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CiViTAS

Cleaner and better transport in cities

CAPITAL

CIVITAS INSIGHT

Access regulations to facilitate cleaner and better transport

Controlling access manages the amount and type of vehicles in sensitive areas and can make road space safer for all potential users. It can support rational schemes for filtering out vehicles that produce more emissions and giving priority to cleaner, more sustainable modes.

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Improving quality of life in sensitive urban spaces

Access controls are not new to Europe. For over 40 years, cities have been decreasing the numbers of cars in crowded historic centres that were never designed with motorised vehicles in mind. However, with the advent of new technologies, access can be controlled for certain types of vehicles or user groups. Likewise, information, payment and enforcement technology has made the management of where, when, and even if cars can park more effectively. Of course, severe congestion and insufficient parking space are drivers for these measures; conditions which have become pervasive in many cities.

Cities have high concentrations of economic activity, which are often located in complex land-use patterns and served by inadequate transport systems and services. The larger the city's population, the greater is its' complexity and potential for disruptions. This is particularly the case when complexity is not managed effectively. Even though the proportion of car use in a city's modal split tends to decrease with increasing population, cities of all sizes suffer from issues related to high traffic congestion. Tackling urban congestion requires managing a number of urban transport problems at the same time:

- Congestion is one of the most prevalent transport problems in urban agglomerations. The supply of infrastructure has often not been able to match the growth in demand for both mobility and parking. Congestion and parking are also interrelated since searching for on-street parking increases traffic - in central areas in large cities, cruising may account for more than 10 per cent of the local traffic as drivers may spend up to 20 minutes searching for a parking space.

- Increasing dispersion of new housing developments as commuters trade in longer travel times for housing affordability. The longer-term implications including fuel costs, security and environmental quality are often not adequately considered.

- Actual and perceived risks have social and economic consequences. Accidents account for a significant share of recurring delays - therefore pedestrians and cyclists feel less safe, and this may impact their transport choices.

- Air and noise pollution generated by traffic has become a serious impediment to the quality of life and the health of urban populations. Energy consumption by urban transport has increased and so has the dependency on petroleum. Peak oil considerations and increasingly higher energy prices can drive a shift towards more efficient and sustainable forms of urban transport, such as electric vehicles and public transport. The transition from carbon-based to alternatively-fuelled vehicles will not result in reduced congestion, while a transfer to other modes will.

- Many public transport systems, or parts of them, are either over- or under-utilised. Crowded peak times are uncomfortable for users, while low ridership makes many services financially unsustainable, particularly in suburban areas. In spite of significant subsidies and cross-financing (e.g. via tolls), almost all public transport systems cannot generate sufficient income to fully cover operating and capital costs. While deficits are deemed acceptable because of public transport's role as an essential service, the financial burden is increasingly controversial.

- The majority of urban roads are publicly owned and free to access. Traffic flows influence the life and interactions of residents and their use of street space. More traffic impedes social interactions and street activities, and people tend to walk and cycle less when traffic is high.

Reducing private car use in urban areas can be a measure in cities to enhance living conditions as well as to minimise congestion. These goals can be achieved through the development of regulations for car access and parking in sensitive areas of the city, such as regulation of parking spaces (e.g. by use of permit systems), pricing of parking spaces, regulation of access to different user groups, pricing schemes for access, or the definition of Low Emission Zones (LEZ) in which only vehicles which meet defined emission standards are allowed.

Access management is a term used by transportation professionals to describe the interaction and the coordination between roadway design and land use to improve transportation. It is defined as, 'the process that provides access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity, and speed.' On the other hand, road pricing means that 'motorists pay directly for driving on a particular roadway or in a particular area'. Value Pricing is a marketing term which emphasises that road pricing can directly benefit motorists through reduced congestion or improved roadways.[1]

Like pricing, access controls can be quite controversial. It is not only important to involve stakeholders and potentially affected groups; having a good understanding of the regulatory restrictions (or lack of enabling legislation) to allow access controls is equally so. Generally speaking, introducing access management or pricing strategies in urban areas can result in improved living conditions for local residents due to less private car traffic on the roads.

1 TDM Encyclopedia, Victoria Transport Policy Institute, accessed October 28, 2015, http://www.vtpi.org/tdm/tdm1.htm and http://www.vtpi.org/tdm/tdm35.htm

CIVITAS' long history of access regulation

Since 2002, CIVITAS cities have been working on access management. The CIVITAS Initiative's Thematic Group on Demand Management Strategies[2] provides a number of resources relevant to the topic of access and pricing options, such as training resources, guidance material, policy recommendations, and many more.

CIVITAS I | Stockholm (Sweden): Preparing a congestion charging scheme

The measure was implemented in response to severe congestion on the main access roads into Stockholm during peak hours. The trial was carried out between January and July 2006 and included significant investments in public transport and park-and-ride facilities. Measure activities included an assessment of the current traffic situation, the development of zone limits, tariffs and time limits, the development of operative targets, and the implementation of an evaluation scheme. The technology used in the trial was dedicated short-range communication microwave technology, previously used in Singapore and Melbourne (Australia). The system comprises on-board transmitters, roadside receivers and cameras mounted at access points to the city centre. Vehicles passing through the zone boundary communicate with the roadside receivers. All vehicles are automatically photographed so that those without a transmitter can also be recognised. The system does not impede the flow of traffic and the passage of emergency, military and 'clean' vehicles. Motorcycles and taxis are exempt from charges. In the Stockholm trial, the system had a single zone boundary encircling the city centre. Tariffs varied according to the time of the day, with higher charges during peak periods.

The trial was implemented with positive results. The proposal for a permanent congestion charge was subsequently approved in a referendum and the system was put into operation in August 2007. An evaluation of congestion charging for the period 2006 to 2008 was completed in 2009. The results were positive, indicating an 18 percent reduction of traffic in the congestion charge zone (equivalent to 96,000 vehicles per day).

Around one-third of all trips were traffic passing through Stockholm and around 28 percent of vehicles benefitted from exemptions. An increase was observed in the number of vehicles using alternative fuels, which were exempt from the congestion charge until July 2012. The introduction of the congestion charge had a positive impact on road safety. The use of the city's park-and-ride facilities increased, and more people started using public transport and cycling. It also attracted a high level of public acceptance.[3]

2 CIVITAS Initiative – Thematic Group on Demand Management Strategies, accessed October 28, 2015, http://www.civitas-initiative.eu/TG/demand-management-strategies
3 Preparing a congestion charging scheme, CIVITAS Initiative, accessed October 28, 2015, http://www.civitas.eu/content/preparing-congestion-charging-scheme

CIVITAS II | Norwich (United Kingdom): Introducing a Low Emission Zone

Due to high levels of nitrogen dioxide pollution in the centre of Norwich, as well as problems with particulates and smoke, an air quality management area had already been declared prior to the measure's implementation. The area includes an important bus route and the removal or cancellation of bus services was not seen as an option, therefore the measure aimed to find an alternative way to improve air quality and safeguard public health.

The development of a Low Emission Zones (LEZ) in the area was proposed as a solution to the problem. The zone was planned to cover one street on which traffic was limited to buses, taxis, delivery vehicles and emergency services with the aim of achieving the UK government targets for annual emissions of nitrogen dioxide and particulates. Following the creation of the LEZ, the council regulated bus emissions and required that a certain percentage of the operator's fleet meet set emissions criteria. As of April 2008, 40 percent of vehicles used for local bus services operating in the LEZ were required to comply with Euro 3 or higher exhaust emissions standard.

Supporting activities were also implemented in the zone, such as an engine switch-off traffic regulation order, and the offer of free eco-driving training sessions for bus drivers. To assist bus companies to meet the standards, Norfolk County Council made grants for the cost of fitting pollution-reduction equipment available.[4]

CIVITAS PLUS | Zagreb (Croatia): Study of congestion charging and dialogue on pricing

In recent years Zagreb has experienced a drastic growth in the level of motorised traffic. This has had a huge impact on the environment and the traffic situation. The high level of traffic congestion in the city centre is the result of an insufficient road network in the northern part of the city, which requires all vehicles travelling across the city centre to go from east to west. Public transportation is also inadequate with too few vehicles and an ill-equipped management system.

The study proposed models for introducing congestion charging in the city centre and defining the exact target area. It also familiarised the public with the possible positive results of such a measure, thus ensuring their support for its implementation. There was also a focus on mitigating the impact of private and transport vehicles on the city environment and finding the most appropriate instruments to achieve the purpose of congestion charging.

Based on well-established technical solutions of urban road charging and an analysis of applied urban charging strategies, an analysis of the existing transport system in Zagreb was undertaken. The proposed preliminary solution suggested the introduction of an 'eco-zone'. The main objective was to reduce congestion and improve air quality and funds would go into the development of a congestion charging scheme and the implementation of measures that discourage the use of private cars.

The eco-zone was designed to cover an area in the city centre of about two km^2. To enter the zone, Croatian drivers need to obtain an annual vignette. The price of the vignette depends on the type of engine, i.e. engines with a lower Euro-standard that produce more emissions, have to pay a higher amount. Vignettes are available in five colours: green, yellow, red, grey and white. White vignettes are related to electric and hybrid vehicles, and allow these vehicles to enter the zone free of charge. The penalty for not having a vignette is the same price of the most expensive vignette (EUR 133.33 or 1,000 Croatian kuna).

Based on data obtained from the Croatian Centre for Vehicles on the projected number and a trend analysis of passenger cars in Zagreb, an estimate was made for purchased vignettes by type until the year 2017. The analysis, forecasts and estimates were used as input for the Cost-Benefit-Analysis. As this study was only an initial step in the implementation of congestion charging, a measure that is quite restrictive for users, it was approached carefully. It is important for the city to reach high levels of acceptance for this proposed solution by stakeholders before implementation.[5]

4 Introducing a low-emission zone, CIVITAS Initiative, accessed October 28, 2015, http://www.civitas.eu/content/introducing-low-emission-zone
5 Study of congestion charging and dialogue on pricing, CIVITAS Initiative, accessed October 28, 2015, http://www.civitas.eu/content/study-congestion-charging-and-dialogue-pricing

Comprehensive strategies for tackling urban congestion

Traffic congestion is a serious problem and is especially pervasive in urban areas. As a result, most urban economists and a growing number of other policy analysts agree that the best policy to reduce its effects would be some form of congestion pricing. Such a policy involves charging a fee for operating a motorised vehicle at times and places where there is insufficient road capacity to easily accommodate demand.[6] The intention is to alter people's travel behaviour sufficiently to reduce congestion.

Public administration has recently become more interested in congestion pricing and other schemes for charging for road use, such as tolls or parking taxes. This broader group of policies is often called road pricing. The interest in road pricing has been stimulated by the desire to find new revenue sources for transportation investments and by the failure of alternative policies to significantly stem the growth of traffic congestion.

As a result, practical experience with road pricing has been increasing worldwide. For many years, the only example of congestion pricing was Singapore, a case that has received mixed reviews. Today there is considerably more experience to draw upon, as well as several quite detailed plans that made considerable progress towards political approval.

■ In 1975 an Area Licensing Scheme was launched in Singapore, where a special supplementary licence had to be purchased if a motorist wanted to enter the restricted zone of the central business district. To complement this scheme, park-and-ride and carpooling were also introduced. The implementation of the Area Licensing Scheme reduced the traffic volume in the city during morning peak hours. In other words, the number of cars entering the district during the restricted hours was significantly reduced from 42,790 in March 1975 to an average of 11,363 in September and October. Additionally, there was an overall increase of 35 percent in carpools as well as higher use of buses into the city during peak hours shortly after the implementation of the Area Licensing Scheme was implemented. In addition to changing travel behaviour, this scheme also helped improve the air quality in the district as air pollution was reduced.[7]

■ In February 2003, the London congestion charge was introduced as a fee charged on motorised vehicles moving in the Congestion Charge Zone in Central London between 07:00 and 18:00 during working days. The charge aimed not only to reduce high traffic flows, but also to raise investment funds for the city's transport system. From 2003 to 2013, about 46 percent of the net revenue (GBP 1.2 billion) has been invested in public transport, road and bridge improvement and walking and cycling schemes. Of these, a total of GBP 960 million was invested on improvements to the bus network. Apart from these investments, also traffic speeds have been getting progressively slower, particularly in central London. Transport for London, concludes that 'while

6 Kenneth A. Small, Jose A. Gomez-Ibanez, Road Pricing for Congestion Management: The Transition from Theory to Policy
7 More information about this measure can be found: Singapore Infopedia, accessed October 28, 2015, http://eresources.nlb.gov.sg/infopedia/articles/SIP_777_2004-12-13.html

levels of congestion in central London are close to pre-charging levels, the effectiveness of the congestion charge in reducing traffic volumes means that conditions would be worse without the Congestion Charging scheme'.[8]

■ Increases in car ownership and high levels of atmospheric pollution that endangered not only residents but also the historic buildings in the city centre forced Rome to revise its transport strategy. For years, development was centred on accommodating the private car but in the mid-1980s, the municipality decided on a series of measures to reduce the negative consequences of car use. The most radical and difficult to implement concerned the implementation of an access control system followed by experiments for a road pricing scheme. The historic centre of Rome was classified as a Limited Traffic Zone (LTZ) in 1989. A dramatic change came in 1994 when concrete blocks were used to prevent entry into the LTZ, physically and visually reinforcing the policy of access control.[9] In 2001, the municipality of Rome implemented a limited traffic zone with automatic access control in the centre of the city, covering an area of 4.8 km2. The control system comprised 23 electronic access gates, and restrictions applied between 06:30 and 18:00 on weekdays and 14:00 to 18:00 on Saturdays. The gates are fitted with automatic number plate recognition technology to monitor whether or not each vehicle is permitted to enter the zone and to automatically issue fines for violations. Following the success of this initial trial, the scheme was enlarged in 2007, when five additional sensitive areas were identified. Restriction periods were introduced and a further 22 electronic access gates were installed at the entry points, amounting to a total of 45 gates controlling access to an area of around 10 km^2. Variable message signs were also installed near the gates, informing drivers about the restrictions. Access is permitted to residents of the zone and to certain other categories of users who pay an annual fee for an entry permit. The revenue from the fee and from fines for violations is used to fund new investments in public transport services.[10]

■ If implemented correctly, such regulations are a key way to improve the quality of life in a city. Otherwise, there is a risk of irritating the public and stakeholders and not achieving the desired impact. The EC-funded CLARS Platform[11], launched in April 2014, was created to provide support to authorities operating urban access regulations by showcasing best practice and sharing experience and knowledge. With members from 14 EU countries, as well as EU-wide organisations, CLARS has developed a database that provides information for vehicle operators on nearly 270 LEZs and 14 urban road-charging schemes in Europe as well as over 100 other access regulations. Details on the access, weight, height, width and length restrictions for 8,000 towns and cities are available through a fully interactive GIS map and new data is being added on a regular basis. CLARS is also involved with the CIVITAS Initiative's Advisory Group on access regulations and has provided recommendations to the European Commission, which is currently preparing a set of six non-binding guidance documents on various aspects of urban vehicle access regulations.[12]

8 More information about this measure can be found: Transport for London (TfL) (January 2014). 'Public and stakeholder consultation on a Variation Order to modify the Congestion Charging scheme Impact Assessment' (PDF). TfL. Retrieved 15 February 2015. See pp. 12: Traffic volume, speed and congestion.
9 See also: Petros Ieromonachou, Stephen Potter, James P. Warren, Evaluation of the implementation process of urban road pricing schemes in the United Kingdom and Italy, 2006
10 Implementing access restrictions, CIVITAS Initiative, accessed October 28, 2015, http://www.civitas-initiative.eu/content/implementing-access-restrictions
11 CLARS Platform, accessed October 28, 2015, http://urbanaccessregulations.eu/public-authorities
12 Eltis - The urban mobility observatory, accessed October 28, 2015, http://www.eltis.org/discover/news/clars-platform-one-year

Access regulations break the vicious circle of car dependency

Automobile use has advantages such as on-demand mobility, comfort, status, speed, and convenience. Several factors influence the growth of the number of private cars, such as sustained economic growth (increase in income and quality of life), complex individual urban movement patterns, more leisure time and increasing populations in suburbs and peri-urban areas. Although rising automobile mobility can be perceived as a positive consequence of economic development, the acute growth in the total number of vehicles also gives rise to increasing levels of congestion. Cities are areas that generate and attract mobility-related activities, which have created a set of geographical paradoxes that are self-reinforcing. Over time, dependency on private cars has emerged and in reduced use of other modes, thereby limiting alternatives to urban mobility further. Two major factors contributing to automobile dependency are:

1 Underpricing and consumer choices: Most road infrastructure is subsidised as they are considered a public service. Consequently, drivers do not bear the full cost of automobile use.

2 'Business as usual' planning and investment practices: Often decisions on new infrastructure do not take into account the evolving transport attitudes, behaviours, and technologies, which are emerging. The problems are often exacerbated because of the long delay between initial decisions on infrastructure and its completion. Regulatory frameworks can stifle rapid change.

There are many alternatives to dependency on cars such as intermodality, carpooling or non-motorised transportation. Indeed, the opposite to automobile dependency is not a total absence of private vehicles, rather it is an accessible multi-modal transport system, providing travellers with access to various transport options and incentives for their use.

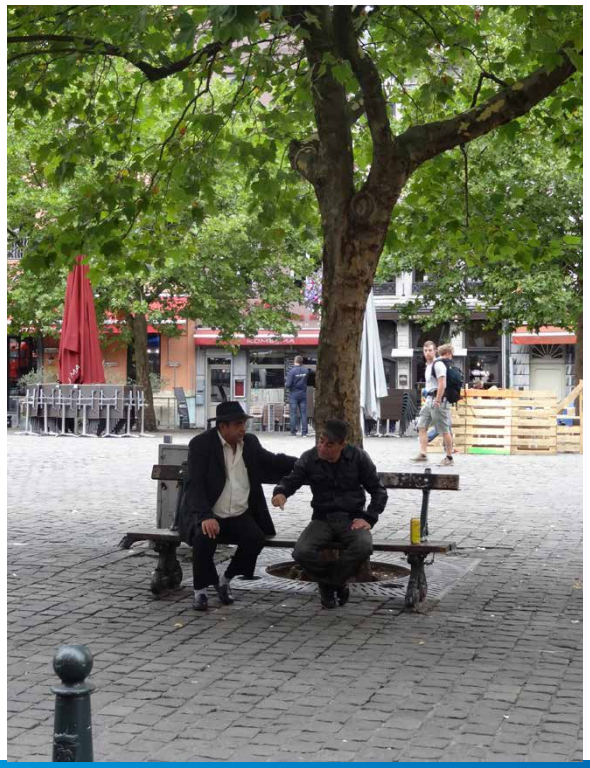
While in the past the tendency towards more sprawled, car-dependent land use patterns increased per capita vehicle travel, since the 1980s, motorisation started to be seen more negatively and several cities implemented policies to limit car use, at least in specific areas, by a set of strategies which include the management of demand through physical and fiscal means.

The practice of transport planning is undergoing a shift towards more comprehensive and multi-modal planning. The new approach recognises the important roles that walking, cycling and public transport play in an efficient and equitable transport system. It increasingly addresses the broader dimension of accessibility, paying attention to the benefits that improving the financial and environmental sustainability of urban transport brings for the economy, the attractiveness of the cities and citizens' wellbeing.

Urban congestion mainly concerns two domains of traffic, passengers and freight, which often share the same infrastructure. However, in general, congestion in urban areas is predominantly caused by commuting patterns and less by freight transport. Moreover, congestion comes in two major forms:

1 Recurrent congestion: This is due to factors that cause regular demand surges on the transport system, such as commuting, shopping or weekend trips. Mandatory trips are mainly responsible for the peaks in circulation flows, implying that about half of the congestion in urban areas is recurring at specific times of the day and on specific parts of the transport system.

2 Non-recurrent congestion: The other half of congestion is caused by random events such as accidents, roadwork and bad weather. Non-recurrent congestion is linked to the presence and effectiveness of incident response strategies, and to the robustness of the networked system.



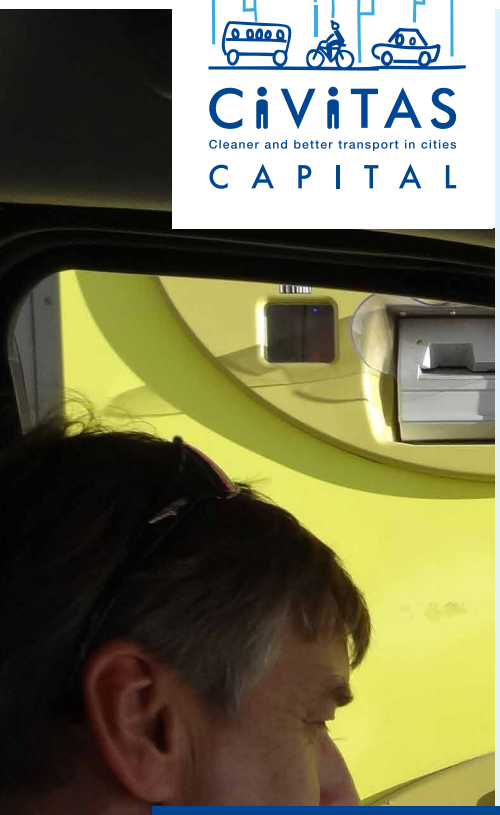
In car-dependent cities, a few measures can help to alleviate congestion to some extent, including traffic signal optimisation, incident management by means of intelligent transport systems, carpooling and car sharing, high occupancy vehicle lanes, parking management, congestion pricing, or access control.

Future research and innovation projects should focus on tackling urban congestion by means of comprehensive reduction strategies, aiming to avoid or radically reduce urban congestion on a long term basis. The aim should be to act upon the causes and not the symptoms of congestion which is too often the short term response.

There are many possible ways to avoid or radically reduce traffic congestion. How they are evaluated can significantly affect urban planning decisions and the implementation of congestion relief measures. It is important that appraisals are made in the context of comprehensive and multi-modal approaches to identify the best congestion reduction strategies, since urban planning often involves trade-offs between competing objectives.

Tackling urban congestion is a complex task, and resolving it involves many stakeholders and interests. As acknowledged already by the SUMP (Sustainable Urban Mobility Plan) methodology for transport planning within cities, dealing with complex transport planning issues needs a greater coordination of all authorities that influence a transport system, such as land use and transport planning, public transport, road use and transport infrastructure. An extension of the coordination of such authorities beyond city limits is also needed, especially in metropolitan areas and regions with multiple cities or large towns.

Although the active cooperation of stakeholders to transport decision-making is still rare in practice, the participation in the planning of urban mobility is now becoming increasingly recognised as an essential dimension of the planning process.



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