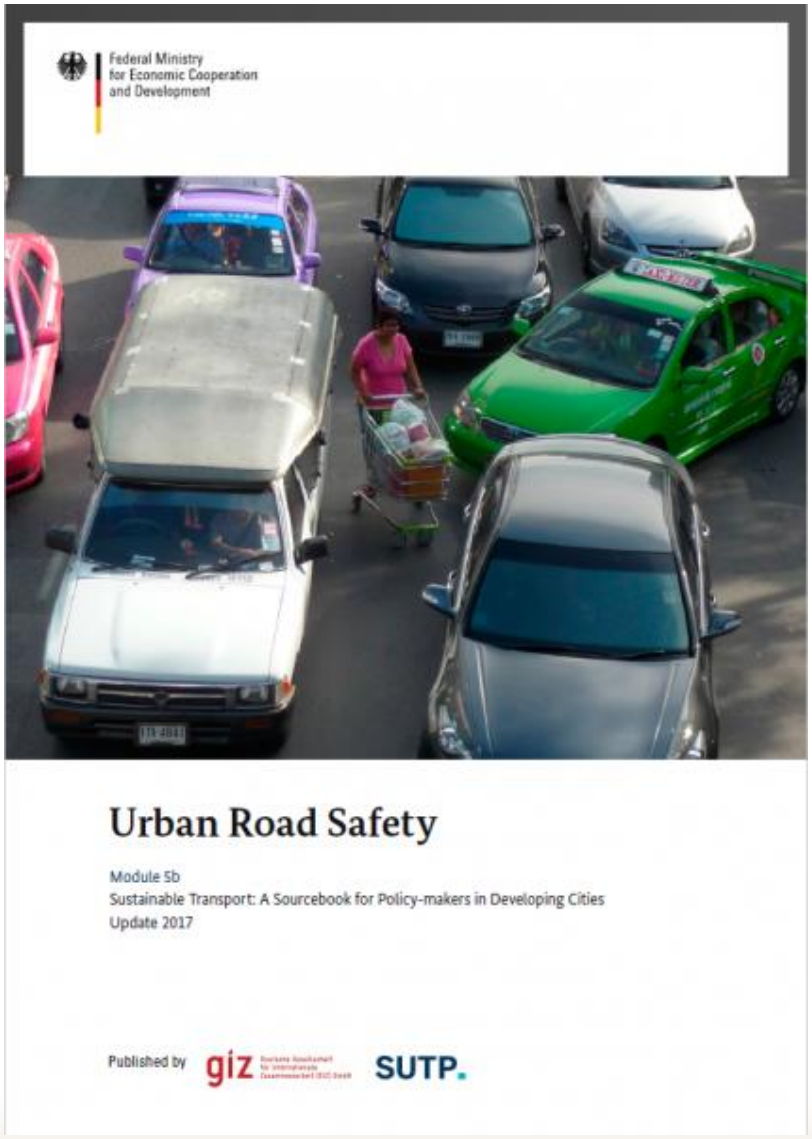
Potential Surcharge in Mio US$ p.a. (Examples)

Cameroon	59
Indonesia	210
Mexico	101
Namibia	8

Source of Funding	Advantages	Disadvantages
Surcharges on motor fuel	Low level of evasion Low collection fee	Difficulty to raise fuel prices
Surcharges on weight-distance charges	Accepted as user charge	High level of evasion
Surcharges on compulsory vehicle insurance fees	Best related to road safety	High level of evasion
Surcharges on vehicle licensing fees	Low collection fee	High level of evasion
Surcharges on road tolls	Low level of evasion Accepted as user charge	Toll roads form only a small part of the road network
Contribution by private sector	Can complement road safety financing and can make use of private sector management and efficiency	Can only provide limited amounts and may not be sustainable
Development loans and grants	Can initiate effective road safety programmes and financing schemes	Not sustainable

Priority Categories:

More: "The Road Safety Cent" - www.giz.de



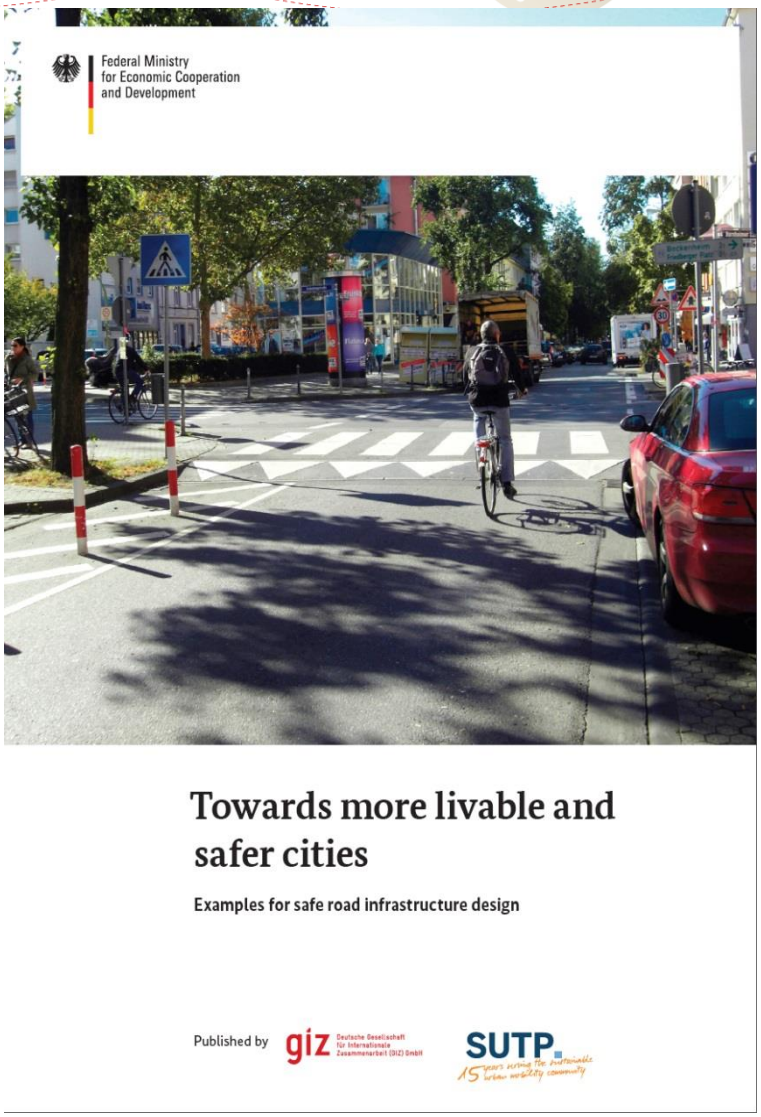
Six Recommendations for Improvement of Urban Road Safety

2017-01-24

With injuries every year on roads – over 90% of which happen in low and middle income countries (LMICs), road safety is now recognized as an urgent global problem.

http://www.sutp.org/en/news-reader/six-recommendations-for-improvement-of-urban-road-safety.html

Update published in 2017



Towards more liveable and safer cities: Examples for safe road infrastructure design

The GIZ publication "Towards more liveable and safer cities: Examples for save safe road infrastructure design" shows selected examples of low-cost and easy to implement solutions, including

- Pedestrian curb extensions
- Crosswalks (pedestrian crossings)
- On-street parking
- Pedestrian refugee islands
- Raised sidewalks at driveway intersections
- Road narrowing
- Small roundabouts
- Traffic diverter
- Traffic calming
- Plantation

Download: http://www.sutp.org/files/contents/documents/resources/J_Others/GIZ_SUTP_Towards-more-livable-and-safer-cities_Examples-for-save-road-infrastructure-design.pdf

GIZ SUTP project
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Transformative Urban Mobility INITIATIVE

Transformative Urban Mobility Initiative

IMPLEMENTING THE NEW URBAN AGENDA



Bilder: © GIZ SUTP Photo Collection

What we do

Transformative Urban Mobility INITIATIVE

Investment

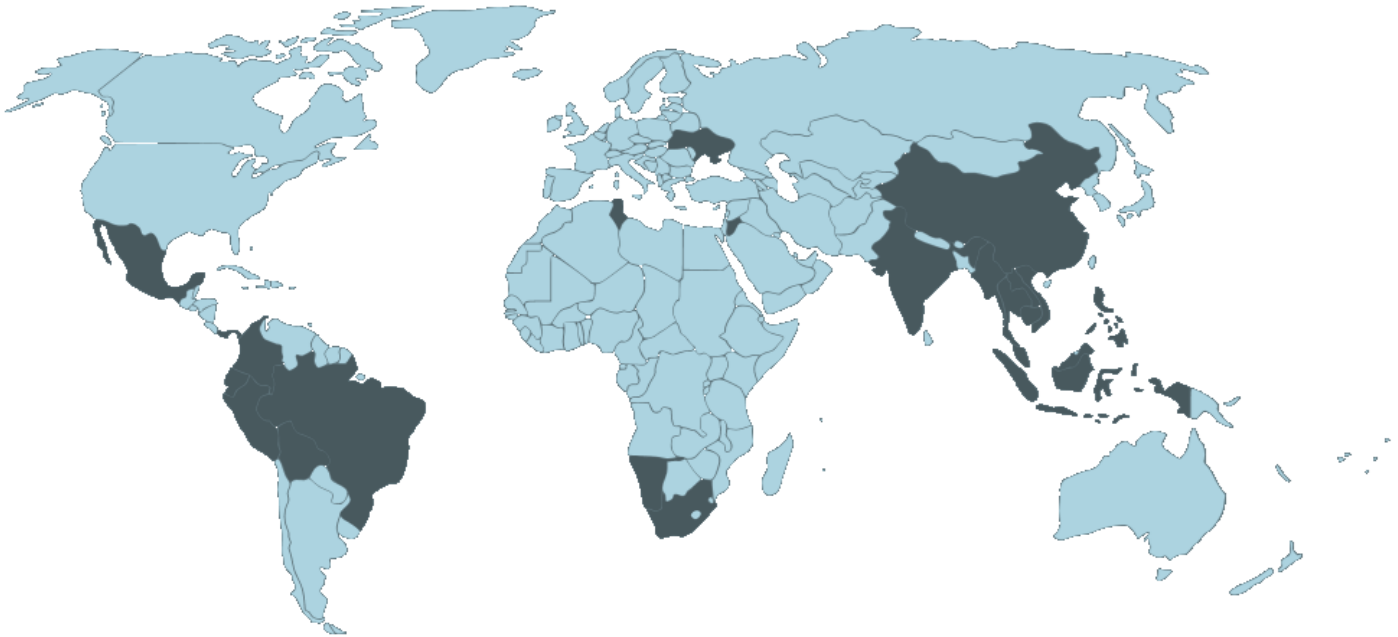
MOBILISE investments to build, modernize and augment sustainable urban mobility infrastructure

1000 Leaders

ENABLE 1,000 urban leaders, decision-makers, planners and students to plan and implement sustainable mobility concepts.

Pilot Cities

SUPPORT innovative solutions with potential for replication and upscaling through a number of pilot activities across the globe



Targets

Transformative Urban Mobility INITIATIVE

(1) Accessible transport systems for economic growth and prosperity

Support our partner cities in reducing congestion and creating accessible environments for people and the economy

(2) Healthy and clean cities as livable places

Support our partner cities in reducing the number of traffic fatalities and transport-related air pollution

(3) Social inclusion for urban dwellers

Support our partner cities in providing affordable access to public transport services and safe walking infrastructures for all population groups

(4) Climate-sensitive urban transport development

Support our partner cities in building resilient structures and reducing greenhouse gas emissions in urban transport

Launch at Habitat-III in Quito

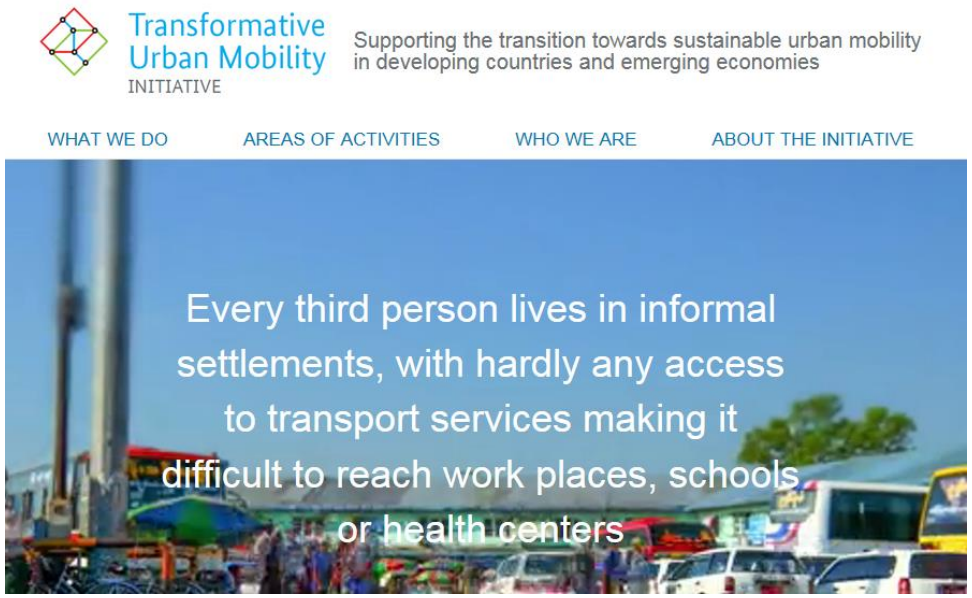
Transformative Urban Mobility INITIATIVE

11 Partners

ADB · C40 CITIES · giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH · Federal Ministry for Economic Cooperation and Development · KFW · WORLD RESOURCES INSTITUTE

ITDP Institute for Transportation & Development Policy · ICLEI Local Governments for Sustainability · CAF · Partnership on Sustainable Low Carbon Transport · UN-HABITAT

Contact



Website: http://transformative-mobility.org

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