Traffic Law and Road Traffic Management

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Table of Contents

Chapter- 1

Traffic Congestion

Traffic congestion on Marginal Pinheiros, near downtown São Paulo. According to *Time* magazine, São Paulo has the world's worst traffic jams. Drivers are informed through variable message signs the prevailing queue length.

Common traffic in Ho Chi Minh City, Vietnam

Bangkok is notorious for its traffic congestion

Congestion on a city road in Moscow

Congestion in Kharkov

A traffic jam in the Himalayas (Garhwal hills, India)

Traffic congestion is a condition on road networks that occurs as use increases, and is characterized by slower speeds, longer trip times, and increased vehicular queueing. The most common example is the physical use of roads by vehicles. When traffic demand is great enough that the interaction between vehicles slows the speed of the traffic stream, congestion is incurred. As demand approaches the capacity of a road (or of the intersections along the road), extreme traffic congestion sets in. When vehicles are fully stopped for periods of time, this is colloquially known as a **traffic jam**.

Causes

Congestion on a street in Taipei consisting primarily of motorcycles

Congestion caused by a road accident, Algarve, Portugal

Congestion caused by evacuees fleeing Hurricane Rita. Traffic in all lanes of the highway is traveling in the same direction.

Traffic congestion occurs when a volume of traffic or modal split generates demand for space greater than the available road capacity, this is point is commonly termed saturation. There are a number of specific circumstances which cause or aggravate congestion; most of them reduce the capacity of a road at a given point or over a certain length, or increase the number of vehicles required for a given volume of people or goods. About half of U.S. traffic congestion is recurring, and is attributed to sheer weight of traffic; most of the rest is attributed to traffic incidents, road works and weather events.

Traffic research still cannot fully predict under which conditions a "traffic jam" (as opposed to heavy, but smoothly flowing traffic) may suddenly occur. It has been found that individual incidents (such as accidents or even a single car braking heavily in a previously smooth flow) may cause ripple effects (a cascading failure) which then spread out and create a sustained traffic jam when, otherwise, normal flow might have continued for some time longer.

Mathematical theories

Some traffic engineers have attempted to apply the rules of fluid dynamics to traffic flow, likening it to the flow of a fluid in a pipe. Congestion simulations and real-time observations have shown that in heavy but free flowing traffic, jams can arise spontaneously, triggered by minor events ("butterfly effects"), such as an abrupt steering maneuver by a single motorist. Traffic scientists liken such a situation to the sudden freezing of supercooled fluid. However, unlike a fluid, traffic flow is often affected by signals or other events at junctions that periodically affect the smooth flow of traffic. Alternative mathematical theories exist, such as Boris Kerner's three phase traffic theory.

Because of the poor correlation of theoretical models to actual observed traffic flows, transportation planners and highway engineers attempt to forecast traffic flow using empirical models. Their working traffic models typically use a combination of macro-, micro- and mesoscopic features, and may add matrix entropy effects, by "platooning" groups of vehicles and by randomising the flow patterns within individual segments of the network. These models are then typically calibrated by measuring actual traffic flows on the links in the network, and the baseline flows are adjusted accordingly.

It is now claimed that equations can predict these in detail:

> Phantom jams can form when there is a heavy volume of cars on the road. In that high density of traffic, small disturbances (a driver hitting the brake too hard, or getting too close to another car) can quickly become amplified into a full-blown, self-sustaining traffic jam...
> A team of MIT mathematicians has developed a model that describes how and under what conditions such jams form, which could help road designers minimize the odds of their formation. The researchers reported their findings May 26 in the online edition of Physical Review E.
> Key to the new study is the realization that the mathematics of such jams, which the researchers call 'jamitons,' are strikingly similar to the equations that describe

detonation waves produced by explosions, says Aslan Kasimov, lecturer in MIT's Department of Mathematics. That discovery enabled the team to solve traffic jam equations that were first theorized in the 1950s.

Economic theories

India's economic surge has resulted in a massive increase in the number of private vehicles on its roads, overwhelming the transport infrastructure. Shown here is a traffic jam in Delhi.

As in India, China's economic surge has resulted in a massive increase in the number of private vehicles on its roads overwhelming the transport infrastructure. Shown here is a traffic jam in Beijing.

Congested roads can be seen as an example of the tragedy of the commons. Because roads in most places are free at the point of usage, there is little financial incentive for drivers not to over-use them, up to the point where traffic collapses into a jam, when demand becomes limited by opportunity cost. Privatization of highways and road pricing have both been proposed as measures that may reduce congestion through economic incentives and disincentives. Congestion can also happen due to non-recurring highway incidents, such as a crash or roadworks, which may reduce the road's capacity below normal levels.

Economist Anthony Downs, in his books *Stuck in Traffic* (1992) and *Still Stuck in Traffic* (2004), argues that rush hour traffic congestion is inevitable because of the benefits of having a relatively standard work day. In a capitalist economy, goods can be allocated either by pricing (ability to pay) or by queueing (first-come first-serve); congestion is an example of the latter. Instead of the traditional solution of making the "pipe" large enough to accommodate the total demand for peak-hour vehicle travel (a supply-side solution), either by widening roadways or increasing "flow pressure" via automated highway systems, Downs advocates greater use of road pricing to reduce congestion (a demand-side solution, effectively rationing demand), in turn plowing the revenues generated therefrom into public transportation projects. Road pricing itself is controversial, more information is available in the dedicated article.

Classification

Qualitative classification of traffic is often done in the form of a six letter A-F level of service (LOS) scale defined in the Highway Capacity Manual, a US document used (or used as a basis for national guidelines) worldwide. These levels are used by transportation engineers as a shorthand and to describe traffic levels to the lay public. While this system generally uses delay as the basis for its measurements, the particular measurements and statistical methods vary depending on the facility being described. For instance, while the percent time spent following a slower-moving vehicle figures into the LOS for a rural two-lane road, the LOS at an urban intersection incorporates such measurements as the number of drivers forced to wait through more than one signal cycle.

Negative impacts

Traffic congestion detector in Germany

Traffic congestion has a number of negative effects:

- Wasting time of motorists and passengers ("opportunity cost"). As a non-productive activity for most people, congestion reduces regional economic health.
- Delays, which may result in late arrival for employment, meetings, and education, resulting in lost business, disciplinary action or other personal losses.
- Inability to forecast travel time accurately, leading to drivers allocating more time to travel "just in case", and less time on productive activities.
- Wasted fuel increasing air pollution and carbon dioxide emissions owing to increased idling, acceleration and braking. Increased fuel use may also in theory cause a rise in fuel costs.
- Wear and tear on vehicles as a result of idling in traffic and frequent acceleration and braking, leading to more frequent repairs and replacements.
- Stressed and frustrated motorists, encouraging road rage and reduced health of motorists
- Emergencies: blocked traffic may interfere with the passage of emergency vehicles traveling to their destinations where they are urgently needed.
- Spillover effect from congested main arteries to secondary roads and side streets as alternative routes are attempted ('rat running'), which may affect neighborhood amenity and real estate prices.

Countermeasures

It has been suggested by some commentators that the level of congestion that society tolerates is a rational (though not necessarily conscious) choice between the costs of improving the transportation system (in infrastructure or management) and the benefits of quicker travel. Others link it largely to subjective lifestyle choices, differentiating between car-owning and car-free households.

Road infrastructure

- Junction improvements
    - Grade separation, using bridges (or, less often, tunnels) freeing movements from having to stop for other crossing movements
    - Ramp signalling, 'drip-feeding' merging traffic via traffic signals onto a congested motorway-type roadway
    - Reducing junctions
        - Local-express lanes, providing through lanes that bypass junction on-ramp and off-ramp zones
        - Limited-access road, roads that limit the type and amounts of driveways along their lengths
- Reversible lanes, where certain sections of highway operate in the opposite direction on different times of the day/ days of the week, to match asymmetric demand. This may be controlled by Variable-message signs or by movable physical separation

- Separate lanes for specific user groups (usually with the goal of higher people throughput with fewer vehicles)
    - Bus lanes as part of a busway system
    - HOV lanes, for vehicles with at least three (sometimes at least two) riders, intended to encourage carpooling
        - Slugging, impromptu carpooling at HOV access points, on a hitchhiking or payment basis
        - Market-based carpooling with pre-negotiated financial incentives for the driver

Urban planning and design

City planning and urban design practices can have a huge impact on levels of future traffic congestion, though they are of limited relevance for short-term change.

- Grid plans including Fused Grid road network geometry, rather than tree-like network topology which branches into cul-de-sacs (which reduce local traffic, but increase total distances driven and discourage walking by reducing connectivity). This avoids concentration of traffic on a small number of arterial roads and allows more trips to be made without a car.
- Zoning laws that encourage mixed-use development, which reduces distances between residential, commercial, retail, and recreational destinations (and encourage cycling and walking)
- Carfree cities, car-light cities, and eco-cities designed to eliminate the need to travel by car for most inhabitants.
- Transit-oriented development are residential and commercial areas designed to maximize access to public transport.

Supply and demand

Widening works underway on the M25 motorway to increase the number of lanes

Congestion can be reduced by either increasing road capacity (supply), or by reducing traffic (demand). Capacity can be increased in a number of ways, but needs to take account of latent demand otherwise it may be used more strongly than anticipated. Critics of the approach of adding capacity have compared it to "fighting obesity by letting out your belt" (inducing demand that did not exist before). Reducing road capacity has in turn been attacked as removing free choice as well as increasing travel costs and times.

Increased supply can include:

- Adding more capacity at bottlenecks (such as by adding more lanes at the expense of hard shoulders or safety zones, or by removing local obstacles like bridge supports and widening tunnels)
- Adding more capacity over the whole of a route (generally by adding more lanes)
- Creating new routes
- Traffic management improvements

Reduction of demand can include:

- Parking restrictions, making motor vehicle use less attractive by increasing the monetary and non-monetary costs of parking, introducing greater competition for

limited city or road space. Most transport planning experts agree that free parking distorts the market in favour of car travel, exacerbating congestion.

- Park and ride facilities allowing parking at a distance and allowing continuation by public transport or ride sharing. Park-and-ride car parks are commonly found at metro stations, freeway entrances in suburban areas, and at the edge of smaller cities.
- Reduction of road capacity to force traffic onto other travel modes. Methods include traffic calming and the shared space concept.
- Road pricing, charging money for access onto a road/specific area at certain times, congestion levels or for certain road users
    - "Cap and trade", in which only licensed cars are allowed on the roads. A limited quota of car licences are issued each year and traded in a free market fashion. This guarantees that the number of cars does not exceed road capacity while avoiding the negative effects of shortages normally associated with quotas. However since demand for cars tends to be inelastic, the result are exorbitant purchase prices for the licenses, pricing out the lower levels of society, as seen Singapore's Certificate of Entitlement scheme.
    - Congestion pricing, where a certain area, such as the inner part of a congested city, is surrounded with a cordon into which entry with a car requires payment. The cordon may be a physical boundary (i.e., surrounded by toll stations) or it may be virtual, with enforcement being via spot checks or cameras on the entry routes. Major examples are Singapore's electronic road pricing, the London congestion charge system, Stockholm congestion tax and the use of HOT lanes predominately in North America.
- Road space rationing, where regulatory restrictions prevent certain types of vehicles from driving under certain circumstances or in certain areas.
    - Number plate restrictions based on days of the week, as practiced in several large cities in the world, such as Athens, Mexico City and São Paulo. In effect, such cities are banning a different part of the automobile fleet from roads each day of the week. Mainly introduced to combat smog, these measures also reduce congestion. A weakness of this method is that richer drivers can purchase a second or third car to circumvent the ban.
    - Permits, where only certain types of vehicles (such as residents) are permitted to enter a certain area, and other types (such as through-traffic) are banned. For example, Bertrand Delanoë, the mayor of Paris, has proposed to impose a complete ban on motor vehicles in the city's inner districts, with exemptions only for residents, businesses, and the disabled.
- Policy approaches, which usually attempt to provide either strategic alternatives or which encourage greater usage of existing alternatives through promotion, subsidies or restrictions.
    - Incentives to use public transport, increasing modal shares. This can be achieved through infrastructure investment, subsidies, transport integration, pricing strategies that decrease the marginal cost/fixed cost

ratios, improved timetabling and greater priority for buses to reduce journey time e.g. [Bus Lanes], [BTR].
    - Cycling promotion through legislation, cycle facilities, subsidies, and awareness campaigns. The Netherlands has been pursuing cycle friendly policies for decades, and around a quarter of their commuting is done by bicycle.
    - Telecommuting encouraged through legislation and subsidies.
    - Online shopping promotion, potentially with automated delivery booths helping to solve the last mile problem and reduce shopping trips made by car.

Traffic management

Use of so-called Intelligent transportation system, which guide traffic:

- Traffic reporting, via radio, GPS or possibly mobile phones, to advise road users
- Variable message signs installed along the roadway, to advise road users
- Navigation systems, possibly linked up to automatic traffic reporting
- Traffic counters permanently installed, to provide real-time traffic counts
- Convergence indexing road traffic monitoring, to provide information on the use of highway on-ramps
- Automated highway systems, a future idea which could reduce the safe interval between cars (required for braking in emergencies) and increase highway capacity by as much as 100% while increasing travel speeds
- Parking guidance and information systems providing dynamic advice to motorists about free parking
- Active Traffic Management system opens up UK motorway hard shoulder as an extra traffic lane, it uses CCTV and VMS to control and monitor the traffic's use of the extra lane

Other associated

- School opening times arranged to avoid rush hour traffic (in some countries, private car school pickup and drop-off traffic are substantial percentages of peak hour traffic).
- Considerate driving behaviour promotion and enforcement. Driving practices such as tailgating and frequent lane changes can reduce a road's capacity and exacerbate jams. In some countries signs are placed on highways to raise awareness, while others have introduced legislation against inconsiderate driving.
- Visual barriers to prevent drivers from slowing down out of curiosity (often called "rubbernecking" in the United States). This often includes accidents, with traffic slowing down even on roadsides physically separated from the crash location. This also tends to occur at construction sites, which is why some countries have introduced rules that motorway construction has to occur behind visual barrier
- Speed limit reductions, as practiced on the M25 motorway in London. With lower speeds allowing cars to drive closer together, this increases the capacity of a road.

Note that this measure is only effective if the interval between cars is reduced, not the distance itself. Low intervals are generally only safe at low speeds.

- Lane splitting/filtering, where space-efficient vehicles, usually motorcycles, scooters, and ultra-narrow cars ride or drive in the space between cars, buses, and trucks. This is however illegal in many countries as it is perceived as a safety risk.

By country

Australia

Traffic during peak hours in major Australian cities, such as Melbourne, Sydney, Brisbane and Perth, is usually very congested and can cause considerable delay for motorists. Australians rely mainly on radio and television to obtain current traffic information. GPS, webcams, and online resources are increasingly being used to monitor and relay traffic conditions to motorists. Measures put in place by the federal and state government to combat traffic congestion include construction of new road infrastructure and increased investment in public transport. In Brisbane, ongoing road works projects on many major roads have caused ongoing congestion throughout the city and increased commutes considerably.

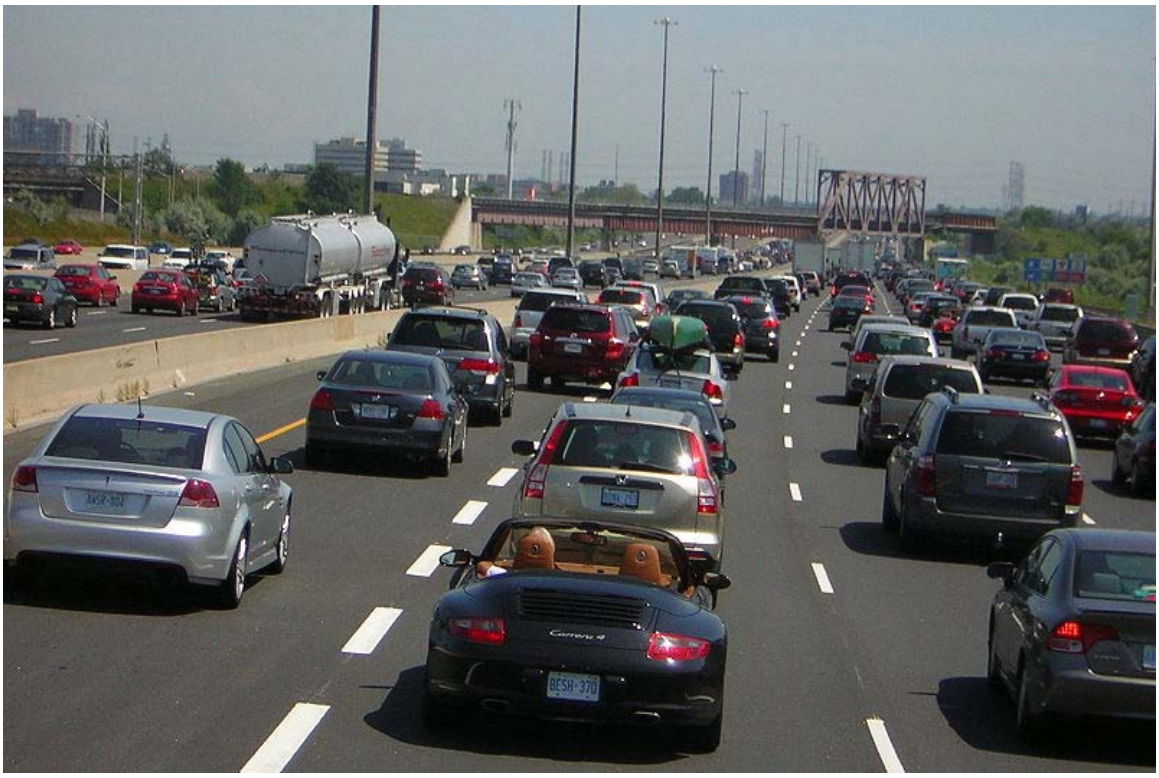
Brazil

Typical traffic jam in São Paulo downtown, despite road space rationing by plate number. *Rua da Consolação*, São Paulo, Brazil.

In Brazil the recent records of traffic jams over the major big cities are recognized by public authorities as one of the main challenges for São Paulo, Rio de Janeiro, Belo Horizonte, Brasilia, Curitiba and Porto Alegre, where due to the country's economic bonanza, the automobile fleets have almost doubled in several of these cities from 2000 to 2008.

According to *Time* magazine, São Paulo has the world's worst daily traffic jams. On June 10, 2009, the historical record was set with more than 182 miles (293 km) of accumulated queues out of 522 mi (835 km) being monitored. Despite implementation since 1997 of road space rationing by the last digit of the plate number during rush hours every weekday, traffic in this 20 million city still experiences severe congestion. According to experts, this is due to the accelerated rate of motorization occurring since 2003, in São Paulo the fleet is growing at a rate of 7.5% per year, with almost 1,000 new cars bought in the city every day, and the limited capacity of public transport. The subway has only 38 miles (61 km) of lines, though 22 further miles are under construction or planned by 2010. Every day, many citizens spend between three up to four hours behind the wheel. In order to mitigate the aggravating congestion problem, since June 30, 2008 the road space rationing program was expanded to include and restrict trucks and light commercial vehicles.

Canada



Highway 401 in Ontario, which passes through Toronto, suffers chronic traffic congestion despite its width, as its average speed varies between 31km/h and 52km/h in 2008.

According to the Toronto Board of Trade, in 2010, Toronto is ranked as the most congested city of 19 surveyed cities, with an average commute time of 80 minutes.

China

The August 2010 China National Highway 110 traffic jam in Hebei province, China, is considered the world's worst traffic jam ever, as traffic congestion stretched more than 100 kilometres (62 mi) from August 14 to the 26, including at least 11 days of total gridlock. The event was caused by a combination of road works and thousands of coal trucks from Inner Mongolia's coalfields that travel daily to Beijing. The New York Times has called this event the "Great Chinese Gridlock of 2010."

Towards the end of 2010, Beijing announced a series of drastic measures to tackle the city's traffic jam, including limiting the number of new plates issued to passenger cars to 20,000 a month and barring cars of non-Beijing plates from entering areas within the Fifth Ring Road during rush hours.

Colombia

In Bogotá the excessive traffic jams cause high levels of stress in people, and are the main cause of air pollution. The problem has been mitigated partially since 2000 through the implementation of the TransMilenio, a bus rapid transit system that has been improving mobility throughout the city. The city also restricts use of vehicles several days each week depending on the last digits of license plates. However, this system, called 'Pico y placa' tends to promote the purchase of second cars by the wealthy.

Hong Kong

Hong Kong aborted a congestion pricing system in the 1980s due to public pressure and has since relied on a vehicle high purchase tax to discourage overall car purchasing but has developed no localised congestion management techniques, However the Transport Department in Hong Kong has set up websites with maps showing congestion for the Cross Harbor Tunnel, it has also set up signs on both sides of the harbor telling drivers which is the quickest way to get to the other side of Victoria Harbor.

Iran

Because of low price of gas and gasoil in Iran and inadequate public transportation traffic congestion is a common problem in different cities like Mash'had, Isfahan, Shiraz and especially Tehran (capital city of Iran). Recently developing Metro and BRT systems in Tehran and strategies for limiting gas uses has been applied to reduce car using, but unfortunately the problem is still crucial.

Netherlands

The road network in the Netherlands is usually congested in the morning and afternoon rush hour on working days. However, the rush hour periods seem to have become longer and longer and one may occasionally run into congestion any time of the day or night. Commuter traffic to and from major cities such as Amsterdam, Rotterdam, The Hague, Utrecht, Eindhoven, Zwolle, Enschede and Groningen may cause congestion. Congestion is difficult to resolve because the Netherlands is a relatively densely populated country where there is little room for expansion. Proposals for a "pay per distance travelled" is thought to discourage car driving but has not been implemented yet due to car owner resistance.

New Zealand

New Zealand has followed strongly car-oriented transport policies since after World War II (especially in the Auckland area, where about one third of the country's population lives), and currently has one of the highest car-ownership rates per capita in the world, after the United States. Because of the negative results, congestion in the big centres is a major problem. Current measures include both the construction of new road infrastructure as well as increased investment in public transport, which had strongly declined in all cities of the country except Wellington.

United Kingdom

In the United Kingdom the inevitability of congestion in some urban road networks has been officially recognised since the Department for Transport set down policies based on the report *Traffic in Towns* in 1963:

Even when everything that it is possibly to do by way of building new roads and expanding public transport has been done, there would still be, in the absence of deliberate limitation, more cars trying to move into, or within our cities than could possibly be accommodated..

The Department for Transport sees growing congestion as one of the most serious transport problems facing the UK. On 1 December 2006, Rod Eddington published a UK government-sponsored report into the future of Britain's transport infrastructure. The Eddington Transport Study set out the case for action to improve road and rail networks, as a "crucial enabler of sustained productivity and competitiveness". Eddington has estimated that congestion may cost the economy of England £22 bn a year in lost time by 2025. He warned that roads were in serious danger of becoming so congested that the economy would suffer. At the launch of the report Eddington told journalists and transport industry representatives introducing road pricing to encourage drivers to drive less was an "economic no-brainer". There was, he said "no attractive alternative". It would allegedly cut congestion by half by 2025, and bring benefits to the British economy totalling £28 bn a year.

United States

On Fridays in California, Interstate 5 is often congested as Los Angeles residents travel north for the weekend.

The Texas Transportation Institute estimated that, in 2000, the 75 largest metropolitan areas experienced 3.6 billion vehicle-hours of delay, resulting in 5.7 billion U.S. gallons (21.6 billion liters) in wasted fuel and $67.5 billion in lost productivity, or about 0.7% of the nation's GDP. It also estimated that the annual cost of congestion for each driver was approximately $1,000 in very large cities and $200 in small cities. Traffic congestion is increasing in major cities and delays are becoming more frequent in smaller cities and rural areas.

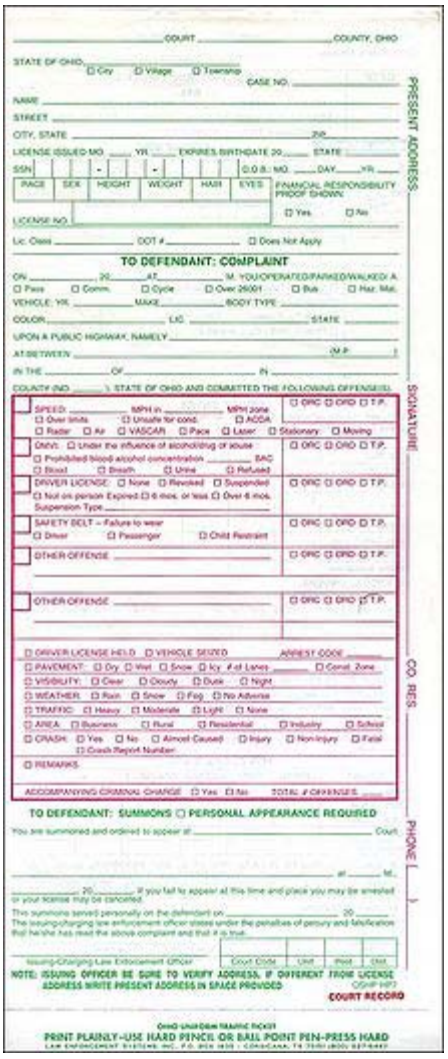
Traffic jam in Los Angeles, 1953

By late 2010 the five cities in the United States with the worst rush hour traffic congestion were New York City, Washington, D.C., San Francisco, Seattle and Los Angeles.

Chapter- 2

Rules of the Road

Traffic code


COURT COUNTY, OHIO

STATE OF OHIO ☐ City ☐ Village ☐ Township CASE NO.

NAME

STREET

CITY, STATE ZIP

LICENSE ISSUED MO. YR. EXPIRES BIRTHDATE 20 STATE

SSN D.O.B.: MO. DAY YR.

RACE | SEX | HEIGHT | WEIGHT | HAIR | EYES | FINANCIAL RESPONSIBILITY PROOF SHOWN: ☐ Yes ☐ No

LICENSE NO.

Lic. Class CDT # ☐ Does Not Apply

TO DEFENDANT: COMPLAINT

ON 20 AT M. YOU OPERATED/PARKED/WALKED A: ☐ Pass ☐ Comm. ☐ Cycle ☐ Over 26001 ☐ Bus ☐ Haz. Mat.

VEHICLE: YR. MAKE BODY TYPE

COLOR LIC STATE

UPON A PUBLIC HIGHWAY, NAMELY

AT/BETWEEN (M.P.)

IN THE OF IN

COUNTY (NO.) STATE OF OHIO AND COMMITTED THE FOLLOWING OFFENSE(S):

☐ SPEED: MPH in MPH zone ☐ Over limits ☐ Unsafe for cond. ☐ ACDA ☐ Radar ☐ Air ☐ VASCAR ☐ Pace ☐ Laser ☐ Stationary ☐ Moving	☐ ORC ☐ ORD ☐ T.P.
☐ OMVI: ☐ Under the influence of alcohol/drug of abuse ☐ Prohibited blood alcohol concentration BAC ☐ Blood ☐ Breath ☐ Urine ☐ Refused	☐ ORC ☐ ORD ☐ T.P.
☐ DRIVER LICENSE: ☐ None ☐ Revoked ☐ Suspended ☐ Not on person ☐ Expired ☐ 6 mos. or less ☐ Over 6 mos. Suspension Type	☐ ORC ☐ ORD ☐ T.P.
☐ SAFETY BELT – Failure to wear ☐ Driver ☐ Passenger ☐ Child Restraint	☐ ORC ☐ ORD ☐ T.P.
☐ OTHER OFFENSE	☐ ORC ☐ ORD ☐ T.P.
☐ OTHER OFFENSE	☐ ORC ☐ ORD ☐ T.P.

☐ DRIVER LICENSE HELD ☐ VEHICLE SEIZED ARREST CODE

☐ PAVEMENT: ☐ Dry ☐ Wet ☐ Snow ☐ Icy # of Lanes ☐ Const. Zone

☐ VISIBILITY: ☐ Clear ☐ Cloudy ☐ Dusk ☐ Night

☐ WEATHER: ☐ Rain ☐ Snow ☐ Fog ☐ No Adverse

☐ TRAFFIC: ☐ Heavy ☐ Moderate ☐ Light ☐ None

☐ AREA: ☐ Business ☐ Rural ☐ Residential ☐ Industry ☐ School

☐ CRASH: ☐ Yes ☐ No ☐ Almost Caused ☐ Injury ☐ Non-Injury ☐ Fatal ☐ Crash Report Number

☐ REMARKS

ACCOMPANYING CRIMINAL CHARGE ☐ Yes ☐ No TOTAL # OFFENSES

TO DEFENDANT: SUMMONS ☐ PERSONAL APPEARANCE REQUIRED

You are summoned and ordered to appear at Court

at M.

20 If you fail to appear at this time and place you may be arrested or your license may be cancelled.

This summons served personally on the defendant on 20

The issuing/charging law enforcement officer states under the penalties of perjury and falsification that he/she has read the above complaint and that it is true.

Issuing-Charging Law Enforcement Officer | Court Code | Unit | Post | Unit

NOTE: ISSUING OFFICER BE SURE TO VERIFY ADDRESS. IF DIFFERENT FROM LICENSE ADDRESS WRITE PRESENT ADDRESS IN SPACE PROVIDED

OSHP HP7

COURT RECORD

PRESENT ADDRESS SIGNATURE CO. RES. PHONE ( )

OHIO UNIFORM TRAFFIC TICKET

PRINT PLAINLY–USE HARD PENCIL OR BALL POINT PEN–PRESS HARD

United States: The Ohio Uniform Traffic Ticket prescribed by the Supreme Court of Ohio for use in violations of the traffic code

Traffic code (also **motor vehicle code**) refers to the collection of local statutes, regulations, ordinances and rules that have been officially adopted in the United States to govern the orderly operation and interaction of motor vehicles, bicycles, pedestrians and others upon the public (and sometimes private) ways.

The traffic code generally includes provisions relating to the establishment of authority and enforcement procedures, statement of the rules of the road, and other safety provisions. Administrative regulations for driver licensing, vehicle ownership and registration, insurance, vehicle safety inspections and parking violations may also be included, though not always directly related to driving safety. Violations of traffic code (i.e., a "moving violation") are often dealt with by forfeiting a fine in response to receiving a valid citation ("getting a ticket"). Other violations, such as drunk driving or vehicular homicide are handled through the criminal courts, although there may also be civil and administrative cases that arise from the same violation (including payment of damages and loss of driving privileges). In some jurisdictions there is a separate code-enforcement branch of government that handles illegal parking and other non-moving violations (e.g., noise and other emissions, illegal equipment). Elsewhere, there may be multiple overlapping police agencies patrolling for violations of state or federal driving regulations.

In the United States each state has its own traffic code, although most of the rules of the road are similar for the purpose of uniformity, given that all states grant reciprocal driving privileges (and penalties) to each others' licensed drivers. There is also a "Uniform Vehicle Code" which has been proposed by a private, non-profit group, based upon input by its members. As with many such offerings, some states adopt selected portions as written, or else with modifications, and others create their own versions. Similarly, most states have adopted relevant standards for signs and signals, based upon the Manual on Uniform Traffic Control Devices from the U.S. Department of Transportation. Many of the standard rules of the road involve consistent interpretation of the standard signs and signals, such as what to do when approaching a stop sign, or the driving requirements imposed by a double-yellow line on the street or highway. Many federal departments have also adopted their own traffic code for enforcement on their respective reservations (e.g., national parks, military bases).

List of some standard Rules of the Road:

- Entering and leaving roadways.
- Right of way at marked and unmarked intersections under various conditions.
- Observing and interpreting traffic signs (especially warning, priority or prohibitory traffic signs)
- Keeping to right side (or left side) except to pass others, where passing is allowed.
- Direction of travel and turning (one way, do not enter, no U-turn, etc)
- Speed, height, width and weight limits.
- Bicycle and pedestrian priority.
- Yielding to special vehicles (emergency, funeral, school bus).
- Vehicle lighting and signalling.

- Stopping if there has been a collision.

Highway Code

The **Highway Code** is the official road user guide for Great Britain. In Northern Ireland the Highway Code for Northern Ireland applies while the Republic of Ireland has its own Rules of the Road. It contains 306 numbered rules and 9 annexes covering pedestrians, animals, cyclists, motorcyclists and drivers. As well as the rules and annexes, there is information on road signs, road markings, vehicle markings and road safety. The annexes contain information on vehicle maintenance, licence requirements, documentation, penalties and vehicle security. The current recommended retail price of the book, as of 2010, is £2.50. Most copies are bought by learner drivers, who are expected to learn the manual for their driving test. In Malta, the road regulations are also known as the Highway Code.

History

The first edition was published in 1931, with a price of one penny, and as of 2004 over one million copies of the modern code are sold each year.

It was published in its entirety for the first time in 1934. During the preparation of the code the Ministry of Transport consulted 'extensively' with the Pedestrians Association.

The latest edition of the Highway Code was released in September 2007 and contained new advice such as the risk of smoking while driving and information for novice drivers.

The code

Certain rules in the Highway Code represent various road traffic laws and must be obeyed. Others are not compulsory, but advisable.

The Road Traffic Act 1988 says:

A failure on the part of a person to observe a provision of the Highway Code shall not of itself render that person liable to criminal proceedings of any kind but any such failure may in any proceedings (whether civil or criminal, and including proceedings for an offence under the Traffic Acts, the [1981 c. 14.] Public Passenger Vehicles Act 1981 or sections 18 to 23 of the [1985 c. 67.] Transport Act 1985) be relied upon by any party to the proceedings as tending to establish or negative any liability which is in question in those proceedings.

The Highway Code applies to England, Scotland and Wales; regional specific signs such as driver location signs in England or bilingual signs in Scotland and Wales are not covered in the code.

Australian Road Rules

Australian Road Rules are model road rules for Australia. The first edition was published on October 19, 1999 and it marked a milestone in road safety policy across Australia.

History

Road rules are set by each of the eight state and territories in Australia. Historically, there were many differences between the eight different sets of traffic laws in force in Australia. Since 1948, attempts have been made to develop a single set of rules to cover the whole nation. In the 1990s, the State Governments and the National Road Transport Commission (now the National Transport Commission) started working together to produce the unified rules. The rules adopted reflect the best practises (on safety and economic grounds) and attempted to minimise the potential confusion caused when travelling across borders. The first edition was published on October 19, 1999, and the Australian Transport Council (made of Australia's transport and road ministers) introduced them from December 1999.

Changes and inconsistencies

When the model rules are changed, it is up to each state and territory to then modify their own legislation. Not all rule changes have been adopted by all states and territories, and sometimes a state or territory has retained an earlier rule. For instance, the change to the urban speed limit from 60 km/h to 50 km/h was not adopted immediately in all states, and has not been adopted at all in the Northern Territory. Similarly, although the Australian Road Rules forbid u-turns at signalised intersections except where explicitly permitted, Victoria retains the state's earlier rule of permitting u-turns except where explicitly forbidden. Since their introduction, there have been amendments in 2003 (twice), and again in 2005.

Highway Traffic Act (Ontario)

The **Highway Traffic Act** (HTA) is an Ontario Act which regulates the licensing of vehicles, classification of traffic offenses, administration of loads, classification of vehicles and other transport related issues. First introduced in 1923 to deal with increasing accidents during the early years of motoring in Ontario, there have been amendments due to changes to driving conditions and new transportation trends.

A list of amended acts over the years:

- HTA 1923 - first act
- HTA 1930
- HTA 1937
- HTA 1950
- HTA 1960
- HTA 1970
- HTA 1980
- HTA 1990

The latest revision (2009) to the act was added to ban use of cell phones in cars.

Manitoba, Newfoundland and Labrador are some of the few provinces with a **Highway Traffic Act**.

Chapter- 3

Vienna Convention on Road Traffic

The **Vienna Convention on Road Traffic** is an international treaty designed to facilitate international road traffic and to increase road safety by standardising the uniform traffic rules among the contracting parties. This convention was agreed upon at the United Nations Economic and Social Council's Conference on Road Traffic (October 7, 1968 - November 8, 1968) and done in Vienna on 8 November 1968. It came into force on 21 May 1977. This conference also produced the Vienna Convention on Road Signs and Signals.

Cross border vehicles

One of the main benefits of the convention for motorists is the obligation on signatory countries to recognise the legality of vehicles from other signatory countries. The following requirements must be met when driving outside the country of registration:

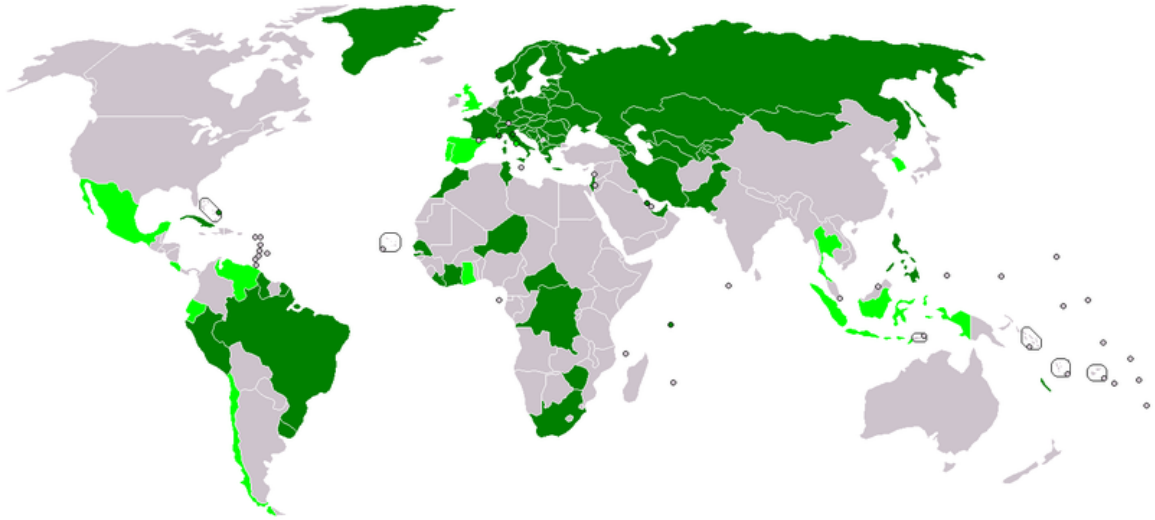
- Cars must display their registration number at the front and rear, even if legislation in the jurisdiction of registration does not require a front vehicle registration plate on cars. Motorcycles need display their registration number only at the rear. Registration numbers must be displayed in Latin characters and Arabic numerals. In addition to this, the registration number may optionally be displayed in a different alphabet.
- A distinguishing sign of the country of registration must be displayed on the rear of the vehicle. The physical requirements for this sign are defined in Annex 3 of the convention, which states that it must comprise black writing on a white oval background and that it must not form part of the vehicle's registration number. In practice, the requirement to display the white oval is mutually waived between some countries, for example between many European countries (where the white oval may be substituted by a blue strip on the vehicle registration plate) and between Canada, the United States and Mexico (where the state or province of registration is usually embossed or surface-printed on the vehicle registration plate).
- The vehicle must meet all technical requirements to be legal for road use in the country of registration. Any conflicting technical requirements (e.g. right-hand-drive or left-hand-drive) in the signatory country where the vehicle is being driven do not apply.

- The driver must carry the vehicle's registration certificate, and if the vehicle is not registered in the name of an occupant of the vehicle (for example a hire car), proof of the driver's right to be in possession of the vehicle.

Mainland China is the most notable example of a non-signatory country. Short-term tourists are not allowed to bring cars into Mainland China at all. All foreign registered vehicles in mainland China must display a mainland Chinese vehicle registration plate. This requirement even applies to vehicles from China's special administrative regions of Hong Kong and Macau.

The convention also addresses minimum mechanical and safety equipment needed to be on board and defines an **Identification mark** (Annex 4) to identify the origin of the vehicle.

Contracting Parties



ratified
signed, but not yet ratified

The Vienna Convention on Road Traffic was done at Vienna on 8 November 1968. Since its entry into force on 21 May 1977, in signatory countries ("Contracting Parties") it replaces previous road traffic Conventions, notably the 1949 Geneva Convention on Road Traffic, in accordance with Article 48 of the Convention.

Therefore, this list of Contracting Parties is no longer valid, and at least the US, Australia and New Zealand are not contracting parties to the 1968 agreement, meaning that the 1949 agreement still applies there.

- Aden Colony British Guyana (ADN)
- Albania (AL)
- Alderney (GBA)
- Algeria (DZ)

- Argentina (RA)
- Australia (AUS)
- Austria (A)
- Bahamas
- Bahamas (BS)
- Bailwick of Guernsey (GBG)
- Bangladesh (BD)
- Barbados (BDS)
- Belgian Congo (RCB)
- Belgium (B)
- Benin (DY)
- Botswana (RB)
- Brazil (BR)
- British Honduras (BH)
- Brune (BRU)
- Bulgaria (BG)
- Côte d'Ivoire (CI)
- Cambodia (K)
- Cameroons under French mandate
- Canada (CDN)
- Central African Republic (RCA)
- Chile (RCH)
- China (RC)
- Costa Rica (CR)
- Cuba (geen letters)
- Cyprus (CY)
- Czech Republic (CZ)
- Democratic Republic of the Congo (CGO)
- Denmark (DK)
- Dominican Republic (DOM)
- Ecuador (EC)
- Egypt (ET)
- Estonia (EST)
- Faroe Islands (FO)
- Federation of Rhodesia and Nyasaland
- Fiji (FJI)
- Finland (SF)
- France including French overseas territories (F)
- Gambia (WAG)
- Georgia (GE)
- Germany (D)
- Ghana (GH)
- Gibraltar (GBZ)
- Greece (GR)
- Grenada (WG)
- Guatemala (GCA)

- Haiti (RH)
- Holy See (V)
- Hong Kong (HK)
- Hungary (H)
- Iceland (IS)
- India (IND)
- Indonesia (RI)
- Iran, Islamic Republic of (IR)
- Ireland (IRL)
- Isle of Man (GBM)
- Israel (IL)
- Italy (I)
- Jamaica (JA)
- Japan (J)
- Jordan (HKJ)
- Kazakhstan (KAZ)
- Kenya (EAK)
- Kyrgyzstan (KS)
- Lao, People's Democratic Republic (LAO)
- Latvia (LV)
- Lebanon (RL)
- Lesotho (LS)
- Lithuania (LT)
- Luxembourg (L)
- Madagascar (RM)
- Malawi (MW)
- Malaysia (MAL)
- Mali (RMM)
- Malta (M)
- Mauritius (MS)
- Mexico (MEX)
- Monaco
- Mongolia(MNG)
- Morocco (MA)
- Myanmar (BUR)
- Namibia (NAM)
- Netherlands (NL)
- Netherlands Antilles (NA)
- Netherlands New Guinea
- New Zealand (NZ)
- Nicaragua (NIC)
- Niger (NG)
- Nigeria (WAN)
- North Borneo
- Norway (N)
- Okinawa

- Pakistan (PAK)
- Papua New Guinea (PNG)
- Paraguay (PY)
- Peru (PE)
- Philippines (PI)
- Poland (PL)
- Portugal (P) all overseas provinces excluding Macau
- Principality of Andorra (AND)
- Republic of Korea (ROK)
- Romania (R)
- Russian Federation (SU)
- San Marino (RSM)
- Senegal (SN)
- Serbia (SRB)
- Seychelles (SY)
- Sierra Leone (WAL)
- Singapore (SGP)
- Slovakia (SK)
- South Africa (ZA)
- South West Africa
- Southern Rhodesia (RSR)
- Spain including African localities and provinces (E)
- Sri Lanka (CL)
- St. Lucia (WL)
- St. Vincent (WV)
- States of Jersey (GBJ)
- Surinam (SME)
- Swaziland (SD)
- Sweden (S)
- Switzerland (CH)
- Syrian Arab Republic (SYR)
- Tanganyika (EAT)
- Thailand (T)
- The Trust Territory of Western Samoa (WS)
- Togo (TG)
- Trinidad and Tobago (TT)
- Trust Territory of Rwanda/ Urundi (RWA)
- Tunisia (TN)
- Turkey (TR)
- Uganda (EAU)
- Ukraine (UA)
- United Arab Emirates (UAE)
- United Kingdom of Great Britain and Northern Ireland (GB)
- United States of America (USA) all the territories for the international relations of which the United States of America is responsible
- Uruguay (U)

- Venezuela (YV)
- Winward Islands
- Zambia (RNR)
- Zanzibar (EAZ)
- Zimbabwe (ZW)

International conventions on transit transport

The broad objective of these International Conventions and Agreements, the Depositary of which is the Secretary-General of the United Nations, is to facilitate international transport while providing for a high level of safety, security and environmental protection in transport:

- Agreement on the International Carriage of Perishable Foodstuffs and on the Special Equipment to be used for such Carriage (1970).
- Convention on Customs Treatment of Pool Containers Used in International Transport (1994).
- Convention on the Contract for the International Carriage of Goods By Road (1956) and its Protocol (1978).
- Convention concerning Customs Facilities for Touring (1954).
- Customs Convention on Containers (1972).
- Customs Convention on the Temporary Importation of Commercial Road Vehicles (1956).
- Customs Convention on the Temporary Importation of Private Road Vehicles (1954).
- European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)(1957) and its Protocol amending articles 1 and 14 (1993).
- Geneva Convention on Road Traffic (1949).
- European Agreement concerning the Work of Crews of Vehicles engaged in International Road Transport (1970).
- International Convention to Facilitate the Crossing of Frontiers for Passengers and Baggage carried by Rail (1952).
- International Convention to Facilitate the Crossing of Frontiers for Goods Carried by Rail (1952).
- International Convention on the Harmonization of Frontier Controls of Goods (1982).
- TIR Convention.

Chapter- 4

Vienna Convention on Road Signs and Signals

A typical warning sign, as defined by the convention

The **Vienna Convention on Road Signs and Signals** is an international treaty designed to increase road safety and aid international road traffic by standardising the signing system for road traffic (road signs, traffic lights and road markings) in use internationally.

This convention was agreed upon by the United Nations Economic and Social Council at the UNESC Conference on Road Traffic in Vienna 7 October 1968 to 8 November 1968, was done in Vienna on 8 November 1968 and came into force 6 June 1978. This conference also produced the Vienna Convention on Road Traffic, which complements this legislation by standardising international traffic laws.

The convention revised and substantially extended the earlier 1949 Geneva Protocol on Road Signs and Signals, itself based in turn on the 1931 Geneva Convention concerning the Unification of Road Signals.

Amendments, including new provisions regarding the legibility of signs, priority at roundabouts and new signs to improve safety in tunnels were adopted in 2003.

Rules

Road signs

An acceptable variant of the above sign. Note the different background and the shape of the symbol.

In article 2 the convention classes all road signs into a number of categories (A - H):

- A Danger warning signs
- B Priority signs
- C Prohibitory or restrictive signs
- D Mandatory signs
- F Information, facilities, or service signs
- G Direction, position, or indication sign
- H Additional panels

The convention then lays out precise colours, sizes and shapes for each of these classes of sign:

Class of sign	Shape	Ground	Border	Size	Symbol
Danger warning sign	Equilateral triangle	White or yellow	Red	0.9 m (large), 0.6 m (small)	Varies, black
	Diamond	Yellow	Black	0.6 m (large), 0.4 m (small)	Varies, black
Priority signs					
Give way sign	Inverted equilateral triangle	White or yellow	Red	0.9 m (large), 0.6 m (small)	None
Stop sign	Octagon	Red	None	0.9 m (large), 0.6 m (small)	Stop† written in white
	Circular	White or yellow	Yellow	0.9 m (large), 0.6 m (small)	Stop† written in blue or black
Priority road	Diamond	White	Black	0.5 m (large), 0.35 m (small)	Yellow square
End priority	Diamond	White	Black	0.5 m (large), 0.35 m (small)	Yellow square and grey or black diagonal lines crossing the sign
Priority for oncoming traffic	Circular	White or yellow	Red	Unspecified	Black arrow indicating direction with priority, red arrow indicating direction without
Priority over oncoming traffic	Rectangle	Blue	None	Unspecified	White arrow indicating direction with priority, red arrow indicating direction without
Prohibitory signs					
Standard prohibitory	Circular	White or yellow	Red	0.6 m (large), 0.4 m (small)	Varies
Parking prohibitory	Circular	Blue	None	0.6 m (large), 0.2 m (small)	Varies
End of prohibition	Circular	White or yellow	None	0.6 m (large), 0.4 m (small)	Black or grey diagonal line
Mandatory signs					
Standard	Circular	Blue	None	0.6 m (large),	Varies, white

mandatory				0.4 m (small), 0.3 m (very small)	
	Circular	White	Red	0.6 m (large), 0.4 m (small), 0.3 m (very small)	Varies, black
Special regulation signs					
All signs	Rectangular	Blue	Unspecified	Unspecified	Varies, white
		Light	Unspecified	Unspecified	Varies, Black
Information, facilities or service signs					
All signs	Unspecified	Blue or green	Unspecified	Unspecified	Varies, on white or yellow rectangle
Direction, position or indication signs					
Informative signs	Rectangular, sometimes with arrowhead	Light	Unspecified	Unspecified	Varies, dark
		Dark	Unspecified	Unspecified	Varies, light
Motorways	Rectangular	Blue or green	Unspecified	Unspecified	Varies, white
Temporary	Rectangular	Yellow or orange	Unspecified	Unspecified	Varies, black
Additional panels					
All panels	Unspecified	White or yellow	Black, blue or red	Unspecified	Varies, black or dark blue
		Black or dark blue	White or yellow	Unspecified	Varies, white or yellow

† May be written in English or the national language

It also specifies the symbols and pictograms which may be used, and the orientations in which they may be used. When more than one is available, the same one must be used nationally. All signs, except for those that do not apply at night, must be reflective enough to been seen in darkness with headlights from a distance.

Road markings

The convention also specifies road markings. All such markings must be less than 6 mm high, with cat's eye reflectors no more than 15 mm above the road surface.

The length and width of markings varies according to purpose, although no exact figures for size are stated; roads in built up areas should use a broken line for lane division, while

continuous lines must only be used in special cases, such as reduced visibility or narrowed carriage ways.

All words painted on the road surface should be either of place names, or of words recognisable in most languages, such as "Stop" or "Taxi".

Traffic lights

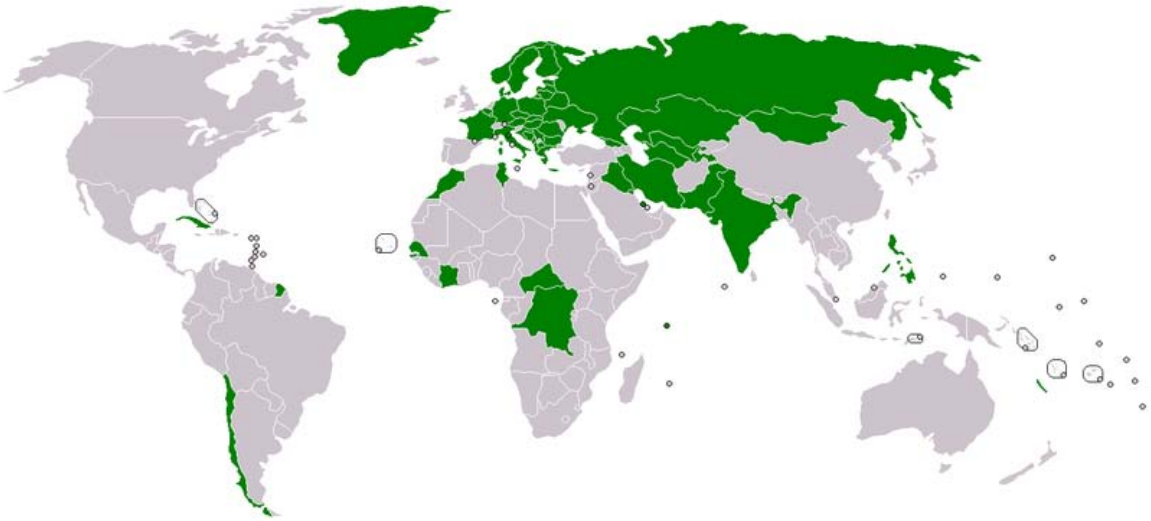
The Convention specifies the colours for traffic lights and their meanings, and places and purposes lights may be used for, like so:

Type	Shape	Colour	Position	Meaning
	Plain	Green	At intersection	Proceed
		Amber	At intersection, level crossing, swing bridge, airport, fire station or ferry terminal	Stop if possible
		Red	At intersection	Stop
		Red and amber	At intersection	Signal is about to change (usually to green)
Non-flashing	Arrow pointing left	Green	At intersection	Only traffic turning left may proceed
	Arrow pointing right	Green	At intersection	Only traffic turning right may proceed
	Arrow pointing upwards	Green	At intersection	Only traffic travelling straight ahead may proceed
	Arrow pointing downwards	Green	Above lane	Traffic may continue in lane
	Cross (×)	Red	Above lane	Traffic may not enter lane (lane closed)
	Arrow pointing diagonally downwards	Amber or white	Above lane	Lane closes shortly ahead, change lane
Flashing	Plain	Double Red	At level crossing, swing bridge, airport, fire station or ferry terminal	Stop
		Amber	Anywhere except intersection	Proceed with caution

	Amber	At intersection	The priority is determined by  Priority Route or  Yield signs.
	Lunar white	At crossing	Proceed

Red flashing lights may only be used at the locations specified above; any other use of the lights is in breach of the convention. Red lights must be placed on top when lights are stacked vertically, or on the side closest to oncoming traffic if stacked horizontally.

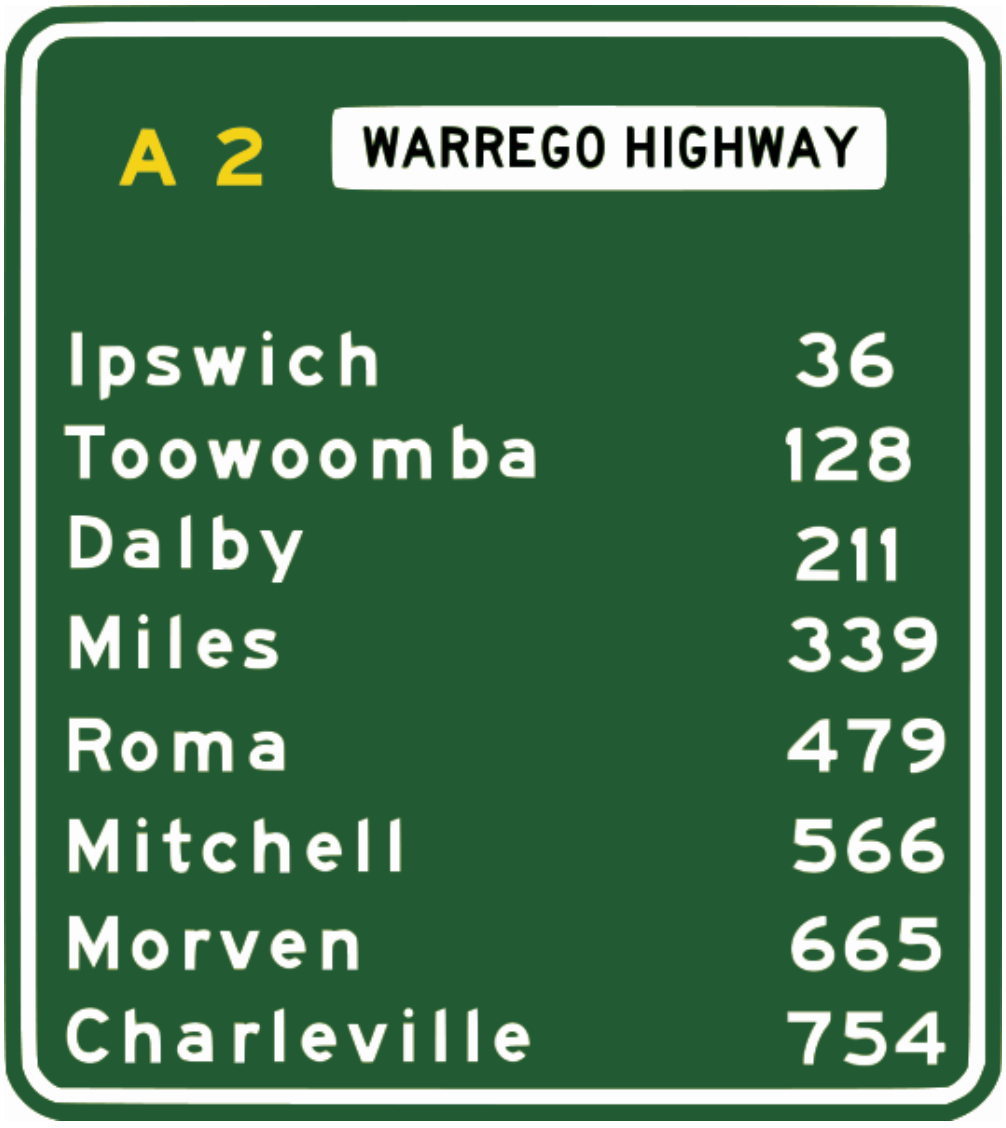
Contracting Parties



52 States at 30 June 2004: Albania, Austria, Bahrain, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Central African Republic, Chile, Côte d'Ivoire, Croatia, Cuba, Czech Republic, Democratic Republic of the Congo, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, India, Iran (Islamic Republic of), Iraq, Italy, Kazakhstan, Kuwait, Latvia, Lithuania, Luxembourg, Mongolia, Montenegro, Morocco, Norway, Pakistan, Philippines, Poland, Romania, Russian Federation, San Marino, Senegal, Serbia, Seychelles, Slovakia, Sweden, Switzerland, Tajikistan, The former Yugoslav Republic of Macedonia, Tunisia, Turkmenistan, Ukraine, Uzbekistan.

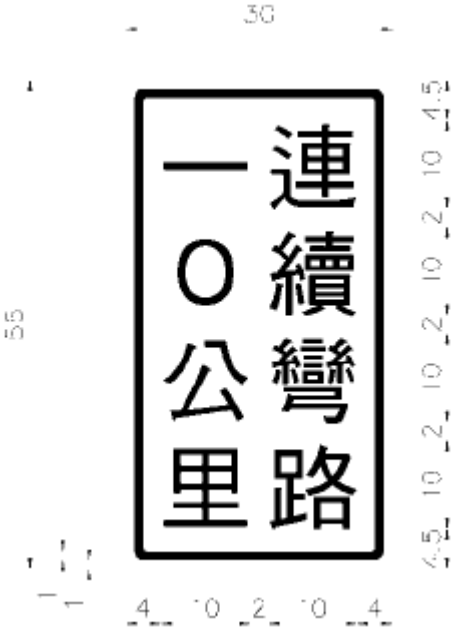
Chapter- 5

Traffic Sign



A "route confirmation" sign on the Warrego Highway in Queensland, Australia, informing motorists of their distance (in kilometres) from the places listed

A sign in the United States of America indicating a local speed limit in miles per hour



The design specifications for a Taiwanese sign warning of double bends ahead

Two or more signs may be displayed on one post. Here a Canadian end-of-road marker appears together with a rural airport sign.

Traffic signs or **road signs** are signs erected at the side of roads to provide information to road users. With traffic volumes increasing over the last eight decades, many countries have adopted pictorial signs or otherwise simplified and standardized their signs to facilitate international travel where language differences would create barriers, and in general to help enhance traffic safety. Such pictorial signs use symbols (often silhouettes) in place of words and are usually based on international protocols. Such signs were first developed in Europe, and have been adopted by most countries to varying degrees.

Categories

A group of green-colored directional signs on the National Highway No. 1 in Kaohsiung, Taiwan.

Traffic signs can be grouped into several types. For example, Annexe 1 of the Vienna Convention on Road Signs and Signals (1968), which at 30 June 2004 had 52 signatory countries, defines eight categories of signs:

- A. Danger warning signs
- B. Priority signs
- C. Prohibitory or restrictive signs
- D. Mandatory signs
- E. Special regulation signs
- F. Information, facilities, or service signs
- G. Direction, position, or indication signs
- H. Additional panels

In the United States, Canada and Australia signs are categorised as follows:

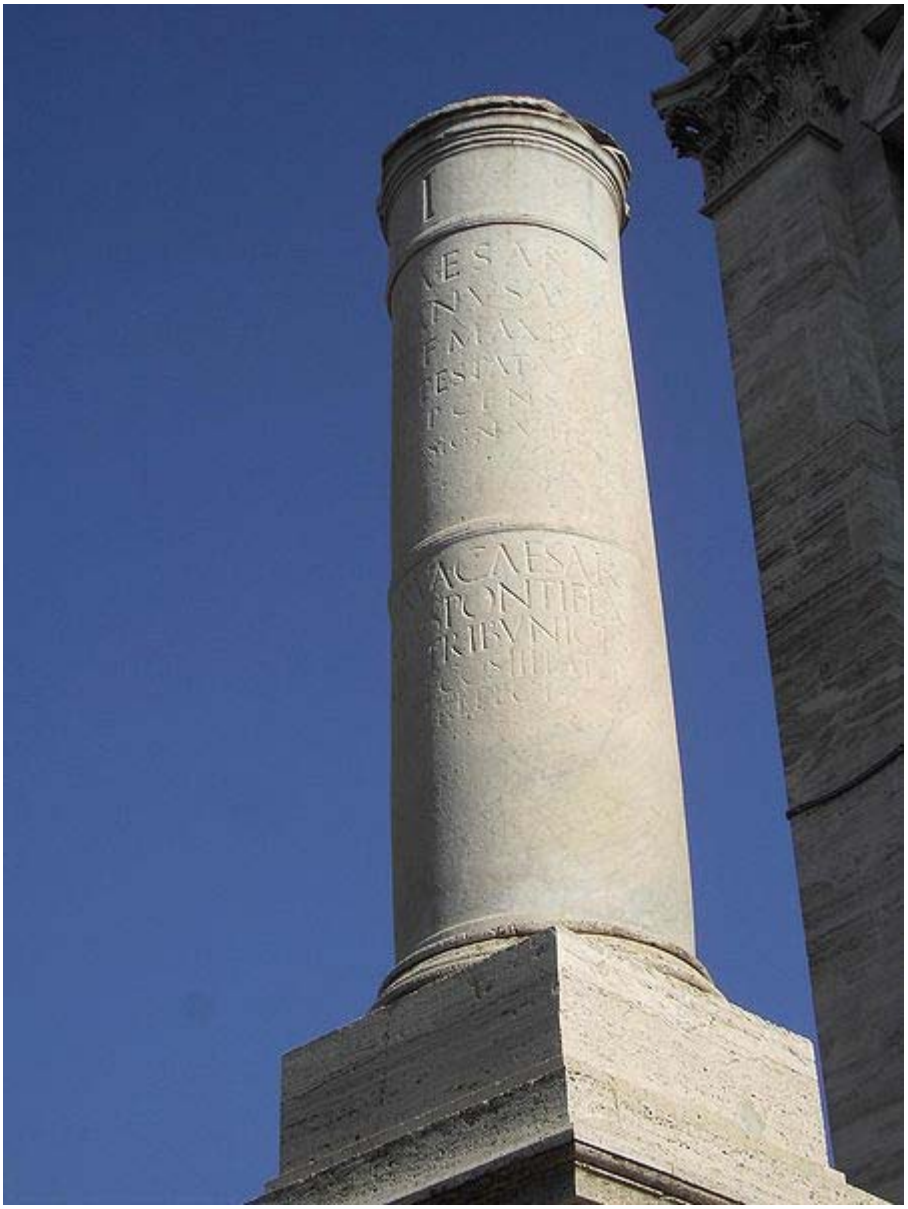
- Regulatory signs
- Warning signs
- Guide signs
    - Street signs
    - Route marker signs

    - Expressway signs
    - Freeway signs
    - Welcome Signs
    - Informational signs
    - Recreation and cultural interest signs
- Emergency management (civil defense) signs
- Temporary traffic control (construction or work zone) signs
- School signs
- Railroad and light rail signs
- Bicycle signs

In the United States, the categories, placement, and graphic standards for traffic signs and pavement markings are legally defined in the Federal Highway Administration's *Manual on Uniform Traffic Control Devices* as the standard.

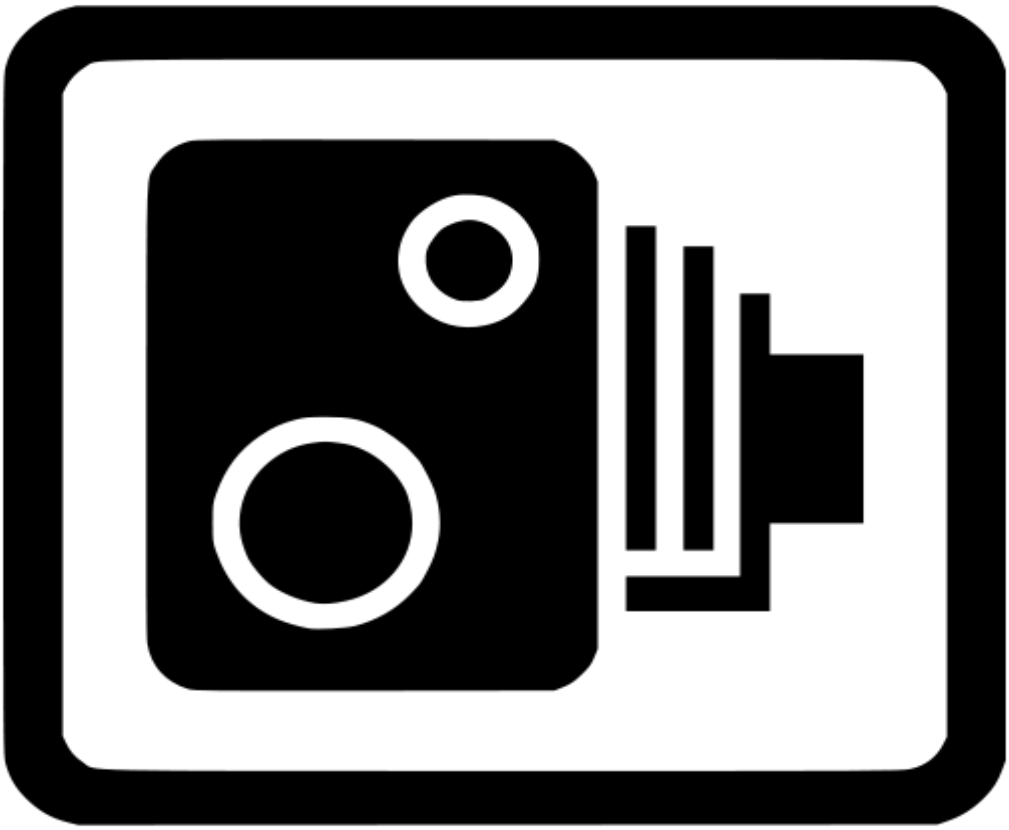
A rather informal distinction among the directional signs is the one between advance directional signs, interchange directional signs, and reassurance signs. Advance directional signs appear at a certain distance from the interchange, giving information for each direction. A number of countries do not give information for the road ahead (so-called "pull-through" signs), and only for the directions left and right. Advance directional signs enable drivers to take precautions for the exit (e.g., switch lanes, double check whether this is the correct exit, slow down). They often do not appear on lesser roads, but are normally posted on expressways and motorways, as drivers would be missing exits without them. While each nation has its own system, the first approach sign for a motorway exit is mostly placed at least 1000 m from the actual interchange. After that sign, one or two additional advance directional signs typically follow before the actual interchange itself.

History



Roman milestone

Rural municipality weight limit sign on a dirt road



Speed camera sign used in Canada, Cyprus, the Czech Republic, Estonia, Finland, Georgia, Hong Kong, Iceland, Ireland, Latvia, Malta, Ukraine, and the United Kingdom

The earliest road signs were milestones, giving distance or direction; for example, the Romans erected stone columns throughout their empire giving the distance to Rome. In the Middle Ages, multidirectional signs at intersections became common, giving directions to cities and towns.

The first modern roadsigns erected on a wide scale were designed for riders of high or 'ordinary' bicycles in the late 1870s and early 1880s. These machines were fast, silent and their nature made them difficult to control, moreover their riders travelled considerable distances and often preferred to tour on unfamiliar roads. For such riders, cycling organisations began to erect signs that warned of potential hazards ahead (particularly steep hills), rather than merely giving distance or directions to places, thereby contributing the sign type that defines 'modern' traffic signs.

The development of automobiles encouraged more complex signage systems using more than just text based notices. One of the first modern-day road sign systems was devised by the Italian Touring Club in 1895. By 1900, a Congress of the International League of Touring Organizations in Paris was considering proposals for standardization of road signage. In 1903 the British government introduced four 'national' signs based on shape, but the basic patterns of most traffic signs were set at the 1908 International Road Congress in Rome. In 1909, nine European governments agreed on the use of four pictorial symbols, indicating "bump", "curve", "intersection", and "grade-level railroad crossing". The intensive work on international road signs that took place between 1926 and 1949 eventually led to the development of the European road sign system. Both Britain and the United States developed their own road signage systems, both of which were adopted or modified by many other nations in their respective spheres of influence. The UK adopted a version of the European road signs in 1964 and, over past decades, North American signage began using some symbols and graphics mixed in with English.

Over the years, change was gradual. Pre-industrial signs were stone or wood, but with the development of Darby's method of smelting iron using coke, painted cast iron became favoured in the late eighteenth and nineteenth centuries. Cast iron continued to be used until the mid twentieth century, but it was gradually displaced by aluminium or other materials and processes, such as vitreous enamelled and/or pressed malleable iron, or (later) steel. Since 1945 most signs have been made from sheet aluminium with adhesive plastic coatings, these are normally retroreflective for nighttime and low-light visibility. Before the development of reflective plastics, reflectivity was provided by glass reflectors set into the lettering and symbols.

New generations of traffic signs based on electronic displays can also change their text (or, in some countries, symbols) to provide for "intelligent control" linked to automated traffic sensors or remote manual input. In over 20 countries, real-time Traffic Message Channel incident warnings are conveyed directly to vehicle navigation systems using inaudible signals carried via FM radio, 3G cellular data and satellite broadcasts. Finally, cars can pay tolls and trucks pass safety screening checks using video numberplate scanning, or RFID transponders in windshields linked to antennae over the road, in support on-board signalling, toll collection and travel time monitoring.

Yet another "medium" for transferring information ordinarily associated with visible signs is RIAS (Remote Infrared Audible Signage), e.g., "talking signs" for print-handicapped (including blind/low-vision/illiterate) people. These are infra-red transmitters serving the same purpose as the usual graphic signs when received by an appropriate device such as a hand-held receiver or one built into a cell phone.

North America, Australia and New Zealand

Handicap sign

One of Catskill Park's distinctive brown town signs with yellow text, showing the hamlet of Pine Hill

Yellow and black warning signs for kangaroos are common in Australia

Color schemes

The North American, Australian and New Zealand colours normally have these meanings:

- red with white for stop signs, yield, and forbidden actions (such as No Parking)
- green with white letters for informational signs, such as directions, distances, and places
- brown with white for signs to parks, historic sites, ski areas, forests, and campgrounds
- blue with white for rest areas, food, gasoline or petrol, hospitals, lodging, and other services
- black with white for commercial, exempt, special, and signs were used in the past
- white with black (or red letters) for regulatory signs, such as speed limits (or parking)
- yellow with black letters and symbols for warning signs, such as curves and school zones
- orange with black letters for temporary traffic control zones and detours associated with road construction

- purple for "lanes restricted to use only by vehicles with registered electronic toll collection (ETC) accounts"

The U.S. *Manual on Uniform Traffic Control Devices* prescribes four other colors:

- fluorescent yellow-green for school zone, school bus stop, pedestrian, playground, and bicycle warning signs
- fluorescent pink for incident management signs
- coral and light blue, which are unassigned.

Regulatory signs are also sometimes seen with white letters on red or black signs. In Quebec, blue is often used for tourist attractions and brown public services such as rest areas; many black-on-yellow signs are red-on-white instead.

Many U.S. states and Canadian provinces now use fluorescent orange for construction signs.

Highway symbols and markers

Rural highway sign, Saskatchewan

Every state and province has different markers for its own highways, but use standard ones for all federal highways. Many special highways– such as the Queen Elizabeth Way, Trans-Canada Highway, and various auto trails in the U.S. – have used unique signs. Counties in the U.S. sometimes use a pentagonal blue sign with yellow letters for numbered county roads, though the use is inconsistent even within states.

Units

Distances on traffic signs generally follow the measurement system in use by the country. Most U.S. road signs use the "U.S. Customary Units" system of miles (or a fraction) or yards, although the federal Department of Transportation has developed metric standards for all signs. United Kingdom signs also display distances in miles. Elsewhere, metric distances are in very wide use, though not universal.

Languages

Multilingual road signs in Mistissini, Quebec in Cree, English and French

Where signs use a language, the recognized language/s of the area is normally used. Signs in most of the U.S., Canada, Australia, and New Zealand are in English. Quebec uses French, while New Brunswick and the Jacques-Cartier and Champlain bridges, in Montreal (as well as some parts in the West Island), use both English and French, and a number of other provinces and states, such as Ontario, Manitoba, and Vermont use bilingual French–English signs in certain localities. Mexico and Spain use Spanish. Signs in Belgium are in French, Dutch and German depending on region. In the Brussels Capital Region, road signs are in French and Dutch. Signs in Finland are in Finnish and Swedish. Signs in Germany and Austria are in German. Signs in Luxembourg are in French and German. Signs in Switzerland are in French, German, and Italian. Within a few miles of the U.S.-Mexico border, road signs are often in English and Spanish in places like San Diego, Yuma, and El Paso. Indigenous languages, mainly Nahuatl as well as some Mayan languages, have been used as well.

Typefaces

The typefaces predominantly used on signs in the U.S. and Canada are the FHWA alphabet series (Series B through Series F and Series E Modified). Details of letter shape and spacing for these alphabet series are given in "Standard Alphabets for Traffic Control Devices," first published by the Bureau of Public Roads (BPR) in 1945 and subsequently updated by the Federal Highway Administration (FHWA). It is now part of Standard Highway Signs (SHS), the companion volume to the MUTCD which gives full design details for signfaces.

Initially, all of the alphabet series consisted of uppercase letters and digits only, although lowercase extensions were provided for each alphabet series in a 2002 revision of SHS. Series B through Series F evolved from identically named alphabet series which were introduced in 1927.

Straight-stroke letters in the 1927 series were substantially similar to their modern equivalents, but unrounded glyphs were used for letters such as B, C, D, etc., to permit more uniform fabrication of signs by illiterate painters. Various state highway departments and the federal BPR experimented with rounded versions of these letters in the following two decades.

The modern, rounded alphabet series were finally standardized in 1945 after rounded versions of some letters (with widths loosely appropriate for Series C or D) were specified as an option in the 1935 MUTCD and draft versions of the new typefaces had been used in 1942 for guide signs on the newly constructed Pentagon road network.

The mixed-case alphabet now called Series E Modified, which is the standard for destination legend on freeway guide signs, originally existed in two parts: an all-uppercase Series E Modified, which was essentially similar to Series E, except for a larger stroke width, and a lowercase-only alphabet. Both parts were developed by the California Division of Highways (now Caltrans) for use on freeways in 1948–1950.

Initially, the Division used all-uppercase Series E Modified for button-reflectorized letters on ground-mounted signs and mixed-case legend (lowercase letters with Series D capitals) for externally illuminated overhead guide signs. Several Eastern turnpike authorities blended all-uppercase Series E Modified with the lowercase alphabet for destination legends on their guide signs.

Eventually, this combination was accepted for destination legend in the first manual for signing Interstate highways, which was published in 1958 by the American Association of State Highway Officials and adopted as the national standard by the BPR.

Uses of non-FHWA typefaces

Some traffic signs, such as the left-turn prohibition sign hanging from this gantry, are lit for better visibility, particularly at night or in inclement weather.

The U.S. National Park Service uses NPS Rawlinson Roadway, a serif typeface, for guide signage; it typically appears on a brown background. Rawlinson has replaced Clarendon as the official NPS typeface, but some states still use Clarendon for recreational signage.

Georgia, in the past, used uppercase Series D with a custom lowercase alphabet on its freeway guide signs; the most distinctive feature of this typeface is the lack of a dot on lowercase *i* and *j*. More recent installations appear to include the dots.

The Clearview typeface, developed by U.S. researchers to provide improved legibility, is permitted for light legend on dark backgrounds under FHWA interim approval. Clearview has seen widespread use by state departments of transportation in Arkansas, Illinois, Maryland, Michigan, Ohio, Pennsylvania, Texas, and Virginia. In Canada, the Ministry of Transportation for the Province of British Columbia specifies Clearview for use on its highway guide signs, and its usage has shown up in Ontario on the Don Valley Parkway and Gardiner Expressway in Toronto and on new 400-series highway installations in Hamilton, Halton and Niagara, as well as street signs in various parts of the province. The font is also being used on newer signs in Alberta, Manitoba, and Quebec.

A new Clearview typeface sign beside an old FHWA typeface, Quebec

It is common for local governments, airport authorities, and contractors to fabricate traffic signs using typefaces other than the FHWA series; Helvetica and Arial are common choices.

Moose crossing warning with kill-counter, Alaska

New Zealand

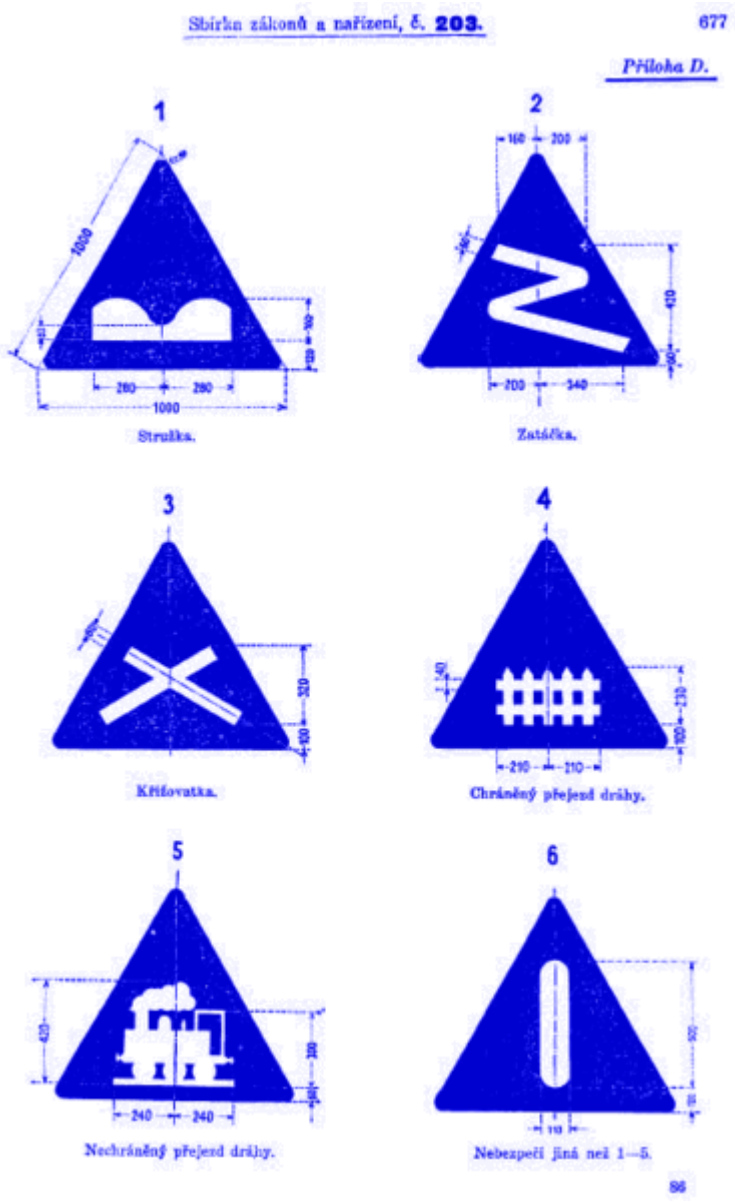
New Zealand road signs are influenced both by American and European practices.

Warning signs are diamond shaped with a yellow background for permanent warnings, and an orange background for temporary warnings. They are somewhat more pictorial than their American counterparts.

Regulatory signs follow European practice, with a white circle with a red border indicating prohibitive actions, and a blue circle indicating mandatory actions. White rectangular signs with a red border indicate lane usage directions. Information and direction signs are rectangular, with a green background indicating a state highway, a blue background for all other roads and all services (except in some, where directional signage is white), and a brown background for tourist attractions.

Before 1987, most road signs had black backgrounds - diamonds indicated warnings, and rectangles indicated regulatory actions (with the exception of the Give Way sign (an inverted trapezium), and Stop sign and speed limit signs (which were the same as today)). Information signs were yellow, and direction signage was green on motorways and black everywhere else.

Europe



The first road signs established in Czechoslovakia on November 1, 1935: six blue-white danger warning signs. They were later supplanted with red-white-black signs.

Road sign in Beussent, France

Keep right, Portugal

Romantic road sign in southern Germany, see Alps at the background

In 1968, the European countries signed the Vienna Convention on Road Traffic treaty, with the aim of standardizing traffic regulations in participating countries in order to facilitate international road traffic and to increase road safety. Part of the treaty was the Vienna Convention on Road Signs and Signals, which defined the traffic signs and signals. As a result, in Western Europe the traffic signs are well standardised, although there are still some country-specific exceptions, mostly dating from the pre-1968 era.

The principle of the European traffic sign standard is that shapes and colours are to be used for indicating same purposes. Triangular shapes (white or yellow background) are used in warning signs. Additionally, the Vienna convention allows an alternative shape for warning signs, a diamond shape, which is rarely used in Europe. The prohibition signs in Europe are round with a red border. Informative and various other secondary signs are of rectangular shape. Animals shown on warning signs include moose, frogs, deer, ducks, cows, sheep, horses, polar bears (on Svalbard), and monkeys (in Gibraltar). The Convention allows any animal image to be used.

Directional signs have not been harmonised under the Convention, at least not on ordinary roads. As a result, there are substantial differences in directional signage throughout Europe. Differences apply in typeface, type of arrows and, most notably, colour scheme. The convention however specifies a difference between motorways and

ordinary roads, and that motorways use white-on-green (e.g., Italy, Switzerland, Denmark, Sweden, Finland, Slovenia, Croatia, Czech Republic, Greece, Cyprus, Bulgaria, Romania, Slovakia, Serbia, Republic of Macedonia, Albania) or white-on-blue (e.g., Norway, Germany, the Republic of Ireland, France, United Kingdom, Spain, Netherlands, Belgium, Austria, Luxembourg, Poland, Portugal, Latvia). Hungary switched from white-on-green to white-on-blue in the early 2000s during the reconstruction of existing and construction of new motorways.

Differences are greater for non-motorways: white-on-blue in Italy, Switzerland, Sweden, Czech Republic, Greece, Cyprus, Slovakia, Bulgaria, Romania, Latvia, Estonia, Finland and Netherlands (in this case the same as motorways), white-on-green in France, United Kingdom, Republic of Ireland, Poland and Portugal, black-on-yellow in Germany, Luxembourg, Norway, Slovenia, Serbia and Croatia, red-on-white in Denmark (though white-on-blue on motorway exits and all overhead gantries), and black-on-white in Spain.

Secondary roads are different from primary roads in France, United Kingdom, Finland, Republic of Ireland, Switzerland and Portugal, always signposted in black-on-white. In Germany, Italy, Romania and Sweden, black-on-white indicates only urban roads or urban destinations.

Signposting road numbers differs greatly as well. Only the European route number, if signposted, will always be placed in white letters on a green rectangle. European route numbers are not signed at all in the United Kingdom.

Some signs like "STOP", "ZONE" etc. are recommended to be in English, but the local language is also permitted. If the language uses non-Latin characters, the names of cities and places should also be in Latin transcription. Road signs in the Republic of Ireland are bilingual, using Irish and English. Wales is also the same, with bilingual Welsh-English signs; some parts of Scotland also have bilingual Scottish Gaelic-English signs. Finland also uses bilingual signs, in Finnish and Swedish.

European countries use the metric system on road signs (distances in kilometres or metres, heights/widths in metres) with the notable exception of the UK, where distances are indicated in miles, and on remaining finger post signs in the Republic of Ireland erected before 1977, where distances are also indicated in miles (which were formally used for all directional signage in the Republic of Ireland prior to 1977 and on speed limits prior to 2005). For countries driving on the left, the convention stipulates that the traffic signs should be mirror images of those used in countries driving on the right. This practice, however, is not systematically followed in the four European countries driving on the left, Cyprus, the Republic of Ireland, Malta and the United Kingdom. The convention permits the use of two background colours for danger and prohibit signs, white or yellow. Most countries use white with a few exceptions like Sweden, Finland, Iceland and Poland, as yellow tends to be more visible in areas in which snow is prevalent.

The European traffic signs have been designed with the principles of heraldry on mind; i.e., the sign must be clear and able to be resolved with one single glance. Most traffic signs conform to heraldic tincture rules, and rather use symbols than written texts for better semiotic clarity.

United Kingdom

One of the more unusual UK road signs, at the Magic roundabout in Swindon

Traffic signing in the UK conforms broadly to European norms, though a number of signs are unique to Britain and direction signs omit European route numbers. The current sign system, introduced on 1 January 1965, was developed in the late 1950s and early 1960s by the Anderson Committee, which established the motorway signing system, and by the Worboys Committee, which reformed signing for existing all-purpose roads.

Britain remains the only European Union member nation and the only major Commonwealth country to use non-metric (Imperial) measurements for distance and speed, although metric "authorised-weight" signs were prescribed in 1981 and there is now a dual-unit (imperial first) option for restriction signage, used on safety grounds where foreign drivers may use the routes so that they may better understand the restriction and/or advice about a hazard ahead.

Three colour schemes exist for direction signs. A road may be a motorway (white on blue), a primary route (white on dark green with yellow route numbers), or a non-primary route (black on white). A fourth colour scheme, black on yellow, is seen on temporary signs, for example marking a diversionary route avoiding a road closure.

Two typefaces are specified for British road signs. Transport *Medium* or Transport *Heavy* are used for all text on fixed permanent signs and most temporary signage, depending on the colour of the sign and associated text color; dark text on a white background is normally set in *Heavy* so that it stands out better. This is except for route numbers on motorway signs, for which a taller limited character set typeface called Motorway is used.

Signs are generally in English although bilingual signs are used in Wales (English/Welsh) and are beginning to be seen in parts of the Scottish Highlands (English/Scottish Gaelic).

All signs and their associated regulations can be found in "The Traffic Signs Regulations and General Directions 2002", as updated by the TSRGD 2010 and complemented by the various chapters of the "Traffic Signs Manual".

The Netherlands

Road signs in The Netherlands follow the Vienna Convention. Directional signs (which have not been harmonised under the Convention) always use blue as the background colour. The destinations on the sign are printed in white. If the destination is not a town (but an area within town or some other kind of attraction), that destination will be printed in black on a separate white background within the otherwise blue sign.

The Netherlands always signpost European road numbers where applicable (i.e., on the advance directional signs, the interchange direction signs and on the reassurance signs). Dutch national road numbers are placed on a rectangle, with motorways being signposted in white on a red rectangle (as an Axx) and primary roads in black on a yellow rectangle (as Nxx). When a motorway changes to a primary road, its number remains the same, but the A is replaced by the N. So at a certain point the A2 becomes N2, and when it changes to a motorway again, it becomes A2 again.

Signs intended for bike-riders always go on white signs with red or green letters.

The Dutch typeface, known as ANWB-Ee, is based on the US typeface. A new font, named ANWB-Uu (also known as Redesign), has been developed in 1997 and appears on many recent Dutch signs. On the motorways however the typeface remains the ANWB-Ee or a similar typeface. The language of the signs is typically Dutch, even though bilingual signs may be used, when the information is relevant for tourists.

Sweden

Swedish elk warning sign

The road signs in Sweden mostly follow the Vienna Convention with a few adaptations, however, allowed within the convention:

- the background of warning signs is yellow
- warning signs for elk and reindeer
- the background of direction signs is blue with white text
- the background of motorway direction signs is green with white text
- when applicable, the language is Swedish in Sweden.

The signage typeface Tratex is used exclusively in Sweden and is available as freeware.

Croatia

Traffic signs in Croatia are the same as traffic signs in the rest of the former Yugoslavia. Croatian road signs follow the Vienna convention (SFR Yugoslavia was the original signatory for Croatia, which is now a contracting party itself). The most common signs are yellow and black signs *for direction*, blue and white signs *for information* and white-on-green signs are used on the highways.

Ireland

Advance directional sign in for a roundabout in Ireland. The green background indicates that this sign is on a national road, with the blue patches left and right indicating a motorway (with symbol) and the white patches indicating a regional road or local road.

Irish warning signs

Until the partition of Ireland in 1922 and the independence of Southern Ireland (now the Republic of Ireland) British standards applied across the island. In 1926 road sign standards similar to those used in the UK at the time were adopted. Law requires that the signs be written in both Irish and English.

In 1956, road signs in the Republic were changed to markedly differ from the UK standard, with the adoption of U.S.-style "diamond" signs for many road hazard warnings (junctions, bends, railway crossings, traffic lights). Some domestic signs were also invented, such as the keep-left sign (a black curved arrow pointing to the upper-left, although some are similar to the European "white arrow on blue disk" signs), while some other signs are not widely adopted outside Ireland, such as the no-entry sign (a black arrow pointing ahead in a white circle with a red slashed circumference).

Directional signage is still firmly based on the United Kingdom standard, however, with the basic design of directional signs remaining the same as the UK in most cases. The same colours are used for directional signs in Ireland as in the UK, and the UK Transport and Motorway fonts are used. However, signage in the Republic of Ireland is bilingual, with the Irish text in mixed case italics, while the English text is in all upper-case.

The 'wild animals' warning sign, used in Italy, Germany, Latvia, and other countries and in the other former republics of the Soviet Union

In January 2005 Ireland adopted metric speed limits. Around 35,000 existing signs were replaced and a further 23,000 new signs erected bearing the speed limit in kilometres per hour. To avoid confusion with the old signs, each speed limit sign now has "km/h" beneath the numerals. Also, since the adoption of signs based on the *Warboys Committee* standard in 1977, Irish directional signs have used the metric system, however, unlike with the later speed limit change over, there was no effort made to change the existing

signage, and as of 2007 many finger posts still remain on rural roads with distances in miles, although the numbers continue to decline as roads are improved.

In late 2007 Ireland started to radically replace signs and posts. Good examples are the M1 (Dublin - Dundalk) and the M50 (Dublin). While being mostly the same as the old signs, it is welcome as a lot of the signs were damaged / stained. About 1/2 of the new posts are now two medium posts with crosshatched metal posts in-between instead of one large pole to minimize the damage in case of a crash.

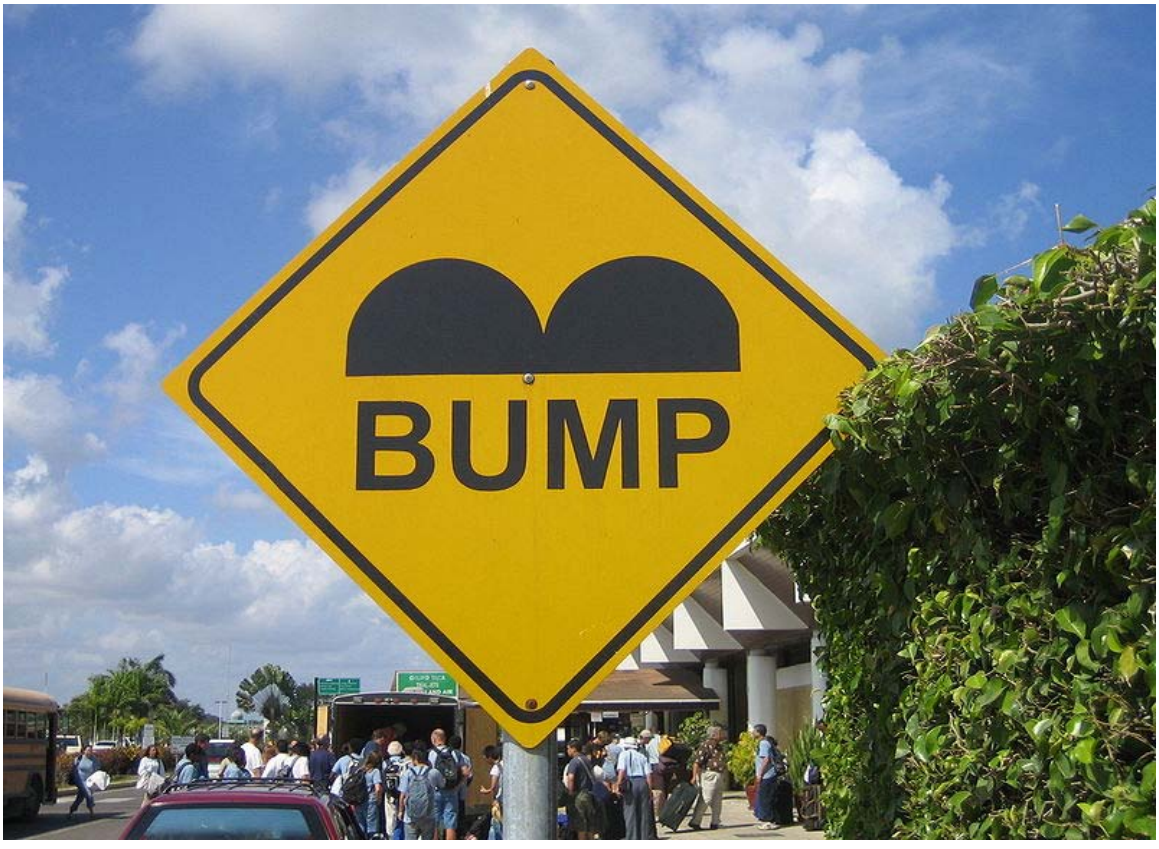
Iceland

Road signs in Iceland mainly follow the Vienna Convention, but use a variant of the colour scheme and minor design changes.

Latvia

Road signs in Latvia mainly of Vienna Convention regulations, only the design is different from many other European countries. The signs have many design issues common with Russian road signs since the times of USSR.

Mexico, South and Central America



Speed bump sign in Beliz

Road signs in Mexico, Central America, and South America vary from country to country. For the most part, conventions in signage tend to resemble United States signage conventions more so than European and Asian conventions. For example, warning signs are typically diamond shaped and yellow rather than triangular and white. Some variations include the "No Parking" sign, which uses a letter *E* instead of *P* (the Spanish word for "parking" is *estacionamiento* and *estacionamento* in Brazilian Portuguese), as well as the Stop sign, which usually reads "Pare" or "Alto". Notable exceptions include speed limit signs, which follow the European conventions, and the "No Entry" sign, often replaced with a crossed upwards arrow.

Colombia

Traffic signs in Colombia are classified into three categories. These are Warning signs, Mandatory signs and Information signs.

Warning signs are very similar to warning signs in United States. They are yellow diamond shaped with a black symbol (the yellow color is changed to an orange color in areas under construction). In certain cases, the yellow color is shifted to fluorescent yellow (in the School area sign and Chevron sign).

Mandatory signs are similar to European signs. They are circular with a red border, a white background and a black symbol. Stop sign and Yield sign are as European, except the word “Stop” is changed for “Pare” and the Yield sign has no letters, it is a red triangle with white center.

Information signs have many shapes and colors. Principally they are blue with white symbols and in many cases these signs have an information letter below the symbol.

Asia

Iran

Road signs in Iran mainly follow the Vienna Convention. Signs are in Persian and English.

Israel

Road signs in Israel mainly follow the Vienna Convention, but have some variants.

Philippines

By law road signs in the Philippines follow the Vienna Convention, however, in reality most road signs are of various character and can occur in different styles and shapes. For example MMDA's (Metro Manila Development Authority) uses pink colored traffic signs within Metro Manila.

China

Warning signs in China are triangular with a black border, yellow background and black symbol. Mandatory signs generally follow European conventions (circular with red border/blue circle)with some local variations. Direction signs are green for expressways, brown for tourist attractions and blue for other roads. Occasionally black on white is used for directions to local facilities.

Japanese stop sign with the word Tomare (止まれ), meaning Stop

Japan

Road signs in Japan are either controlled by local police authorities under Road Traffic Law (道路交通法) or by other road-controlling entities including Ministry of Land, Infrastructure and Transport, local municipalities, NEXCO (companies controlling expressways), under Road Law (道路法). Most of the design of the road signs in Japan are similar to the signs on the Vienna Convention, except for some significant variances, such as stop sign with a red downward triangle. The main signs are categorized into four meaning types: guidance (white characters on blue in general - on green in expressways), warning (black characters and symbols on yellow diamond), regulation (red or blue circle, depending on prohibition or regulation), and instruction (mostly white characters or symbols on blue square).

Automatic traffic sign recognition

Cars are beginning to feature cameras with automatic traffic sign recognition, beginning with the Opel Insignia. It mainly recognises speed limits and no-overtaking areas.

Street sign theft

Street sign theft occurs when street signs are stolen, often to be used as decorations, but also sometimes to avoid obeying the law by claiming later the sign was not there. Although the theft often seems arbitrary, signs that are unusual or amusing tend to be stolen more frequently. Sometimes considered to be a prank by the perpetrators, the theft is often costly and inconveniencing for the municipality or agency that owns the sign. In the United States, each street sign generally costs between $100 and $500 to replace.

Popular culture can act as a catalyst to street sign theft. Popular bands The Beatles and Lynyrd Skynyrd have inadvertently perpetuated street sign theft as their songs and albums include real place names including Penny Lane, Blue Jay Way, Abbey Road, and Brickyard Road.

Another commonly stolen sign marks the entrances to the village of Fucking, Austria. The sign simply says the name of the village. Because of the vulgar connotation of the word, "fucking," this sign has been repeatedly stolen by pranksters.

Chapter- 6

Traffic Guard

Traffic guard

Japanese traffic guard

Occupation

Type	Employment
Activity sectors	Traffic, law enforcement, security, civil engineering

Description

Related jobs	Construction worker, guard, police

A **traffic guard**, "traffic controller", "flagman", or "flagger" is a person who directs traffic through a construction site or other temporary traffic control zone past an area using signs or flags. They are responsible for maintaining the safety and efficiency of traffic, as well as the safety of road workers, while allowing construction, accident recovery or other tasks to proceed. Flaggers are commonly used to control traffic when two way roads are reduced to one lane, and traffic must alternate in direction.

Their duties are to direct traffic to safer areas where construction, accidents, and severe traffic are taking placed. In addition they have to moderate the traffic density to not cause traffic jams. They guide motorists to follow the traffic laws; but may not be able to enforce the law. Most traffic guards are seen as construction workers; but in some nations, they dress or perform as security guards and police officers.

Duties and careers

Highway and expressway safety

Traffic guards are employed on highways and expressways. They are trained to set up warning signs and barricades to slow down the speed of traffic in a temporary traffic control zone. Some areas have full-time traffic guard teams for responding to incidents that could risk the safety to motorists. When they are on scene they will set up equipment to warn approaching traffic about the incident.

Intersections

If construction or maintenance is occurring in an intersection and a law enforcement officer is not used to direct traffic, a traffic guard would control the intersection instead of the traffic light or signs.

Road construction

Flagger on M-124, Hayes State Park, Michigan

Traffic guards who are directing traffic during road construction would maybe block a lane on the road and direct the motorists to merge with another lane. If the road is two lanes and traffic flow moves both ways then one lane will be closed and the traffic guards will direct the traffic to take turns in crossing this area. They would stop one way of traffic for a time till some traffic from other way could pass and then they switch turns.

Crossings

Traffic guard on Michigan Avenue in Chicago

Traffic guards who are stationed at a crossing with no signal or placed for extra safety at a junction. They stop pedestrians and vehicles from crossing a junction where another thing has the right of way to cross.

Parking and gate guard

These traffic guards are waiting for motorists to leave and enter a complex. They also help pedestrians cross or stop them in front of the complex's entrance. They act as second pair of eyes to keep motorists and pedestrians safe. They may direct street traffic to stop for exiting motorists from the complex and they may not allow in doing that.

Equipment

- Signal flags; a small or large flag in colors such as white, red, and orange.
- Signal hand sign; called stop/slow paddles in the United States, these are a sign that has 'stop' on one side and 'slow' or 'go' on the other side.
- Signal baton (or marshalling wand); a baton that lights up or reflects light.
- Traffic vest; a brightly colored vest that is made to reflect headlights light or has built in LED lights.
- Helmet (or a hard hat); protecting the head from hazards.
- Signal flares; flares for night or bad weather.

- Traffic cones and warning signs; a warning and barrier used to slow down traffic and alert drivers.

Chapter- 7

Traffic Enforcement Camera

Gatso speed camera

A **traffic enforcement camera** (also **road safety camera**, **road rule camera**, **photo radar**, **speed camera**, **Gatso**) is an automated ticketing machine. It may include a

camera which may be mounted beside on over a highway or installed in an enforcement vehicle to detect traffic regulation violations, including speeding, vehicles going through a red traffic light, unauthorized use of a bus lane, for recording vehicles inside a congestion charge area and others.

The latest automatic number plate recognition systems can be used for the detection of average speeds and raise concerns over loss of privacy and the potentially for governments to establish mass surveillance of vehicle movements and therefore by association also the movement of the vehicle's owner. Vehicles owners are often required by law to identify the driver of the vehicle and a case was taken to the European Court of Human Rights who found that the Human Rights Act 1998 was not being breached. Some groups, such as the National Motorists Association in the USA, claim that systems "encourage ... revenue-driven enforcement" rather than the declared objectives.

Types

Automatic speed enforcement gantry or "*Lombada Eletrônica*" with ground sensors at Brasilia, D.F.

Gatso Mobile Speed Camera, used in Victoria, Australia. The camera is mounted on the passenger side dash, whilst the black box on the front is the radar unit.

Bus lane enforcement

Some bus lane enforcement cameras use a sensor in the road which triggers a number plate recognition camera which compares the vehicle registation plate with a list of approved vehicles and records images of other vehicles. Other systems use a camera mounted on the bus, for example in London where they monitor Red routes on which stopping is not allowed for any purpose (other than taxis and disabled parking permit holders).

On Monday, February 23, 2009, New York City announced testing camera enforcement of bus lanes on 34th Street in Midtown Manhattan where a New York City taxi illegally using the bus lanes would face a fine of 150 USD adjudicated by the New York City Taxi and Limousine Commission.

Red light enforcement

Red light camera in Springfield, Ohio, USA

A red light camera is a traffic enforcement camera that takes an image of a vehicle that illegally goes through an intersection where the light is red. Red light cameras help to ticket drivers by automatically photographing vehicles and drivers disobeying stop lights. The system continuously monitors the traffic signal and the camera is triggered by any vehicle entering the intersection above a preset minimum speed and following a specified time after the signal has turned red.

Speed limit enforcement

Speed enforcement cameras are used to monitor compliance with speed limits which may use Doppler, LIDAR or Automatic number plate recognition. Other speed enforcement systems are also used which are not camera based.

Fixed or mobile speed camera systems that measure the time taken by a vehicle to travel between two or more fairly distant sites (from several hundred metres to several hundred

kilometres apart) are called automatic number plate recognition (ANPR) cameras. These cameras time vehicles over a known fixed distance, then calculate the vehicle's average speed for the journey. The name derives from the fact that the technology uses infrared cameras linked to a computer to "read" a vehicle's registration number and identify it in real-time.

Dazzle camouflaged speed camera in Loipersdorf, Austria

Number plate recognition systems

Automatic number plate recognition can be used for purposes unrelated to enforcement of traffic rules. In principle any agency or person with access to data either from traffic

cameras or cameras installed for other purposes can track the movement of vehicles for any purpose.

In Australia's SAFE-T-CAM system, ANPR technology is used to monitor long distance truck drivers to detect avoidance of legally prescribed driver rest periods.

The United Kingdom's police ANPR system logs all the vehicles passing particular points in the national road network, allowing authorities to track the movement of vehicles and individuals across the country.

In the UK an 80-year-old pensioner John Catt and his daughter Linda (with no criminal record between them) were stopped by City of London Police while driving in London, UK in 2005, had their vehicle searched under section 44 of the Terrorism Act 2000 and were threatened with arrest if they refused to answer questions. After they complained formally, it was discovered they were stopped when their car was picked up by roadside ANPR CCTV cameras; it had been flagged in the Police National Computer database when they were seen near EDO MBM demonstrations in Brighton. Critics point out that the Catts had been suspected of no crime, however the UK's mass surveillance infrastructure allowed them to be targeted due to their association.

Other

- Congestion charge cameras to detect vehicles inside the chargeable area which have not paid the appropriate fee
- High-occupancy vehicle lane cameras to identify vehicles violating occupancy requirements.
- Level crossing cameras to identifying vehicles crossing railways at grade
- Noise pollution cameras that record evidence of heavy vehicles that break noise regulations by using engine braking
- Parking cameras which issue citations to vehicles which are illegally parked or which were not moved from a street at posted times.
- Toll-booth cameras to identify vehicles proceeding through a toll booth without paying the toll
- Turn cameras at intersections where specific turns are prohibited on red. This type of camera is mostly used in cities or heavy populated areas.
- Automatic number plate recognition systems can be used for multiple purposes, including identifying untaxed and uninsured vehicles, stolen cars and potentially mass surveillance of motorists.

Fixed camera systems can mounted in boxes or on poles beside the road or attached to gantries over the road, or to overpasses or bridges. Cameras can be concealed, for example in garbage bins.

Mobile speed cameras may be hand-held, tripod mounted, or vehicle-mounted. In vehicle-mounted systems, detection equipment and cameras can be mounted to the vehicle itself, or simply tripod mounted inside the vehicle and deployed out a window or

door. If the camera is fixed to the vehicle, the enforcement vehicle does not necessarily have to be stationary, and can be moved either with or against the flow of traffic. In the latter case, depending on the direction of travel, the target vehicle's relative speed is either added or subtracted from the enforcement vehicle's own speed to obtain its actual speed. The speedometer of the camera vehicle needs to be accurately calibrated.

Some number plate recognition systems can be used from vehicles.

A red-light and speed camera in Darwin, Northern Territory, Australia

Controversy

Legal issues

There are a number of legal issues which arise as a result depending on local laws and the procedures used by the enforcing bodies. Various legal issues arise from such cameras and the laws involved in how cameras can be placed and what evidence is necessary to prosecute a driver varies considerably in different legal systems.

One issue is the potential conflict of interest when private contractors are paid a commission based on the number of tickets they are able to issue. Pictures from the San Diego red light camera systems were ruled inadmissible as court evidence in September 2001. The judge said that the "total lack of oversight" and "method of compensation" made evidence from the cameras "so untrustworthy and unreliable that it should not be admitted".

Some U.S. states and provinces of Canada such as Alberta operate "owner liability" where it is the registered owner of the vehicle who must pay all such fines regardless of whether he was driving at the time of the offense, although they do release the owner from liability if he signs a form identifying the actual driver and that individual pays the fine. These states do not issue demerit points for camera infractions which has has been criticized by some as giving a "license to speed" to those who can more easily afford speeding fines.

In Albuquerque, New Mexico, the city government attempted to bypass the legal issue of a defendant's right to cross-examine his accuser, as well as the issue of verifying the driver's identity. Automated red-light and speeding offenses are classed as public nuisances and fined to the vehicle's registered owner as civil violations, not as criminal offenses.

In April 2000 two motorists who were caught speeding in the United Kingdom challenged the Road Traffic Act 1988 which required the keeper of a driver to identify the driver at a particular time as being in contradiction to the Human Rights Act 1998 on the grounds that it amounted to a 'compulsory confession', also that since the camera partnerships included the police, local authorities, Magistrates Courts Service (MCS) and Crown Prosecution Service (CPS) which had a financial interest in the fine revenue that they would not get a fair trial. Their plea was initially granted by a judge then overturned but was the heard by the European Court of Human Rights (ECtHR), and the European Court of Justice (ECJ). In 2007 the European Court of Human Rights found there was no breach of article 6 in requiring the keepers of cars caught speeding on camera to provide the name of the drive.

Surveillance

- Police and government have been accused of "Big Brother tactics" in over-monitoring of public roads, and of "revenue raising" in applying cameras in deceptive ways to increase government revenue rather than improve road safety.

Revenue not safety

- In 2010 a campaign was set up against a speed camera on a dual carriageway in Poole, Dorset in a 30 mph area in the United Kingdom. which had generated £1.3m of fines every year since 1999. The initial Freedom of information request was refused and the information was only released after an appeal to the Information Commissioner.
- In May 2010 the new Coalition government said that the 'Labour's 13-year war on the motorist is over' and that the new government 'pledged to scrap public funding for speed cameras' In July Mike Penning, the Road safety minister reduced the Road Safety Grant for the current year to Local Authorities from £95 million to £57 million saying that local authorities had relied too heavily on safety cameras for far too long and that he was pleased that some councils were now focusing on other road safety measures. It is estimated that the as a result the Treasury is now distributing £40 million less in Road Safety Grant than is raised from fines in the year. Dorset and Essex announced plans to review camera provision with a view to possibly ending the scheme in their counties, however Dorset strongly affirmed its support for the scheme, albeit reducing financial contributions in line with the reduction in government grant. Seven counties also announced plans to turn off some or all of their cameras, amidst warnings from the country's most senior traffic policeman that this would result in an increase in deaths and injuries. Gloucestershire cancelled plans to update cameras and has reduced or cancelled maintenance contracts.

Unpopularity

Use of cameras is opposed by some motorists and motoring organisations. They have also be rejected in some places by referendum.

- The first speed camera systems in the USA was in Friendswood, Texas in 1986 and La Marque, Texas in 1987. Neither program lasted more than a few months before public pressure forced them to be dropped.
- In 1991 cameras have been rejected by voters in referenda in Peoria, Arizona voters were the first to reject cameras by a 2-1 margin. Speed cameras have since been installed on the highways in the Phoenix area since 2007.
- In 1992 cameras have been rejected by voters in referenda in Batavia, Illinois.
- Anchorage, Alaska rejected cameras in a 1997 referendum
- In 2002 the state of Hawaii experimented with speed limit enforcement vans but they were withdrawn months later due to public outcry.

- In 2005, the Virginia legislature declined to reauthorize its red light camera enforcement law after a study questioned their effectiveness, only to reverse itself in 2007 and allow cameras to return to any city with a population greater than 10,000.
- Steubenville, Ohio rejected cameras in a 2006 referendum.
- In 2009, a petition was started in the town of College Station, Texas which requested that all red light cameras be dismantled and removed from all of the town's intersections. Enough signatures were captured to put the measure on the November 2009 general election ballot. After an extensive battle between the College Station city council and the opposing sides, both for and against red light cameras, the voters voted to eliminate the red light cameras throughout the entire city. By the end of November the red light cameras were taken down. However, all citations issued are still valid and must be paid by the offenders.
- On May 4, 2010 an ordinance authorizing the use of speed cameras in the town of Sykesville, Maryland was put to a referendum, in which 321 out of 529 voters (60.4%) voted against the cameras. The turnout for this vote was greater than the number of voters in the previous local Sykesville election for mayor where 523 residents voted.
- Arizona decided to not renew their contract with Redflex in 2011 following a study of their statewide 76 photo enforcement cameras. Reasons given included less than expected revenue due to improved compliance, mixed public acceptance and mixed accident data.

A red-light camera in use in Beaverton, Oregon, USA

Effectiveness

- The town of Swindon abandoned the use of fixed cameras in 2009, questioning their cost effectiveness with the cameras being replaced by vehicle activated warning signs and enforcement by police using mobile speed cameras: in the nine months following the switch-off there was a small reduction in accident rates which had changed slightly in similar periods before and after the switch off (Before: 1 fatal, 1 serious and 13 slight accidents. Afterwards: no fatalities, 2

serious and 12 slight accidents). The journalist George Monbiot claimed that the results were not statistically significant highlighting earlier findings across the whole of Wiltshire that there had been a 33% reduction in the number of people killed and seriously injured generally and a 68% reduction at camera sites during the previous 3 years.

Avoidance/evasion

A GPS map showing speed camera POI information overlaid onto it

To avoid detection or prosecution drivers may:

- Brake just before a camera in order to travel past its sensor below the speed limit. This is however a cause of collisions.
- Use GPS navigation devices which contain databases of known camera locations to alert them in advance. These databases may in some cases be update in near-realtime. The use of GPS devices to locate speed cameras is illegal in some jurisdictions.
- Install passive laser detectors or radar detectors that detect when the vehicle's speed is being monitored and warn the driver. Use of these devices may be illegal in some jurisdictions.
- Install active laser jammer or radar jammer devices which actively transmit signals that interfere with the measuring device. These devices are illegal in many jurisdictions.
- Remove, falsify, obscure or modify vehicle license plate. Tampering with number plates is illegal in many jurisdictions.

In August 2010 a fast driving Swedish driver reportedly avoided several older model speed cameras, but was detected by a new model, as traveling at 186 mph (300 km/h), resulting in the world's largest speeding fine to date.

History

Older traffic enforcement camera in Ludwigsburg, Germany

The concept of the speed camera can be dated back to at least 1905; Popular Mechanics reports on a patent for a "Time Recording Camera for Trapping Motorists" that enabled the operator to take time-stamped images of a vehicle moving across the start and endpoints of a measured section of road. The timestamps enabled the speed to be calculated, and the photo enabled identification of the driver.

The Dutch company *Gatsometer BV*, which was founded in 1958 by rally driver Maurice Gatsonides, produced the 'Gatsometer'. Gatsonides wished to better monitor his average speed on a race track and invented the device in order to improve his lap times. The

company later started supplying these devices as police speed enforcement tools. The first systems introduced in the late 1960s used film cameras to take their pictures. Gatsometer introduced the first red light camera in 1965, the first radar for use with road traffic in 1971 and the first mobile speed traffic camera in 1982;

From the late 1990s, digital cameras began to be introduced. Digital cameras can be fitted with a network connection to transfer images to a central processing location automatically, so they have advantages over film cameras in speed of issuing fines, maintenance and operational monitoring. However, film-based systems may provide superior image quality in the variety of lighting conditions encountered on roads, and are required by courts in some jurisdictions. New film-based systems are still being sold, but digital pictures are providing greater versatility and lower maintenance and are now more popular with law enforcement agencies.

Chapter- 8

Speed Limit Enforcement

Gatso speed camera

Speed limit enforcement is the action taken by appropriately empowered authorities to check that road vehicles are complying with the speed limit in force on roads and

highways. Methods used include roadside **speed traps** set up and operated by the police and automated roadside 'speed camera' systems which may incorporate the use of an automatic number plate recognition system. Traditionally the police would have used stopwatches to measure the time taken for a vehicle to cover a known distance, but latterly they have speed guns and automated in-vehicle systems at their disposal.

Many jurisdictions operate traffic violations reciprocity where non-resident drivers are treated like residents when they are stopped for a traffic offense that occurs in another jurisdiction. They also ensure that penalties such as demerit points and the ensuing increase in insurance premiums follow the driver home. The general principle of such interstate, inter-provincial, and/or international compacts is to guarantee the rule 'one license, one record.'

Some groups, such as the National Motorists Association in the USA, claim that systems are used primarily as a source of revenue rather than to enforce traffic rules for the declared objectives. However, studies have demonstrated that speed cameras have been effective in reducing the number of traffic injuries and deaths.

History

Traffic calming was built into the UK 1865 'Locomotive Act', which set a speed limit of 2 miles per hour (3.2 km/h) in towns and 4 miles per hour (6.4 km/h) out of town, by requiring a man with a red flag to walk 60 yards (55 m) ahead of qualifying powered vehicles. The distance ahead of the pedestrian crew member was reduced to 20 yards (18 m) in 1878 and the vehicles were required to stop on the sight of a horse. The speed limit being effectively redundant as vehicle speeds could not exceed the speed at which a person could walk.

By 1895 some drivers of early lightweight steam-powered autocars assumed that these would be legally classed as a horseless "carriage" and would therefore be exempt from the need for a preceding pedestrian. A test case was brought by motoring pioneer John Henry Knight who was subsequently convicted with using a locomotive without a licence.

In 1905 The Automobile Association was formed to help motorists avoid police speed traps.

A Royal Commission on 'Motorcars' in the UK reported in 1907 raised concern about the manner in which speed traps were being used to raise revenue in rural areas rather than being used to protect lives in towns. In parliamentary debates at the time it was observed that "Policemen are not stationed in the villages where there are people about who might be in danger, but are hidden in hedges or ditches by the side of the most open roads in the country", "In my opinion they are manifestly absurd as a protection to the public, and they are used in many counties merely as a means of extracting money from the passing traveller in a way which reminds one of the highwaymen of the Middle Ages".

In 1910 in legal test case ('Betts -v- Stevens') between Automobile Association patrolman and a potentially speeding motorist and the Chief Justice, Lord Alverston, the judge ruled that where a patrolman signals to a speeding driver to slow down and thereby avoid a speed-trap, that person would have committed the offence of 'obstructing an officer in the course of his duty' under the Prevention of Crimes Amendment Act 1885. Subsequently the organisation developed a coded warning system which was used until the 1960s whereby a patrolman would always salute the driver of a passing car which showed a visible AA Badge unless there was a speed trap nearby on the understanding that their officers could not be prosecuted for failing to salute.

Gatsometer BV, founded in 1958 by rally driver Maurice Gatsonides, produced the 'Gatsometer' which was described as "a revolutionary speed-measuring device". Developed initially for improving his race times, it was later marketed as police speed enforcement tool. Gatsometer claim to have developed the first radar for use with road traffic in 1971, but this claim is undermined by evidence that radar detectors were already for sale in 1967. Gatsometer BV produced the world's first mobile speed traffic camera in 1982.

VASCAR was in use in North Carolina, New York and Indiana by February 1968.

Methods

Police officers in Bavaria checking speed with a tripod-mounted LIDAR device

Speed limits were originally enforced by manually timing or "clocking" vehicles travelling through "speed traps" defined between two fixed landmarks along a roadway that were a known distance apart; the vehicle's average speed was then determined by dividing the distance travelled by the time taken to travel it. Setting up a speed trap that

could provide legally satisfactory evidence was usually time consuming and error prone, as it relied on its human operators.

Average speed measurement

VASCAR is a device that semi-automates the timing and average speed calculation of the original manually-operated "speed trap". An observer on the ground, in a vehicle or in the air simply presses a button as a vehicle passes two landmarks that are a known distance apart, typically several hundred metres.

Automatic number plate recognition (ANPR) systems that use a form of optical character recognition to read the vehicle's licence or registration plate. A computer system reads vehicle registration plates at two or more fixed points along a road, usually hundreds of meters or even kilometers apart, then uses the known distance between them to calculate a vehicle's average speed. If the average speed exceeds the speed limit, then a penalty is automatically issued.).

Police in some countries like France have been known to prosecute drivers for speeding, using an average speed calculated from timestamps on toll road tickets.

Instantaneous speed measurement

Texas police officer using a LIDAR speed gun

Instantaneous speed cameras measure the speed at a single point. These may either be a semi-permanent fixture or be established on a temporary basis. A variety of technologies can be used:

- Radar guns use a microwave signal that is directed at a vehicle; the Doppler effect is used to derive its speed.
- LIDAR guns utilize the time of flight of laser pulses to make a series of timestamped measurements of a vehicle's distance from the laser; the data is then used to calculate the vehicle's speed.
- Sensors embedded in the roadway in pairs, for example electromagnetic induction or Piezo-electric strips a set distance apart).
- Infra-red light sensors located perpendicular to the road, e.g. TIRTL

Pacing

Officers in some jurisdictions may also use pacing, particularly where a more convenient radar speed measuring device is not available—a police vehicle's speed is matched to that of a target vehicle, and the calibrated speedometer of the patrol car used to infer the other vehicle's speed.

Other

Some jurisdictions such as Australia, allow prosecutions based on a subjective speed assessment by a police officer.

Evidence gathering

UK fixed speed camera, showing "Dragon's Teeth" painted on the road"

While digital cameras can be used as the primary means of speed detection when combined with automatic number plate recognition (ANPR) average-speed camera systems, their use is more commonly restricted to evidence gathering where speeding offences are detected by various other types of sensors such as such as Doppler radar, piezo strips, infrared or laser devices.

Photographs are typically time-stamped by a high resolution timing device so that a vehicle's speed can be checked manually after the fact if necessary using the secondary method of calculating its speed between a series of calibrated lines (known as "Dragon's Teeth") painted on the road surface.

The change from analogue "wet film" to digital technology has revolutionised speed cameras, particularly their maintenance and the back-office processing required to issue penalty notices. Images from digital cameras can be uploaded in seconds to a remote office over a network link, while optical character recognition software can automate the "reading" of vehicle registration numbers.

Types of camera include Gatso, Truvelo Combi and D-cam.

Avoidance and evasion

Passive RADAR and LIDAR detector

Some drivers use passive radar detectors or LIDAR detectors to detect police radar or LIDAR signals, with the intention of avoiding or evading prosecution by slowing down before entering an enforcement zone. The legal standing of these type of devices varies by jurisdiction. Active devices might also be used—in this instance radar or LIDAR signals are typically jammed with counter emissions. These devices are more frequently illegal than passive devices.

Drivers may flash their lights to approaching drivers to warn them of a speed trap. The legal standing of this action also varies by jurisdiction.

In 2006 the UK Automobile Association controversially published a road map that included the location for thousands of speed cameras—the first time such information was available in printed form, although more accurate and frequently-updated GPS-based information was freely available for some time before that.

Tolerances

Speed limits may not be enforced for speeds close to the legal limit. In the United States, speeding enforcement tolerance is usually up to the discretion of the arresting officer. Some states (such as Pennsylvania) have official tolerances. In the United Kingdom

ACPO guidelines recommend a tolerance level of the speed limit "+10% +2 mph" (e.g., a maximum tolerance in a 30 mph (50 km/h) zone of 30 + (30 × 10% = 3) + 2 = 35 mph).

In Germany, a 3 km/h tolerance (4 km/h when speeding over 100 km/h) in favor of the offender is always deducted. Fines for speeding depend on how high above the speed limit the measured speed is and where the offense occurred. Speeding in built-up areas invariably carries higher fines than outside city limits. While fines for minor offenses tend to be moderate, speeds in excess of 20 km/h (12 mph) above the limit in built-up areas and 30 km/h (19 mph) on other roads result in distinctly higher fines and points on the driver's license, and, depending on the speed at which the offender was clocked, may lead to a driving ban of at least one month.

The state of Victoria in Australia allows for only a 3 kilometres per hour (1.9 mph) tolerance on the basis that although the increased risk is lower there are very many more drivers involved which creates a substantial risk across the road network. An alternate view is that police devices are accurate to 1 km/h, and that a 2–3 km/h tolerance is the minimum margin that police require to defeat any challenge in court regarding the accuracy of their speed measurement equipment.

Speed limit policy can affect enforcement. According to a 1994 report by the AASHTO, "experience has ... shown that speed limits set arbitrarily below the reasonable and prudent speed perceived by the public are difficult to enforce, produce noncompliance, encourage disrespect for the law, create unnecessary antagonism toward law enforcement officers, and divert traffic to lesser routes".

In Mexico City, maximum speed limit on freeways and beltways is set as 80 kilometres per hour (50 mph). However, fines are only given when speeding above 90 kilometres per hour (56 mph), thus giving a 10 kilometres per hour (6.2 mph) tolerance. Speed limit is enforced by an automatically-set camera. The device takes a picture of the speeding car's license plate and sends a printed fine by mail directly to the driver's home.
Mexican highway patrol may enforce speed laws only when a car is speeding above reasonable speeds in regard of the amount of traffic. Maximum speed for all Mexican highways is 110 kilometres per hour (68 mph). Speeding fines are given to those going 130 kilometres per hour (81 mph) and up to 220 kilometres per hour (140 mph). Police may however place a Dodge Charger vehicle as a pace car so drivers behind cannot overpass 100 kilometres per hour (62 mph); this is common during Summer and Winter holiday season.

Law enforcement approaches

Local conditions, law and police practices mean that the tactics adopted to catch speeding motorists vary considerably. In some regions, police may adopt a more subtle approach, concealing themselves and their equipment as much as possible; other jurisdictions require highly visible policing, with cameras painted yellow, and camera operators not permitted to use approaches such as attaching the camera to what may appear to be a broken-down vehicle when enforcing speed limits.

Authorities are not able to monitor every vehicle on every road—limited resources generally mean that enforcement needs to be targeted. A New Zealand study concluded that actual enforcement as well as the *perceived* chance of being caught both contributed to changes in drivers' behaviour.

Extra-judicial enforcement

In 2001, Acme-Rent-a-Car in Connecticut controversially tried to use a contractual clause in the rental agreement to issue speeding fines to any of its customers that exceeded speed limits as detected by GPS tracking units its cars. The company actions were challenged and defeated in court.

Regional issues

Australia

Gatso Mobile Speed Camera, used in Victoria, Australia. The camera is mounted on the passenger side dash, whilst the black box on the front is the radar unit.

In 2004 a government inquiry in the state of Victoria found that maintenance and accuracy checks had not been done on a regular basis. This had resulted in a 4-cylinder Datsun 120Y sedan reported as doing 158 km/h, while the maximum speed it was capable of was found to be only 117 km/h.

In August 2005, in Sydney, Australia a speed camera photograph was challenged on the basis that an MD5 cryptographic hash function used to protect the digital photograph from tampering was not robust enough to guarantee that it had not been altered. Magistrate Lawrence Lawson demanded that the Roads and Traffic Authority (RTA) produce an expert witness who could prove the photographs were tamper-proof, but the RTA was unable to provide such evidence. The defendant was acquitted and awarded court costs.

Victoria achieved record low road tolls in both 2008 and 2009. A report about the 2009 road toll reduction credited increased use of mobile speed cameras to police speed limits as having contributed to the result for that year.

Canada

Speed limit enforcement cameras were a substantial election issue in the province of Ontario, Canada and were abolished by the premier Mike Harris in 1995.

In February 2006, Edmonton, Alberta, Canada erupted in scandal when it was alleged that two police officers accepted bribes from private contractors who received lucrative contracts to provide speed limit enforcement cameras. The officers and contractor involved now face criminal charges that remain before the courts.

United Kingdom

The United Kingdom uses a variety of methods to enforce its road speed limits including average and instantaneous speed cameras, however eight counties are to switch off or remove cameras and a further two counties are considering such action.

There has also been debate as to whether the use of such cameras in order to force a driver to confess to the crime of speeding is in violation of European basic human rights; however, in 2007 the European Court of Human Rights, in *O'Halloran and Francis v United Kingdom*, found there was no breach of article 6 of the Human Rights Act 1998 in requiring the keepers of cars caught speeding on camera to provide the name of the driver, or to be subject to criminal penalty of an equivalent degree of severity if they failed to do so.

The number of designated traffic officers fell from 15–20% of Police force strength in 1966 to seven per cent of force strength in 1998, and between 1999 and 2004 by 21%. It is an item of debate whether the reduction in traffic accidents per 100 million miles driven over this time has been due to robotic enforcement.

United States

In the U.S. state of Ohio, the issue of whether a city has jurisdiction under the Ohio Constitution to issue citations based on speed cameras was heard by the Ohio Supreme

Court on September 18, 2007, in the case of Kelly Mendenhall et al. v. The City of Akron et al. The court ruled in favor of the city.

They are illegal in Nassau County, Yonkers, Buffalo, Rochester, and Suffolk County, except in toll lanes equipped with E-ZPass where driving through at a speed in excess of the posted limit can result in a Speed Notice indication.

Some U.S. states that formerly allowed red-light enforcement cameras but not speed limit enforcement cameras ('photo radar'), have now approved, or are considering, the implementation of speed limit enforcement cameras. The Maryland legislature approved such a program in January 2006. In 2005, 2006, 2008 and 2009 the California legislature considered, but did not pass, bills to implement speed limit enforcement cameras. Tennessee legislators are also considering expanding their speed limit enforcement cameras after successes in Chattanooga such as generating $158,811 in revenue in the first three months.

A 2007 study of speed cameras on the Arizona State Route 101 in Scottsdale found a 50% reduction in the total crash frequency, with injuries falling by 40% however rear-end collisions increased by 55%.

As of late 2008 cameras are being placed along all Phoenix area freeways capturing drivers doing speeds greater than 11 mph over the posted speed limit. Over 100 new cameras are expected to be up and running by 2009.

As of 2009 speed cameras existed in 48 communities in the United States, including in Arizona, Colorado, Illinois, Iowa, Louisiana, Maryland, Massachusetts, New Mexico, Ohio, Oregon, Tennessee, Washington, and Washington, DC.

In the United States, it is common for all installation, operation, and verification procedures to be carried out by private companies that in some States receive payment based on the number of infringements they issue, and often under no testing regime whatsoever, however these units are required by law to take at least two pictures of each vehicle.

Opposition groups have formed in some locations where automated traffic enforcement has been used. In the US city of Scottsdale Arizona, an activist group CameraFraud was formed and staged sign-wave protests and petition drives to oppose the use of speed limit enforcement cameras ('photo radar'). In the 2008 elections in nearby Pinal County, Paul Babeau won an election for Sheriff after making a campaign promise to eliminate speed cameras.

It has been announced that Arizona will not renew its contract with Redflex, the company that operates the cameras.