MORE
Multimodal Optimisation of Roadspace in Europe

Deliverable D.2.2

The Regulatory Framework

Start date of project:	**1st September 2018**	Duration:	**36 months**

Version:	**3.5**
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Verified by:	**BC & ScPo**
Status:	**Final**
Dissemination level:	**CO**

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 769276

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1. Introduction

This deliverable is a document in work package 2 (WP2). It fulfils the requirement of D2.2 to provide a summary of the regulatory framework. It has been expanded to add information from the interventions anticipated in D5.2 (Case Study Design Methodology – Future Conditions), which is now finalised for each city. Pending the actual design proposals in later deliverables, the indication at this stage is that all proposed measures can be implemented within each country's current regulatory regime making use of existing traffic signs and road markings. It would therefore appear that there is no proposal requiring the augmentation of any country's regulatory framework.

This deliverable therefore focuses on the taxonomy of regulatory measures, dividing them into categories to help understand their function, meaning for the road user and purpose. It also summarises the results of a questionnaires sent to city partners in November 2018 and October 2019. It includes the full responses received as Appendix A.

References are given where appropriate, but there is little formal research on the subject. Most of the information is based upon the extensive experience of Buchanan Computing working with public authorities in the United Kingdom, Ireland, Greece, Cyprus and Malta, and also on news reports and informal on-line sources.

The topics to be covered in D2.2 are:

> D2.2 (i) Categorisation and grouping of measures that require road users to change their behaviours.
>
> D2.2 (ii) Overview of the current use and enforcement of regulatory measures in each of the countries involved in a MORE demonstration project. This will include the processes by which new regulations are introduced and the cost timescale and any difficulties in doing so.
>
> D2.2 (iii) Overview of innovative road user and traffic control measures identified in other tasks that might require innovative enforcement and other regulatory measures.
>
> D2.2 (iv) Detailed discussion of the working and effectiveness of current regulatory measures and possible improvements that might result from new techniques, greater use of technology or legislative and administrative changes.
>
> D2.2 (v) Matrix of measures under consideration for each of the corridor studies against the suitability of different enforcement and other road user influencing techniques needed to make them effective.

2. Background to Regulation

2.1. Origins of Regulation

Roads and streets are public spaces shared by a large number of individuals for multiple reasons. Those individuals generally have a wide degree of freedom as to how they occupy and use the common space. But their freedom to enjoy the benefits of the infrastructure of necessity imposes obligations not to unreasonably interfere with or impede other people who wish to enjoy those same rights. Thus, as with all freedoms comes obligation: the need the respect the rights of others.

Therefore there has been the need to regulate to use of the highway since time immemorial, to proscribe actions that unreasonably hinder others' use of the same space. Traffic regulation thus has ancient origins.

The most obvious 'rule of the road' needed was to decide how to pass vehicles and bodies of people coming in the opposite direction. Passing on the left apparently dates back earlier than Roman times, arguably because people are predominately right-handed, so chose to use their left-hand to control their horse or steer their vehicle, leaving their dominant arm free for defensive purposes. There is some archaeology to support this[1].

Possibly the earliest and certainly best-documented case of the conflict between the Link and Place functions of a street was adjudged in England in 1812, when Lord Chief Justice Ellenborough pronounced to the effect: "The King's highway is not to be used as a stable yard"[2] when ruling against leaving a carriage on the road for a long period.

The earliest known system for site-specific regulation of stationary vehicles was developed in Switzerland and the form of signing used was presented to a League of Nations committee (the *International Union of Towns*) in 1927 for possible international use [League of Nations Archives box R1132]. The same committee found that in some states, such as Belgium, there was little central control, with regulation left to individual local authorities.

There have always been casualties resulting from road transport, but the rise in cycling in Western Europe and then the introduction of motor vehicles caused a pressing need to address the rising toll of deaths and injuries. Signing of "dangerous and precipitous places" was an initial reaction to this, with speed limits and other restrictions following. Sometimes these were quite restrictive, such as the late 19th century British requirement for someone to walk in front of a motor vehicle carrying a red flag.

Whilst there have thus been forms traffic regulation in Europe for thousands of years, they tended to address individual nuisances and matters deemed important to the efficient and

[1] Walters, Bryn. Bulletin of the Association for Roman Archaeology. Autumn 1998], and documentary evidence that in 1300, Pope Boniface VIII directed pilgrims to keep left [Anderson, Charles (2003)]
[2] R v Cross 3 Camp 224, 170 Eng. Rep. 1362 (1812).

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equitable use of roadspace. It was not until the mid-20th century that most countries started introducing both guidance and statutory measures to form a coherent code for regulation of all forms of road use.

2.2. Changing Road User Behaviour

Regulation is just one method open to highway engineers and transport planners to influence how people use roads and streets. It is perhaps the most extreme one but not necessarily the most effective in all situations. Whether people chose to make journeys that involve the road network at all is a much wider issue of planning and economics. Modal choice is an area governed not so much by regulation as by economics and the availability of public transport, adequate provision for walking and cycling, etc.

Even when an individual has made the choice to use a particular mode, he or she will modify their behaviour to do what they consider safe, and will usually accept small time penalties to be courteous to other road users. The nature of the road, the nature of its frontages, adjacent land use, width and surfacing, and the number of other road users and their mode of travel will all influence vehicle speeds, driver awareness and road user behaviour generally, often more effectively than regulation. As an example, an informal pedestrian crossing is a raised or block-paved strip across a carriageway that has no regulatory significance at all. But it is used in almost all European countries and works effectively and with reasonable safety for both pedestrians and vehicles, due to road user psychology and the courtesy and intuition of the majority of them.

Physical clues to expected behaviour are often sufficient, even with very little enforcement of any regulations that back them up. These include distinctive road surfacing, road narrowings, gateway treatments and kerb realignment that directs traffic to turn a particular way. Very few drivers wish deliberately to disobey the rules of the road – they simply need ample guidance that stands out about all the other ‘noise’ of the road environment – as to what they are expected to do.

3. Forms of regulation

The earliest forms of regulation were not site specific. They applied to the whole road network or to all roads passing through a particular type of area, such as a town. Speed limits and the prohibition of 'obstruction' are in this category. These widespread rules and norms still have an important role in reducing road casualties, achieving an equitable balance between the competing desires of different road users and making highways usable for their movement function.

3.1. Availability of road network

The most fundamental restriction covers whether a link of the network is available at all to a particular road user at the time they wish to use it. There might be a permanent ban on a wide category of vehicles (such as all motor vehicles), or there might be specified hours of enforcement or exceptions for certain journey purposes (such as to access premises).

Examples of signs relating to the availability of the road network to particular vehicles and/or for specified purposes

Recent restrictions falling into this category include "Clean air zones" or "Low emission zones", terms which unfortunately have different meanings in different situations. They can mean a total (or time dependent) ban on certain (generally older) vehicles, they can mean a requirement to pay a charge dependent upon the type of vehicle, or they might indicate that there is no regulatory requirement at all for the ordinary road user – just a political aspiration by the authority concerned, accompanied by other initiatives aimed at reducing road traffic.

A similar type of restriction implemented not for air quality, but for reasons of congestion (or for revenue raising) is a charging zone or toll. This might be a daily charge or might be incurred every time a boundary point is crossed, and could relate to an individual road link (typically to recoup the cost of building a bridge or tunnel) or to a whole area.

More limited restrictions in this category control access for particular types of vehicle for amenity reasons, such as to avoid noise, intrusion and vibration from goods vehicles, or because of physical limitations of the highway, such as a low or weak bridge, narrow sections or sharp bends.

One-way streets also fall into this category, but are generally part of a traffic management system that provides an alternative route for traffic in the opposite direction.

A further type of restriction is a ‘bus-only road’, introduced to give priority to public transport. This might reserve the road exclusively for buses, might permit also vehicles needing access, or might allow several other categories, such as motor cycles, taxis or goods vehicles. The restriction could apply at all times, or the road might be available to any vehicle outside peak times.

The above types of road use restriction generally apply to a whole link between junctions.

A further category is a banned or compulsory turn, affecting just a single junction and not placing any particular restrictions on the links it connects to. Such turning restrictions are generally imposed either to improve the junction capacity and throughput or to address a safety problem. There are also cases where a turning restriction at traffic signals is necessary to allow a pedestrian of cyclist facility to operate at the same time as a vehicle movement, without the danger of those vehicles conflicting with the path of the pedestrians or cyclists.

3.2. Manner of driving

A large number of restrictions fall into this category. They are mainly safety related, but some are aimed at managing the road network equitably or minimising congestion. They range from somewhat subjective offences such as dangerous or careless driving, through to minor infringements, such as blocking a junction or a pedestrian crossing.

Allowing other traffic precedence at a junction, either by ‘giving way’ or by bringing the vehicle to a stop, is a common restriction in this category. It is very seldom specifically enforced, with prosecutions mainly arising as the consequence of a collision. An extension of this is the traffic signal. This is actually a temporal restriction, but one of such short duration that it is better considered as simply a junction with alternating priority.

Examples of signs and markings related to manner of driving

The restriction in this category that generates the most public interest and probably the greatest number of prosecutions in all European countries is the speed limit. Occasionally a minimum speed limit is set, for example in a road tunnel, to improve traffic flow and eliminate blockages. But speed limits are almost invariably maximum speeds set for motor vehicles, imposed largely for reasons of safety, but occasionally to improve air quality. Maximum

speed limits for the whole road network or for all roads of a particular character are set nationally, sometimes differentiating between vehicle types. Where a speed limit applies only to a particular section of the network, for either a permanent or a temporary situation such as road works, this is indicated by road signs.

Most European countries also have the option of dynamic speed limits on their motorways indicated by variable message signs (VMS). These can be changed by human operators or automatically using sensors that gauge the volume and speed of traffic or the weather conditions. They are used to slow traffic for safety reasons (for example because of fog or an obstruction ahead) or to improve traffic flow. They use either gantry-mounted VMSs, one over each lane, or verge-mounted signs that apply to the whole carriageway.

3.3. Managing the road space

A highway is an area of land, either formally designated as a thoroughfare, or more often recognised as such due to custom and practice over the years. How this area is used and allocated is essentially what the MORE project is about. Over the past 30 years, most European countries have introduced increasingly complex ways of dividing up this space and allocating it to (i) different **modes of transport or types of vehicle** (e.g. bus and cycles only), or by the **purpose** the road user is making of the highway at that moment (e.g. loading) or by the **type of person** (e.g. resident or disabled traveller).

This is an important and large category, so is best divided into two:

i. moving vehicle purposes (the Link function of the street), and

ii. all other purposes such as parked and loading vehicles and pedestrian use of the space, which relate to its Place function. This is sometimes referred to a ‘managing the kerbside’.

Pedestrian usage, and amenities relating to the Place function, such as seating, planting, landscaping, sculpture and telephone and post boxes are normally confined to land that is left over after other areas have been allocated, and thus do not normally need any regulation.

3.4. Allocation of moving vehicle space

The most common rule on road space usage is this one referred to above as being the most ancient: which side of the road to use for a particular direction of travel. This is normally covered by national legislation, with no specific local rules required.

In urban areas, another obvious restriction on what part of the highway may be used by vehicles is one that generally needs no site-specific regulation at all: the division of the space into carriageway and footway, normally with a raised kerb to separate the two. Most countries have general legislation against driving motor vehicles on footways, so authorities do not need to make regulations for individual locations and may change the space allocation (by making footways wider, for example) without formality.

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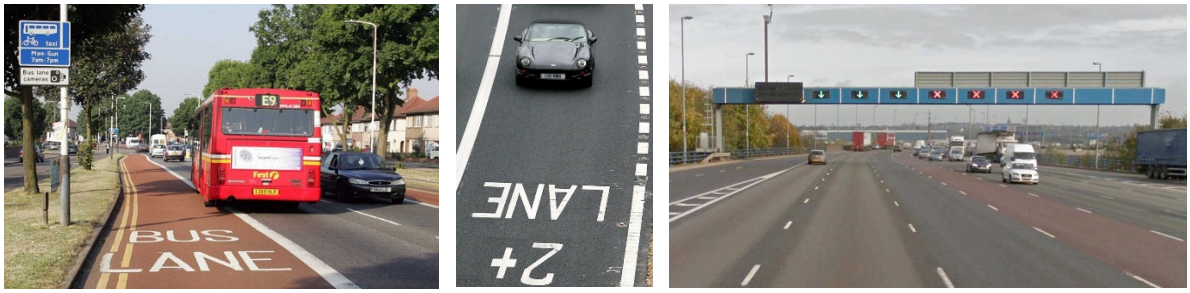
Cycle lanes and tracks are probably the earliest form of vehicle category space allocation. They fall into the following categories:

- A reserved track alongside and parallel with a road, physically separated by a kerb, verge or possibly only by intermittent obstacles, such as 'armadillos',
- An area at the edge of the main carriageway from which other vehicles are legally excluded,
- A strip along the edge of a carriageway marked for the use of cyclists but with no legal restriction preventing other vehicles entering it.

The second most common type of vehicle category allocation is to prioritise public transport, either buses or trams. To be effective, **bus lanes** are generally mandatory, meaning that drivers entering them without an acceptable reason can be prosecuted. It is undesirable from a safety perspective to force cyclists to move away from the nearside edge of a carriageway, so where there is no separate provision for cyclists, bus lanes tend to be bus and cycle lanes in practice.

Bus and cycle lanes may allow those categories of vehicle to proceed in the opposite direction to other traffic (contra-flow lanes)

Another type of reserved space is the **high-occupancy vehicle (HOV) lane**. This is intended to encourage car sharing by giving priority to vehicles carrying a certain minimum number of people, typically two. Further types of vehicle afforded use of reserved lanes in some European cities include taxis, mini-cabs, low emission vehicles and goods vehicles over a specified weight. These are often combined with bus lanes.



Examples of signs and markings related to management of moving vehicle space

Both cycle and bus lanes are generally on the nearside of the road, for the safety of cyclists and to facilitate boarding of buses. There is therefore a conflict between such provision and the kerbside uses of road space considered in the next section. A cycle or bus lane is not very effective, and arguably counter-productive, if it is regularly blocked by stationary vehicles, even if those vehicles have a legitimate reason for being there such as to load goods or service adjacent premises.

It is noted in D5.2[3] that in Budapest consideration is being given to placing bus lanes in the middle of the street. This has precedent in that it has conventionally been the position for tram tracks, but using this position presents a challenge for the design of boarding and alighting points and ensuring the safety of pedestrians reaching them.

3.5. Managing the kerbside

Private cars spend around 96% of their time parked[4]. Many owners do not have the space to take them off-street, so much of this parking will be at the sides of residential roads. When a vehicle is used, it will usually require parking at its destination. This causes pressure on authorities to permit kerbside parking, particularly in areas where there is no convenient off-street car park.

But for the urban corridors being considered in MORE, such **private parking** by able-bodied motorists is often prohibited, at least during the main working day. A provision for disabled people to be able to park as close as possible to their destination is more common, either by the provision of dedicated 'blue badge' bays or by national legislation that exempts blue badge holders from some normal restrictions. A common example is to allow them to use loading bays or simply park at the kerbside at times when loading is permitted. Where possible, disabled parking spaces are placed in side roads to avoid reducing capacity on major corridors.

Examples of sign and markings related to managing the kerbside

What cannot easily be restricted entirely is the need for shops and other commercial premises on a major route to be serviced and supplied through **loading**, and for large items to be delivered to or collected from residential premises. The Place function of the street has

[3] MORE D5.2 *Case Study Design Methodology – Future Conditions* Section 2.5 Table 16, 2021
[4] Marsden, Anable , Bray, Seagriff & Spurling *Shared mobility – where now, where next?* Centre for Reseach into Energy Demand Solutions. Oxford, 2019, and Bates, J. & Leibling, D. *Spaced Out: Perspectives on parking policy*. RAC Foundation, 2012.

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needs that must be met for it to flourish and for those living and working there to have a similar level of access and convenience to those located on minor roads.

Further calls for roadspace allocation for stationary vehicles often come from shopkeepers who are dependent upon passing trade and from authorities that wish to charge for parking and thus achieve some income from the space used.

Stopping for a very short duration is necessary to **set down and pick up passengers**, so this is a further category that may be regulated separately. On major traffic routes permission to stop to set down might be limited to taxis or to disabled people.

Most countries divide different permitted reasons for a vehicle to be stationary at the kerbside into three categories. But the terminology used is inconsistent across Europe and even sometimes within countries. Often this categorisation has arisen over time and without much conscious thought. It is worth drilling down into what these categories imply, both in terms of their necessity for the Place function of a street, and their likely impact on moving traffic and the availability of space on the highway for other purposes.

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Common description of prohibition and symbols used	*Usual description of same activity when permitted and symbols used*	*Notes*	*Typical time stationary (minutes)*
No stopping / Clearway 	**Stopping** to set-down or pick-up a passenger	Only rarely prohibited in urban areas	1-2
No loading	**Loading only**  	Includes also unloading. When permitted, it often requires loading activity to be observed and may only apply to goods vehicles and/or to items that cannot conveniently be carried,	Less than 20
No waiting / No parking  	**Parking** or “P” symbol  	Usually means the vehicle is left unattended, but an offence can occur with the driver present.	30 or more

By combining the purpose and the likely duration of the kerbside activity, the categories seek to balance the reasonable needs of frontagers and other Place function users with those wanting efficient throughput for the Link function.

Typical categories are listed above in ascending order of the expected duration of the stopping activity. A prohibition of any one implies also a prohibition of the longer duration activities below it in the list. In each case the activity might be described and signed using different wording or symbols when it is permitted from when it is prohibited.

Each of these categories may be subdivided further. Any permitted or restricted activity might apply to everyone or could be limited to certain vehicles or to those issued with a form of permit. There might be a specified maximum duration for which the vehicle can be stopped.

The above categories combine both a purpose – the reason the vehicle is stationary – and a stated or likely maximum duration. These categories have evolved to cater for the necessary or reasonable requirements of the Place function and to balance competing interests. For

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example, on a major traffic corridor it would be considered unreasonable for a vehicle to stop for a trivial reason, such as for the driver to take a phone call. But to set down a passenger, particularly an elderly or disabled one, a short stop is tolerated. Parking, even for a short period such as 20 minutes, would usually be prohibited on such a road, but a vehicle might be permitted to stop for that same period if that was the time it took to load or unload goods for adjacent premises.

Most countries do make use of categories of kerbside stopping similar to these, but their understanding of their use and interrelationship and the way in which the restrictions are communicated to the public and enforced is often confused.

For a street of residential or commercial property without any rear access or service road, permitting stopping and loading is normally considered essential for its economic and social health and to meet the established legal rights of occupiers of property. It is also common to provide parking specifically for disabled persons close to their homes and to premises they may wish to visit, as the distance they can easily travel once away from their vehicle may be limited.

Buses also need to stop to set down and pick up, usually at designated bus-stops at intervals along a route. The design of the bus and particularly the method of payment can make a big difference to the time needed for loading and thus the impact on other traffic.

In contrast to the above activities, any other reason for a vehicle being stationary for a time, generally referred to as ‘parking’, is essentially optional for the operation of the street. It may be possible to relocate parking provision elsewhere, or the need for parking might be eliminated if private car journeys can be reallocated to another mode. However, many authorities derive substantial revenue from on-street parking. This revenue is sometimes ring-fenced for use only on transport projects. Many authorities would be reluctant to lose it.

An increasing amount of the kerbside in most urban areas is dedicated to the charging of electric vehicles. This might be limited to permit holders or available to anyone who can access the charging equipment. The spaces are normally restricted only to electric or hybrid vehicles, but there is little effort currently to stop such vehicles continuing to occupy the spaces (possibly to the exclusion of others) after charging has been completed.

Another form of kerbside use linked to sustainability is to provide space exclusively for car club vehicles. Having such spaces (and an agreement with a provider of the vehicles) in close proximity to residential areas helps to reduce the need for car ownership. It can thus reduce the overall level of parking provision needed in an area.

There are many competing needs for kerbside space. One of these is the capacity of a road for its Link function. As a consequence, many cities have evolved quite complex restrictions for the use of the kerbside to try to achieve the optimum balance between these conflicting pressures. These measures often involve specifying multiple time intervals during the day for the different activities, requirements relating to the vehicle type, any permit held, the activity being performed, the duration for which the vehicle is stopped and any payment required. A recent innovation in a few localities are computer applications for ‘dynamic kerbside

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management' that permit primarily goods vehicle operators to book a space to load in advance, with the actual timing fine-tuned as they approach the location concerned[5].

The term 'Managing the kerbside' has become a popular meme in recent months, with authorities being encouraged to see it as a valuable resource that needs proactive engagement. In addition to the dynamic loading provision mentioned above, the control of computer-bookable mini-cabs, such as Uber, setting down and picking up is another prize some authorities are eyeing, particularly if it can generate revenue for them.

More generally, control of kerbside activities is achieved through a combination of three measures:

- **Physical:** a limit on the amount of kerbside space available for a designated activity.
- **Regulatory**: controls on who can use a particular space, for what purpose, at what times and for what duration.
- **Price:** charging for kerbside use, often related to the duration of the activity.

3.6. Time dependent and dynamic restrictions

Many of the above categories of moving traffic and kerbside restrictions are not imposed and enforced for 24 hours every day. Parking and stopping restrictions, in particular, are generally tailored to maximise the space for through traffic at times when that capacity is most needed (Link function priority), whilst facilitating purposes connected with the Place function of the street at other times.

All the city corridors being studied in MORE have the capability to impose restrictions that operate only at pre-defined times, as indicated on the relevant road signs.

What is more difficult to impose for legal and practical reasons are dynamic restrictions that vary according to traffic, weather or other conditions. Their times of operation are therefore unpredictable and will differ even on adjacent weekdays. On major inter-urban roads and motorways frequent gantry and other variable message signs (VMS) can be quickly changed manually or automatically to indicate a lower speed limit or a lane closure. There is some use of variable road markings in the Netherlands and UK to indicate measures that change dynamically, but these are somewhat experimental and are expensive to install and maintain. Dynamic restrictions relating to moving vehicles that can therefore only be accommodated on major traffic routes that have the necessary infrastructure in place.

The illustrations below show signs and LED road studs that were installed in 2015 in Northolt, London to indicate dynamically when a bus lane was in operation. The studs illuminated only when the lane was open to general traffic, and there was also a rotating prism type VMS to indicate that both lanes were available. Whilst this technology could have

[5] Moran, *Virtual loading bays to go live in London*, Parking Review, 3 October 2017

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been used to indicate unpredictable and regularly changing activation of the bus lane, in practice the lane had fixed operational hours. Its operation was not therefore responsive, as it might have been, to traffic volumes, degree of congestion or the presence of buses. It was designed simply to encourage use of the lane at times when it wasn't restricted to buses, arguably a somewhat expensive and complex way to encourage road users to be less cautious in their observance of a regulatory measure.

Accommodating dynamic parking restrictions and other kerbside controls is more difficult. The effective operation of any type of kerbside control is generally dependent upon the majority of drivers being familiar with the restrictions, as a result of the operational hours being the same throughout an area. Small vertical signs giving the enforceable hours and other conditions are provided for the benefit of visitors, but these can normally only be read once a vehicle has stopped, and are often quite widely space (in UK up to 60 m apart) to avoid cluttering the street and to enable them to be mounted on existing infrastructure. With suitable cabling or other power and communications infrastructure, these plates could be converted to VMS. But they might need to be placed more frequently than at present to indicate a regularly changing and unpredictable message than for the current static messages that the majority of road users are familiar with.

A system of VMSs is being installed in Southwark, London in 2021 to indicate bays that can be pre-booked for loading purposes. These are used in conjunction with permanent message signs, designed to the normal regulations, indicating that the bays are only available to permit holders. They are designed to be used as additional footway space for pedestrians when not required for vehicles to load. They are therefore an example of dynamic shared space.

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Computer visualisation of solar-powered signs for Southwark

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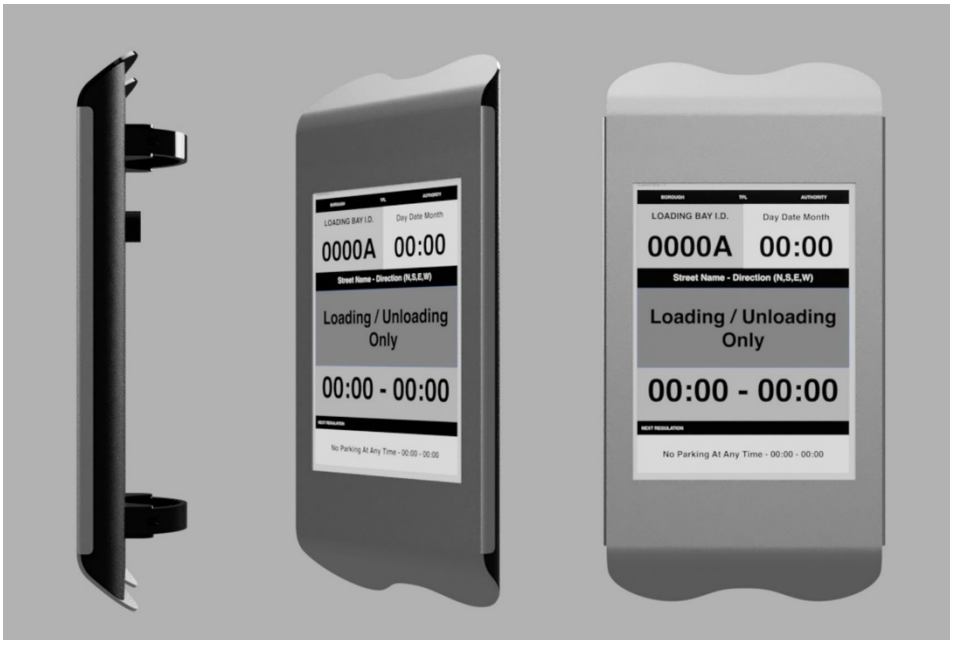
Computer visualisation of bookable loading bays in Southwark



Detail of proposed VMS displays on signs in Southwark
(images courtesy of GRID Smarter Cities)

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The above signs work in conjunction with detailed information available on a website for those wishing to reserve and pay for a space for loading purposes. The signs on-site therefore need only be sufficient to deter those who have not booked from using the space and to provide an indication of the code of the vehicle for which a space is currently reserved. At the time of writing, this system had not been brought into operation.

In contrast, a dynamic restriction that is available to or affects all road users, needs to be fully explained in the on-street signage. There would be no opportunity for casual users wishing to stop or park to consult a website or to receive other information. For effective compliance with such dynamic restrictions, a high level of VMS signing would be needed. This could comprise either signs large enough to be read from a moving vehicle at the gateway to the area concerned, or a sufficient number of smaller signs positioned close to each point at which a vehicle might be permitted to stop. Either of these might be seen as intrusive and a form of street clutter that detracted from the appearance and amenity of the street.

In addition to showing what is currently permitted, the signs for a dynamic restriction at the kerbside also need to show at what time in the future the measure ends or changes. Otherwise, a vehicle might be unattended when the restriction changes preventing its driver from being able to move it immediately. This requirement would hinder the introduction of restrictions with unpredictable timings, ones that depend upon traffic volume or demand for example, and limit how responsive the change could actually be. A period of notice of an impending change could be given on signs, taking into account the maximum duration permitted for the kerbside activity in question. This problem already occurs to some extent in residential areas where vehicles might be left parked for a week or more whilst the owner is away if, during that time, the authority wishes to suspend the parking place for street works or a special event.

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4. Compliance and enforcement

There is little benefit in introducing traffic regulations unless they are well respected and generally obeyed. Many measures work well without much enforcement, but a good level of compliance depends upon many factors including sociological and psychological ones.

Measures that people recognise are for their safety tend to achieve the highest level of compliance. Traffic signals, banned turns and one-way streets are very well observed across Europe with only minimal activity needed by the police or other enforcement body. This is partly driven by what is socially acceptable and how visible a contravention is to others, but overwhelming also by drivers' perceptions of how likely they are to have a collision as a result of breaking a traffic rule.

Speed limits are also a generally a safety measure, although sometimes set for environmental reasons or to improve air quality. But many drivers consider themselves able to judge a suitable speed for the current conditions and regard the limit set by the road authority as arbitrary and over-cautious. They are therefore less inhibited about breaking speed limits, as they usually consider themselves safe drivers and do not appreciate they are putting themselves and others at risk by speeding.

4.1. Enforcement methods and agencies

Traditionally throughout Europe, a county's police forces were solely responsible for enforcement activities on the roads, and sometimes also for directing traffic and other non-regulatory work. The pressures on police forces are immense and in most countries they are being stretched to cover an ever wider range of responsibilities. When there is public concern about violent crime, for example, traffic policing tends to receive a low priority. This has led to a lack of effective enforcement in many countries and quite widespread flouting of regulations. This in turn influences other more law-abiding road users – if they see others getting away with it, they are more likely to break the rules themselves.

As a result, many countries have delegated some or all traffic policing work to civilian staff who are not trained police officers. Such staff might work under the jurisdiction of the police, or be controlled by another public body, such as the road authority or the town or regional council. In some countries, authorities may contract out the enforcement to private companies, but normally only under their close oversight. Difficulties arise if the contract with the enforcement company includes any financial or other incentive for them to issue or obtain payment of a higher number of penalties. Then they can be open to allegations of being overzealous or even corrupt in their activities. There is generally an appeal process for road users who consider they have been unfairly penalised, and it is vital that this process is conducted independently of the staff involved in day-to-day enforcement, and certainly not by any company that has a financial interest in the outcome.

Often tied with the change to municipal enforcement is a move from infringements being processed under the criminal law to being simple financial penalties that can be recovered

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like any other debt under the civil law. To help ensure payment of these penalties, there is often a provision for the owner of the vehicle to be responsible for paying them even if someone else was driving at the time.

The potential benefit of these administrative changes to the effectiveness of enforcement, and therefore the extent to which regulatory measure are complied with, cannot be overstated. A study by GART and Statiom in 2016[6] made to inform the proposed decriminalisation process in France highlighted the many benefits and also the pitfalls. It made a detailed comparison of the enforcement policies in eight towns and cities in six countries: Belgium, Spain, Norway, Netherlands, Portugal and UK, and produced this summary of the lessons learned (with some paraphrasing and amplification):

1. Make reforms in multiple stages (geographically or administratively), rather than all at once.
2. Make regulatory objectives coincide with mobility and public transport policies.
3. There is no single model used across Europe, with some countries favouring partial decriminalisation and some full.
4. Efficiency of enforcement depends upon how it is organised.
5. The pricing policy (both for initial charges and penalties) has an impact on the effectiveness of the system.
6. Paid on-street parking can be financially viable.
7. The effectiveness of outsourcing the management of on-street parking is difficult to assess.
8. There needs to be an efficient process for managing disputes and challenges.
9. Vehicle registration data needs to be accessible to the enforcement authority.
10. There must be good communication throughout the reform process and beyond.

The study found that revenue covered enforcement costs in all cases.

Despite making the administrative and legal changes outlined above, many countries are still concerned about a lack or effective enforcement for some measures, making them less effective as traffic engineering tools. Problems can result from any of the following:

- lack of enforcement activity, leading to a low probability of an infringement being penalised,
- a level of penalty that is not seen as a deterrent and can be considered as a normal expense of using a vehicle in a city, particularly by businesses undertaking deliveries,
- weak mechanisms for following up on penalties issued, leading to a high proportion remaining unpaid,
- poor accuracy of national vehicle ownership data, causing many vehicles to be untraceable or to still be registered to previous owners,

[6] *La gestion du stationnement payant sur voirie en Europe* https://www.gart.org/wp-content/uploads/2016/04/Etude-stationnement-en-Europe_GART-STATIOM_09032016.pdf (and English translation courtesy of Parking Matters Ltd/Statiom.)

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- a high proportion of foreign registered vehicles that cannot easily be enforced against,
- forging or fraudulent use of disabled persons' and other permits,
- vehicles displaying false registration plates,
- vehicle owners being able to frustrate the legal process in various ways.

Regarding the collection of penalties, GART/ Statiom found that this varied in 2013 from 83.5% in Dorset, UK to 35% in Lisbon. A low level of collection clearly has the double disbenefit of reducing the revenue available to fund the authority's processes and initiatives, and increasing the number of drivers prepared to take the risk of parking illegally.

Another significant variation found in this study was the number of enforcement officers employed. This varies from one per 256 parking spaces in Lisbon to one for every 2062 in Amsterdam. The difference was attributed to the use of 'Scanacar' in the Netherlands and elsewhere. This method of enforcement uses a moving vehicle equipped with ANPR to scan the registration plates of the parked vehicles it passes. These are then compared with the electronic record of payments received for parking that day, as these payments are required to have been done electronically with the vehicle registration included.

4.2. Kerbside enforcement

This has traditionally been done with officers patrolling the streets on foot and affixing penalty notices to the windscreens of errant vehicles. In places where loading is permitted there is often an 'observation period' during which the officer must check whether there is any loading activity before issuing a penalty for a parking offence. More recently, enforcement officers might patrol an area by car or motorcycle, stopping only when they see a potential infringement in order to investigate and take any further action on foot.

Some countries give authorities the power to attach an immobilisation clamp or to remove the vehicle to a pound, in either case ensuring payment is received before the vehicle is released. These powers may be reserved for vehicles committing a particularly serious or obstructive offence, or which have a number of outstanding penalties recorded against them.

From 1990s onwards in some jurisdictions enforcement against stationary vehicles has been permitted by camera, either vehicle-mounted or fixed. This usually makes it impractical to affix a 'ticket' to the vehicle at the time of the infringement, so the first indication the vehicle owner has of the penalty is a notice received by post, possibly several weeks later. This has been seen in some areas as unfair on the road user, as after that time it is more difficult for them to understand why they have been penalised or for them to the gather evidence regarding the state of the road on the day in question. As a result, in some countries there has been public criticism of this method of enforcement that has caused politician to change policies. In UK for example camera enforcement for parking offences was banned in 2015, except for areas with a particular safety concern, such as outside schools.

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4.3. Moving traffic enforcement

Since the early 20th century, enforcement of all traffic law was undertaken only by individual police officers, either on the ground or in marked or unmarked vehicles. Most countries required the driver to be stopped and issued with the necessary paperwork at the time of the offence. The most common manifestation of this was the speed trap, sometimes involving two stationary police officers measuring vehicle speed over a particular length of road, or a marked or unmarked police car following a speeding vehicle for a sufficient distance to measure its speed and then overtaking to flag it down. Banned turns and one-way streets were few in number before 1960s and were enforced in the same ad-hoc way based upon a police officer happening to observe an offence or discovering one had occurred as the result of investigating a road collision.

A device for remotely monitoring vehicle speeds was invented in 1958 by the Dutch company Gatsometer BV initially to record motor racing speeds. It was not until the early 1990s that a shortened version of this name, *Gatso*, came to be the colloquial term for a speed camera, as a result of their introduction in many areas in western Europe. As early as 1965 the company also offered a device for recording red light violations at traffic signals, but his was much slower to be adopted by enforcement agencies. Digital cameras have largely taken over, and can be set to detect almost any moving traffic violation, such as bus lane infringements, stopping in 'keep clear' boxes and performing banned manoeuvres. These cameras are often capable of being panned and zoomed, either automatically or remotely by an operator. In most countries changes were needed to national legislation to allow evidence gathered by approved cameras to be used in legal cases, and also for the serving of the notice of an alleged infringement to be by post to the vehicle owner, rather than to the person driving the vehicle at the time.

For bus lane enforcement, cameras can be mounted on the buses. This is only practical if they are operated or financed by the enforcement authority.

The processing of images from digital cameras can be largely automatic with the minimum of manual supervision, leading to the possibility of generating a large number of penalty notices per day. This has caused much disquiet and allegations of authorities putting in enforcement measures largely to make money, rather than for specific traffic engineering or policy reasons.

4.4. New technologies

Manual enforcement is increasingly being assisted by Artificial Intelligence (AI).

The oldest form of AI in enforcement is optical character recognition (OCR) of vehicle registration plates. This is known as ANPR (automatic number plate recognition) and was developed in UK in 1976 for police purposes[7]. It has been in regular use for around 30 years

[7] www.anpr-international.com/history-of-anpr/

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to match inbound with outbound vehicles in car parks as well as by the police to identify stolen, uninsured or untaxed vehicles. The same technology can be used on-street for both moving vehicle and kerbside infringements if these can be captured on suitably placed static or vehicle-mounted cameras.

More recently, AI has been developed to take this a step further and save much of the manual viewing of hours of video that would otherwise be needed. Computers can be trained to recognise groups of pixels on the images as individual vehicles[8]. They can then determine whether each vehicle is moving or stationary and whether it is passing through a controlled area, such as a bus lane or a 'no stopping' box[9]. Some vendors purport to have achieved sufficient accuracy for the system to generate and dispatch penalty notices fully automatically. In many case stills from the video will be included showing the alleged offence to minimise the number of cases where a driver decides to contest the matter. But most countries require a manual check before allowing a road user to be penalised in this way.

A more dramatic innovation will be the increasing use of in-vehicle technology that can minimise or even eliminate the need for formal enforcement. The equipment can make it clear to drivers that they are disobeying the road rules of even actively prevent them from doing so.

A technology entitled *Intelligent Speed Adaptation* (ISA) has been in use in Europe since the early 1990s. This is the ability of a specially adapted vehicle to either advise a driver if the current speed limit is exceeded or, in mandatory mode, to physically preventing the vehicle exceeding that speed. This initial work was conducted in Sweden, Netherlands, France, Austria and UK [10]. A large-scale trial of ISA in Sweden between 1999 and 2001 involved around 5000 vehicles. There were smaller projects in Denmark and the Netherlands at the same time. Transport for London (TfL) launched their system in 2009, initially fitted in a single bus, but later extended to a further 20 and then several hundred of their own vehicles.

The cruise control fitted to most new vehicles offers a form of this technology if the driver elects to use it. But this is only effective if the vehicle has access to reliable data on the relevant restriction. Unfortunately this data is lacking in most European countries. Whilst car and 'sat-nav' manufactures attempt to display the current speed limit, for example, this has a significant error rate and cannot be relied upon. In Europe, only Finland and Norway are known to have reliable government-supported digital speed limit data for all their roads. Other countries have partial data, such as that collected and published by TfL for the Greater London area.

This speed limit compliance technology has not been widely extended to other type of road regulation. Sat-nav devices attempt to alert drivers to prohibited movements and one-way streets, but they can actually encourage contraventions if their data is out-of-date. When a

[8] www.theverge.com/2018/1/23/16907238/artificial-intelligence-surveillance-cameras-security
[9] www.itsinternational.com/its2/news/london-borough-gets-civil-enforcement-system?amp
[10] Jamson, Carsten, Chorlton & Fowkes, 2006 and Servin, Boriboonsomsin & Barth 2008

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bus-only restriction was introduced in the village of Bathpool, Somerset, UK in September 2017, despite the best efforts of the council to inform them, it took until February 2019 for some of the major brands of sat-nav to update their data. During the intervening 17-month period these devices were actually directing motorists to use a route that passed through the prohibition, and thus incur a penalty[11].

Improving the ability of vehicles to obey all road rules will obviously be essential for autonomous vehicles, but will require an accurate and regularly updated 'digital highway code' (as the UK Law Commission has described it), something that will be of great benefit to the human driver as well. It may also require the uprating of the precision of GPS data currently used by in-vehicle devices to ensure they can determine which traffic lane a vehicle is in.

The alternative, an option which is already installed in many new vehicles, is to have forward facing cameras connected to AI software to attempt to read the road signs. This is worthwhile if the information gleaned is provided as guidance to a human driver. But current technologies (and the poor condition and maintenance of many road signs) make this method insufficiently reliable for autonomous driving of any form.

The options for communicating the 'road rules' to a moving vehicle may be summarised:

Central data fed via 4G & 5G networks, using sat-nav for position

- **Requires national (preferably international) repository and management of 'road rules'**
- **Needs in-vehicle back-up data for areas with no signal**

Camera technology and AI to spot and interpret signs

- **Prone to errors in interpretation**
- **Signs can be obscured by other vehicles, vegetation and be poorly lit at night**
- **Signs need a very high level of maintenance**

Work on making the kerbside restrictions and parking rules available to in-vehicle devices is progressing in a number of countries, but is hampered by the lack of international standards for recording the information. The European road network standards TN-ITS and Datex II do not provide readily for detailed and regularly updated kerbside information. This is being addressed in UK by extending TN-ITS with a structure known as TRO-D (Traffic Regulation

[11] Private correspondence between Buchanan Computing and Somerset County Council

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Order-Digital)[12] that also links to an international structure for car parking information published by the Alliance for Parking Data Standards (APDS)[13] – an international body covering Europe and USA. The APDS standard is being developed into an international ISO standard, as are other aspects of the UK work, which is being funded and developed by the Department for Transport and a number of commercial partners including Buchanan Computing.

[12] www.britishparking.co.uk/write/Documents/TIR%20Board/BPA_TRO_Data_Model_User_Guidance.pdf
[13] www.allianceforparkingdatastandards.org

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5. National Standards and Regulations

Whilst there are European standards covering the engineering and durability of traffic signs and markings, their form and appearance to the road user has been only superficially synchronised. European standardisation of many aspects of the use of motor vehicles began early in the 20th century. These included safety features for vehicles and road infrastructure, although not formal regulation initially. In 1909 the Paris *Convention internationale relative à la Circulation des Automobiles* recommended the use of four circular warning signs. These confirmed the trend of using images or pictograms to represent hazards, with any text small and readable only when close to the sign. The use of symbology recognised the small amount of time that drivers have to observe a sign without taking their eye off the road ahead for too long, and was also presumably a response to the multiplicity of languages used in Europe.

Recommended warning signs from the report of the 1909 Paris Convention

A further symbol was added in 1924 for open level crossings

The concept of a red triangle to indicate a hazard, now standard across most of Europe, was considered a Scandinavian invention and was put to the 1909 convention by Sweden. Despite also being used in UK by this time, it was not adopted until later[14].

Further conventions, now international involving countries outside Europe, followed in Paris in 1926, Geneva in 1931 and 1949, and finally in Vienna in 1968. Not every country ratified these conventions, but they are nevertheless adhered to across Europe. The UK was one of the last to adopt these principles, leaving it as late as 1965 before implementing a system of largely pictorial signs[15].

[14] Frank Schipper, *Metropoles*, 6/2009
[15] Ministry of Transport *Traffic Signs 1963*

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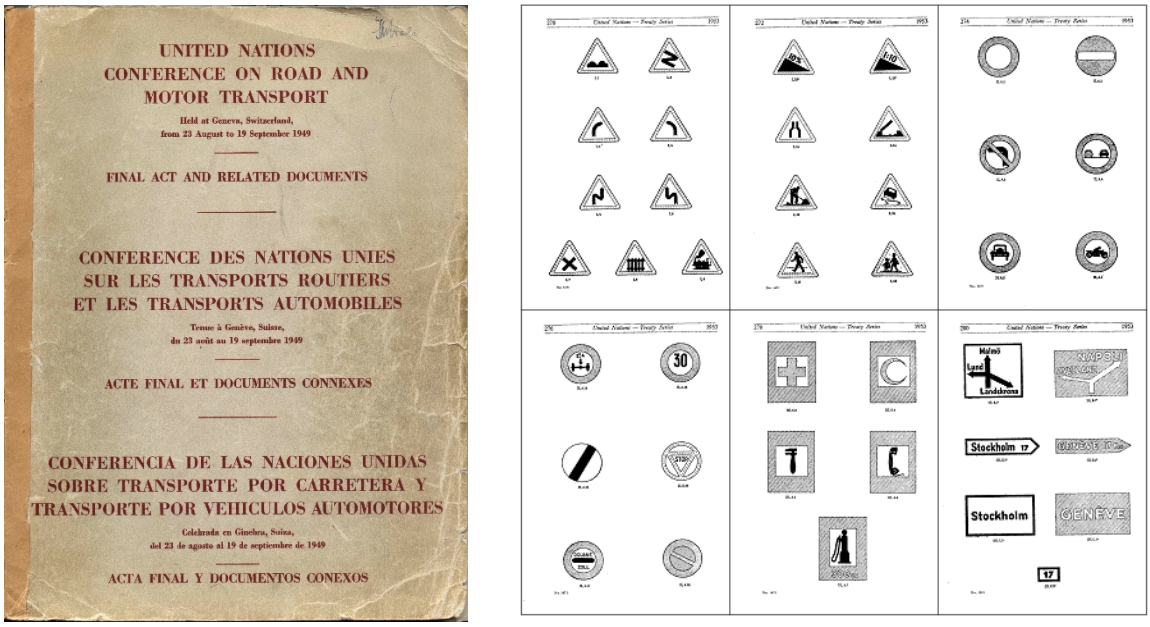

The report and some illustrations from the 1949 United Nations Geneva conference

The potential benefits of the European standard for signing, the 1968 Vienna convention and its subsequent amendments, are restricted by it not being fully comprehensive of all types of signs, and by the flexibility it offers – leading to significant variation of even common signs. More recent concepts, such as bus lanes, are covered only by examples of possible signs, without any attempt to standardise them.

Further work on standardisation and classification of traffic signs has been undertaken in Europe under the auspices of United Nations' Global Forum for Transport Safety. A Working Party on Road Traffic Safety under the Economic Commission for Europe continues to work on this subject, its most recent major report being the 2010 *Consolidated Resolution on Road Signs and Signals* (R.E.2).[16] This highlights some of the inconsistencies in sign meaning across Europe and of the difficulty of categorising them by function and meaning. More recently they have identified[17] 39 issues with the 2010 report and recommended additions to the 1968 *Convention on Road Signs and Signals*. The problems they mention include imprecise terminology, failure to identify to what extent signs may be varied, and the limited scope of the provisions for directional signing, as well as many issues of detailed design.

A comparison of 1968 Convention regulatory signs with those typically used across the world from this report is given in Appendix C.

[16] www.unece.org/fileadmin/DAM/trans/main/wp1/wp1fdoc/ECE-TRANS-WP.1-119-Rev.2%20e.pdf
[17] Nineteenth session final report: https://www.unece.org/fileadmin/DAM/trans/doc/2019/wp1/ECE-TRANS-WP1-2019-4e_.pdf

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5.1. Legislation

The legislation and administrative requirements governing the introduction and enforcement of traffic regulation in each of the countries in the MORE project is discussed below.

Hungary

To make changes to the street environment and regulations, the support of various tiers of government and the public. This is more complex in Budapest because of the 2-tier government structure: the City Municipalities, one or more Districts and the road maintenance company are all involved. All this takes time and needs co-operation.

Bus lanes, speeding, set-belt usage, etc. are enforced by the police under criminal law against the driver. Vehicles are allowed to enter a bus lane to make a turn, but not otherwise. Most moving traffic measures, such as speed limits and bus lane usage, are not well observed like. Some fixed speed cameras are installed in the city, but that only has a local effect in their immediate vicinity.

Parking enforcement is undertaken by the Districts under the civil law and penalties can be recovered from vehicle owners. Parking inspectors monitor this regularly and overstaying can result in an extra fee or the vehicle being clamped. Obstructive vehicles can be towed away.

Enforcement activity is high in Budapest because of the income it generates for the Districts. Parking penalties are paid quickly, because they are relatively cheap if paid quickly (for example the cost of 10 hours' parking if paid within 5 days), but escalate rapidly after this. However the immediate penalty for misuse of a disabled bay is 300 times the hourly charge.

All types of camera can be used for both civil and criminal enforcement, depending on the quality of the picture, and the seriousness of the offence.

No particularly innovative types of regulation have been used in Budapest or elsewhere in Hungary, but a congestion charge and an (ultra) low emission zone would be useful for the city. The former has been under discussion for 10 years, but is seen as an unacceptable political risk.

Portugal

The procedures required to introduce new measures include publication of the appropriate regulation amendment, public consultation and approval by the Municipal Assembly. Some measures would need national approval if the Road Traffic Code was affected, for example to create a mixed use bus and cycle lane.

Some traffic regulations are generally well observed in Portugal, but parking and bus lanes are particular problems. There are frequent transgressions and a high incidence of double parking ('second line parking'). The need to limit the duration of loading activity is also an issue. Difficulties arise from lack of staff to undertake enforcement, a low penalty level and a general sense that parking restrictions can be ignored with impunity. Vehicles are often

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double parked, blocking in other drivers and seriously obstructing the carriageway and any bus or cycle lane, typically staying there for 20 minutes.

The municipality has their own police that can enforce measures. For parking enforcement, the municipal company for parking management can apply fines. Restrictions on parking can be enforced under the civil law by the road authority and vehicle owners can be pursued if the driver cannot be identified.

An innovative type of restriction in Lisbon is around 200 bays that are used for car parking between 08.00 and 20.00, and for loading outside these times. It is hoped to introduce bay occupancy sensors, mainly for gathering data on usage rather than for enforcement.

Cameras can be used for enforcement after manual confirmation of the plate numbers. GDPR considerations have ruled out the immediate use of vehicle registrations gleaned from automatic number plate recognition (ANPR) to fine those disobeying the regulations.

Romania

It is relatively straightforward to create new local traffic regulations. They need to be adopted and enforced through a Local Council Decision. For any measure affecting the road network, the road manager needs the acceptance of the Road Department Police. An independent local committee, the City Traffic Commission, with representatives from these bodies and other stakeholders, looks at and can amend the proposals. The proposal must be communicated to the general public and at least one public debate organized. The time needed for these processes varies.

The enforcement of road traffic regulations is done mainly by the Road Police, Romanian Road Authority, Romanian Autovehicle Register, both via the Local Police Departments, and arranged by the Municipality, at local level.

Depending upon the severity of the infringement, the penalties can be processed as civil or criminal matters

Reference: Emergency Ordinance no. 195/2002 regarding the movement on public roads.

Sweden

Local traffic regulations are made by the municipality for urban areas and any roads they control outside. Even for state-controlled roads the municipality can restrict vehicle speeds, stopping and parking. The County Administrative Board makes regulations in other cases, including for intersections of their roads with municipal ones.

The Military Traffic Regulation and the Road Traffic Regulation for the municipal civil protection organization under education and high preparedness regulations provide exemptions from the above.

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Traffic regulations are generally well observed in Sweden, with the exception of speed limits. Local authorities can enforce some measures. Most penalties are being dealt with under criminal law but not all. Vehicle owners can be pursued even if the driver cannot be identified. Certain measures can be enforced using cameras.

No significant new regulations are envisaged in Malmö for the MORE Project, as the corridor will be newly constructed and controls implemented by means of traffic signalling will be implemented. A likely innovation will be a reversible bus lane: a lane that can be used by buses in one direction during times when that is the predominant direction of flow, and in the opposite direction at other times[18].

United Kingdom

On most urban roads, the 'traffic authority' is the top tier local authority: the unitary council, if there is one, or otherwise the county council. They have the power to make almost any form of order affecting moving or stationary vehicles and other road users, provided they follow statutory advertising and consultation procedures. The legislation makes no mention of dynamic restrictions, allowing the interpretation that they are permitted. Restrictions that apply "only when signs are displayed" have been used for many years for temporary measures at road works and more recently for dynamic speed limits on motorways, without any successful legal challenge.

For the TEN-T network, motorways and a network of other main roads known as 'trunk roads', the government is the traffic authority and is responsible for making any necessary orders.

Most authorities budget for a cost of around €2000 - €3000 for making a new traffic order and allow a time period of at least 3 months, but this depends upon the complexity of the measure and whether there is likely to be significant opposition to it.

The main legislation is the Road Traffic Regulation Act 1984[19] (amended many times by subsequent legislation), and The Local Authorities' Traffic Orders (Procedure) (England and Wales) Regulations 1996[20]. Similar, but distinct, legislation applies in Scotland and Northern Ireland, but is not relevant to London as a MORE pilot city.

Regulations that relate to stationary vehicles or to bus lanes and bus-only streets can be enforced under civil law against the vehicle owner by the local authority. These tend to be well observed, as the chance of receiving a penalty and having it followed up are high. Except in London and Cardiff, other moving traffic regulations are enforced only by the

[18] https://open.karnovgroup.se/transport-och-kommunikation/SFS1998-1276#K10P10S1
[19] www.legislation.gov.uk/ukpga/1984/27
[20] www.legislation.gov.uk/uksi/1996/2489/contents/made

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police. Where regular camera enforcement occurs, compliance with speed limits tends to be good, but enforcement of other moving traffic measures in minimal.

There are some gaps between the enforcement activities of the police and that of local authorities, which are exploited by a small minority of motorists. One example is obstruction: only the police have powers to penalise drivers who leave vehicles in obstructive, but otherwise unregulated, positions. But they devote little time of effort to such enforcement, allowing people to continue this behaviour with impunity. Another issue is footway parking, which local authorities outside London can only themselves enforce against if they make regulations and put up a large number of traffic signs indicating a prohibition of this practice.

Camera enforcement is not permitted for most waiting, parking and loading offences, but it is in areas deemed safety critical or traffic sensitive. It is permitted for moving vehicle offences under both civil and criminal law.

5.2. Traffic signs and markings

The countries involved in the MORE project all use signs derived from the 1968 Vienna Convention of Traffic Signs. The main signs used for moving traffic are superficially identical, and would present no problem to a road user from one country visiting another.

But in the complex area of kerbside controls on parking, loading and stopping, national differences have become large and signs usually rely upon textural information in the national language. Where a time period is shown, most countries use the 24-hour clock format (for example “07.30 - 18.30”), but the UK has opted to retain a 12-hour clock with “am” or “pm” to indicate morning or afternoon. This presents them with the problem that noon and midnight have to be stated explicitly, as they are neither “am” nor “pm”.

A comparison of the majority of regulatory signs intended to be read from a moving vehicle for MORE countries is given in Appendix B, together with the most commonly used regulatory markings. A comparison of Vienna convention regulatory signs with those typically used throughout the world is given in Appendix C.

Road Markings

Road markings are also very similar across Europe. The Vienna convention permits either white of yellow makings for most purposes, but all cities in the MORE project use white for markings relevant to moving traffic. A solid line is standard for the boundary between a lane reserved for particular vehicles (typically bicycles or buses) and implies “no crossing”. Intermittent lines with various patterns of marks and gaps indicate advisory markings, such as those guiding drivers to keep in lane. Parking bays are marked in various ways, and most countries’ regulations give significant flexibility. In UK, for example, a bay may be marked with any pattern of solid or intermittent white line of any width, or it may have steel studs at its corers or be indicated by block pavers of a different type to the adjacent carriageway.

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Pedestrian crossings

The requirement to give priority to pedestrians crossing the road (other than at traffic signals) is universally indicated by a pattern of white stripes across the carriageway, giving it the popular name of “zebra crossing”. In some countries these markings are purely advisory, but even when regulatory the actual rules drivers need to follow and the degree to which they are observed or enforced vary considerably across Europe.

Vertical signs are not always used with these crossings, but where present they are generally rectangular blue signs with a triangular white pictogram of a pedestrian using the crossing. The pedestrian symbol is sometimes varied for political or diversity reasons to show more than one person or to depict a particular gender.

The UK is a notable exception to this convention, retaining at zebra crossings the orange globes introduced in 1934 by the Transport Minister, Leslie Hore-Belisha, and still named after him. Originally plain spheres, they now have an internal intermittent light source that is effective at night, but less so in daylight. Flashing amber devices are used also to alert drivers to the likely presence of pedestrians, at traffic signals and near schools, for example.

Typical vertical indications of an uncontrolled pedestrian crossing (or “zebra”)

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6. Issues for each City

6.1. Regulatory regimes

The full responses from the five cities to the questionnaire sent to them in November 2018 and the further questions posed in October 2019 are in Appendix A. This section summarises some of the key results and contracts the different regimes in each country.

Some terms used have caused confusion. Terms such as waiting and parking are not used in consistent ways across Europe, hence the need to define them more precisely above.

It was particularly difficult to obtain information on the possibility of using restrictions that are in effect at times that are not predefined (i.e. dynamic measures indicated by variable message signs). This is not surprising in view of the fact that this is a novel concept, not significantly used in any urban environment in Europe. In any case, this type of measure in not envisages to be needed in any of the detailed area being studied, but London is interested in the possibility of a dynamic bus lane in the wider corridor but outside the specific study area.

The legal procedure necessary for making new regulations and any public or other consultation required is not clear in some cities.

Table 1: Possible moving traffic regulations possible in each city

	Budapest	Constanta	Lisbon	London	Malmö
by vehicle type or purpose	most	most	Y	Y	most
by movement	Y	Y	Y	Y	Y
part time	usually	usually	Y	Y	Y
dynamic	usually	usually	not clear	Y	Y

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Table 2: Categories of stopping recognised in each city

	Budapest	Constanta	Lisbon	London	Malmö
Total ban	Y	Y	Y	Y	Y
Setting down	Y	Y	Y	Y	Y
Loading	Y	N	Y	Y	Y
Limited waiting	Y	N	Y	Y	with payment

Table 3: Summary of enforcement bodies and methods, and compliance in each city

	Budapest	Constanta	Lisbon	London	Malmö
police	Y	Y	Y	Y	Y
highway authority	Y	Y	Y	Y	Y
using cameras	Y	?	Y	Y	Y
compliance	good	?	good for some measures	?	generally good
problem areas	moving traffic			moving traffic exemptions	speed limits

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6.2. Regulatory measures envisaged to meet Future Conditions

This section examines the proposals in the MORE document D5.2: *Case Study Design Methodology – Future Conditions* to ascertain whether these can be accommodated within the existing regulatory framework of the country concerned. Each city has chosen a work programme to address the particular issues of their chosen study corridor and beyond, so the measures proposed do not necessarily relate to issues identified in previous sections.

The proposals mentioned with a regulatory element are summarised below. These measures are discussed in 6.3, to reflect upon the future regulatory requirements of the cities.

Budapest

The focus in Budapest is on reallocating and optimising kerbside use to facilitate the multiple 'Place' function uses of the street, and also to promote public transport and active travel modes.

The measures listed in D5.2 for Budapest cover:

More than 20 km of new cycle lanes have already been installed.
Regulation of taxis, parking, e-scooters and car sharing as means of transport.
Further bicycle lanes and/or micro-mobility lanes.
Introduce 30 km/h speed limits.
Reallocate and optimize the location of:

- taxi stops,
- parking facilities for locals, commuters and car-sharing users, including short-term parking for customers.
- mobility points,
- EV-charging points,
- bicycle street storage,
- city tour bus stops,
- goods loading zones (for cars, vans, cargo bikes, cargo drones) with better times of operation
- Bus lanes
- Public transport lane (bus, trolleybus, tram) for each direction at the centre of the street
- Cycle lane next to the kerbside available also to micro-mobility vehicles

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Constanta

The focus in Constanta is on improving the street for pedestrians and other active travel and sustainable modes, greater safety, less visual intrusion and achieving compliance.

The measures listed in D5.2 for Constanta cover:

Provide:

- Dedicated infrastructure for cycling and micro-mobility
- proper pavements
- proper street signals and road markings
- safe parking
- parking for rented vehicles

For cars and other motor vehicles:

- Reduce speed, including by using speed detection
- Provide clear road markings and signs
- Create infrastructure for recharging EV
- Improve the traffic management system
- Improve enforcement

Remove & signalise an existing roundabout.

Malmö

The focus in Malmö is on considering the restriction traffic by means of charging or by adjusting traffic signal timings, and on regulating micro-mobility rental.

The measures listed in D5.2 for Malmö cover:

Measures under consideration:

- E-scooters:
  From 2022, the City of Malmö plans on charging the scooter companies a fee of circa €175 per year and vehicle together with applying for a permit for each vehicle.
- Traffic control by means of gating (co-ordination of traffic signal timings and restricting 'green time') to restrict the flow of traffic to the stress section.
- Introduce a charge for motor vehicles using the corridor stress section for through traffic.

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Lisbon

The focus in Lisbon is on reducing traffic and on optimising kerbside use to facilitate the multiple 'Place' function uses of the street. Priority lanes for public transport and cycling are also addressed.

The measures listed in D5.2 for Lisbon cover:

Measures under consideration:

- Implement bus lanes in Rua Morais Soares in each direction
- Restrict vehicle access to the historic downtown area of Baixa-Chiado with the intention of reducing vehicle numbers by 40% and giving priority to public transport, pedestrians and active modes. Initially as a temporary measure.
- Analyse the need for a cycle lane

Parking and loading:

- Intelligent kerbside management for the allocation of parking slots. This would facilitate efficient use of parking, especially for load/unload operations, which may allow to increase public space using those parking spots, during some periods.
- Intention to reduce speed limit to 30 km/h in most of the roads in the city.
- Reduce the number of lanes, which may reduce double parking occurrences and reduce the speed limit.
- Improve parking organization: promote load/unloading operations into particular periods with a scheme of time slots; Take advantage of some of these load/unloading bays to increment places for low rotation parking spaces;
- Analyse a scheme of implementing diagonal parking,
- Increase parking capacity in some places, and remove parking bays in other places to enlarge sidewalks/create places to stay and rest;
- Analyse the need for parking places for autonomous vehicles and drone deliveries.

London

The focus in London is on optimising kerbside use and maximising the use of rear accesses to facilitate the 'Place' function of the street, and also to regulate micro-mobility rental, and provide for the future use of Connected and Autonomous Vehicles.

The measures listed in D5.2 for London cover:

Regulations are needed for Connected and Autonomous Vehicles (CAVs).
Micro mobility management:

- the ability to cap operator and scooter numbers and set basic parameters for responsible use for where they can and cannot be parked will be vital. Otherwise the deployment of dockless vehicles (shared bikes, e-bikes or e-scooters) would become becoming dangerous and unmanageable.

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Parking and Loading:

- Clear and concise restrictions for parking and loading at convenient points.
- Consolidate and re-time deliveries with out-of-area waiting facilities where necessary.
- Make use of rear accesses for deliveries when possible.
- Provide accessible taxi ranks.
- Provide dedicated drop-off/pick up points at interchange locations.

6.3. Discussion of future regulatory requirements

The majority of the measure described above can be accommodated within the existing regulatory regimes of the countries concerned. That is to say, there are established methods to sign them in to bring them into effect within the normal order-making powers of the municipality.

Innovations mainly relate to new types of vehicle that may require national legislation both to control whether such vehicles are permitted on the roads at all, and in what numbers, and to give municipalities the power to make regulations regarding their use at a local level. CAVs in particular will require much national legislation both to permit them to operate at all and to govern their safety in use. This is particularly as issue for urban areas where the need for them to interact with pedestrians, cyclists and non-CAVs is a very challenging. But whilst their use and control might affect traffic volumes and the need for parking, the regulatory aspects are not specific to the MORE corridors, so will not be considered further here.

E-scooters and other micro-mobility vehicles are also pressing concerns for national governments, but their regulation is of great importance to municipal authorities, as they are generally licenced (when required) locally, and the control of the total number of vehicles for hire and where they can be left has a big effect upon other road users and on street amenity and safety. It is hoped that all countries are enabling their municipalities to make regulations that include being able to identify and deter irresponsible use of micro-mobility vehicles.

To return to the aspiration specific to the study corridors, these mainly comprise conventional measures such as bus and cycles lanes, lower speed limits and the control of parking and loading. There has been little mention of areas of the street that assume different functions at different times of day (for example permitted loading at certain times in areas that are normally part of the pedestrian thoroughfare). But these are already used in London and other cities, so may well be regarded as part of normal waiting and loading control that have been mentioned.

The proposal in London for out-of-area bays for goods vehicles to wait is an innovative and interesting one. This would enable precious time slots for loading in the stress section to be managed and used as effectively as possible. This might be accomplished purely by contractual arrangements, with the operators or businesses concerned and not require

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specific regulation (other than to keep the designated loading areas clear of unauthorised vehicles). The scheme in London mentioned in section 3.6 above does include the use of variable message signs to help manage the requirement to keep the bay free for the pre-booked vehicle.

For Malmö, a proposal under consideration is to charge through traffic to deter it from using the stress section. In regulatory terms, this is similar to congestion charges and tolls for using bridges or tunnels that are well-established in most countries. But effective enforcement might be hindered by the difficulty in determining whether a vehicle actually needs access to an area or is 'through traffic'. ANPR can help to establish this, particularly if it measures the journey times of individual vehicles passing through an area. But ANPR is often seen as overly intrusive, and it cannot in any case determine whether a vehicle made a quick stop, particularly at congested times. Another possible enforcement mechanism is to identify residents and their visitors by issuing them with permits, but this still presents problems for deliveries. In many countries, vehicle prohibitions 'except for access' are not well enforced and a percentage of contraventions is tolerated. Where penalty notices are regularly issued, the onus is often on the driver to dispute such a notice if they did have a valid reason for their vehicle to be in the area. This can be an administrative burden to delivery drivers and companies, and to the enforcement authority.

There are no particular innovations requiring further discussion mentioned in D5.2 for Budapest, Constanta or Lisbon.

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7. Summary and Conclusion

7.1. Summary

There is a wide variation in the regulatory regimes and their enforcement across the cities involved in MORE. Each country has created its own unique procedures for introducing new regulations, and all have found workable solutions that take into account the need for multiple organisations to be involved in decision-making and for the public to be consulted. These processes work tolerably well and without unduly delaying the process or creating a major barrier to change.

These systems all appear to be sufficiently flexible and the nature or roads and their usage and control changes. Every country seems to be capable of evolving its system of traffic regulation to meet these changing needs. Whilst there was doubt in some cities as to whether various innovative uses of street space might be possible under current legislation, there was optimism that changes could be made, if necessary by national government. In most countries the basic layout of traffic signs and road markings is set nationally, but it is generally possible to achieve changes when needed if a good case can be made.

Even for the management of existing street conditions, there is a significant possibility of improvement, and for different countries to learn from each other. There is enormous variation across Europe in many matters, such as the efficiency of civil enforcement of traffic regulations and the extent to which people comply with them.

A particular issue is the ease with which changes can be made to on-street regulations. The change could be to a single parking place or could be a large scheme restricting through traffic over a wide area. No country appears to have addressed the issue of the scalability of the process. A procedure that is appropriate for a large scheme or a significant length of a main through route might require a high degree of discussion, consultation and feedback. But most countries apply the identical procedure to minor changes. For these small-scale changes the process is often cumbersome, expensive and a reason to avoid or delay making what might be a valuable improvement.

In UK the Department for Transport is considering whether to divide schemes into major and minor with different procedures for each. But there is a problem of arriving at a robust definition of a minor scheme that is not either subjective or open to abuse by authorities wishing to circumvent their obligations.

Gaining public acceptance of parking measures, enforcement and transport policy generally is another key to achieving a harmonious and well-respected regime. The issue of charges for parking can be particularly contentious. Even in countries where the revenue from parking and contraventions can only be used on transport-related projects, there is still tendency for authorities to be criticised as ‘money grabbing’. There is a pressing need for policies, and their benefits to road users, to be clearly and frequently explained.

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Enforcement is the area where different countries have most to learn from each other, but for which major legal changes might be needed. In countries that have introduced enforcement under civil law by the municipal authority itself, the improvement in compliance is usually dramatic. Provided that the authority can retain some of all of the revenue from penalties and that the level of penalty is sufficient, there is funding for their enforcement activity. If they to employ sufficient enforcement officers and deploy them effectively, there will be a significant chance that those flouting the traffic rules will have to pay a penalty, and thus a strong motivation to comply. There is the further issue of the technology used for enforcement and how labour-intensive it is to operate. If these issues are all tackled, regulatory measures can become very effective and, sometimes after a period of time, be seen as reasonable by a large section of the public.

7.2. Outcomes and Recommendations

From the experience of the cities that use regulatory measures most effectively as one of the keys to achieving their policies, these are the main lessons to be learned:

1. Public understanding and acceptance of the authority's policies is vital. Many measures can be introduced with minimal enforcement if the public understands and supports the reasons behind them, thus appreciating that they are for the public good.

2. Clear and consistent signing is vital. People understandably feel aggrieved if they think they have been penalised unfairly and did not deliberately contravene. Other communications, such as leaflets, web pages, the county's highway code, and advertising all play a part in this education of road users, as does giving visual clues to the intended uses of areas of the street, such as with hard landscaping.

3. Having a fair and prompt system for handling appeals and representations against penalties plays an important part in gaining public acceptance of the regulatory regime. To demonstrate fairness, it is normally necessary for the body considering the appeals to be independent of the enforcement authority and for it to have no financial incentive to determine appeals either way.

4. The level of penalties for contraventions needs to be high enough to deter but not at a level that weakens public acceptance or generates bad publicity.

5. There needs to be a high chance of an individual contravention being successfully detected and penalised. This implies sufficient enforcement activity and a legal process that can identify errant drivers or vehicle owners and ensure payment is made.

6. Some enforcement activity is usually needed for new measures, but can often tail off once compliance has become customary. If physical changes can be made to the street layout to inhibit or prevent the prohibited activity, enforcement may be rendered unnecessary from the start.

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7. Civil enforcement is pivotal to effective compliance. This involves the municipal authority itself undertaking or controlling the enforcement activity and receiving some or all of the penalty income. Relying on the police for most urban traffic enforcement is almost always unsatisfactory, due to their understandable focus on more major issues of crime and public safety.

8. Where a sustained level of enforcement is found to be needed, technological innovations, such as the use of unattended cameras and artificial intelligence to process their output, should be considered.

7.3. Conclusion

Effective regulation of traffic can be achieved and used to manage street space, deal with the problems of individual locations, balance the needs and wishes of different categories of road user, and help introduce policies that have a major impact on peoples' travel decisions and choice of mode. Changes that improve the quality of the street scene for those living or working there, or simply using or enjoying it, can thus be achieved.

Good use of regulatory measures, with sufficient enforcement to achieve a high level of compliance is pivotal to the achievement of almost all transport objectives and thus to the health and vitality of a municipal area.

Many cities have demonstrated that this is perfectly achievable.

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8. Appendix A: responses to the regulatory measures questionnaires

Traffic regulations – CONSTANTA

General restrictions on motor vehicles

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Total ban on general traffic	X	X	X
Ban on traffic other than buses	X	X	X
Ban on traffic other than vehicles needing access to premises	X	X	X
Ban on traffic other than vehicles needing to load/unload goods	X	X	X
Ban on goods vehicles over specified weight	X	X	X
Ban on buses over specified weight (or number of seats)	X	+	X
Ban on slow or agricultural vehicles	X	+	+
Ban on vehicles carrying explosives or dangerous goods (e.g. by ADR code)	X	+	+
Ban on vehicles exceeding certain emissions (e.g. Euro 6 or CO_2 > 75 g/km)	+	+	+
All motor vehicles must pay a charge	X	X	X
Vehicles over a certain emission level must pay a charge	+	+	+

References/comments:

Emergency Ordinance no. 195/2002 regarding the movement on public roads.

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Restrictions on pedestrians, cyclists and unpowered vehicles

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*
Total ban on pedestrians (e.g. on a freeway, underpass or flyover)	X
Total ban on cyclists/ equestrians (e.g. on a freeway, underpass or flyover)	X
Legal obligation on pedestrians to use only designated footways	X
Legal obligation on cyclists to use only designated cycleway and not to ride on the general carriageway	X
Legal obligation on cyclists to give priority to pedestrians on shared footway/cycleway	+
Restrictions on power-assisted bicycles, powered skateboards invalid carriages, etc. that do not apply to unpowered cycles or to pedestrians	+
Restrictions on equestrians or horse-drawn vehicles	X

References/comments:
Emergency Ordinance no. 195/2002 regarding the movement on public roads.

Restrictions on road position (lane use)

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Reserved lane for buses on a scheduled service	X	+	X
Reserved lane for buses and coaches	X	+	X
Reserved lane for a particular direction of traffic (includes "no crossing" lines if 24/7)	X	X	X

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Reserved lane for cyclists	X	X	X
Reserved lane for motor cycles (including in combination with other types)	+	+	+
Reserved lane for high occupancy vehicles (e.g. 2 or more people) (including in combination with other types)	+	+	+
Reserved lane for goods vehicles (including in combination with other types)	+	+	+

References/comments:

Emergency Ordinance no. 195/2002 regarding the movement on public roads.

Restrictions on stopping

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Total ban on stopping (except in emergency or to avoid a collision)	X	X	X
Ban on stopping other than for a taxi to set down/pick up a passenger	+	+	+
Ban on stopping other than to set down/pick up a disabled passenger	+	+	+
Ban on stopping other than to set down/pick up any passenger	X	+	+
Ban on stopping other than to load/unload goods (for a specified maximum duration)	+	+	+
Ban on stopping other than to load/ unload goods (for as long as it takes)	+	+	+
Ban on stopping other than for scheduled buses	+	+	+

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Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Ban on stopping other than for any bus or coach	+	+	+
Ban on stopping other than for licensed taxis	X	+	X
Ban on stopping other than for doctors'/emergency/ diplomatic vehicles	+	+	+
Ban on waiting, other than for disabled persons (blue badge holders) for a maximum duration	?	?	?
Ban on waiting, other than for disabled persons (blue badge holders) for unlimited duration	+	+	+
Ban on waiting for longer than a specified duration	+	+	+
Payment required for waiting	+	+	+
Waiting permitted only for those issued in advance with a permit	+	+	+
Waiting permitted only for car club (shared) vehicles	+	+	+

References/comments:

Emergency Ordinance no. 195/2002 regarding the movement on public roads.

Making of regulations

Please explain briefly the procedure and approximate timescale involved in making new regulations. Are there any measures for which consent from a higher tier authority or national government would be needed?

Example. Restrictions on both moving traffic and stopping may be made by resolution of the highway authority, after it has advertised the proposal and considered any objections. Typically the process takes 3 months from finalisation of the proposals to implementation on street.

Consent from regional government is needed for measures that could affect the capacity of major roads classified N or above.

Consent from national government is needed for innovative measures and their signs and road markings. There is a procedure for obtaining this, usually within 6 months.

Space for your contributions:

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The procedure for elaboration of local regulations is not so hard/problematic, but it needs acceptance in order to be adopted/ enforced through a Local Council Decision.

For any road network intervention, the road manager needs the acceptance of the Road Department Police.

There is also a local committee composed of City representatives, Road police representatives and other stakeholders that is amending all proposal for Local Council Decisions dealing with urban environment changes.

Also, all the proposal must be communicated to the general public and at least one public debate must be organized by the initiator of the regulation.

References:

Enforcement of regulations

Are traffic regulations generally well observed in your country? Can local councils or highway authorities enforce measures themselves, or must the police be involved? Are penalties dealt with under civil or criminal law? Can vehicle owners be pursued if the driver cannot be identified?

Can evidence from cameras be used for enforcement or must the infringement be observed by an officer on the ground?

Example. Restrictions on parking can be enforced under the civil law by the road authority. They are well observed in areas with regular patrols by enforcement operatives and can be enforced against vehicle owners.

Moving traffic infringement are only prosecuted by the police under criminal law against the driver. Many measures are well observed without much enforcement activity, but speed limits and bus lanes are not.

Only cameras of a type approved by national government can be used for enforcement and then only for a limited range of safety-related infringements.

Space for your contributions:

The road traffic regulations observation is done mainly by the Road Police, Romanian Road Authority, Romanian Autovehicle Register at all levels and the Local Police Departments, organized at the Municipality level, at local level.

According to the gravity of the infringement the penalties can attract civil or criminal responsibility.

References:

Emergency Ordinance no. 195/2002 regarding the movement on public roads.

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Further questions: October 2019

1. Please describe any problems you expect in introducing regulatory measures that might be needed in your corridor study area.

Answer: In order to introduce new regulatory measures we will need the approvals from the Road Police and also from the City Traffic Commission (an local independent commission composed of representatives of the Municipality, Road Police and the Road Management Company). The cost will not be so high for introducing these measures as we need to provide traffic indicators and markings on street. Regarding the duration we cannot give any time-frame for this activity but we have to consider the time needed for getting internal approvals from the decision taking level, afterwards for the legal approvals and also we have to consider the necessary time for the works for installing the new indicators.

2. Once introduced, do you expect any problems with people regularly contravening the restrictions? If so, is this down to low enforcement activity, a difficulty pursuing and obtaining penalties, the penalty level being too low, or any other reason?

Answer: We consider that there will be no problems in introducing these kind of measures, except for some limited time in the beginning of the modification until users get used with these measures. Anyway these are issues that the local Police and the Road Police are responsible for and they have to enforce the law whenever necessary.

3. Have any innovative or unusual regulatory measures (or combination of measures on the same stretch of road) been used anywhere in your country?

Answer: We do not have the information for this question.

4. Do you think any new types of restriction (or combination of measures, or the times they operate for) might be needed for your corridor study that have not been used before in your country?

Answer: We do not think that new types of restriction might be needed for our corridor.

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Traffic regulations - BUDAPEST

General restrictions on motor vehicles

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Total ban on general traffic	y	y	y
Ban on traffic other than buses	y	y	y
Ban on traffic other than vehicles needing access to premises	y	y	y
Ban on traffic other than vehicles needing to load/unload goods	y	y	y
Ban on goods vehicles over specified weight	y	n	n
Ban on buses over specified weight (or number of seats)	y	n	n
Ban on slow or agricultural vehicles	y	y	y
Ban on vehicles carrying explosives or dangerous goods (e.g. by ADR code)	y	y	y
Ban on vehicles exceeding certain emissions (e.g. Euro 6 or CO_2 > 75 g/km)	n	y, but only for trucks over 3.5t	y, but only for trucks over 3.5t
All motor vehicles must pay a charge	y, only for truck over 3.5t	n	n
Vehicles over a certain emission level must pay a charge	y, for yearly parking passes, and for trucks	n	n

References/comments:
Parking regulation of Budapest
Freight traffic regulation of Budapest
Regulation of slow and overweight vehicles

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Restrictions on pedestrians, cyclists and unpowered vehicles

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*
Total ban on pedestrians (e.g. on a freeway, underpass or flyover)	y
Total ban on cyclists/ equestrians (e.g. on a freeway, underpass or flyover)	y
Legal obligation on pedestrians to use only designated footways	n
Legal obligation on cyclists to use only designated cycleway and not to ride on the general carriageway	n
Legal obligation on cyclists to give priority to pedestrians on shared footway/cycleway	y
Restrictions on power-assisted bicycles, powered skateboards invalid carriages, etc. that do not apply to unpowered cycles or to pedestrians	n
Restrictions on equestrians or horse-drawn vehicles	y

References/comments:
Highway code

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Restrictions on road position (lane use)

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Reserved lane for buses on a scheduled service	y	n	n
Reserved lane for buses and coaches	y	n	n
Reserved lane for a particular direction of traffic (includes "no crossing" lines if 24/7)	n	n	n
Reserved lane for cyclists	y	n	n
Reserved lane for motor cycles (including in combination with other types)	n	n	n
Reserved lane for high occupancy vehicles (e.g. 2 or more people) (including in combination with other types)	n	n	n
Reserved lane for goods vehicles (including in combination with other types)	n	n	n

References/comments:
Highway code
local regulations

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Restrictions on stopping

Please place a tick (for “yes”) or a cross (for “no”) in each of the boxes below for types of traffic regulation that are used in your country. Enter “?” for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Total ban on stopping (except in emergency or to avoid a collision)	y	y	y
Ban on stopping other than for a taxi to set down/pick up a passenger	n	n	n
Ban on stopping other than to set down/pick up a disabled passenger	y	y	y
Ban on stopping other than to set down/pick up any passenger	y	n	n
Ban on stopping other than to load/unload goods (for a specified maximum duration)	y	y	y
Ban on stopping other than to load/ unload goods (for as long as it takes)	y	y	y
Ban on stopping other than for scheduled buses	y	n	n
Ban on stopping other than for any bus or coach	y	n	n
Ban on stopping other than for licensed taxis	y	n	n
Ban on stopping other than for doctors’/emergency/ diplomatic vehicles	y	n	n
Ban on waiting, other than for disabled persons (blue badge holders) for a maximum duration	y	n	n
Ban on waiting, other than for disabled persons (blue badge holders) for unlimited duration	y	n	n

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Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Ban on waiting for longer than a specified duration	y	n	y
Payment required for waiting	y	n	y
Waiting permitted only for those issued in advance with a permit	y	n	n
Waiting permitted only for car club (shared) vehicles	n	n	n

References/comments:
Parking regulation
Highway code

Making of regulations

Please explain briefly the procedure and approximate timescale involved in making new regulations. Are there any measures for which consent from a higher tier authority or national government would be needed?

Example. Restrictions on both moving traffic and stopping may be made by resolution of the highway authority, after it has advertised the proposal and considered any objections. Typically the process takes 3 months from finalisation of the proposals to implementation on street.

Consent from regional government is needed for measures that could affect the capacity of major roads classified N or above.

Consent from national government is needed for innovative measures and their signs and road markings. There is a procedure for obtaining this, usually within 6 months.

Space for your contributions:

References:

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Enforcement of regulations

Are traffic regulations generally well observed in your country? Can local councils or highway authorities enforce measures themselves, or must the police be involved? Are penalties dealt with under civil or criminal law? Can vehicle owners be pursued if the driver cannot be identified?

Can evidence from cameras be used for enforcement or must the infringement be observed by an officer on the ground?

Example. Restrictions on parking can be enforced under the civil law by the road authority. They are well observed in areas with regular patrols by enforcement operatives and can be enforced against vehicle owners.

Moving traffic infringement are only prosecuted by the police under criminal law against the driver. Many measures are well observed without much enforcement activity, but speed limits and bus lanes are not.

Only cameras of a type approved by national government can be used for enforcement and then only for a limited range of safety-related infringements.

Space for your contributions:

Restrictions on parking can be enforced under the civil law by the road authority. They are well observed in areas with regular patrols by enforcement operatives and can be enforced against vehicle owners.

Moving traffic infringement are only prosecuted by the police under criminal law against the driver. Most of the measures are not well observed like speed limits and bus lane usage. Some fixed speed cameras are installed in the city, but that's only has a micro level effect.

Every kind of camera can be used for enforcement, depending on the quality of the picture, and the seriousness of the demerit.

References:

Further questions: October 2019

1. Please describe any problems you expect in introducing regulatory measures that might be needed in your corridor study area.

Current traffic situation:

The traffic at the Area under stress in Budapest is a very busy road (a.k.a. Kossuth Lajos street) and it's located between Ferenciek square and Astoria (square). There are 3 traffic lanes in each direction. More than 60 buses go throw in peak hours. Buses are using bus lanes, which are the outer lanes at the carriageway, and they are situated next to the kerbside.

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The car traffic is also huge, they can use 2 traffic lanes in each direction. The area under stress is mostly saturated every part of a day, especially at peak hours.

Next to public transport buses, hop on-hop off buses, taxis, motorcyclists, cyclists where it approved, and cars for turning movement also are be able to use bus lanes. Unauthorised use of bus lanes can be punished by the police. The case of traffic offences, the police can punish one.

Due to the amount of traffic, parking and waiting next to kerbside areas are prohibited, bus lanes are settled there. Citizens can use the neighbourhood low traffic streets for parking and waiting.

Most packing and loading are also located in the neighbourhood area. One of them is located next to the kerbside at the bus lane, this loading and packing area has strong time restriction (duration and time of a day).

There are some parts of area under stress, where bus lanes are thick. There are Hop on-hop off bus stops and taxi stop. Buses can overtake these obstacles in lane.

Nowadays, boarding and alighting to the public transport service are the main applied form of kerbside activity. Pedestrian guard rails separate the pedestrian and vehicle traffic from each other. Pedestrian guard rails prevent several kerbside activities. Sidewalks are narrow, but the pedestrian flow is huge.

Future scenario:

When we want to modify the current layout of the street temporary at this project, we have to negotiate with the following main factors: Municipality of Budapest, Municipalities of Districts (mainly with the V. District, but VI. and VII. Districts are also stakeholders), the road maintenance company (Budapest Public Road) and in-house cooperation. It needs time and public consultation for participative planning.

Parking restriction and enforcement:

One has to pay a parking fee at most of the centre location in Budapest. The parking fee an hour is correlating with the importance of the area, and it is between 175 HUF/hour (approx. 0.5€/hour) and 525 HUF/hour (1.5€/hour). One can buy a parking tickets via mobile phone and parking meter. The core city centre and Buda Castle are parking protected areas, only residents and office workers are able to visit these place with car and parking.

Parking enforcement is part of Districts responsibilities. Parking inspectors monitor the parking rights. Parking lots have time duration restriction in most part of Budapest. If one can overparking, an extra fee has to be pay and wheel clamp could be settled. Wheel clamp could be settled also when drivers do not have parking tickets at all.

Car can be transported when it takes obstacle against everyday traffic (i.e. public transport vehicles cannot go away)

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2. Once introduced, do you expect any problems with people regularly contravening the restrictions? If so, is this down to low enforcement activity, a difficulty pursuing and obtaining penalties, the penalty level being too low, or any other reason?

Law enforcement activity is high because it is one of most important income of Districts in Budapest. Parking penalties are paid quickly, because one has to pay extra money if one cannot pay in time. Parking penalty within 5 calendar days is 10 times an hourly parking fee. The parking penalty above 5 calendar days and within 90 calendar days is 30 times an hourly parking fee. The parking penalty above 90 calendar days is 50 times an hourly parking fee. If one parking at a disabled parking lot without permission, one has to get a high penalty, which equals to 300 times an hourly parking fee.

One has to pay extra money above the penalty fee if one gets a wheel clamp or transported one's car.

Police can punish on for traffic offenses (i.e. unauthorized lane usage, speeding, lack of use of seat belts) on-site or based on camera pictures. The amount of punishing depends on the kind of traffic offenses.

3. Have any innovative or unusual regulatory measures (or combination of measures on the same stretch of road) been used anywhere in your country?

Road regulation measures and enforcements are quite similar in every part of Hungary. Budapest only has some specialties because of a two-tailed local government system. It comes from the hierarchy and complexity of the city. There aren't any extra specialties at the MORE corridor.

4. Do you think any new types of restriction (or combination of measures, or the times they operate for) might be needed for your corridor study that have not been used before in your country?

Congestion charge, (ultra) low emission zone would be useful for the city. Implementation of the congestion charge is a hot topic for 10 years, but it has not been implemented until this because it has uncountable political risk.

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Traffic regulations - MALMÖ

General restrictions on motor vehicles

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Total ban on general traffic	✓	✓	✓
Ban on traffic other than buses	✓	✓	✓
Ban on traffic other than vehicles needing access to premises	✓	✓	✓
Ban on traffic other than vehicles needing to load/unload goods	X	X	X
Ban on goods vehicles over specified weight	✓	✓	✓
Ban on buses over specified weight (or number of seats)	✓	✓	✓
Ban on slow or agricultural vehicles	✓	X	X
Ban on vehicles carrying explosives or dangerous goods (e.g. by ADR code)	✓	X	X
Ban on vehicles exceeding certain emissions (e.g. Euro 6 or CO_2 > 75 g/km)	✓	X	X
All motor vehicles must pay a charge	✓	✓	✓
Vehicles over a certain emission level must pay a charge	*see below		

References/comments:

*this is regulated through taxes

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Restrictions on pedestrians, cyclists and unpowered vehicles

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*
Total ban on pedestrians (e.g. on a freeway, underpass or flyover)	✓
Total ban on cyclists/ equestrians (e.g. on a freeway, underpass or flyover)	✓
Legal obligation on pedestrians to use only designated footways	✓
Legal obligation on cyclists to use only designated cycleway and not to ride on the general carriageway	✓
Legal obligation on cyclists to give priority to pedestrians on shared footway/cycleway	✓
Restrictions on power-assisted bicycles, powered skateboards invalid carriages, etc. that do not apply to unpowered cycles or to pedestrians	X
Restrictions on equestrians or horse-drawn vehicles	?

References/comments:

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Restrictions on road position (lane use)

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Reserved lane for buses on a scheduled service	✓	✓	✓
Reserved lane for buses and coaches	✓	✓	✓
Reserved lane for a particular direction of traffic (includes "no crossing" lines if 24/7)	✓	✓	✓
Reserved lane for cyclists	X	X	X
Reserved lane for motor cycles (including in combination with other types)	X	X	X
Reserved lane for high occupancy vehicles (e.g. 2 or more people) (including in combination with other types)	X	X	X
Reserved lane for goods vehicles (including in combination with other types)	X	X	X

References/comments:

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Restrictions on stopping

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Total ban on stopping (except in emergency or to avoid a collision)	✓	✓	✓
Ban on stopping other than for a taxi to set down/pick up a passenger	✓	✓	✓
Ban on stopping other than to set down/pick up a disabled passenger	✓	✓	✓
Ban on stopping other than to set down/pick up any passenger	✓	✓	✓
Ban on stopping other than to load/unload goods (for a specified maximum duration)	✓	✓	✓
Ban on stopping other than to load/ unload goods (for as long as it takes)	✓	✓	✓
Ban on stopping other than for scheduled buses	✓	X	X
Ban on stopping other than for any bus or coach	?	?	?
Ban on stopping other than for licensed taxis	✓	✓	✓
Ban on stopping other than for doctors'/emergency/ diplomatic vehicles	✓	X	X
Ban on waiting, other than for disabled persons (blue badge holders) for a maximum duration	✓	X	X
Ban on waiting, other than for disabled persons (blue badge holders) for unlimited duration	X	X	X

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Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Ban on waiting for longer than a specified duration	X	X	X
Payment required for waiting	Parking fee	X	X
Waiting permitted only for those issued in advance with a permit	X	X	X
Waiting permitted only for car club (shared) vehicles	X	X	X

References/comments:

Making of regulations

Please explain briefly the procedure and approximate timescale involved in making new regulations. Are there any measures for which consent from a higher tier authority or national government would be needed?

Example. Restrictions on both moving traffic and stopping may be made by resolution of the highway authority, after it has advertised the proposal and considered any objections. Typically the process takes 3 months from finalisation of the proposals to implementation on street.

Consent from regional government is needed for measures that could affect the capacity of major roads classified N or above.

Consent from national government is needed for innovative measures and their signs and road markings. There is a procedure for obtaining this, usually within 6 months.

Space for your contributions:

Local traffic regulations are communicated by the following authorities.

- 1. The municipality
- a) in respect of which area shall be a densely populated area,
- b) for other roads in densely populated areas than public roads for which the state is road holders,
- c) for all roads in a densely populated area if the regulations concern travel speed, stopping or parking,
- d) for roads except urban areas for which the municipality is road holders, as well
- e) for terrain.

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• 2. County Administrative Board
• a) in other cases than referred to in 1,
• b) in the case of stopping duty and weighing duty for roads in intersections with public roads for which the state is road holders

The Military Traffic Regulation and the Road Traffic Regulation for the municipal civil protection organization under education and high preparedness regulations provide for exemptions from this Regulation.

References:
https://open.karnovgroup.se/transport-och-kommunikation/SFS1998-1276#K10P10S1

Enforcement of regulations

Are traffic regulations generally well observed in your country? Can local councils or highway authorities enforce measures themselves, or must the police be involved? Are penalties dealt with under civil or criminal law? Can vehicle owners be pursued if the driver cannot be identified?
Can evidence from cameras be used for enforcement or must the infringement be observed by an officer on the ground?

Example. Restrictions on parking can be enforced under the civil law by the road authority. They are well observed in areas with regular patrols by enforcement operatives and can be enforced against vehicle owners.
Moving traffic infringement are only prosecuted by the police under criminal law against the driver. Many measures are well observed without much enforcement activity, but speed limits and bus lanes are not.
Only cameras of a type approved by national government can be used for enforcement and then only for a limited range of safety-related infringements.

Space for your contributions:

Yes, traffic regulations are generally well observed in Sweden with the exception of speed limit.
Local authorities can enforce some measures.
Most penalties are being dealt with under criminal law but not all.
Yes, Vehicle owners can be pursued even if the driver cannot be identified.
Certain regulation can use cameras for enforcement.

References:

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Further questions: October 2019

1. Please describe any problems you expect in introducing regulatory measures that might be needed in your corridor study area.

Malmö is replacing the analysis of "current situation" with a "gating strategy" study consisting of inducing delays through the studied section using traffic signalling to reduce congestion in the city centre as well as a traffic modelling study of the effect of introduction of mobility hubs. We will therefore not apply new regulations and restrictions on a street at least not in the study of the current situation.

The only measure that is planned for the upcoming years is removal of existing parking places on the west side of Nyhamn. They will be replaced by a temporary mobility hub on the east side of the area.

The freed area will have temporary "area activation" functions, such as outdoor offices, a temporary park, seating etc aiming on activating the area and making it popular during the constructing period. Through these temporary functions the project will evaluate which activities are most important and permanent them.

A regulation that could be introduced in the future situation is reversible lanes.

2. Once introduced, do you expect any problems with people regularly contravening the restrictions? If so, is this down to low enforcement activity, a difficulty pursuing and obtaining penalties, the penalty level being too low, or any other reason?

See answer above.

Some of the car commuters will be reluctant to park their cars in the assigned area. The city is preparing dialogues with stakeholders to achieve compliance.

3. Have any innovative or unusual regulatory measures (or combination of measures on the same stretch of road) been used anywhere in your country?

Reversible bus lanes in semi-central locations without many intersections.

4. Do you think any new types of restriction (or combination of measures, or the times they operate for) might be needed for your corridor study that have not been used before in your country?

Mobility hubs addressing car commuters from outside the city aiming on changing their travel mode in the central parts of the city towards public transport and cycling.

The city of Malmo follows the regulations adopted by "Wien Convention on Road Traffic" and haven't made any deviations from this.

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Traffic regulations - LISBON

General restrictions on motor vehicles

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Total ban on general traffic	√	?	?
Ban on traffic other than buses	√	√	?
Ban on traffic other than vehicles needing access to premises	√	√	?
Ban on traffic other than vehicles needing to load/unload goods	√	√	?
Ban on goods vehicles over specified weight	√	√	?
Ban on buses over specified weight (or number of seats)	√	√	?
Ban on slow or agricultural vehicles	√	√	?
Ban on vehicles carrying explosives or dangerous goods (e.g. by ADR code)	√	√	?
Ban on vehicles exceeding certain emissions (e.g. Euro 6 or CO_2 > 75 g/km)	√	x	?
All motor vehicles must pay a charge	x	x	x
Vehicles over a certain emission level must pay a charge	x	x	x

References/comments:

The third column is always answered with a question mark because we don't understand how is it different from the second one. In Portugal, if we want to apply a restriction at a predefined time, we use the total restriction and add a plate with additional information.

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Restrictions on pedestrians, cyclists and unpowered vehicles

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*
Total ban on pedestrians (e.g. on a freeway, underpass or flyover)	√
Total ban on cyclists/ equestrians (e.g. on a freeway, underpass or flyover)	√
Legal obligation on pedestrians to use only designated footways	√
Legal obligation on cyclists to use only designated cycleway and not to ride on the general carriageway	√
Legal obligation on cyclists to give priority to pedestrians on shared footway/cycleway	?
Restrictions on power-assisted bicycles, powered skateboards invalid carriages, etc. that do not apply to unpowered cycles or to pedestrians	x
Restrictions on equestrians or horse-drawn vehicles	√

References/comments:

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Restrictions on road position (lane use)

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Reserved lane for buses on a scheduled service	√	√	?
Reserved lane for buses and coaches	x	x	?
Reserved lane for a particular direction of traffic (includes "no crossing" lines if 24/7)	√	?	?
Reserved lane for cyclists	√	x	?
Reserved lane for motor cycles (including in combination with other types)	√	√	?
Reserved lane for high occupancy vehicles (e.g. 2 or more people) (including in combination with other types)	x	x	?
Reserved lane for goods vehicles (including in combination with other types)	x	x	?

References/comments:

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Restrictions on stopping

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Total ban on stopping (except in emergency or to avoid a collision)	√	√	?
Ban on stopping other than for a taxi to set down/pick up a passenger	√*	x	?
Ban on stopping other than to set down/pick up a disabled passenger	x	x	?
Ban on stopping other than to set down/pick up any passenger	√	√	?
Ban on stopping other than to load/unload goods (for a specified maximum duration)	√	√	?
Ban on stopping other than to load/ unload goods (for as long as it takes)	√	√	?
Ban on stopping other than for scheduled buses	√	√	?
Ban on stopping other than for any bus or coach	√	√	?
Ban on stopping other than for licensed taxis	√	√	?
Ban on stopping other than for doctors'/emergency/ diplomatic vehicles	√	√	?
Ban on waiting, other than for disabled persons (blue badge holders) for a maximum duration	?	?	?
Ban on waiting, other than for disabled persons (blue badge holders) for unlimited duration	?	?	?
Ban on waiting for longer than a specified duration	√	√	?

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Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Payment required for waiting	x	x	?
Waiting permitted only for those issued in advance with a permit	x	x	?
Waiting permitted only for car club (shared) vehicles	x	x	?

References/comments:

* In the airport

Making of regulations

Please explain briefly the procedure and approximate timescale involved in making new regulations. Are there any measures for which consent from a higher tier authority or national government would be needed?

Example. Restrictions on both moving traffic and stopping may be made by resolution of the highway authority, after it has advertised the proposal and considered any objections. Typically the process takes 3 months from finalisation of the proposals to implementation on street.

Consent from regional government is needed for measures that could affect the capacity of major roads classified N or above.

Consent from national government is needed for innovative measures and their signs and road markings. There is a procedure for obtaining this, usually within 6 months.

Space for your contributions:

References:

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Enforcement of regulations

Are traffic regulations generally well observed in your country? Can local councils or highway authorities enforce measures themselves, or must the police be involved? Are penalties dealt with under civil or criminal law? Can vehicle owners be pursued if the driver cannot be identified?

Can evidence from cameras be used for enforcement or must the infringement be observed by an officer on the ground?

Example. Restrictions on parking can be enforced under the civil law by the road authority. They are well observed in areas with regular patrols by enforcement operatives and can be enforced against vehicle owners.

Moving traffic infringement are only prosecuted by the police under criminal law against the driver. Many measures are well observed without much enforcement activity, but speed limits and bus lanes are not.

Only cameras of a type approved by national government can be used for enforcement and then only for a limited range of safety-related infringements.

Space for your contributions:

- Some traffic regulations are generally well observed in Portugal, not all
- The municipality has their own police that can enforce measures. Additionally for parking enforcement, the fiscals of the municipal company for parking management can apply fines.

Restrictions on parking can be enforced under the civil law by the road authority and vehicle owners can be pursued if the driver cannot be identified.

- Cameras can be used for enforcement although and officer in the office have to confirm the plate numbers

References:

Further questions: October 2019

1. Please describe any problems you expect in introducing regulatory measures that might be needed in your corridor study area.

In our study area, the major problems are the improper use of parking spaces, namely load/unload spots, second line parking which causes several constrains in the existing bus lanes and inappropriate sidewalk dimensions considering the existing demand.

It is our intention to change load/unload parking times and schedule as well as to increase these parking slots. It will also be necessary to change some regulation aspects as well as to enforce higher parking supervision to:

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- Enforce load/unload park in order to be assure that the parking time is fulfilled and there isn't any abusive behaviour, especially from the shopkeepers whom currently use them to park their car.
- Enforce second line parking, especially in the bus lanes

However, it is expected to have limitations in increasing parking enforcement:

- Video record can only be used as a preventive tool given the fact that, due to GDPR, plates can't be used to fine the transgressors. However, it can be used to improve statistics in order to act as a preventive tool and to foresee where a most active supervision should be implemented.
- Other problem is the lack of available human resources to perform a regular parking supervision, especially in load/unload parking times.

We should also be aware that to propose higher parking restrictions it is necessary to follow the next procedures, which may demand an extend period of time:

- Parking regulation amendment;
- Public consultation;
- Meeting in the municipal assembly to approve the new regulation.

There is also some measures, that could be implemented, that exceed the municipality jurisdiction because it could obliged to change Road Traffic Code, like the creation of a lane with a bus and cycle mixed use.

2. Once introduced, do you expect any problems with people regularly contravening the restrictions? If so, is this down to low enforcement activity, a difficulty pursuing and obtaining penalties, the penalty level being too low, or any other reason?

- Low enforcement activity;
- Lack of human resources to supervise parking and bus lanes' illegal occupation;
- Low penalty level – Low fines' value and without consequences in the driver's license.
- Sense of impunity – There is a general abuse of second line parking in the city without consequences. In Lisbon, average second line parking is 21 minutes.

3. Have any innovative or unusual regulatory measures (or combination of measures on the same stretch of road) been used anywhere in your country?

- We are implementing a video record network to detect high speeds and parking abuse around the city. Although it won't be possible to fine using the information made available by the cameras, they will be used to feed city's database in order to be aware of the transgression's local as a preventive measure. This will be used to analyse speed limits, second line parking and it can also be used to assess average parking time in load/unload spots.

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- In Lisbon, around 200 car sharing parking spots were implemented to be used between 8 and 20h. Outside that time slot, these places are used as load/unload areas.

4. Do you think any new types of restriction (or combination of measures, or the times they operate for) might be needed for your corridor study that have not been used before in your country?

- We would like to implement automatic parking sensors that could identify average parking times in load/unload spots. These measure is under study in the project "Park4SUMP Cities" that is currently under development in Lisbon.

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Traffic regulations – LONDON (TfL)

General restrictions on motor vehicles

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Total ban on general traffic	Yes	Yes	Yes
Ban on traffic other than buses	Yes[a]	Yes	Yes
Ban on traffic other than vehicles needing access to premises	Yes[b] (but ineffective)	Yes[b] (but ineffective)	Yes[b] (but ineffective)
Ban on traffic other than vehicles needing to load/unload goods	Yes[b] (but ineffective)	Yes[b] (but ineffective)	Yes[b] (but ineffective)
Ban on goods vehicles over specified weight	Yes	Yes	Yes
Ban on buses over specified weight (or number of seats)	Yes	Yes	Yes
Ban on slow or agricultural vehicles	Yes	Yes	Yes
Ban on vehicles carrying explosives or dangerous goods (e.g. by ADR code)	Yes	Yes	Yes
Ban on vehicles exceeding certain emissions (e.g. Euro 6 or CO_2 > 75 g/km)	Yes	Yes	Yes
All motor vehicles must pay a charge	Yes	Yes	Yes
Vehicles over a certain emission level must pay a charge	Yes	Yes	Yes

References/comments:

Department for Transport. (2016). *Traffic Signs Regulations and General Directions 2016.* [online] Available at: https://tsrgd.co.uk/pdf/tsrgd/tsrgd2016.pdf

[a]We are able to implement 24hr bus lanes, but there are exceptions that allow other vehicles to use these lanes, such as taxis in London (but not private hire vehicles).

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[b]Our colleague who works on implementing Traffic Regulation Orders suggests these regulations are ineffective

Restrictions on pedestrians, cyclists and unpowered vehicles

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*
Total ban on pedestrians (e.g. on a freeway, underpass or flyover)	Yes (e.g. on a motorway, which is classified as a special road under the Highway Act 1980 and therefore not automatically considered a right of way for all users, unlike other roads)
Total ban on cyclists/ equestrians (e.g. on a freeway, underpass or flyover)	Yes
Legal obligation on pedestrians to use only designated footways	No
Legal obligation on cyclists to use only designated cycleway and not to ride on the general carriageway	No
Legal obligation on cyclists to give priority to pedestrians on shared footway/cycleway	No specific regulation for this, but it could be covered by the general duty of care under English law
Restrictions on power-assisted bicycles, powered skateboards invalid carriages, etc. that do not apply to unpowered cycles or to pedestrians	Yes
Restrictions on equestrians or horse-drawn vehicles	Yes

References/comments:

Department for Transport. (2016). *Traffic Signs Regulations and General Directions 2016.* [online] Available at: https://tsrgd.co.uk/pdf/tsrgd/tsrgd2016.pdf

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Restrictions on road position (lane use)

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Reserved lane for buses on a scheduled service	Yes	Yes	Yes
Reserved lane for buses and coaches	Yes	Yes	Yes
Reserved lane for a particular direction of traffic (includes "no crossing" lines if 24/7)	Yes	Yes	Yes
Reserved lane for cyclists	Yes	Yes	Yes
Reserved lane for motor cycles (including in combination with other types)	Yes	Yes	Yes
Reserved lane for high occupancy vehicles (e.g. 2 or more people) (including in combination with other types)	Yes	Yes	Yes
Reserved lane for goods vehicles (including in combination with other types)	Yes	Yes	Yes

References/comments:

Department for Transport. (2016). *Traffic Signs Regulations and General Directions 2016.* [online] Available at: https://tsrgd.co.uk/pdf/tsrgd/tsrgd2016.pdf

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Restrictions on stopping

Please place a tick (for "yes") or a cross (for "no") in each of the boxes below for types of traffic regulation that are used in your country. Enter "?" for any for which it is uncertain and not tried.

Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Total ban on stopping (except in emergency or to avoid a collision)	Yes	Yes	Yes (e.g. football games)
Ban on stopping other than for a taxi to set down/pick up a passenger	Yes	Yes	Yes
Ban on stopping other than to set down/pick up a disabled passenger	Yes	Yes	Yes
Ban on stopping other than to set down/pick up any passenger	Yes	Yes	Yes
Ban on stopping other than to load/unload goods (for a specified maximum duration)	Yes	Yes	Yes
Ban on stopping other than to load/ unload goods (for as long as it takes)	Yes	Yes	Yes
Ban on stopping other than for scheduled buses	Yes	Yes	Yes
Ban on stopping other than for any bus or coach	Yes	Yes	Yes
Ban on stopping other than for licensed taxis	Yes	Yes	Yes
Ban on stopping other than for doctors'/emergency/ diplomatic vehicles	Yes	Yes	Yes
Ban on waiting, other than for disabled persons (blue badge holders) for a maximum duration	Yes	Yes	Yes
Ban on waiting, other than for disabled persons (blue badge holders) for unlimited duration	Yes	Yes	Yes

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Restriction	*Can be used applying all the time (24/7)*	*Can be used applying just at predefined times (e.g. peak hours)*	*Can apply only when signs indicate (at times not predefined)*
Ban on waiting for longer than a specified duration	Yes	Yes	Yes
Payment required for waiting	Yes	Yes	Yes
Waiting permitted only for those issued in advance with a permit	Yes	Yes	Yes
Waiting permitted only for car club (shared) vehicles	Yes	Yes	Yes

References/comments:

Department for Transport. (2016). *Traffic Signs Regulations and General Directions 2016.* [online] Available at: https://tsrgd.co.uk/pdf/tsrgd/tsrgd2016.pdf

TfL. (2018). *Loading for the public*. [online] Available at: https://tfl.gov.uk/modes/driving/red-routes/rules-of-red-routes/loading-for-the-public

TfL. (2018). *Parking information*. [online] Available at: https://tfl.gov.uk/info-for/taxis-and-private-hire/parking-information

TfL. (2018). *Red lines and no stopping*. [online] Available at: https://tfl.gov.uk/modes/driving/red-routes/rules-of-red-routes/red-lines-and-no-stopping

Making of regulations

Please explain briefly the procedure and approximate timescale involved in making new regulations. Are there any measures for which consent from a higher tier authority or national government would be needed?

Example. Restrictions on both moving traffic and stopping may be made by resolution of the highway authority, after it has advertised the proposal and considered any objections. Typically the process takes 3 months from finalisation of the proposals to implementation on street.

Consent from regional government is needed for measures that could affect the capacity of major roads classified N or above.

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Consent from national government is needed for innovative measures and their signs and road markings. There is a procedure for obtaining this, usually within 6 months.

Space for your contributions:

Traffic Regulation Orders (TRO) on both moving and stopping traffic can be made by resolution of the *traffic authority*. In most authorities the traffic authority and highway authority are one in the same, but not always. Transport for London is the traffic and highway authority for all its own roads, i.e. the Transport for London Road Network (covered in more detail in Section 7).

Road Traffic Orders are made in mainland UK under the Road Traffic Regulation Act and then in accordance with the procedures that are laid down by regulation. They set out the various steps that have to be followed when you make an Order, which are different for temporary and permanent orders.

Typically the way it would work is that the Traffic Authority passes a resolution to introduce a restriction, then follows the procedures in order to make the Order to give the controls their effect, which will include publicising the proposal. If objections are received the traffic authority must follow the procedures for them to be properly considered, which can involve a public enquiry.

Given no objections, 3 months is about right to process the Order through the various steps that have to be taken (cost averages at about £2.5k).

Under the Traffic Management Act, Orders must facilitate the expedient movement of traffic on the traffic authorities roads and any neighbouring authorities roads, so you cannot just dump your problems on your neighbours. This could be any adverse effect, not just on a major road. (I think a typo in the example below should be Classified B and above not N).

The only circumstances where innovative measures would need consent from National Government agencies is where the Traffic Signs Regulations and General Directions don't provide traffic signs that could be used to give them effect. Congestion Charging was an example where a new sign had to be created and approved, but is now in wider use for charging schemes (Dartford Crossing now uses the same C signs as Congestion Charging).

What you can do is use the regulations in innovative ways, as is done with Managed Motorways where speed limits can be adjusted during the day, where lanes can be closed or opened in response to incidents etc. We have Traffic Orders in place where the measures are implemented at irregular times in response to incidents, and for planned maintenance. Blackwall Tunnel surrounds for example, where we have a variety of controls that can be introduced in response to incidents in the tunnel or its approaches, or for planned maintenance activities when needed.

References:

Internal consultation of colleagues at TfL

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Enforcement of regulations

Are traffic regulations generally well observed in your country? Can local councils or highway authorities enforce measures themselves, or must the police be involved? Are penalties dealt with under civil or criminal law? Can vehicle owners be pursued if the driver cannot be identified?

Can evidence from cameras be used for enforcement or must the infringement be observed by an officer on the ground?

Example. Restrictions on parking can be enforced under the civil law by the road authority. They are well observed in areas with regular patrols by enforcement operatives and can be enforced against vehicle owners.

Moving traffic infringement are only prosecuted by the police under criminal law against the driver. Many measures are well observed without much enforcement activity, but speed limits and bus lanes are not.

Only cameras of a type approved by national government can be used for enforcement and then only for a limited range of safety-related infringements.

Space for your contributions:

Are traffic regulations generally well observed in your country?

It is difficult to provide a meaningful and objective answer to this. We could approximate this by comparing the number of traffic offences police deal with and the total traffic counts so that we can express the number of offences as a proportion of the total number of vehicles using our roads (suggest doing this within London). However, this would be assuming all offences are caught by the police and would only be useful if other countries do the same analysis. The number of offences that go unnoticed/unrecorded in each country may vary considerably, which would also limit the conclusions you could draw from this analysis.

Can local councils or highway authorities enforce measures themselves, or must the police be involved?

Certain local councils or highway authorities may be empowered by legislation to enforce against civil traffic contraventions, such as those regarding parking, banned turns, yellow box markings at junctions, and driving in bus lanes. Police enforce the law with regard to criminal traffic offences, such as speeding, drink/drug driving, driving without insurance or a licence, using a hand-held mobile phone, and careless or dangerous driving.

Are penalties dealt with under civil or criminal law?

Either civil or criminal law, depending on the contravention or offence. Local councils authorities are empowered to issue penalty charge notices. The police issue fixed penalty notices or prosecute through the courts.

Can vehicle owners be pursued if the driver cannot be identified?

Yes. The owner can be traced if the vehicle registration number (licence plate) is known.

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Can evidence from cameras be used for enforcement or must the infringement be observed by an officer on the ground?

It depends on the offence, and in the case of civil traffic contraventions, it may depend on the highway authority. For example, Transport for London can enforce parking using CCTV on the Transport for London Road Network, but London boroughs cannot use CCTV to enforce to enforce parking on the roads they manage. The police can use cameras to detect speeding and red light offences, but other offences require on-street officers to observe them. The use of cameras by police or local authorities requires Home Office Type Approval.

References:

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9. Appendix B: Comparison of Regulatory Signs for the MORE Cities

Typical regulatory signs used in the MORE corridor countries:

	Hungary	Portugal	Romania	Sweden	United Kingdom
Road closed to all vehicles in both directions					
No entry for vehicular traffic					
No motor vehicles					
No motor vehicles except motorcycles					
No motorcycles					
No cycling					
No pedestrians					
No buses					

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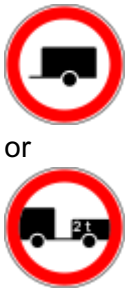
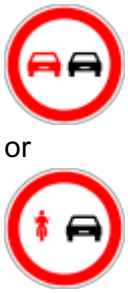
	Hungary	Portugal	Romania	Sweden	United Kingdom
No heavy goods vehicles		 or			
No tractors					
No trailers		 or			
No overtaking		 or			
No overtaking by heavy goods vehicles					NOT USED
Maximum speed limit					
Speed limit zone				NOT USED	

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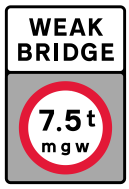
	Hungary	Portugal	Romania	Sweden	United Kingdom
Maximum height					
Maximum width					
Maximum vehicle length					  and
Maximum weight					
Maximum weight per axle					NOT USED
No vehicles carrying dangerous goods					
No vehicles carrying dangerous water pollutants				NOT USED	NOT USED
No vehicles carrying explosives				 	 

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	Hungary	Portugal	Romania	Sweden	United Kingdom
Minimum safe following distance between vehicles	 or				NOT USED
No right turn					
No left turn					
No U-turns					
No parking or waiting					
No stopping					
No parking zone					
End of overtaking prohibition					
End of all restrictions					NOT USED

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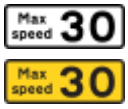
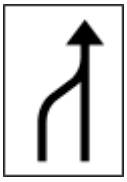
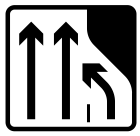
	Hungary	Portugal	Romania	Sweden	United Kingdom
End of speed limit zone				NOT USED	
One-way street					
					
Pedestrian crossing				 or	
Advisory speed limit					 or (temporary)
Lane ends					
Residential area/Living street					

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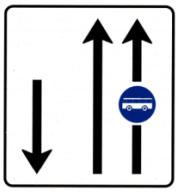
	Hungary	Portugal	Romania	Sweden	United Kingdom
Pedestrian zone					
Bus lane					
Bus-only street					
Limited-access road					NOT USED
End of limited-access road					
Motorway					

Main source: Wikipedia en.wikipedia.org/wiki/Comparison_of_European_road_signs with additions and corrections from the official traffic signs documentation of the partner countries.

Portugal: www.ansr.pt/SegurancaRodoviaria/RegulamentoSinalizacaoTransito/Documents/decreto%20Regulamentar%20n%2062019,%20de%2022%20de%20outubro%202019.pdf

UK: www.legislation.gov.uk/uksi/2016/362/pdfs/uksi_20160362_en.pdf

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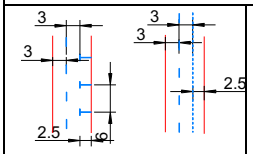
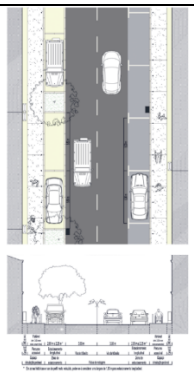
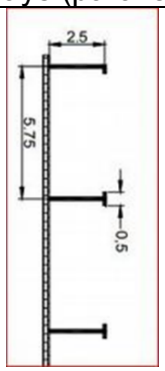
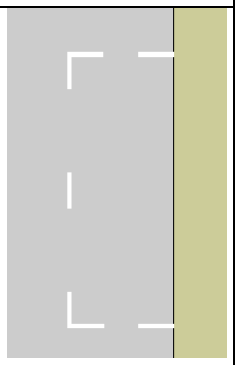
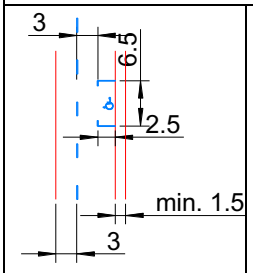
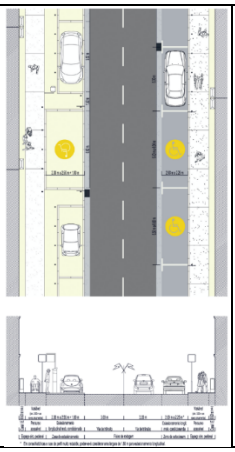
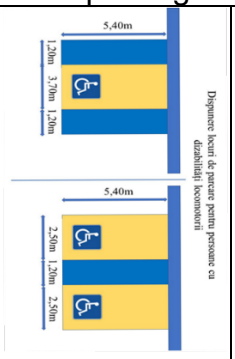
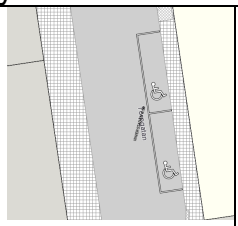
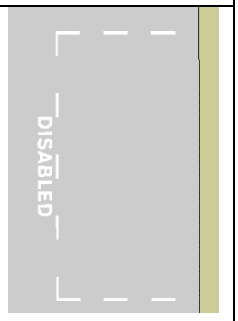
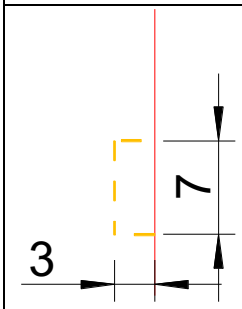
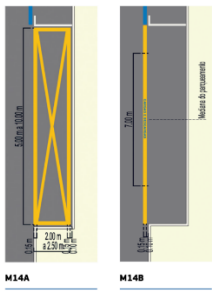
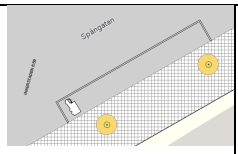
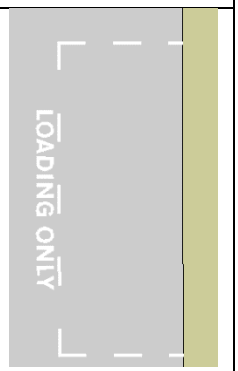
Typical regulatory markings used in the MORE corridor countries:

Hungary	Portugal	Romania	Sweden	UK
Parking bays (parallel parking)				
			No marking just signage for either amount spaces, length of regulation or “start” /“end” 	
Disabled parking bays				
				
Loading bays				
	 M14A is the most normal	Not defined	 Symbol not a national standard	

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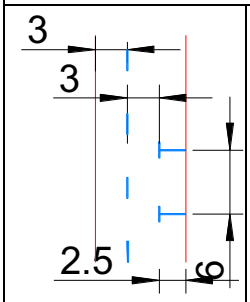
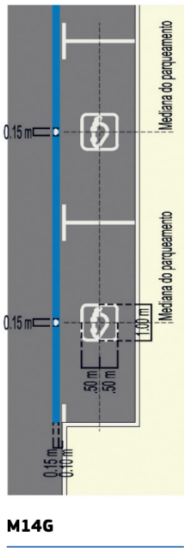
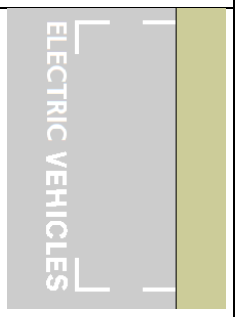
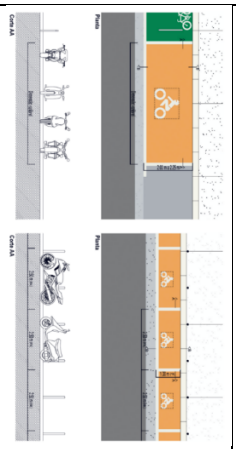
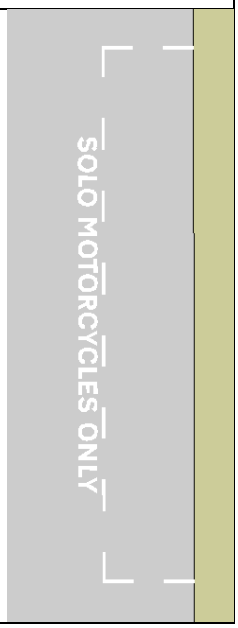
Hungary	Portugal	Romania	Sweden	UK
Electric Vehicle Charging				
		Not defined	Not used currently, but can be indicated on signs.	
Motorcycle Parking				
N/A		Not defined	Not used currently, as m/cs can park where cars can, but can be indicated on signs.	

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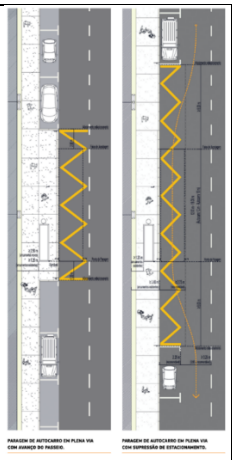
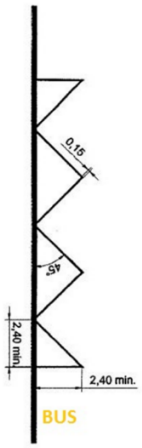
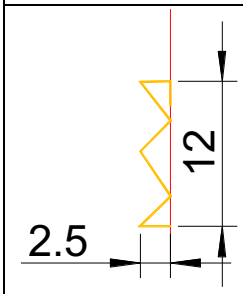
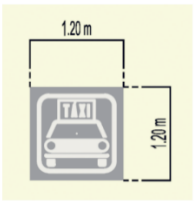
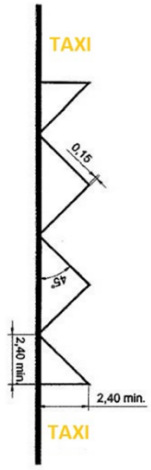
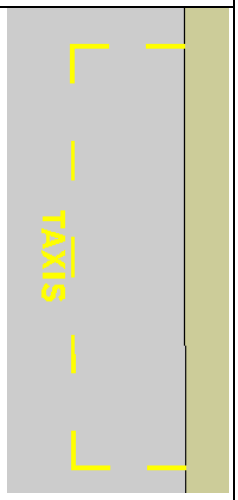
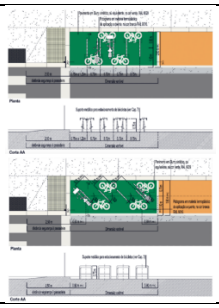
Hungary	Portugal	Romania	Sweden	UK
Bus stop				
			Normally represented by white line on kerb/footway to show extent of bus-stop. Parking not allowed. (or just signage) 	
Taxi rank				
	Same as Electric Vehicles with the following image 		Normally just signage: “no parking”, Can be specifically designated if need be: 	
Cycle parking				
N/A		Not defined	Signage only	Signage only

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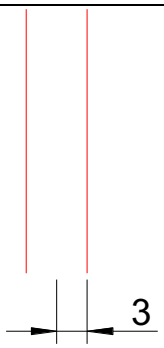
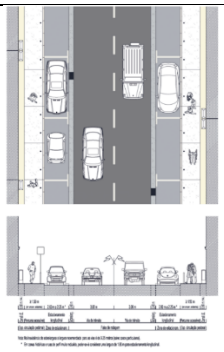
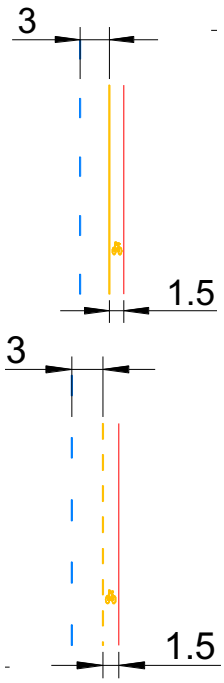
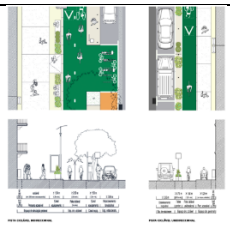
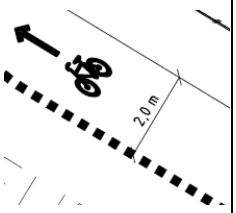
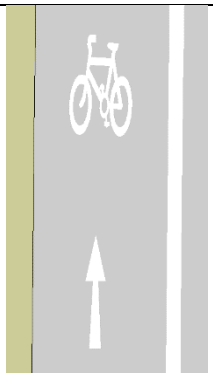
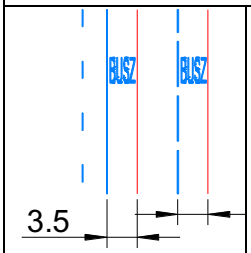
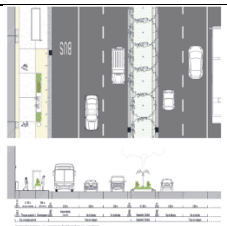
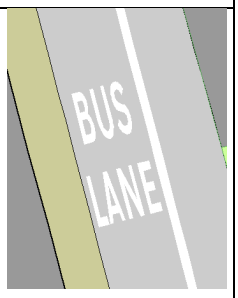
Hungary	Portugal	Romania	Sweden	UK
Separate traffic lanes				
		Same as UK	Normally 3+3 m in urban area, 9+3 m in rural Width 0.1 m  	
Cycle lane				
		Same as UK	Marking 0.1 + 0.1 m Width 0.1 m  Width of lane: 1.5 – 2.5 m Symbol at start of each block  	
Bus lane				
		Same as UK	Normally 3+3 m.  Symbol M28: 	

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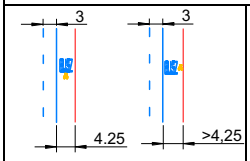
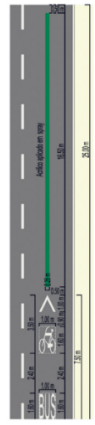
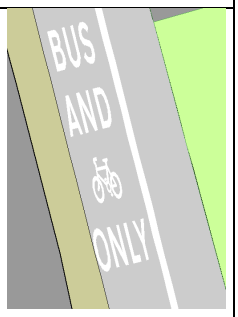
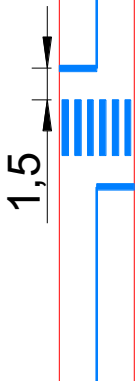
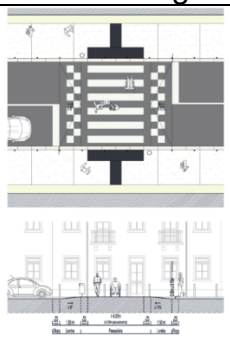
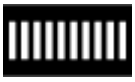
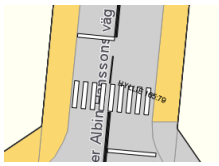
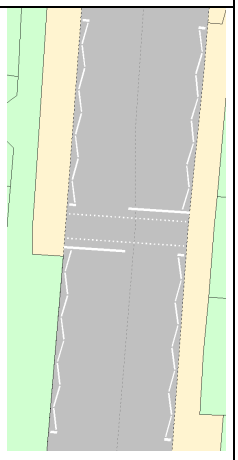
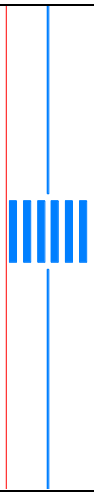
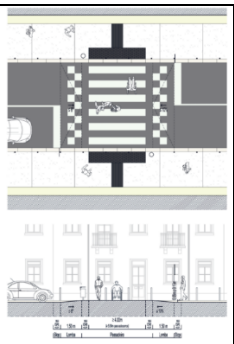
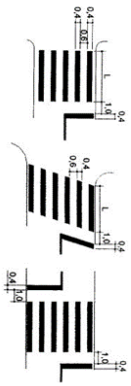
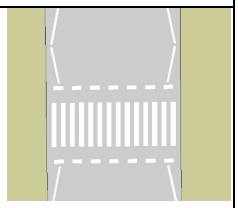
Hungary	Portugal	Romania	Sweden	UK
Contraflow bus and cycle lane				
		Same as UK But in yellow: just word BUS and cycle symbol	As with-flow	
Signalled Pedestrian crossing				
		Not defined	Length 2-4 m Width per part 0.5 m  Stop-line Width 0.5 m  	
Uncontrolled pedestrian crossing (zebra)				
			As for controlled, but without stop-line	

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10. Appendix C: Comparison of signs in practice with 1968 Vienna Convention

Comparison between the 1968 Convention regulatory signs and those typically used in European countries and worldwide to indicate the extent to which the Convention is followed and to show the extent of variation.

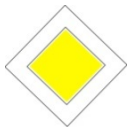
GIVE WAY

Convention sign:	Examples from countries:
	  

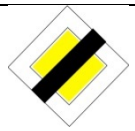
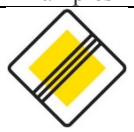
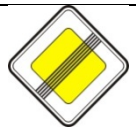
STOP

Convention sign:	Examples from countries:
	 PARE RPI - 2  301  

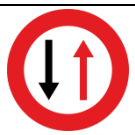
PRIORITY ROAD

Convention sign:	Examples from countries:
	  

END OF PRIORITY

Convention sign:	Examples from countries:
	  

PRIORITY FOR ONCOMING TRAFFIC

Convention sign:	Examples from countries:
	       

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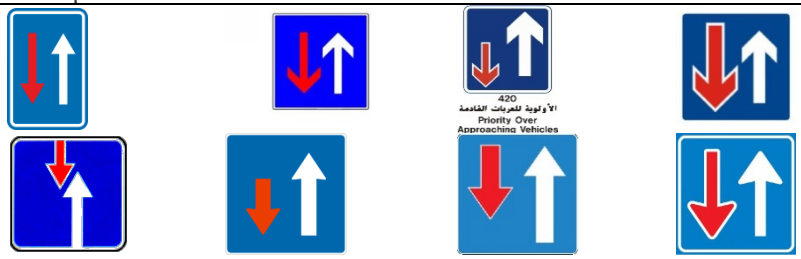
PRIORITY OVER ONCOMING TRAFFIC

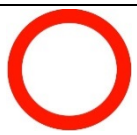
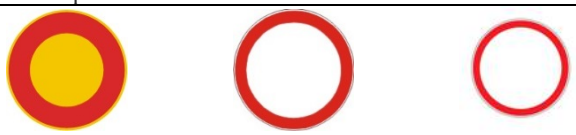
Convention sign:	Examples from countries:
	

NO ENTRY

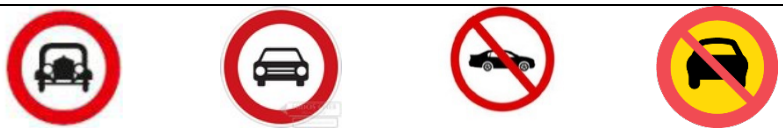
Convention sign:	Examples from countries:
	

Convention sign:	Examples from countries:
	

CLOSED TO ALL VEHICLES IN BOTH DIRECTIONS

Convention sign:	Examples from countries:
	

NO ENTRY FOR ANY MOTOR VEHICLE EXCEPT TWO-WHEELED MOTOR CYCLES WITHOUT SIDE-CAR"

Convention sign:	Examples from countries:
	

NO ENTRY FOR MOTOR CYCLES

Convention sign:	Examples from countries:
	

NO ENTRY FOR CYCLES / NO CYCLING

Convention sign:	Examples from countries:
	

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NO ENTRY FOR MOPEDS

Convention sign:	Examples from countries:
	  

NO ENTRY FOR GOODS VEHICLES

Convention sign:	Examples from countries:
	   

NO ENTRY FOR ANY POWER DRIVEN VEHICLE DRAWING A TRAILER OTHER THAN A SEMI-TRAILER OR A SINGLE AXLE TRAILER

Convention sign:	Examples from countries:
	   

NO ENTRY FOR ANY POWER DRIVEN VEHICLE DRAWING A TRAILER

Convention sign:	Examples from countries:
	  

NO ENTRY FOR VEHICLES CARRYING DANGEROUS GOODS FOR WHICH SPECIAL SIGN PLATING IS PRESCRIBED

Convention sign:	Examples from countries:
	   

NO ENTRY FOR PEDESTRIANS

Convention sign:	Examples from countries:
	    NO PEATONES RPO - 16

NO ENTRY FOR ANIMAL-DRAWN VEHICLES

Convention sign:	Examples from countries:
	   

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NO ENTRY FOR HANDCARTS

Convention sign:	Examples from countries:
	  

NO ENTRY FOR POWER DRIVEN AGRICULTURAL VEHICLES

Convention sign:	Examples from countries:
	  

NO ENTRY FOR VEHICLES CARRYING MORE THAN A CERTAIN QUANTITY OF EXPLOSIVES OR READILY INFLAMMABLE SUBSTANCES

Convention sign:	Examples from countries:
	   

NO ENTRY FOR VEHICLES CARRYING MORE THAN A CERTAIN QUANTITY OF SUBSTANCES LIABLE TO CAUSE WATER POLLUTION

Convention sign:	Examples from countries:
	   

NO ENTRY FOR MOTOR VEHICLES

Convention sign:	Examples from countries:
	     

NO ENTRY FOR MOTOR VEHICLES OR ANIMAL-DRAWN VEHICLES

Convention sign:	Examples from countries:
	   

NO ENTRY FOR VEHICLES HAVING AN OVERALL WIDTH EXCEEDING … METRES

Convention sign:	Examples from countries:
	  

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NO ENTRY FOR VEHICLES HAVING AN OVERALL HEIGHT EXCEEDING … METRES

Convention sign:	Examples from countries:
	  

NO ENTRY FOR VEHICLES EXCEEDING … TONNES LADEN MASS

Convention sign:	Examples from countries:
	       

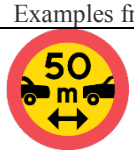
NO ENTRY FOR VEHICLES HAVING A MASS EXCEEDING … TONNES ON ONE AXLE

Convention sign:	Examples from countries:
	       

NO ENTRY FOR VEHICLES OR COMBINATIONS OF VEHICLES EXCEEDING METRES IN LENGTH

Convention sign:	Examples from countries:
	      

DRIVING OF VEHICLES LESS THAN METRES APART PROHIBITED

Convention sign:	Examples from countries:
	  

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NO LEFT/RIGHT TURN

Convention sign:	Examples from countries:		
			
			

NO U-TURNS

Convention sign:	Examples from countries:		
			

OVERTAKING PROHIBITED

Convention sign:	Examples from countries:		
			

Convention sign:	Examples from countries:		
			

OVERTAKING BY GOODS VEHSILCES PROHIBITED

Convention sign:	Examples from countries:			
				
				
				

MAXIMUM SPEED LIMITED TO THE FIGURE INDICATED

Convention sign:	Examples from countries:		
			

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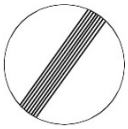
USE OF AUDIBLE WARNING DEVICES PROHIBITED

Convention sign:	Examples from countries:
	   

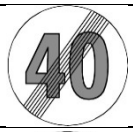
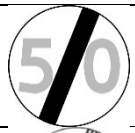
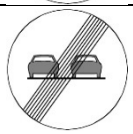
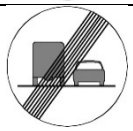
PASSING WITHOUT STOPPING PROHIBITED

Convention sign:	Examples from countries:
	   

END OF ALL LOCAL PROHIBITIONS ON MOVING VEHICLES

Convention sign:	Examples from countries:
	   

END OF SPEED LIMIT, END OF PROHIBITION OF OVERTAKING (by GOODS VEHICLES)

Convention sign:	Examples from countries:
	   
	   
	   

PARKING and/or STANDING PROHIBITED

Convention sign:	Examples from countries:
	   
	   

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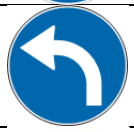
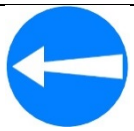
ALTERNATE PARKING (on different days)

Convention sign:	Examples from countries:			
				
				

DIRECTION(s) TO BE FOLLOWED

Convention sign:	Examples from countries:			
				
				
				
				

PASS THIS SIDE

Convention sign:	Examples from countries:			
				

ROUNDABOUT

Convention sign:	Examples from countries:			
				

COMPULSORY CYCLE TRACK

Convention sign:	Examples from countries:			

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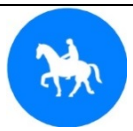
COMPULSORY PATH FOR PEDESTRIANS

Convention sign:	Examples from countries:
	   

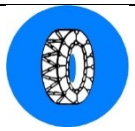
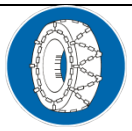
COMPULSORYTRACK FOR RIDERS ON HORSEBACK

Convention sign:	Examples from countries:
	   

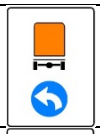
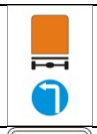
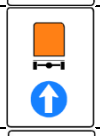
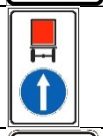
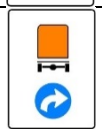
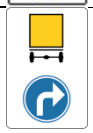
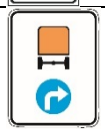
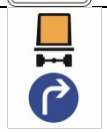
START and END of MINIMUM SPEED"

Convention sign:	Examples from countries:
	  
	  

SNOW CHAINS COMPULSORY

Convention sign:	Examples from countries:
	  

COMPULSORY DIRECTION FOR VEHICLES CARRYING DANGEROUS GOODS"

Convention sign:	Examples from countries:
	   
	   
	   

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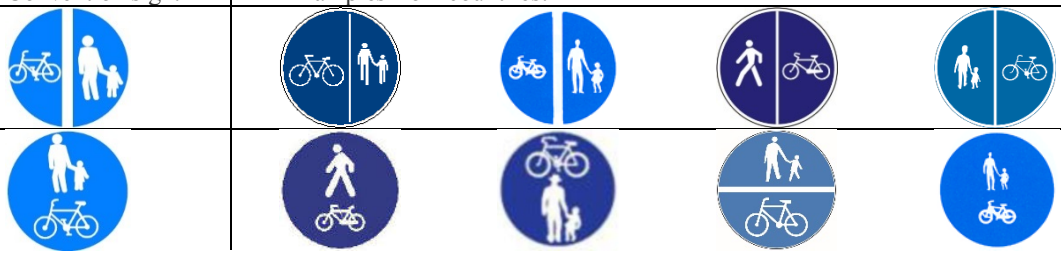
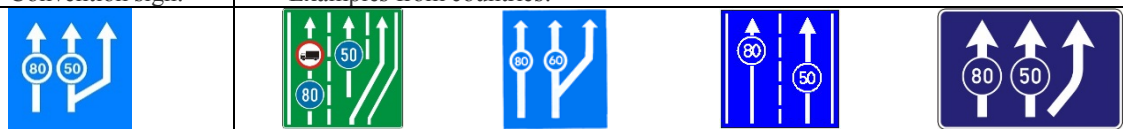
SEGREGATED AND SHARED CYCLE AND PEDESTRAIN TRACK

Convention sign:	Examples from countries:



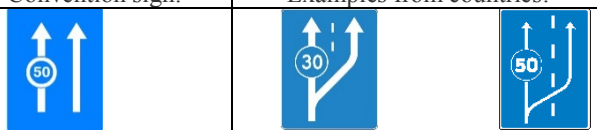
MINIMUM SPEED APPLYING TO DIFFERNET LANES

Convention sign:	Examples from countries:



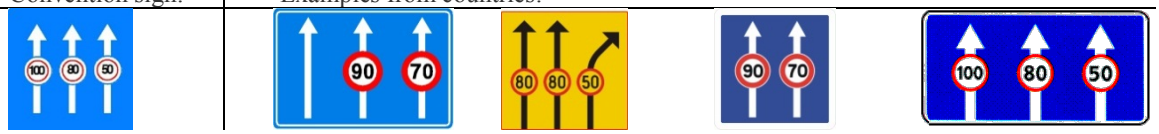
MINIMUM SPEED APPLYING TO ONE LANE"

Convention sign:	Examples from countries:



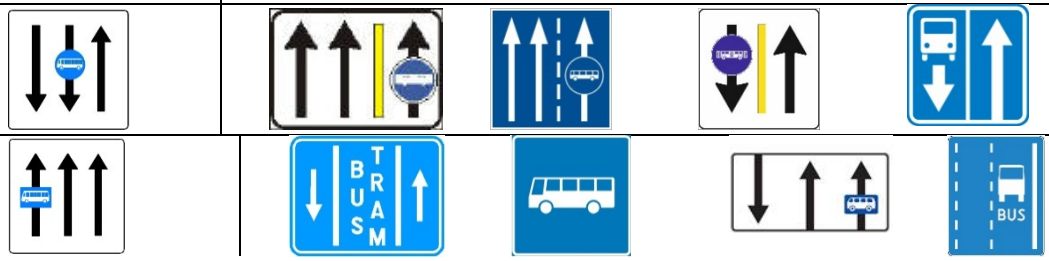
SPEED LIMITS APPLYING TO DIFFERENT LANES

Convention sign:	Examples from countries:



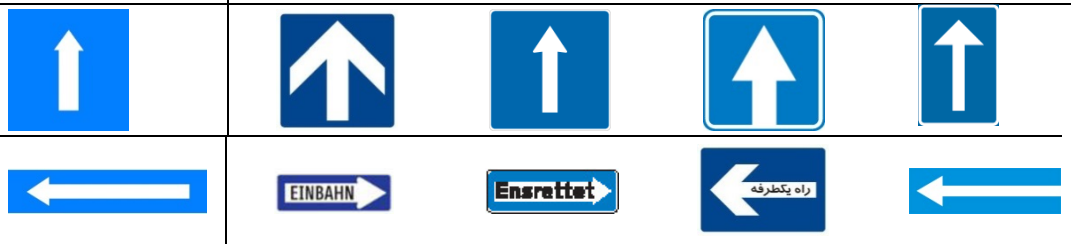
SIGNS FOR BUS LANES

Convention sign:	Examples from countries:



ONE WAY

Convention sign:	Examples from countries:



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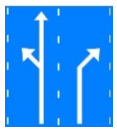
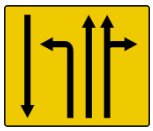
LANE SELECTION

Convention sign:	Examples from countries:				
					

MOTORWAY

Convention sign:	Examples from countries:			
				

END OF MOTORWAY

Convention sign:	Examples from countries:			
				

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ROAD FOR MOTOR VEHICLES

Convention sign:	Examples from countries:			
				

END OF ROAD FOR MOTOR VEHICLES

Convention sign:	Examples from countries:			
				

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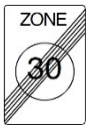
SIGNS HAVING ZONAL VALIDITY

Convention sign:	Examples from countries:			
				
				
				
				
				
				
				
				

PEDESTRIAN CROSSING”

Convention sign:	Examples from countries:		

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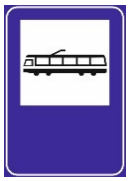
PARKING

Convention sign:	Examples from countries:
	  
	  
	  

BUS STOP, TRAMWAY STOP

Convention sign:	Examples from countries:
	     
	     

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RESIDENTIAL AREA, WOONERF or HOME ZONE

Convention sign:	Examples from countries:		
			
			

STOPPING PLACE IN CASE OF EMERGENCY OR DANGER

Convention sign:	Examples from countries:			
				
				

Based upon United Nations Economic and Social Council report ECE/TRANS/WP.1/2019/4
Global Forum for Road Traffic Safety: *Final report of the Group of Experts on Road Signs and Signals*:
www.unece.org/fileadmin/DAM/trans/doc/2019/wp1/ECE-TRANS-WP1-2019-4e_.pdf

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