Tow Truck Road Safety

Introduction

Road traffic safety aims to reduce the harm (deaths, injuries, and property damage) resulting from crashes of road vehicles. Harm from road traffic crashes is greater than that from all other transportation modes (air, sea, space, off-terrain, etc.) combined.

Road traffic safety deals exclusively with road traffic crashes – how to reduce their number and their consequences. A *road traffic crash* is an event involving a road vehicle that results in harm. For reasons of clear data collection, only harm involving a road vehicle is included. A person tripping with fatal consequences on a public road is not included as a road-traffic fatality. To be counted a pedestrian fatality, the victim must be struck by a road vehicle.

Road traffic crashes are one of the world's largest public health and injury prevention problems. The problem is all the more acute because the victims are overwhelmingly healthy prior to their crashes. According to the World Health Organization more than a million people are killed on roads each year.

Types of Harm

Fatality

Conceptually, the clearest type of harm in a road traffic crash is death – or a fatality. However, the definition of a road-traffic fatality is far more complicated than a casual thought might indicate, and involves many essentially arbitrary criteria. In the United States, for example, the

definition used in the Fatality Analysis Reporting System (FARS) run by the NHTSA is a person who dies within 30 days of a crash on a US public road involving a vehicle with an engine, the death being the result of the crash. In America therefore, if a driver has a non-fatal heart attack that leads to a road-traffic crash that causes death, that is a road-traffic fatality. However, if the heart attack causes death prior to the crash, then that is not a road-traffic fatality.

Injuries

It is highly uncertain exactly how many road traffic crash injuries occur in the world. Whether an injury is reported may depend upon compensation and medical procedures as well as on the amount of harm.

Property Damage

Data for property damage crashes is even more uncertain than for injuries. In some jurisdictions the criterion for reporting is damage exceeding some monetary amount specified by statute. Because of inflation, this requirement may include more and more minor crashes as time passes, until the amount is abruptly changed, thereby reducing the reported number of crashes. Drivers generally report single-vehicle property damage crashes only if they see some benefit in reporting them, regardless of legal obligations.

Crash Rates

The safety performance of roadways is almost always reported as rates. That is, some measure of harm (deaths, injuries, or property damage) divided by some indicator of exposure to the risk of

this harm. Common rates related to road traffic fatalities include the number of deaths per capita, per registered vehicle, per licensed driver, or per vehicle mile traveled.

Simple counts are almost never used. The annual count of fatalities is a rate, namely, the number of fatalities per year. There is no one rate that is superior to others in any general sense. The rate to be selected depends on the question being asked – and often also on what data are available. What is important is to specify exactly what rate is measured and how it relates to the problem being addressed.

Defining the Problem

The standard measures used in assessing road safety interventions are fatalities and Killed or Seriously Injured (KSI) rates; crashes per million vehicle miles.

Speed is a key goal of modern road design, but impact speed affects the severity of injury to both occupants and pedestrians. Injuries are caused by sudden, severe acceleration (or deceleration); this is difficult to measure. However, crash reconstruction techniques can be used to estimate vehicle speeds before a crash.

Interventions

Interventions take many forms. Contributing factors to highway crashes may be related to the driver (such as driver error, illness or fatigue), the vehicle (brake, steering, or throttle failures) or the road itself (lack of sight distance, poor roadside clear zones, etc). Interventions may seek to reduce or compensate for these factors, or reduce the severity of crashes that do occur.

Road Design

On neighborhood roads where many vulnerable road users, such as pedestrians and bicyclists can be found, traffic calming can be a tool for road safety. Shared space schemes, which rely on human instincts and interactions, such as eye contact, for their effectiveness, and are characterized by the removal of traditional traffic signals and signs, and even by the removal of the distinction between roadway and sidewalk, are also becoming increasingly popular. Both approaches can be shown to be effective.

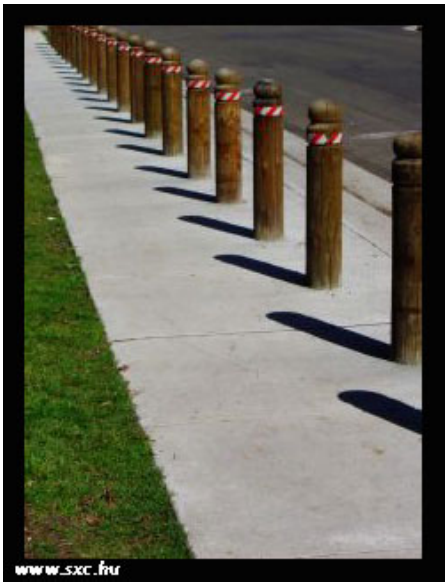
Outside neighborhood roads, design features are added to increase motorized safety and mobility. These features come at increasing costs; costs which include monetary amounts, decreased or discouraged usage by non-motorized travelers, as well as aesthetics. Benefits include a broader spectrum of occupational, cultural and entertainment options than enjoyed by more travel-limited generations.

Freeways have the best engineered road features, limited access and minimize opportunities for conflict so are typically the safest roads per mile travelled and offer better fuel economy despite higher average speeds.

Road Design Features

Better freeways are banked on curves in order to reduce the need for tire-traction and increase stability for vehicles with high centers of gravity. Most roads are cambered (crowned), that is, made so that they have rounded surfaces, to reduce standing water and ice, primarily to prevent frost damage but also increasing traction in poor weather.

Modern safety barriers are designed to absorb impact energy and minimize the risk to the occupants of cars, and bystanders. For example, most side rails are now anchored to the ground, so that they cannot skewer a passenger compartment, and most light poles are designed to break at the base rather than violently stop a car that hits them. Some road fixtures such as road signs and fire hydrants are designed to collapse on impact. Highway authorities have also removed trees in the vicinity of roads; while the idea of "dangerous trees" has attracted a certain amount of skepticism, unforgiving objects such as trees can cause severe damage and injury.



The ends of some guard rails on high-speed highways are protected with impact attenuators, designed to gradually absorb the kinetic energy of a vehicle and slow it more gently before it can strike the end of the guard rail head on, which would be devastating at high speed. Several mechanisms are used to dissipate the kinetic energy. Fitch Barriers, a system of sand-filled barrels, uses momentum transfer from the vehicle to the sand. Many other systems tear or deform steel members to absorb energy and gradually stop the vehicle.

Road hazards and intersections in some areas are now usually marked several times, roughly five, twenty and sixty seconds in advance so that drivers are less likely to attempt violent maneuvers.

Most road signs and pavement marking materials are retro-reflective, incorporating small glass spheres or prisms to more efficiently reflect light from vehicle headlights back to the driver's eyes.

Some major roads have "tone bands" impressed or cut into the edges of the legal roadway, so that drowsing drivers are awakened by a loud hum as they release the steering and drift off the edge of the road. Tone bands are also referred to as "rumble strips," owing to the sound they create.

Freeways

Freeways have the highest design standards for speed, safety and fuel efficiency. They improve safety by:

- prohibiting more vulnerable road users
- prohibiting slow-moving vehicles, thus reducing speed variation
- segregating opposing traffic flows with median dividers or crash barriers, thus reducing potential for opposite-direction collisions
- removing roadside obstacles.

Although freeways may experience greater severity than most roads due to higher speeds in the event of a crash, the probability of a crash is reduced by removing interactions (crossing, passing, slower and opposing traffic), and crash severity is reduced by removing massive, fixed

objects or surrounding them with energy attenuation devices (e.g. guardrails, wide grassy areas, sand barrels). These mechanisms deliver lower fatalities.

The proportion of traffic borne by freeways is a significant safety factor. The reduction of conflicts with other vehicles results in smoother traffic flow, reduced collision rates, and reduced fuel consumption compared with stop-and-go traffic on other roadways.

The improved safety and fuel economy of freeways are common justifications for building more freeways. However, the planned capacity is often exceeded in a shorter timeframe than initially planned, due to the under estimation of the extent of the suppressed demand for road travel.

Pavement Design

Poor pavement construction can lead to safety problems. If too much asphalt or bituminous binder is used in asphalt concrete, the binder can 'bleed' or flush' to the surface, leaving a very smooth surface that provides little traction when wet. Certain kinds of stone aggregate become very smooth or polished under the constant wearing action of vehicle tires, again leading to poor wet-weather traction. Either of these problems can increase wet-weather crashes by increasing braking distances or contributing to loss of control. If the pavement is insufficiently sloped or poorly drained, standing water on the surface can also lead to wet-weather crashes.

Alternative Approaches

For most of the 20th Century, many road authorities believed that traffic should be separated and controlled by class (pedestrian, bicyclist, and motor vehicle driver) in order to combine high speed use of motor vehicles with good traffic safety. Acceptance of this view by the authorities has led to the widespread use of traffic lights, pedestrian crossings, and, in some jurisdictions, cycle lanes.

Motorized Vehicle Safety Features

Safety can be improved by reducing the chances of a driver making an error, or by designing vehicles to reduce the severity of crashes that do occur. Most industrialized countries have extensive lists of safety features on new vehicles. Other features are extra-cost options. Safety interventions focusing on motorized vehicles include:

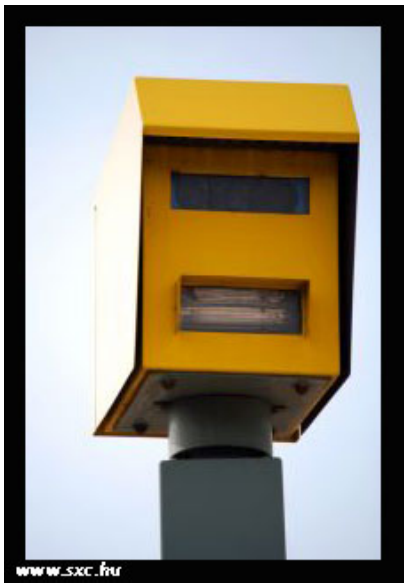
- Seat belts, including seat belt legislation. Seat belts are now fitted by law in both front and rear of most passenger cars and an increasing number of public transit vehicles.
- Airbags
- Electronic Stability Control
- Safety cages, which protect the driver from intrusion by impacting objects, and crumple zones, which absorb collision energy.
- Compulsory safety testing of vehicles over a certain age.
- Crash compatibility, including efforts to match bumper heights and sill heights, moderate differences in vehicle weight, and match crumple zone stiffness.

- Adaptive cruise control that automatically detects how close the driver is to the car in front and warn the driver or automatically adjust the car's throttle or brakes to prevent the car from getting closer than the distance in which it can safely stop.
- *Parking sensors*: These sensors give audible warnings at slow speed if the front or rear of the vehicle approaches an object.
- *Sobriety detectors*: These interlocks prevent the ignition key from working if the driver breathes into one and it detects significant quantities of alcohol. They have been used by some commercial transport companies, or suggested for use with persistent drink-driving offenders on a voluntary basis
- *Drifting monitors*: These devices monitor how close a vehicle is travelling to lane markers and, if it starts to drift toward or over the markers without the turn signal being activated, sounds an alarm.

Countermeasures Directed at Drivers

Safety can be improved by methods that encourage safe behavior, or reduce the chances of driver error. Some of these include:

- Compulsory training and licensing (although this is often a once-off requirement some countries require periodic retests and others will require drivers convicted of offences to undergo certain training and retests before being allowed back on the roads). (see: traffic psychology)



- Restrictions on driving while drunk or impaired by drugs.
- Restrictions on mobile phone use while on the move.
- Compulsory insurance to compensate victims.
- Restrictions on commercial vehicle driver hours, and fitting of tachographs.
- Conventional and automated enforcement of traffic laws, including red-light running cameras and photo-radar.

Other Road Users

Pedestrians and Cyclists are among the most vulnerable road users, and in some countries constitute over half of all road deaths. Interventions aimed at improving safety of non-motorized users:

- segregated facilities such as cycle lanes, underpasses and over bridges
- physical separation of segregated facilities
- pedestrian barriers to prevent pedestrians crossing at junctions
- limiting pedestrian access to highways
- bicycle helmet promotion and compulsion
- traffic awareness campaigns
- pedestrian crossings, which are seen as restricting the number of points at which a road may be crossed and often requiring detours.
- traffic calming and speed humps

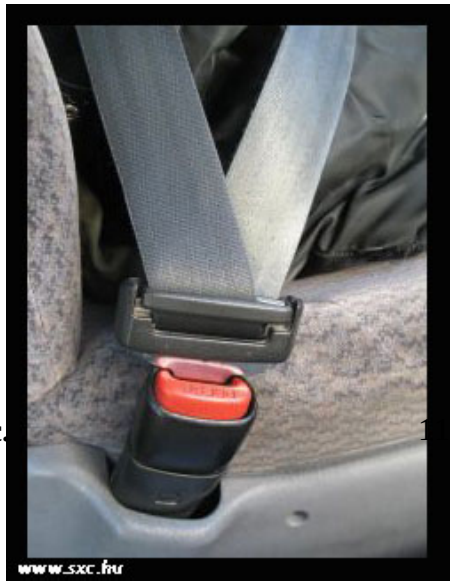
- shared space schemes giving ownership of the road space and equal priority to all road users, regardless of mode of use
- reduced urban speed limits
- rigorous speed limit enforcement by automated means such as speed cameras

Specific Road Safety Recommendations for Tow Truck Operations

Tow truck operators transport damaged, non-operational or illegally parked vehicles, aid motorists and keep streets and highways clear. Vehicles are moving all the time, so tow truck operators are called out at all times of day, year-round. Operators should learn safety basics because this job involves personal safety, driving, heavy equipment, and traffic safety for tow truck operations.

Your personal safety: be sure that someone knows your destination and is monitoring your planned route. If any situation looks or feels dangerous, don't get involved; call for backup. Be calm and diplomatic when dealing with customers. When exiting your truck, be aware of the traffic around you; look and think before you enter an active roadway. To avoid a fall, use the steps and handles getting in and out of the truck and don't jump in or out of the cab or bed.

Your physical condition is a key factor in your safe working environment. Your job may require stretching, bending, lifting, and climbing. Avoid back injuries by using good body mechanics and lifting techniques. Don't strain, twist,



or over-reach, and avoid extreme or awkward positions as much as possible.

Vehicle/driving safety: Drive defensively and stay alert. Avoid alcohol, drugs, and medications that cause drowsiness. Follow safe hours of service guidelines. Wear your seatbelt. Obey speed limits and road regulations. Don't multi-task; keep your eyes and mind on the road. When towing, use your lights or a light bar to signal your intentions and show the rig length.

Overloading may cause an accident; know your equipment rating and capacity. Be aware of your truck height for maneuvering under overpasses and bridges. Inspect the truck before each use. Check the utility body and mounts and fix broken bolts, cracked welds, or stress fractures. Inspect the chains and hooks on the rig. Be sure the security pins are not bent or falling out and the chain has no bent, stretched, or hammered links.

Inspect the winch and cable often, keep it clean and lubricated; repair or replace as required. Use hooks and clamps rated at the same capacity as the wire. Maintain 3 to 5 wraps on the winch drum and rewind it periodically to lay the cable flat and even. Watch the lines so that they don't get tangled; placing continued pressure can shear the cable and send it flying at high speed.

When hooking up a towed vehicle, block and chock the wheels before disengaging the driveshaft or the brakes. Try not to work under a lifted truck; if you must do so, block and chock the wheels, front and back. Use lockout/tagout procedures on the wheel lift, boom and winches while working under a truck or between the truck and towed vehicle. If you have a remote to the lift, boom or winch, do not leave it in your pocket or on the ground where it could be accidentally activated; lockout and secure the remote inside your truck until you are ready to use it. When working in the tow-away zone, stay in the safety zone.