COST Action 358
Pedestrians’ Quality Needs

Short Term Scientific Mission
Report
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Summary

European cities are historically devoted to pedestrians and walking was long the dominant way of transport. However, during the latest centuries, car driving has been given more and more priority in investment programs, and the increasing car dependency in cities has negatively affected pedestrians quality needs, that means accessibility, safety, comfort and environmental aesthetics. Most road safety problems for pedestrians are common to all European countries and, as regards mobility issues, walking seems to have declined over the last ten years.

European cities have to change car-oriented policies, tending to more sustainable Design and Traffic Planning, as well as Mobility Management. Over the past decades, several efforts have been spent in order to give priority to walking (and cycling) in urban areas and, as regards safety issue, the target of European countries is to strongly reduce pedestrians fatalities by 2010. Countries are on the right lines and there are several pedestrian-friendly cities examples, however much has to be done and in European context there are too many disparities with countries that performe better than other.

Technical (engineering) interventions are not sufficient in many cases and policy making measures are required too to ensure pedestrians a safe and pleasant environment where to walk and live. Parallel to interventions, other issues have to be considered. Particularly, it is necessary to encourage European countries to collect exposure and safety data on pedestrians, implementing standardization of procedures and improving collection’s quality. Official statistics on walking and pedestrians mobility is heterogeneous and incomplete, and safety data lack in quality (i.e. under-reporting problem, incorrect information, lack of completeness, inability to integrate).

Pedestrian environment and the cities’ walkability could not be improved if Local Authorities do not include pedestrians in policy making for planning, development and transport in urban areas. Furthermore pedestrians research could not be improved if European countries do not exchange information and do not tend to standard methods in data collections.

Within this context, particular groups have to be considered to create walking-friendly cities: children, elderly and disabled people. Walking should be encouraged among children, because it is the most efficient and the only fully sustainable mode of travel and children represent the future. Particularly, “walking to school” has to be supported and School Travel Plans, together with engineering measures, are the best opportunity to achieve the goal. In Europe there are several examples of child-friendly cities, where School Travel Plans have been implemented, introducing mainly educational and training programs and “Walking School Bus” initiatives. There are both good resolutions and solid bases on which to work, and improvements most definitely are on their way.
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1 Introduction

1.1 Why this STSM?

Three issues apply in the STSM: relevancy, scientifically interesting and opportunity.

Relevancy

Walking concerns everyone and is a potential solution for many problems, but is such a basic way of travelling that one tends to forget its importance. Everybody walks, particularly some groups like children, elderly and handicapped. The total distance travelled on foot will stay approximately constant (the amount of door-to-door walking per person will decrease, but multi-modal walking will increase and the population is growing).

Pedestrian quality produces economical value and lessens societal costs. Providing for pedestrians most of the times is significantly cheaper than providing for cars, public transport and even bicycles. Awareness of the problem is crucial and nowadays politicians and policy makers do not get a fair representation of the importance of walking, although it is perceived as a public task.

Walking is a solution to many health problems, since it is a simple and very feasible form of exercise that everyone can and should take.

Scientifically interesting

In research pedestrians quality needs is rather a neglected issue and the challenge of providing for walking issue and substantiating research is growing and stimulating.

Most of the pedestrian research done up till now focuses on urban design, pedestrian safety or the spatial or travel needs of specific groups like children, the elderly or the handicapped. In the majority of these studies the central issue is not the pedestrian or his needs and little is done yet to get overview and to start a more comprehensive approach regarding general pedestrian needs.

Contributions from disciplines like psychology, sociology, philosophy, ergonomics, history, geography and law are still rather rare.

Opportunity

Over the years the point of departure for pedestrian issue research has become increasingly favourable and nowadays a more comprehensive approach regarding general pedestrian needs is starting. There is abundant support in the scientific and political world for a comprehensive approach to pedestrian issue.

A Short Term Scientific Mission (STSM) in COST context is a good option to overview the accumulated knowledge on pedestrians issue and provide a contribution to it. COST Actions aim at a general interdisciplinary systems approach study on different issues, offering an effective framework and an extended dissemination of knowledge, and these Missions contribute to the realization of their scientific objectives. Short Term Scientific Missions are aimed at strengthening the existing networks by allowing young scientists to go to an institution or laboratory in another COST country to foster collaboration, to learn a new technique or to make measurements using instruments and/or methods not available in their own institution/laboratory.

STSM within COST Action 358

This STSM provides a contribution to Working Group 4 (Coherence and integration) within COST Action 358 – Pedestrians’ Quality Needs. PQN Action networks 20 countries and is being supported by the COST Office of the European Commission. It provides knowledge of significant pedestrians’ quality
needs and how these needs relate to structural and functional interventions, policy making and regulation to support walking conditions across the European Union and other involved countries.

WG4 package focuses on identifying interrelations and improvement options among the other three Working Groups:

→ WG1 - Functional perspective  
→ WG2 - Perception perspective  
→ WG3 - Durability and future prospects

Task 1  
identification of quality needs

Task 2  
avassess importance of qualities

Task 3  
identify requirements

Task 4  
avess current level of service

Task 5  
avass compliance and satisfaction

Task 6  
identify compliance and satisfaction mechanisms

Task 7  
Assess pedestrian system output

Task 8  
formulate recommendations for system input

Research tasks Working Group 4

Working Group 4 deals with the coherence and integration of the research strategy, the research findings, conclusions and recommendations. The work package includes quality control and communication: evaluation of research designs, proposed and used methods and methodology, data quality and issues to be communicated externally.

The work package is to lead to:

- An overview and valuation of the state of affairs (integration of the Country Reports)
- Identification of valid, reliable and quantifiable indicators for pedestrian quality
- Identification of changeable, constant and irreversible factors influencing the pedestrians’ situation
- Identification of compensatory mechanism
- Identification of models, concepts and theories that can help advance effectiveness and efficiency of the systems approach regarding pedestrian quality improvement
- Identification of a (design) theory for integrating the functional, perception and durability and future progress perspectives into one persuading paradigm
- An overview of the State of the Art and relevant innovations, including the ones developed in the PQN project
Practical audit instruments (development of guidelines for Pedestrians’ Quality Needs Audit)

Recommendations for Making It Happen: what strategies are feasible and how can strategies for implementation and innovation be improved?

Identification of optimal dissemination strategies and methods, agenda for action

Recommendations on further research

The focus of the STSM Report is on the European situation within pedestrians issue. In most countries pedestrians needs are not supported enough and governmental attention for them is still at an initial stage. The STSM is an integral part of the COST Action 358 – Pedestrians’ Quality Needs and aims to explore how pedestrians needs relate to structural & functional interventions and policy making to support walking conditions across the twenty countries [Methorst, 2008]. Particularly it covers task 4 and task 9, since it provides an assessment of current level of service among the countries (Chapter 3) and identifies gaps in knowledge and best practises (Chapter 2).

1.2 Central question

The STSM follows the main objective of COST Action 358, that is the strong will to provide a contribution to the knowledge in the frame of PQN, in order to stimulate interventions that take into account the functional and perceptional perspectives of the system.

The stages of the STSM are as follows.

Firstly the STSM aims to overview and evaluate the state of affairs, through a comprehensive analysis of the Country Reports submitted by the countries involved in the COST Action. The reliability and validity of the available information (data) for each country is taken into consideration and additional information regarding pedestrians’ issue is provided, in accordancy with “PQN Work Plan”. The STSM is to be placed in Stage 3 (summer 2007 – September 2008) indeed: in this stage the available data collected in the second stage are further analyzed and whenever possible completed by additional (empirical) research and an updating of available statistical data. The final objective of this stage is to benchmark countries, after the selection of proper (reliable) PQN indicators. As consequence of this goal, overall key-questions are defined as below:

- What is the availability of information in the countries?
- What is the quality of the information?
- What are the lacks in pedestrians’ data collection?
- Is it possible to identify proper PQN indicators?
- Is it possible to benchmark countries?

Following this the STSM aims to assess the influence of interventions, that were adopted by designer and policy makers within the twenty countries, on the pedestrian system. The study is extended to all participating countries and attempts to provide a qualitative approach (analysis of 20 pedestrian-friendly cities) to evaluate the interventions with regards to PQN issue. The STSM is strongly oriented towards a comprehensive comparison among the countries, in order to stress differences and similarities and identify gaps in knowledge, thus improving the process of decision. As consequence of this goal, overall key-questions could be defined as below:

- Which are pedestrians needs?
- Which is the influence of context on PQNs?
- To what extent do the realised interventions help to realise PQNs?
- Which are the differences among the countries?
- Which are the similarities among the countries?

The first and second stages respectively cover task 4 (“Assessment of current level of service”) and task 9 (“Identification of gaps in knowledge and Best Practises”). The focus of these stages is the concept of walkability, which is the measure of the overall walking conditions in an (urban) area [Litman, 2004]. Particularly, the qualitative analysis of twenty pedestrian-friendly cities aims to improve knowledge related to walkability. Many communities have embraced pedestrian mobility as an
alternative to past urban design practices that favored car use. Reasons for this shift include a recognition that dependency on cars leads to an unsustainable future or that car-oriented environments engender dangerous conditions to both motorists and pedestrians. Countries benchmarking also is related to the concept of walkability, since comparing countries gives hints of how they perform in walking context, thus underlying lacks or improvements in terms of walkability too.

Finally, the STSM provides a specific literature review on children’s walking patterns and "Walk to school" topic. The STSM focuses on this Group, since it is one of the most vulnerable of the populations within pedestrian issue. The main objective is to understand the role of walking (and walking to/from school trips) within children’s mobility among the countries, in order to get a more detailed image of this particular group of pedestrians.

1.3 Demarcation

The STSM is limited to five topics (Group, Time, Space, Pizza Model, Walking Type) and they are summarised as below.

Group
The STSM focuses on pedestrians’ needs and supposes that the system needs to be adapted to the pedestrian and not vice versa. Particularly the literature review (Chapter 4) focuses on a certain Group of Vulnerable Road Users, that means pedestrian children. More precisely, it looks at "primary school children" Group, which includes infant, lower and upper junior children (6 – 11 years). Children are particularly vulnerable road users, their quality needs should be a fundamental issue in decision-makers agenda and interventions should be primarily undertaken for them.

Time
The STSM confines itself to the current state of affairs and to recent interventions undertaken by the countries. Durability and future prospects are not taken into account and the focus of the quantitative (countries benchmarking) and qualitative (20 pedestrian-friendly cities) approaches is the present-day.

Space
The STSM confines itself to European situation, and particularly to the twenty European countries participating in the COST Action. However generic lessons learned elsewhere (mainly in the United Stated, Canada, Australia and New Zealand) are taken into account in the literature review (Chapter 4).

The countries’ list is the following:

- Austria
- Belgium
- Czech Republic
- Estonia
- Finland
- France
- Germany
- Greece
- Hungary
- Israel
- Italy
- Netherlands
Pizza model

The STSM confines itself to one slice of the ‘Pizza Model’ [Appendix A], that means the “spatial environment” slice. Considering the “transport system” slice as well would be interesting and appropriate, since in this way a comprehensive approach of the technical field of the system could be provided, but the choice of focusing only on spatial environment is due to the STSM limited duration. Particulary, the 3-layers subdivision is taken into account and as regards the spatial environment, a distinction is made between the physical environment (site), the network (route) and land use (spatial planning).

It must be noted that in this framework statements are made only about the public space, that is to say, all space that is or should be freely accessible for everyone: streets, paths, squares, public parks, etc. In the cities’ analysis the “spatial environment” is confined to the urban area, that includes the city centre and the residential areas in its outskirts.

Walking Type

The STSM follows the COST Action guidelines and is confined to everyday walking. Long distance recreational walking, wandering and walking for sports are not included, although they may of course profit from interventions taken to improve walkability. It is however assumed that this limitation would cover the vast majority of pedestrians needs.

1.4 Methodology

The STSM focuses on a comprehensive approach of PQN issue within a European scale and the methodological aspects and working methods can be summarized with the following steps:

a) Take stock of available data, information, research, publications, current projects on the issue from the Country Reports.
b) Screen the information on validity, reliability and comprehensiveness
c) Check for options for collection of empirical data on the short term to fill gaps.
d) Select valid and reliable PQN indicators.
e) Benchmark the countries.
f) Develop a qualitative approach to compare the countries.
g) Add literature regarding children and “Walk to school”.

As concern the collection of empirical data and additional literature, the main utilized sources are:

- Cordis (http://cordis.europa.eu/)
- Internet websites
- Dienst Verkeer en Scheepvaart (DVS) Library
- Electronic Databases
- Reference Lists and bibliographies

It is worth noticing that during the early STSM stage the twenty countries were invited to submit the updated Country Reports too, in order to be provided with additional material.
2 Country Comparison

The first stage of the STSM is to scan the Country Reports submitted by the participating countries and to carry out an overview and valuation of the state of affairs. Actually the drafts of the Country Reports are analyzed, since the work is still in progress. Comments on the data availability are also provided and possible improvements are taken into account. The aim of this analysis is to select proper PQN indicators basing on the availability and quality of the data. This is essential to carry out a valid and reliable benchmarking among the twenty European countries at a later stage, thus giving an image of PQN situation in pedestrians’ context. The data from the participating countries can be compared to assess similarities, differences and trends indeed, but it is necessary to dispose on data that are both homogeneous and good in quality. The STSM aims to highlight gaps in data collections’ availability and quality, in order to stimulate further discussions and recommendations.

2.1 Country Reports Review

In this section the current state of affairs in each country is scanned, that means that the Country Reports are reviewed and a series of summary tables are reported to give an idea of the present-day situation (March 2008). Afterwards an integration is provided, as regards some specific statistical data. Pedestrian data (safety and mobility) are missing in some reports and some countries have not submitted it yet.

2.1.1 Current situation

The primary objective of this review is to check and screen both the content and the quality of the Country Reports. The results are summarized on the basis of the Country Reports Questionnaire’s template [Appendix C] distributed to the countries during the first year of the Action. Each country was asked to provide information on some specific topics.

The Country Reports are available at the website http://www.walkeurope.org/ [Publications], but to date information is not totally complete and updating is expected. During the STSM period (February – March 2008) a ‘request’ has been also forwarded to the countries to have the more complete and reliable Country Reports. Several countries have update their draft and the Report has been update: facts and figures refer to the situation in November 2008.

Basing on the Country Reports Questionnaire’s template, the current situation, as it is in November 2008, is summarized through the following tables.

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3) *Current research projects*

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- **L**: List
- **D**: Detailed information (expected results / contact details / …)

4) *Policy statements*

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- **X**: No information
- **~**: Some information
- **✓**: Detailed information

5) *Legal position of pedestrians*
### Legal position of pedestrians

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### Best Practises

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### Innovations

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### General Atmosphere

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- **✓**: Detailed information
The following statements can be pointed out:

- At the moment there are four countries that haven’t submitted their Country Report yet: Poland, Portugal and Sweden. Some other countries have delivered only partial drafts, that means only the PDF file (Austria, Estonia, France, Germany, Greece, Netherlands, Norway, Spain, Switzerland, United Kingdom) or the Excel file (Hungary).

- There are gaps and lacks of information in the majority of the Country Reports: not every report submitted is complete and uniform, although a common template has been developed and distributed. Furthermore, in some reports the whole country situation was considered, not only the pedestrian specific one.

- However, the completed Country Reports prove that the situation regarding statistical information is heterogeneous, but actually quite bad. In most countries there are no data on mobility and there are some data on road traffic accidents, in which only accidents with moving vehicles are reported.

2.1.2 Integration

As it has been already pointed out, heterogeneity and differences emerge among the countries’ data collections and information. In most cases improvements are required and, as regards statistical data, additional research is needed to fill the gaps. The aim of this study is to have adequate information from all the countries, in order to carry out the most comprehensive and correct benchmarking in a later stage [2.3] within the STSM.

With regard to statistical data, two topics are evaluated: "exposure" (population + road length + mobility: kilometers travelled, time spent travelling, vehicles kilometers, number of vehicles, etc) and "pedestrian safety" (number of fatalities, injured persons, fatal accidents, injury accidents, etc).

Sources are mainly National Statistic, Census, National Travel Surveys, National Projects. Basic statistics on walking and data regarding safety and mobility are summarized country by country, taking into account also the Country Reports’ data already collected.
Collection method, Sample, Quality

Exposure data are official data, coming from the National Statistical Institution Statistik Austria that is committed to ensuring the highest quality with respect to the compilation of statistical information. It processes in compliance with internationally recognised scientific principles and standards and ensure that statistics are as up-to-date as possible (annual data). As part of the European Statistical System (ESS), it adheres to principles and standards for the production and dissemination of high-quality statistics. The following data have been found in the Yearbook of Statistik Austria (http://www.statistik.at/web_en/publications_services/statistisches_jahrbuch/), that is a comprehensive reference work on official statistics and gives concise national information on the demographic, social and economic structure and development of Austria. Pedestrian safety data can be found in the KfV (Kuratorium für Verkehrssicherheit) website. KfV is the “Austrian Road Safety Board”, a private institution that organises its diverse fields of activity into three departments: Transport & Mobility, Home, Leisure & Sports and Property & Fire. KfV has developed the Austrian accident analysis system called UNDAT (Unfalldatenbank – Accident Database), that is used for the production of general statistics, having the ability for flexible queries for all variables defined in the accident form and providing many user-friendly tools. Studies for the evaluation of measures can automatically be performed at a 95% level of significance and the computation of accident rates (number of accidents per traffic volume, length and time) and densities (number of accidents per length and time) is also possible for given road sections. The system is used by KfV and its subsidiaries in all of Austria’s nine provinces and it is also used by dedicated departments in the Ministry for Transport, other Ministries, transport experts of province authorities and even by some municipalities. The following data have been found in the “Road Accident Statistics, 2006” Report (http://www.kfv.at/fileadmin/Publikationen_englisch/VUS2006-engl.pdf), which publishes the main statistical data about road safety issues in Austria.

EXPOSURE DATA

- Population (1870 to 2006)
- Population by five-year age groups and sex (1869 to 2001)
- Population by age and sex (2006)
- Stock of motor vehicles (1948 to 2006)
- Road Network (2000 – 2006)
- Cars km traveled (2000 – 2006)

PEDESTRIAN SAFETY DATA

- Persons involved in road traffic accidents by Länder (2006)
- Road traffic accidents by type of accident (2006)
- Accidents, involved vehicles or pedestrians, injuries and fatalities (2000 - 2006)
- Number of injuries by location: inside/outside urban areas (2000 – 2006)
- Number of fatalities by location: inside/outside urban areas (2000 – 2006)
- Road accidents involving pedestrian by severity: injuries, fatalities (2002 – 2006)
- Road accidents involving pedestrian by province and severity: injuries, fatalities (2002 – 2006)
- Injured pedestrians by five-year age groups and sex (2000 - 2006)
- Pedestrians fatalities by five-year age groups and sex (2000 - 2006)
- Injuries and casualties by five-year age groups and participation in traffic (2000 – 2006)
- Fatalities by five-year age groups and participation in traffic (2000 – 2006)
- Child fatalities and injuries by province and participation in traffic (2000 – 2006)
- Child fatalities and injuries by five-year age groups and participation in traffic (2000 – 2006)
Source

**Statistiques Belge**
Website: http://www.statbel.fgov.be/

**IBSR**
Website: http://www.ibsr.be/index.jsp

**Collection method, Sample, Quality**

Exposure data are official data, coming from the "Federal Public Service Economy, SMEs, Self-employed and Energy" website. Their quality is good and are reliable. Mobility data are available from a National Travel Survey carried out in 1998-1999 (Nationale enquête naar de mobiliteit van de huishoudens) and they are good in quality too. Pedestrian safety data are based on information collected by the police at the scene of traffic accidents involving dead or injured persons; studies [xxx] have documented that 87% of accidents involving pedestrians had no police on the scene, so that the data lack in quality because of a large amount of under-registrations. Some safety data are also available in IBSR (Institut Belge pour la Sécurité Routière) website. The "Belgian Road Safety Institute" is an official non-profit organization, which depends on the Federal Public Service for Mobility and Transport (the Minister of Mobility and Transport is president of the Institute). The general aim of IBSR is to improve road safety and the road usability by means of information and education and by study and research. The following data are available on the Internet in the section "Statistiques d’accidents, Belgique, 2002" (http://www.ibsr.be/main/PublicatieMateriaal/Statistieken/catalogDetail.shtml?detail=717096316&language=fr).

**EXPOSURE DATA**

- Population by age group and gender (1947 - 2005)
- Number of vehicles (1930 – 2006)
- Passenger kilometers per year (1970 - 2005)
- Vehicles kilometers per year (1970 – 2005)
- Road Network by region (1938 – 2006)
- Modal split - Belgium and regions (1998/1999)
- Travel modes for home-work- Belgium and regions (1998/1999)
- Travel modes for home-school - Belgium and regions (1998/1999)

**PEDESTRIAN SAFETY DATA**

- Number of killed persons (1978 – 2003)
- Number of (seriously) injured persons (1978 – 2003)
- Number of (slightly) injured persons (1978 – 2003)
- Number of fatal accidents (1978 – 2003)
- Number of severe accidents (1978 – 2003)
- Number of all injury accidents (1978 – 2003)
- Number of killed and seriously injured persons (1970 – 2002)
- Number of killed and seriously injured persons by age (2002)
- Number of killed and injured (seriously and slightly) persons (2002)
- Number of killed and injured (seriously and slightly) persons by region (2002)
CZECH REPUBLIC

Source

Český statistický úřad
Website: http://www.czso.cz/

Ministerstvo vnitra
Website: http://www.mvcr.cz/

Collection method, Sample, Quality

These data can be found in the “Czech Statistical Office” website and they are very good (since 1995), as CZSO produces official statistics and ensures high quality in terms of content, timeliness, accuracy and comparability. In the "Ministry of Interior of the Czech Republic" website are available statistical data about pedestrian safety, which are collected by the Police Presidium of the Czech Republic and are quite good in quality (reporting rates). The obligation to report an accident to the Traffic Police arises in case of the injury or death of the person(s) involved in the accident or in case of the material damage to the property of the third party or in case of the material damage exceeding 20000 CZK (from 01/01/2001).

EXPOSURE DATA

- Population by age group (1950 - 2005)
- Number of vehicles (1970 – 2005)
- Vehicles kilometers per year (1980 – 2000)
- Passenger kilometers per year (1980 - 2000)
- Road network (1960 – 2005)

PEDESTRIAN SAFETY DATA

- Accidents resulting in injury or death caused by pedestrians (2000 – 2007)
- Number of killed persons (1980 – 2005)
- Number of (seriously) injured persons (1980 – 2005)
- Number of (slightly) injured persons (1980 – 2005)
- Number of fatal accidents (1980 – 2005)
- Number of severe accidents (1995 – 2005)
- Number of all injury accidents (1980 – 2005)
Source

Statistics Estonia
Website: http://www.stat.ee/

Maanteeamet
Website: http://www.mnt.ee/atp/

Collection method, Sample, Quality

Official data regarding exposure can be found in the statistical public database of “Statistics Estonia”, a government agency at the area of administration of the Ministry of Finance, which main task is to provide the public institutions, international organisations and individuals with reliable and objective information service (official statistics) on economic, demographic, social and environmental situation and trends in Estonia. The quality of the data is good, as statistics is in compliance with international classifications and methods. Pedestrian safety data can be found in the Maanteeamet website. The “Estonian Road Administration” (ERA) is a government agency, which operates within the administrative area of the Ministry of Economic Affairs and Communications and one of its main functions is the organisation of road management and the creation of conditions for safe traffic on the roads in the state ownership. ERA maintains also a statistical database where some information about recent statistics and road safety analysis is available. The following safety data have been found in the “ERA Annual Report 2006” (http://www.mnt.ee/atp/failid/mnt_2006aastakogumik_eng_pdf), a comprehensive an overview of the activities on the national roads of Estonia in 2006.

EXPOSURE DATA

- Population by sex and age group (1970 - 2007)
- Number of vehicles (1980 – 2006)
- Vehicles kilometers by axes of vehicle per year (2001 – 2006)
- Road network (2002 - 2006)

PEDESTRIAN SAFETY DATA

- Number of fatalities by road type: national roads – local roads – streets - other places (2004 – 2006)
- Number of casualties by road type: national roads – local roads – streets - other places (2004 – 2006)
FINLAND

Source

*Tilastokeskus*
Website: [http://www.stat.fi/](http://www.stat.fi/)

*Liikenneturva*
Website: [http://www.liikenneturva.fi/fi/](http://www.liikenneturva.fi/fi/)

Collection method, Sample, Quality

“Statistics Finland” publishes official data by different topics in the Internet. Around 95 per cent of the basic data needed for statistics derives from administrative sources and only the remaining five per cent comes by direct data collections. Finland is one of the world leaders in exploiting administrative datatiles for statistics production. The exposure data have been found in the database available in the Internet. Other data can be found in the National Travel Survey carried out in 2004-05 (Valtakunnallinen henkilöliikennetutkimus 04-05; [http://www.hlt.fi/](http://www.hlt.fi/)), which provides an overall picture of Finnish passenger mobility and its background as well as demographic, geographic and temporal variations in mobility. The survey was conducted by interviewing over 13 000 Finns by telephone and in order to ensure the quality of the study the interviewers were trained separately prior to commencing the interviews. Complete data are available for research use by obtaining permission from the Finnish National Road Administration. As regards pedestrian safety data, the source is the "Statistical Yearbook 2006 – Road Traffic Accidents", that is available in the website of [Liikenneturva](http://www.liikenneturva.fi/fi/tilastot/liitetiedot/Tieliikenneonnettomuudet_2006.pdf).

Liikenneturva is the central organisation for Finnish traffic safety work and promotes the safety of road traffic by influencing people’s attitudes and traffic behaviour. It operates under the guidance of the Ministry of Transport and Communications and key partners include Road Administration, police, the municipalities and associations of various fields. These safety data are based on accident information as reported by the police, which is complemented by Statistics Finland with cause-of-death statistics data regarding the fatalities, by the Finnish Road Administration’s information about the location of the accident and by the traffic accident research committees’ information about the drunk-driving accidents which led to fatalities. Statistical records about the traffic accidents which are reported by the police are also kept by Road Administration and the municipalities. Traffic Safety Committee of Insurance Companies (VALT) also compiles its own statistics about accidents where there was compensation issued from traffic insurance. These statistics features a great number of traffic accidents that are not included in accident statistics based on police reports. Outside the VALT statistics, however, there are the alcohol-related cases, a part of the single-vehicle accidents, reindeer accidents and accidents which do not fall under the categories of traffic insurance or where insurance compensation was not applied for, for example due to the minor nature of the damages. Statistics of traffic accident cases are compiled also by hospitals and healthcare centres, but the assembled information is primarily meant for health care purposes and can not be effectively used in traffic safety work.

EXPOSURE DATA

- Population by age group and gender (1950 - 2006)
- Number of vehicles (1950 – 2005)
- Vehicles kilometers per year (1980 – 2005)
- Passenger kilometers per year (1970 - 2005)
- Road Network (1950 – 2005)

PEDESTRIAN SAFETY DATA

● Number of killed persons by age (2006)
● Number of injured persons by age (2006)
● Number of killed persons (1970 - 2006)
● Number of injured persons (1980 - 2006)
● Number of killed persons by month (2006)
● Number of injured persons by month (2006)
● Number of killed persons by type of accident (2001 - 2006)
● Number of injured persons by type of accident (2001 - 2006)
● Number of killed persons by speed limit (2006)
● Number of injured persons by speed limit (2006)
● Number of killed persons by road class (2006)
● Number of injured persons by road class (2006)
● Number of killed persons by light condition (2006)
● Number of injured persons by light condition (2006)
● Number of killed persons by junction (2006)
● Number of injured persons by junction (2006)
● Number of killed persons by road surface condition (2006)
● Number of injured persons by road surface condition (2006)
● Number of killed persons in accidents involving one or more persons under the influence of alcohol (2006)
● Number of injured persons in accidents involving one or more persons under the influence of alcohol (2006)
● Number of killed persons by municipality (2006)
● Number of injured persons by municipality (2006)
Source

**INSEE**

**INRETS**
Website: [http://www.inrets.fr/](http://www.inrets.fr/)

**Ministère de l’Ecologie, du Développement et de l’Aménagement durables (Direction de la sécurité et la circulation routières)**
Website: [http://www.securiteroutiere.equipement.gouv.fr/infos-ref/observatoire/](http://www.securiteroutiere.equipement.gouv.fr/infos-ref/observatoire/)

Collection method, Sample, Quality

Statistical data are available from the *Institut National de la Statistique et des Études Économiques* (National Institute of Statistics and Economic Studies) which is a Directorate-General of the Ministry of the Economy, Finance and Employment. INSEE guarantees the quality of the methodology of the data collection and of the analysis. The website publishes some data and the following have been found in the "France in Figures, 2007" Report ([http://www.insee.fr/fr/ppp/publications/intfrcbref.pdf](http://www.insee.fr/fr/ppp/publications/intfrcbref.pdf)) and from other public data available in the Internet ([http://www.statistiques.equipement.gouv.fr/IMG/pdf/I_Les_infrastructures_de_transports_cle29daba.pdf](http://www.statistiques.equipement.gouv.fr/IMG/pdf/I_Les_infrastructures_de_transports_cle29daba.pdf)). As regards pedestrians safety, some data are published in the "Registre des victimes d'accidents de la circulation routière" ([http://www.inrets.fr/ur/umrestte/publications/umrestte0509.pdf](http://www.inrets.fr/ur/umrestte/publications/umrestte0509.pdf)), available in the INRETS website. INRETS is the "French National Institute for Transport and Safety Research" under the dual administrative supervision of the Ministry in charge of Research and the Ministry in charge of Transports. It organises, executes and assesses technological research and developments concerned with diverse fields. As regards safety issues INRETS disposes of three complementary data sources: one data file of police, the detailed accident analysis and the medical register of the road accident victims of the department of the Rhone. More data can be found in ONISR (Observatoire National Interministériel de la Sécurité Routière) website, that publishes the data collected by the police. In France the police has to complete a form (BAAC = Bulletins d'Analyse des Accidents Corporels) for each injury accident, coding inforamtion on the accident characteristics (location, users anc vehicles involved,...). More detailed records of injury accidents exist, but they are kept by the police and can be inspected only by authorised people. Accidents surveys "Comprendre pour agir" are carried out as well, but they regards only fatal or severe accidents and they are not published. The following data can be found in the sectorial study “La sécurité des piétons en 2001” ([http://www.securite-routiere.gouv.fr/IMG/Synthese/Pietons2001.pdf](http://www.securite-routiere.gouv.fr/IMG/Synthese/Pietons2001.pdf)), that includes a huge amount of (very reliable) data on pedestrians. Data more recent (2005) are also available at this website: [http://www.securite-routiere.gouv.fr/IMG/Synthese/Pietons.pdf](http://www.securite-routiere.gouv.fr/IMG/Synthese/Pietons.pdf).

**EXPOSURE DATA**

- Population by age and gender (1985 - 2007)
- Road Network (1980 - 2006)
- Number of vehicles (1950 – 2005)

**PEDESTRIAN SAFETY DATA**
- Number of killed persons (1970 - 2005)
- Number of (seriously) injured persons (1970 - 2005)
- Number of (slightly) injured persons (1970 - 2005)
- Number of fatal accidents (1970 - 2001)
- Number of severe accidents (1970 - 2001)
- Number of all injury accidents (1970 - 2001)
- A huge amount of data of pedestrians issue related to age, gender, road type, period of time,... (1970 - 2001)
- Number of accidents (1980 - 2005)
- Number of killed persons by age, gender, intersection localisation (2005)
- Number of killed persons by crossing localisation (2005)
- Number of killed and injured persons by other means of transportation involved (2005)
- Number of killed persons by travel purose (2005)
GERMANY

Source

**Statistisches Bundesamt Deutschland**
Website: [http://www.destatis.de/jetspeed/portal/cms/](http://www.destatis.de/jetspeed/portal/cms/)

**German Federal Ministry of Transport, Building and Urban Affairs**
Website: [http://www.bmvbs.de/](http://www.bmvbs.de/)

Collection method, Sample, Quality

Statistical data is comprehensively available from the “Federal Statistical Office - Germany” who maintains a statistics portal for inquiries over the Internet. As regards the collection of safety data, BAST (Bundesanstalt für Straßenwesen) plays an important role. BAST is a Federal Highway Research Institute with a responsibility for scientifically sound assistance in making decisions on technical issues and transport policy; since 1970 the German Federal Parliament appointed it to be the central agency for accident research. The following data can be found in the published “Statistical Yearbook, 2007” for the Federal Republic of Germany, that provides an overview of statistical data in Germany and it is available for download free of charge ([http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/SharedContent/Oeffentlich/AI/IC/Publikationen/Jahrbuch/Verkehr.property=filepdf](http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/SharedContent/Oeffentlich/AI/IC/Publikationen/Jahrbuch/Verkehr.property=filepdf)). More detailed pedestrian safety data can be found also in the “Road traffic accidents in 2005” Report (FSO + Deutscher Verkehrssicherheitsrat - DVR), that is available in the Internet: [http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/Internet/DE/Presse/pk/2006/Unfallgeschehen/PressebroschuedeUnfallgeschehen05.property=filepdf](http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/Internet/DE/Presse/pk/2006/Unfallgeschehen/PressebroschuedeUnfallgeschehen05.property=filepdf). DVR is the German Road Safety Council and coordinate the road safety policy in the country with the objective of support measures aimed to improve traffic safety of all road users, pedestrians included.

EXPOSURE DATA

- Road Network (2005 - 2006)

PEDESTRIAN SAFETY DATA

- Number of killed and injured persons by age (2004 - 2006)
- Number of killed and injured persons by month (2004 - 2006)
- Number of killed and injured persons (1970 - 2006)
- Number of killed and injured children (age < 15 years)(2004 - 2005)
- Number of injured children (age < 15 years) by time of the day (2005)
- Number of killed and injured seniors (age > 65 years)(2004 - 2005)
- Modal share (2005)
Source

**Statistics Greece**

Website: [http://www.statistics.gr/](http://www.statistics.gr/)

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**Collection method, Sample, Quality**

The "National Statistical Service of Greece" (NSSG) is the official source of the statistical information in Greece, which ensure the harmonization of the statistics compiled in the country, through uniform methodology, concepts, definitions and classifications. As regards safety data, they are tabulated after appropriate processing that considers the police’s collection and the information from hospitals and social insurance organization. The quality of safety data is regarded as highly prioritised matter in Greece and special emphasis has been given over the last twenty years to research on road safety and traffic and accident analysis, as well on transportation information systems at national and international level. More precisely, the "Department of Transportation Planning and Engineering" of the National Technical University of Athens, NTUA-DTPE, has been involved in more than 50 international and 80 national research projects. The following data can be found in the website above mentioned, in the "Greece in figures, 2007" Report ([http://www.statistics.gr/eng_tables/hellas_in_numbers_engpdf](http://www.statistics.gr/eng_tables/hellas_in_numbers_engpdf)) and in the "Concise Statistical Yearbook, 2006" ([http://www.statistics.gr/Documents/yearbook-06pdf](http://www.statistics.gr/Documents/yearbook-06pdf)).

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**EXPOSURE DATA**

- Population by age and gender (1956 - 2006)
- Number of vehicles (2001 - 2006)
- Road Network (1994 - 2005)
- Vehicle kilometers (2002 - 2004)

**PEDESTRIAN SAFETY DATA**

- Number of killed persons (1996 - 2004)
- Number of killed persons by age and sex (1996 - 2004)
- Number of killed persons from specific vehicle (1996 – 2003)
- Number of (seriously) injured persons (1996 - 2004)
- Number of (seriously) injured persons by age (1996 - 2004)
- Number of (slightly) injured persons (1996 - 2004)
- Number of (slightly) injured persons by age (1996 - 2004)
- Number of fatal accidents (1996 – 2003)
**Source**

*KSH*

Website: [http://portal.ksh.hu/portal/page?_pageid=38,119919&_dad=portal&_schema=PORTAL](http://portal.ksh.hu/portal/page?_pageid=38,119919&_dad=portal&_schema=PORTAL)

**Collection method, Sample, Quality**

*Közponi Statisztikai Hivatal* ("Hungarian Central Statistical Office") is a professionally independent administrative organ of nation-wide authority operating under the direct supervision of the government in Hungary. Official data are published in the website, where it is possible to consult a complete database that reports the results of the last censuses. As regards road safety, the "Institute of Transport Sciences" (KTI) is the hungarian research institution that studies the theoretical and practical aspects needed for the development and operation of transport, to satisfy social and economic demands. Unfortunately public accident databases are not available and in the Reports there are no 'pedestrian data'.

**EXPOSURE DATA**

- Population by age and gender (1990 - 2005)
- Road Network (2005 - 2006)

**PEDESTRIAN SAFETY DATA**

- Number of killed persons (1990 - 2005)
- Number of injured persons (1990 - 2005)
- Number of fatal accidents (1990 – 2005)
- Number of severe accidents (1990 – 2005)
- Number of all injury accidents (1990 – 2005)
Source

Central Bureau of Statistics
Website: http://www.cbs.gov.il/engindex.htm

Collection method, Sample, Quality

Official statistical data are collected from the Central Bureau of Statistics of Israel. As regards the quality of the safety data, they are good since they come from NRSA's database, which are content-rich, up-to-date, credible, searchable, and accessible to researchers and decision makers. The "National Road Safety Authority" (NRSA), which is an independent statutory body within the Ministry of Transport, coordinates and supervises all activities relating to the prevention of road crashes in Israel and particularly it deals with safety data. The input data are the Police crash data files, the trauma entry files and the MDA rescue files (MDA – Magen David Adom – is the national emergency medical and ambulance service); afterwards a procedure for the input of insurance company data files is set up, thus assisting in improving and refining data sourced from the Israel Police (crash location, also by GPS).

EXPOSURE DATA

- Population by age and gender (1950 - 2007)
- Number of vehicles (2003 – 2007)
- Vehicle kilometers (2005)
- Road Network (2005)

PEDESTRIAN SAFETY DATA

- Number of killed persons (1988 – 2007)
- Number of (seriously) injured persons (1988 – 2007)
- Number of (slightly) injured persons (1988 – 2007)
- Number of all injury accidents (1988 – 2007)
ITALY

Source

ISTAT
Website: http://www.istat.it/

ISFORT
Website: http://www.isfort.it/

Collection method, Sample, Quality

The "National Institution of Statistic" (ISTAT) renders available recent official dates on exposure and pedestrian safety. As regards the latter, they can found in the annual “Statistics of road accidents” Report cured by ISTAT and ACI (Automobile Club of Italy). The road accident database is set up with the collaboration of ACI and other Institutions (Ministry of Internal, Road police, Carabineers, Provincial policy, Municipal police and Statistical Offices of the capitals of provinces), which provide data of different quality. Particularly, not all the accidents come to the attention of the police, when they don’t cause death and there is a big discrepancy, by medical statements, in data about accidents, involving personal injuries (it is possible to say that police registered ones are only one fourth of the whole amount). The following data have been found in ISTAT website and more precisely in the "Road accident, 2006" Report (http://www.istat.it/salastampa/comunicati/non_calendario/20071211_00/testointegrale20071211.pdf) and in the “Statistical Yearbook, 2007 – Transport” (http://www.istat.it/dati/catalogo/20071212_00/PDF/cap19.pdf). As regards (pedestrians) travel data, ISFORT (Istituto Superiore di Formazione e Ricerca per i trasporti) has implementated new methodologies in order to collect data about urban mobility and human behaviour in Italy; particularly, the Observatory Audimob is the result of this effort. This very detailed survey is carried out yearlong and it is widespread all over the country. Data are very good in quality, since ISFORT guarantees their reliability (the sample is weighted by sex, age and swelling place of the single individual). Some data for year 2007 can be also found in the “Rapporto congiunturale di fine anno, 2007” (http://www.isfort.it/sito/pdf/Conquisturali/Annuali/RA_2007.pdf).

EXPOSURE DATA

- Number of vehicles (1990 – 2000)
- Passenger kilometers per year (1990 – 2000)
- Road Network (1994 - 2005)
- Modal split - not by purpose (2000 - 2006)
- Pedestrians trips by hour of the day (2000 - 2007)

PEDESTRIAN SAFETY DATA

- Number of killed persons by sex (1999)
- Number of injured persons by sex (1999)
- Number of killed persons by sex and age (2002, 2006)
- Number of injured persons by sex and age (2002, 2006)
- Number of accident depending on day hour (1995)
- Number of accident depending on causing typology of vehicle (1995)
- Number of accident depending on urban and extra-urban area (1995)
Statistics Netherlands is responsible for collecting, processing and publishing statistics to be used in practice, by policymakers and for scientific research. The legal basis for Statistics Netherlands and its work is the Act of 20 November 2003; the Central Commission for Statistics watches over the independence, impartiality, relevance, quality and continuity of CBS statistical programme. CBS has categorised its information in statistical themes and the following data can be found through StatLine, the electronic databank of Statistics Netherlands that enables users to compile their own tables and graphs. These information can be accessed, printed and downloaded free of charge. Particularly, mobility data come from National Travel Surveys, which are carried out continuously by DVS (Centre for Transport and Navigation – Ministry of Transport, Public Works and Water Management) since 2000. As regards pedestrian safety data, they are available through SWOV (Nationale Wetenschappelijke Instituut voor Verkeersveiligheidsonderzoek) website. SWOV is the “Dutch national road safety research institute” and provides an interactive databases (Powerplay for the web by Cognos) where accident data can be analyzed. Safety data are collected in a number of situations: accident data reported by the police to DVS, hospital data collected from all hospitals (concerning serious injury traffic accidents, where the involved road users were hospitalised) and Emergency Medical Service data from a representative selection of hospitals (15) in the NL (they includes pedestrians’ single accidents). In this database are also available travel and transport data (from CBS collection).

EXPOSURE DATA

- Population by age and gender (1947 - 2007)
- Number of vehicles (1986 – 2006)
- Road Network (1985 – 2007)
- Passenger kilometers per year (1985 - 2006)
- Vehicles kilometers per year (1985 – 2006)
- Modal split by year, month, weekday, hour of departure, sex, age, purpose (1985 - 2006)
- Number of pedestrians trips by year, month, weekday, hour of departure, sex, age, purpose, province (1985 - 2006)
- Km of pedestrians trips by year, month, weekday, hour of departure, sex, age, purpose, province (1985 - 2006)

PEDESTRIAN SAFETY DATA

- A huge amount of data on pedestrians accident related year, month, weekday, hour of departure, sex, age, purpose, collision partner, area, province, manoeuvre, road location, speed circumstances, road surface, light conditions, weather,… (1976 – 2005).
Source

**Statistisk Sentralbyrå**
Website: [http://www.ssb.no/](http://www.ssb.no/)

**TØI**
Website: [http://www.toi.no/](http://www.toi.no/)

Collection method, Sample, Quality

Exposure and safety data can be easily found in Statistics Norway website through a user friendly StatBank service where you may select different variables, thus obtaining numerous combinations of data. The quality is guaranteed, as they are official data and Statistisk Sentralbyrå aims at provide data that are relevant, up-to-date, accurate, comparable and coherent, available and documented, unbiased and produced efficiently. To achieve this, the statistics is founded on international statistical standards (definitions, classifications, accounting systems). Some pedestrian safety data can also be found in a Report published by TØI, *Transportøkonomisk institutt*, within “Vision Zero Programme” and that can be found in the Internet (“Making Vision Zero real: Preventing pedestrian accidents and making them less severe”, [http://www.toi.no/getfile.php/Publikasjoner/T%20rapporter/2007/889-2007/889-2007-nett.pdf](http://www.toi.no/getfile.php/Publikasjoner/T%20rapporter/2007/889-2007/889-2007-nett.pdf)). TØI is the “Institute of Transport Economics” in Norway and carries out applied research on issues related to transport promoting the application of its results by advising authorities, the transport industry and the public at large. Its sphere of activity includes issues in road safety, as well as in pedestrians ones.

EXPOSURE DATA

- *Number of private cars and vans currently licensed, by age and make* (1999 – 2006)
- *Domestic passenger transport by mode of transport* (1965 - 2006)

PEDESTRIAN SAFETY DATA

- *Number of accidents by type of accident* (1999 – 2008)
- *Number of killed persons by type of accident* (1999 – 2008)
- *Number of injured persons by type of accident* (1999 – 2008)
- *Number of accidents by sex* (2004 – 2008)
- *Number of killed persons by sex* (2004 – 2008)
- *Number of (seriously) injured persons by sex* (2004 – 2008)
- *Number of (slightly) injured persons by sex* (2004 – 2008)
- *Number of killed persons by age and type of accident* (2001 – 2006)
- *Number of (seriously) injured persons by age and type of accident* (2001 – 2006)
- *Number of (slightly) injured persons by age and type of accident* (2001 – 2006)
- *Number of killed persons by age and police district* (2001 – 2006)
- *Number of injured persons by age and police district* (2001 – 2006)
- *Relative injury risk for pedestrians in different winter conditions* (1996)
Collection method, Sample, Quality

GUS is the "Central Statistical Office" in Poland and exposure data can be easily find in its Data Bank, that allows users to make compilation with data for variables from selected category, group and subgroup, in selected time period and for selected territorial units. Some data are also available in the "Concise Statistical Yearbook of Poland, 2007" (http://www.stat.gov.pl/cps/rde/xbrd/gus/PUBL_concise_statistical_yearbook_of_poland_2007.pdf). Unfortunately pedestrians’ safety data are not available in the Internet and only few figures are published in the website of Krajowa Rads Bezpieczeństwa Ruchu Drogowego, the "National Road Safety Council" (NRSC), chaired by the Infrastructure Minister, that coordinates the government’s road safety efforts, proposing governmental policies and developing road safety programmes and researches. Particularly, some data for 2002-2003 can be found here: http://www.krbrd.gov.pl/download/pdf/Stan%20BRD%202003.pdf. The situation is particularly bad for vulnerable road users in Poland, since in major cities more than 60% of people killed in road accidents are pedestrians, and the unavailability of public data is a lack in the issue. However safety data collected by the police are not very good in quality and SEWIK, the polish database of road accidents (pedestrian and not), doesn’t fit the European Union standards. To date SEWIK’s shortfalls are a matter of fact and it is not sufficient for in-depth analyses at a local level, although some improvements have been carried out in the last two years in order to harmonize road safety data with the EU.

EXPOSURE DATA

- **Number of vehicles** (1995 – 2006)
- **Passenger kilometers per year** (1995 - 2006)

PEDESTRIAN SAFETY DATA

- **Number of killed persons** (2002 – 2003)
- **Number of injured persons** (2002 – 2003)
Source

Instituto Nacional de Estatística
Website: http://www.ine.pt/portal/page/portal/PORTAL_INE

Direção Geral de Viação
Website: http://www.dgv.pt/dgv/index.asp

Collection method, Sample, Quality

Exposure data can be found in Statistics Portugal website, which collects data and information from exhaustive population surveys (censuses), sample surveys and administrative sources. Most of the information released by Statistics Portugal is available on-line in its database or issued in publications. The following data’s source are the “Transport Statistics – 2006” Report and the “Statistical Yearbook of Portugal, 2006” Report. As regards pedestrian safety data, the reference is the former Direcção Geral de Viação (Portuguese National Traffic Department), now named ANSR (National Authority on Road Safety), that handle the road accident and injury information system, based on police reports. Precisely, these data can be found in the “Sinistralidade Rodoviaria, 2006” Report (http://www.dgv.pt/UpLoadedFiles/REL_ANUAL06.pdf).

EXPOSURE DATA

- Population (1990- 2006)
- Number of vehicles (1990 – 2006)
- Vehicles kilometers per year (1990 – 2006)
- Road Network (1990 – 2006)

PEDESTRIAN SAFETY DATA

- Number of killed persons (1998 – 2006)
- Number of (seriously) injured persons (1998 – 2006)
- Number of (slightly) injured persons (1998 – 2006)
- Number of killed, injured (seriously, slightly) persons by age and gender (2005 - 2006)
- Number of killed, injured (seriously, slightly) persons by area and road type (2005 - 2006)
- Number of killed, injured (seriously, slightly) persons by area and month (2005 - 2006)
- Number of killed, injured (seriously, slightly) persons by area and weekday (2005 - 2006)
- Number of killed, injured (seriously, slightly) persons by area and day/night (2005 - 2006)
- Number of killed, injured (seriously, slightly) persons by area and manoeuvre (2005 - 2006)
Source

Statistical Office of the Republic of Serbia
Website: http://webrzs.statserb.sr.gov.yu/axd/index.php

Collection method, Sample, Quality

The Statistical Office of the Republic of Serbia carries out around 200 surveys every year and
publishes their results at regular press conferences and in its website. The following data can be found
there and particularly in the “Statistical Yearbook, 2007” (http://webrzs.statserb.sr.gov.yu/axd/en/god.htm). Data are official and don’t lack in quality, since
the Statistical Office adheres to principles and standards for the production and dissemination of high-
quality statistics (see the “European statistics code of practice”). Unfortunately no pedestrian safety
data are available in the Internet or from other sources.

EXPOSURE DATA

- Population (1999 - 2006)
- Population by age groups and gender (2006)
- Number of vehicles (1999 – 2006)
- Road Network (2005 – 2006)
- Passenger kilometers per year (1999 – 2006)

PEDESTRIAN SAFETY DATA

- Road traffic accidents with killed (2004 – 2005)
- Road traffic accidents with injured (2004 – 2005)
- Casualties accidents with killed (2004 – 2005)
Source

**Instituto Nacional de Estadística**
Website: [http://www.ine.es/](http://www.ine.es/)

**Dirección General de Tráfico**
Website: [http://www.dgt.es/portal/](http://www.dgt.es/portal/)

Collection method, Sample, Quality

The "Spanish National Statistics Institute" elaborates and improves the current demographic, economic and social statistics; it has adopted the "European statistics Code of good practice" and therefore the data are good in quality. The following ones can be found in INE public database and in the "Anuario Estadístico de España, 2007" ([http://www.ine.es/prodyser/pubweb/anuario07/anu07_14servi.pdf](http://www.ine.es/prodyser/pubweb/anuario07/anu07_14servi.pdf)), that includes general statistical information, garnering data from different internal and external sources. Pedestrian safety data are available in the website of the Dirección General de Tráfico. DGT is the "General Directorate for Road Traffic", an agency that belongs to the Ministry of Internal Affairs and centralises most of the competences on road safety, including statistics of accidents. At the end of 2004 DGT created the National Observatory for Road Safety to centralise the expertise on road safety and follow-up and analysis of statistics on accidents. The following data can be found in the “Series Estadísticas sobre Accidentes y Víctimas, 2006” Report ([http://www.dgt.es/was6/portal/contenidos/documentos/seguridad_vial/estadistica/accidentes_30dias_analisis_datos/accidentes_30dias015.pdf](http://www.dgt.es/was6/portal/contenidos/documentos/seguridad_vial/estadistica/accidentes_30dias_analisis_datos/accidentes_30dias015.pdf)) that is available under the section “Seguridad Vial” in DGT website. The data are continuously updated and provisional report are drawn up every month. DGT aims to guarantee the quality of accidents data and numerous efforts are made to guarantee reliable data in Spain. An example is given by the “University of Zaragoza, Group for Road Safety and Traffic Accidents” that has implemented new methodologies in accident data collection ([http://gsv.unizar.es/rat/rat.htm](http://gsv.unizar.es/rat/rat.htm)).

EXPOSURE DATA

- Road Network by region (1998 – 2006)

PEDESTRIAN SAFETY DATA

- Number of killed persons by age, sex and area (1980 – 2006)
- Number of killed persons by area (1980 – 2006)
- Number of injured persons by age, sex and area (1980 – 2006)
- Number of pedestrian fatal accidents
Source

**Statistiska centralbyråns**
Website: [http://www.scb.se/](http://www.scb.se/)

**SIKA**
Website: [http://www.sika-institute.se](http://www.sika-institute.se)

Collection method, Sample, Quality

Statistics Sweden’s website contains a database with a large amount of official statistics and all exposure data can be found in it. The statistical database is available free-of-charge, expansion and development is ongoing constantly and to maintain high quality, the website is continuously being updated. As regards pedestrian safety data, the source is SIKA, “Swedish Institute for Transport and Communications Analysis”, an agency that is responsible to the Ministry of Industry, Employment and Communications. Statistical data are limited to the cases when at least one vehicle has been involved, where the accident has taken place on a road, and where a person has been injured. The statistics are, by their nature, activity statistics, where a professional group reports its activities. In this case, the police reports the injuries and accidents in road traffic that they come into contact with in connection with investigating traffic cases. This means there is a hidden number associated with the statistics. Data are published in the form of a number of tables on SIKA’s website and in report forms ([http://www.sika-institute.se/Doclib/2007/SikaStatistik/ss_2007_30.pdf](http://www.sika-institute.se/Doclib/2007/SikaStatistik/ss_2007_30.pdf)). In the website are also available data from the “National travel survey (RES)” carried out in 2005 – 2006, where information about the mode of transport, the length of the journey, the starting and finishing point,… are collected ([http://www.sika-institute.se/Doclib/2007/SikaStatistik/ss_2007_19_eng.pdf](http://www.sika-institute.se/Doclib/2007/SikaStatistik/ss_2007_19_eng.pdf)).

EXPOSURE DATA

- *Population by age group and gender (1968 - 2007)*
- *Passenger kilometers per year (1923 - 2006)*
- *Vehicles kilometers per year (2005 – 2006)*
- *Road lengths (2005)*
- *Number of pedestrians journeys by age, sex and county of residence (2005 – 2006)*
- *Average distance traveled on pedestrians journeys by age, sex and county of residence (2005 – 2006)*
- *Average travel time for pedestrians journeys by age, sex and county of residence (2005 – 2006)*

PEDESTRIAN SAFETY DATA

- *Number of killed persons (1960 – 2006)*
- *Number of (seriously) injured persons (1960 – 2006)*
- Number of (slightly) injured persons (1960 – 2006)
- Number of killed persons by age and sex (1998 – 2006)
- Number of (seriously) injured persons by age and sex (1998 – 2006)
- Number of (slightly) injured persons by age and sex (1998 – 2006)
- Number of killed and (seriously) injured persons by area (1998 – 2006)
- Number of fatal accidents by area (1998 – 2006)
Source

Statistik Schweiz
Website: http://www.bfs.admin.ch/

BFU
Website: http://www.bfu.ch/

Collection method, Sample, Quality

The Swiss Statistics website is maintained by the “Federal Statistical Office” (FSO) and contains a wide range of statistical information on the most important areas of life (population, health, economy, employment, education,...). Its on-line database (Statweb) provides the results of a large number of surveys and questionnaires; official data are subdivided in topics can be used to create customized tables. Exposure data can be found here and in the “Mobility and Transport, Pocket statistics 2007” Report (http://www.bfs.admin.ch/bfs/portal/en/index/news/publikationen.Document.96665.pdf). Other data regarding travel and pedestrians can be found in the section Mobilität und Verkehr and particularly in the report of the "Mikrozensus zum Verkehrsverhalten", a mobility microcensus carried out in Switzerland in 2005 (http://www.bfs.admin.ch/bfs/portal/de/index/news/publikationen.Document.91873.pdf). As regards pedestrians’ safety data, the main source is BFU, Beratungsstelle für Unfallverhütung ("Council for Accident Prevention"), that conducts research in road traffic, sport, home and leisure sectors and passes on its knowledge to private people and specialist circles by means of consultancy, training sessions and communications. Accident statistics is available in the website and a comparison between data registered by the police and cases not registered (based on BFU extrapolation) is provided: it can be noticed that data’s under-reporting is a matter of fact, as in other European countries.

EXPOSURE DATA

- Number of vehicles (1990 – 2007)
- Road infrastructure (2000 – 2005)
- Passenger kilometers per year (2000 - 2005)
- Average daily passenger distance traveled by age and sex (2000 - 2005)
- Vehicles kilometers per year (1980 – 2005)
- Modal split by purpose (2005)
- Average daily distance traveled on pedestrians journeys by weekday (1984 - 2005)
- Daily travel time for pedestrians journeys by weekday (1984 - 2005)
- Daily travel time for pedestrians journeys by purpose (2005)
- Range of kilometres traveled on pedestrians journeys (2005)
- Number of daily pedestrians trips (2005)

PEDESTRIAN SAFETY DATA

- Number of killed persons (1980 - 2006)
- Number of (seriously) injured persons (1980 - 2006)
- Number of (slightly) injured persons (1980 - 2006)
- Number of fatal accidents (1980 - 2005)
- Number of all injury accidents (1980 - 2005)
- Number of injured persons and fatalities by age (2005)
- Number of injured persons and fatalities by age groups: children – young people – senior citizens (2005)
- Number of injured persons and fatalities by road type (2005)
- Number of injured persons and fatalities by age and pedestrian crossing regulation (2005)
- Number of injured persons and fatalities on pedestrian crossing (1980 – 2005)
The “Office for National Statistics” is the government department responsible for collecting and publishing official statistics about the UK’s society and economy. Exposure and some of the following data are available in its website. ONS monitors the quality of published statistics that are compiled in accordance with standards and procedures set out in the National Statistics Code of Practice and Protocols. Pedestrian safety data can be found in the website of the Department for Transport, which provides leadership across the transport sector. DfT collects, analyses and publishes a wide range of statistics and pedestrians’ data can be found especially in “Road Casualties Great Britain” annual reports available in the website (Report 2006: http://www.dft.gov.uk/162259/162469/221412/221549/227755/rcgb2006v1.pdf). They headline final figures on the number of people killed and injured on the roads in Great Britain, based on information about accidents reported to the police (STATS19). Very few fatal accidents don’t become known to the police. However, research conducted on behalf of the Department in the 1990s has shown that a significant proportion of non-fatal injury accidents are not reported to the police. In addition, some casualties reported to the police are not recorded and the severity of injury tends to be underestimated. DfT is undertaking further research to investigate whether the levels of reporting have changed. Further information on reporting levels can be found at this webpage: http://www.dft.gov.uk/pgr/statistics/datatablespublications/accidents/roadaccidentstatisticsgreatbritain. Other information about pedestrians’ accidents can be found in the Hospital Episode Statistics (HES), a national statistical database provided by National Health Service hospitals. The latest HES data (2005 – 2006) are available via the internet from the ‘free data section’ of the website. Data variations (organisational changes, reviews of best practice within the medical community, adoption of new coding schemes and data quality problems) can lead to false assumptions about trends, so great care must be exercised in comparing figures for different years. Travel information can be found through the National Travel Surveys that has been conducted in UK since July 1988; in the Internet NTS reports are available (NTS Report 2006: http://www.dft.gov.uk/162259/162469/221412/221531/223955/322743/NTS2006V3.pdf). Data from 1995 onwards have been weighted, thus adjusting for non-response bias and also for the drop-off in the number of trips recorded by respondents during the course of the travel week. All results now published for 1995 onwards are good in quality as based on weighted data and direct comparisons can be made.

EXPOSURE DATA

- Population by age and gender (1981 - 2006)
- Road length (1955 – 2006)
- Number of vehicles (1955 – 2006)
- Passenger kilometers per year (1995 - 2006)
Vehicles kilometers per year (1995 – 2006)
Modal split by purpose (1995 - 2006)
Average distance traveled as a pedestrian (1995 - 2006)
Number of pedestrian trips by purpose (1995 - 2006)
Number of pedestrian trips by distance (1995 - 2006)
Percentage of pedestrian trips by age and gender (1995 - 2006)
Average pedestrian trip length (1995 - 2006)
Average pedestrian trip time (1995 – 2006)
Number of pedestrian trips to school by age (1995 – 2006)
Frequency of walks of 20 minutes or more by age (2006)

PEDESTRIAN SAFETY DATA

Number of killed persons (1999 – 2006)
Number of (seriously) injured persons (1999 – 2006)
Number of (slightly) injured persons (1999 – 2006)
Number of killed, injured (seriously – slightly) persons by age (1999 – 2006)
Number of killed, injured (seriously) persons by age and gender (1999 – 2006)
Number of killed children (1999 – 2006)
Number of (seriously) injured children (1999 – 2006)
Number of accidents by contributory factors (1999 – 2006)
Number of injured persons by external cause and age (2005 – 2006)
2.2 PQN indicators

Benchmarking analysis [2.3] seeks to compare the performance of the twenty countries involved in the COST Action, regarding pedestrian quality needs. In order to carry out a reliable analysis, a basic question is posted: "Which PQN indicators can be used to compare the countries?".

PQN interventions are implemented in all the twenty countries to improve the system where pedestrians live and walk. To assess the interventions undertaken in the countries, it is necessary to select a series of PQN (macro) indicators. In order to accomplish with this issue, it is essential to look at the output of the system, since the indicators are strongly related to how the system reacts after the implementation of PQN (and not only) interventions.

Actually there are no standard indicators and the choice is not easy, due to two reasons: the lack of homogenous data and information from the countries, and the very choice of the proper indicators. The first issue is unavoidable, since it is difficult to have the same information, that means both coverage and quality, for all the countries. The problem has emerged in the previous section. The latter one imply an engineering effort and some compromises: literature examples in this case is a cornerstone.

It is possible to get around these problems by looking at European or International data collections and translating PQN with the "need to be safe while walking", thus focusing on safety items and neglecting other pedestrian quality requirements such as accessibility, comfort, etc because there is no data on their satisfaction and compliance.

2.2.1 Data comparability

The previous section and above all the “data integration” confirmed that the situation regarding pedestrian exposure and safety information is actually quite bad in the European context. The consequence is that it is difficult to compare countries in terms of pedestrians issue. Empirical data are needed and standardisation in data collection within the European context is the first task that should be accomplished. Moreover European countries should recognize the essential role of collecting high-quality ata on road accidents and on exposure in order to measure the scale of the problem and to devise effective and efficient countermeasures.

The difficulty in comparing pedestrians data can be summarized in two topics: availability and quality.
### Availability

This issue regards both the ‘exposure’ and the ‘pedestrian safety’ data, as it is shown in the following table that summarizes the results of the “Country Reports Review” [2.1].

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| **PED SAFETY DATA** | | | | | | | | | | | | | | | | | | | | |
| Killed persons | ✓ | ❌ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Seriously injured | ✓ | ❌ | ❌ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Slightly injured | ✓ | ❌ | ❌ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Fatal accidents | ✓ | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ |
| Severe accidents | ❌ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| All injury accidents | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

Legend:
- ❌ Data not available
- ~ Data partially available *
- ✓ Data available

* Examples:
  - pedestrians and cyclist data are reported together;
  - seriously and slightly injured pedestrians are reported together.

As regards exposure data, the situation is quite worrying and pedestrian mobility data are missing. Pedestrians accident rates should be related to exposure data reasonably available and the only type of data that does not require a special effort to obtain seems to be “population”. There are hardly any data for safety of pedestrians, but there are some common figures (e.g.: number of killed persons) that are continuously collected, even though other problems arise in this frame, such as ‘lack of quality’.

### Quality

Exposure data are less affected by this issue than safety data, since they are measured and collected in an objective way (GIS is now widely available and can provide objective measures of many features of the built environment) or National Travel Surveys guarantee the quality of mobility data. Actually,
some gaps in quality are present in exposure data too, but pedestrian safety data are more affected by this problem.

The problem of pedestrians accidents reports include:

- The lack of completeness in accident reporting, as recorded by the official agencies: that refers both to failure in reporting an entire accident or of important specific data (e.g.: age of the injured pedestrian).

- The under-reporting problem, that means the discrepancy between injury information in the official accident report compared to hospital data (under-reporting of hospitalised casualties - all modes - is estimated to vary between 30 and 60%) and the under-reporting of killed pedestrians too. Not all fatal accidents are reported to and recorded by the Police indeed and some other bias (files are lost) affect the quality of these data. Efforts are currently being made to try to correlate Police records with hospital and death records in order to get better analysis.

- The large amount of incorrect information, especially related to the precise location of the accident. It is important to develop common formats for the collection and recording of (pedestrians) accidents, in order to overcome any existing gaps in the coverage of accidents and ensure that the collected data is compatible. Most of the Police reports often do not include geo-coded location data and the collection of this data has to be implemented to document precisely where each accidents occurred.

- The inability to integrate accident files with other relevant data files (driver, vehicle, medical, traffic, infrastructure, land use), although in the last years comprehensive programs for improving the collection, storage and retrieval of pedestrians accidents data have been undertaken. The inconsistencies between jurisdictions (regions) in the same country in the application of their particular accident class code is also a problem that can’t be neglected.

It is difficult to compare data that lack in availability and (above all) quality and the situation is worsened by another issue, that means the “difference in definitions” regarding pedestrians (and not only) safety data. Some definitions differ among EU member states, so that a casualty which would be recorded in one country might not be recorded in another or a casualty which might be recorded as ‘serious’ in one country might sometimes be recorded as ‘slight’ in another, etc. Differences in definitions regard mainly the injury severity, but other item are affected too, such as the type of area (e.g.: inside urban area / outside urban area), the modes of transport (e.g.: car / heavy good vehicles / lorries < 3,5 t / moped,...), the type of junction (e.g.: not a junction / crossroad / roundabout / T or Y junction), the type of walking trips included, etc.

2.2.2 European and International Databases

To avoid bias emerging from these problems, it is wise to make use of European and International accident databases to study pedestrian safety and to make comparisons. Presently available tools, especially statistical ones, make the problems more tractable through an harmonization of data. Particularly, the databases that collect and maintain exposure and safety data for pedestrian issues in European countries are the following:

CARE

CARE (Community Road Accident Database) is a Community database on road accidents resulting in death or injury. The major difference between CARE and most other existing international databases is the high level of disaggregation, since CARE comprises detailed data on individual accidents as collected by the Member States. National data sets are integrated into the CARE database in their original national structure and definitions, then transformation rules (linking road accident and medical databases) are implemented in the CARE database in order to increase data compatibility and thus enhance the functioning of the system. On-line access to the CARE database is currently restricted to
expert users, but summary statistical tables and figures are available: they provide an overview of pedestrian accident data from 1991 to 2006.


**ECMT**

ECMT (European Conference of the Ministers of Transport) publishes accident statistics since 1975. Between 1975 and 1984 these statistics were included in the Transport Statistics Yearbook. Since 1985 accident statistics are presented in a separate publication: the annual Road Accident Statistics Yearbook. The ECMT road accident data file and the transport statistics database contain data on accidents and victims, and on exposure related data, that provides road accident related indicators (especially rates). The access to the database is restricted.

Website: [http://www.cemt.org/index.htm](http://www.cemt.org/index.htm)

**Eurostat**

Eurostat (Statistical Office of the European Communities) mission is to provide the European Union with a high-quality statistical information service. Data is freely available on the internet.


**IRTAD**

In 1988, the OECD Road Transport Research Programme established IRTAD (International Road Traffic and Accident Database) as a mechanism for providing an aggregated database, in which international accident and victim as well as exposure data are collected on a continuous basis. IRTAD member organisations have full access to the database, but a selection of accident data is freely available on the internet.

Website: [http://cemt.org/IRTAD/IRTADPublic/index.htm](http://cemt.org/IRTAD/IRTADPublic/index.htm)

**UNECE**

The UN-commission UNECE (Economic Commission for Europe) publishes since 1955 an annual publication containing statistics on the road traffic system activity in Europe and North America. Data on pedestrians accidents and victims are presented, with data on road length, traffic volumes, number of registered vehicles and population.


### 2.2.3 Selection of PQN indicators

There is considerable literature available about what makes a good indicator; generally any indicator has to be SMART, i.e.:

- **Specific**: Indicators need to relate specifically to intended changes.
- **Measurable**: Indicators should be measured using a replicable methodology.
- **Attainable**: Information must be attainable at reasonable cost using an appropriate collection method.
- **Relevant**: Indicators should be relevant to the management information needs of the people who will use the data.
- **Time-related**: Indicators should be monitored over time (giving the trends) and should have a suitable start and end date. They should also be transferable in the rime (different time periods).
Because of the “data comparability” problem, only limited comparisons among the European countries can be made and the selection of valid and reliable macro indicators within the STSM analysis is summarized as below. For each indicator is given a short explanation of its validity.

- **Number of pedestrians fatalities**

  Currently, the numbers of pedestrians killed is the best option to compare countries, although it is not perfect. As regards availability, there are data for all the twenty countries except for Serbia, which is therefore excluded from the analysis. As regards quality, in nearly all EU countries the degree of under-reporting problem is acceptably small (it is certainly different respect to injury fatalities, which are more affected by the problem).

  Firstly, the trend in numbers of fatalities between 1997 and 2006 is examined. It is focused on the fatalities rate [see below for the exposure choice], since absolute values do not provide the best way to compare countries. It is interesting to analyze the percentage change in pedestrians fatalities per million inhabitants too, comparing 2006 to 1997. Then the analysis between countries can be improved using CARE databases and the latest data available (2006), in order to benchmark the number of pedestrians fatalities in accordance with specific variables:

  - **Age group**
    - 00 to 09
    - 10 to 19
    - 20 to 29
    - 30 to 39
    - 40 to 49
    - 50 to 59
    - 60 to 69
    - 70 to 79
    - 80 to 89
    - 90 +

  - **Gender**
    - Female
    - Male

  - **Type of area**
    - Inside urban area
    - Outside urban area

  - **Period of time**
    - Month
    - Day of the week

  - **Weather conditions**
    - Dry
    - Fog or mist
    - Rain
    - Snow, sleet, hail
    - Strong wind
    - Other

  - **Type of junction**
    - Not at junction
    - Crossroad
    - Level crossing
    - Roundabout
    - T or Y junction
    - Other

  Particularly, in this more deep comparison data from all the twenty (nineteen) countries are not available, since CARE database collects and harmonizes information of some European
countries. This could be seen as a lack, but it is interesting to investigate the variables above mentioned, although not all the countries participating in the COST Action are included.

- **Number of all injured pedestrians**

Despite the under-reporting problem that affects the reporting and collecting of injured pedestrians all through the countries, the number of all injured pedestrians is considered as a PQN indicator too. If the quality lack in, the availability is not a big problem, since data of ALL the injured pedestrian can be found for the nineteen countries (Serbia is still excluded) from 1997 to 2006. Injured pedestrians should not be considered for European level comparisons, but in this context the aim is to observe the range where the countries are settle and to have a general indication.

In this context, the trend in numbers of injured pedestrian between 1997 and 2006 is examined, focusing on the rate [see below for the exposure choice], since absolute values do not provide the best way to compare countries. It is interesting to analyze the percentage change in all injured pedestrians per million inhabitants too, comparing 2006 to 1997. CARE database is used in this context too, in order to analyze injury severity and distinguish between seriously and slightly injured pedestrians. Only some of the nineteen countries are investigated and the focus is on the percentage change (2006 compared to 1997).

- **Number of pedestrians accidents**

Through CARE database, it is possible to analyze pedestrians accidents too, distinguishing between fatal and injury accidents. Despite the quality of the data, the real problem emerged in the first part of this chapter is the lack of availability among the countries and recur to an European database is essential. Only some of the nineteen countries are investigated and the focus is on the percentage change (2006 compared to 1997).

---

**Exposure data**

National accident data provide insight into the size and composition of the road safety problem and, within pedestrian issue, this is still a valid statement. Relating casualities (or accidents) data to exposure data produces estimates of road safety rate, that is especially relevant for making predictions about future road safety situation and for making international comparisons. The difficulty of combining two measures partly reliable (casualities or accidents + exposure) with the expectation of obtaining a reliable third measure (rate) is obvious.

The common exposure measure used in pedestrian research are:

- distance walked;
- number of road crossed;
- time spent walking;
- number of walk trips;
- volume of pedestrians.

This categorisation is somewhat arbitrary and there is no general rule as to what is the best or preferred exposure measure. Time spent and distance walked are definitely good exposure measures, but often they are not available. The problem that arise in this frame is that there are data that are generally available in some countries and data that are not (and there is the "quality issue" that affects data too). To describe pedestrians casualties / accidents change, exposure data reasonably available are needed and generally the data used for country comparisons are: population, vehicle fleet, road length, fuel consumption, driver kilometres and vehicle kilometres. In pedestrians context
the exposure measure used is **population**, due to its availability and quality. Actually, the rate of casualties / accidents per million inhabitants has its own significance, but can’t be considered as the best option, since it does not describe overall progress or lack of it, in respect to pedestrian safety. The most appropriate measures of exposure appear to be kilometres of travel (walk) or time spent (walk) because they are closer to the theoretical concept of exposure, as already pointed out, but in a macro context population (from basic National Statistics) is definitely the best option.
2.3 Countries benchmarking

The benchmarking compares the performance of countries’ interventions, using the set of indicators selected in the previous section. In this way differences in indicator values can be identified, thus pointing out how the European countries perform in terms of PQN and enabling ways to improve performance to be identified.

As regards the data collected and processed in the CARE database, data for some countries were not yet available in the database at the date of the STSM. For example, there are no data of years 2005 and 2006 for both Italy and the Netherlands, and of year 2004 for the Netherlands. In these cases, the latest data available were used (i.e.: data of year 2003 for the Netherlands and data of year 2004 for Italy).

2.3.1 Number of pedestrians fatalities


In 2006, 6682 pedestrians were killed in road traffic accidents in the EU-19 (all the country involved in the COST Action, except for Serbia). The annual absolute values by country from 1997 to 2006 do not provide significant information and to compare countries the respective population size has been taken into account to calculate pedestrians fatalities rates. In 2006, the rate varies from 4,04 pedestrians fatalities by million inhabitants in the Netherlands to 46,02 pedestrians fatalities by million inhabitants in Poland, which means a factor of 11 difference between the best and worst performing countries. The following figures show the trend of the number of pedestrians fatalities per million inhabitants. Considering the EU-19, in the last ten years there has been a decrease from 23,70 to 14,57 pedestrians fatalities per million inhabitants. Respect the 2006 value (14,57), there are countries performing better (NL, NO, SE) and worse (EE, PL, HU). The percentage change in pedestrians fatalities per million inhabitants (1997 - 2006) it is also plotted and the countries that have seen the major change are Portugal (- 72,92 %) and Czech Republic (- 52,09 %).

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### Table 2.2: Annual number of pedestrians fatalities per million inhabitants by country, 1997 - 2006

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Source: National Reports
Date of query: March 2008
* Data 2005

Source: National Reports
Date of query: March 2008
* Data 2005
### Table 2.3: Percentage change in pedestrians fatalities per million inhabitants by country, 2006 compared to 1997

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*Data 2005*

Source: National Reports

Date of query: March 2008
Age group

The distribution of pedestrians fatalities by age group (2006) is different among the countries, but a common aspect can be pointed out: children (age group 00 to 09) and seniors (age group 60 +) are the groups more affected in terms of safety. Particularly, seniors citizens are still the largest group in pedestrian fatalities in all countries (particularly in Italy and Greece) and the trend will become more serious with an increase in the elderly population in the future. In EU-11 the number of children pedestrians fatalities decreased in the last ten years (-59,22 %) and the range of percentage change of all groups vary from –20% to –59,22 %. As regards children pedestrians fatalities (compared to all children pedestrians fatalities), most countries reported a decrease (except for Italy). The countries with the highest values in 2006 are the United Kingdom (50,8 %) and Sweden (41,7 %). Focusing on the absolute values, percentage changes are settled in a range that goes from –15,4 % (NL) to – 100 % (FI). As regards seniors pedestrians fatalities (compared to all seniors pedestrians fatalities), there are some countries (BE, FI, FR, IT) that report an increase. The countries with the highest values in 2006 are the United Kingdom (38,9 %) and Greece (38,7 %). Looking at the absolute values, percentage changes are settled in a range that goes from –21,3 % (IT) to – 66,3 % (PT).

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Distribution of pedestrians fatalities by age group, 2006

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Table 2.5: Percentage change in pedestrians fatalities by age group in EU-11 (1997 and 2006)

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Source: CARE
Date of query: March 2008
Country excluded: Estonia
Table 2.6: Percentage change in children pedestrians fatalities (age group: 00 to 09), 2006 compared to 1997

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Source: CARE
Date of query: March 2008
* Data 2004
** Data 2003
Table 2.7: Percentage change in seniors pedestrians fatalities (age group: 60 +), 2006 compared to 1997

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<td>All</td>
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Source: CARE
Date of query: March 2008
* Data 2004
** Data 2003
Gender

The distribution of pedestrians fatalities by gender (2006) is similar among the countries and there are few differences between male and female pedestrians, since the proportion of male pedestrians fatalities is a little higher than that of female: precisely, the number of fatalities of male pedestrians vary from 51 % (FI) to 69,2 % (IT). In EU-11 the number of fatalities decreased in the last ten years, both for the female (- 40,67 %) and for the male (- 33,57 %). As regards female pedestrians fatalities (compared to all female pedestrians fatalities), most countries reported a decrease (except for Belgium, France and Greece). The countries with the highest values in 2006 are the Portugal (34,1 %) and Greece (32,8 %). Focusing on the absolute values, percentage changes are settled in a range that goes from – 3,7 % (BE) to – 68,2 % (PT). As regards male pedestrians fatalities (compared to all male pedestrians fatalities), most countries reported a decrease (except for Austria, Finland and Italy). The countries with the highest values in 2006 are the United Kingdom (18,8 %) and Spain (12,6 %). Looking at the absolute values, percentage changes are settled in a range that goes from – 3,8 % (FI) to – 73,7 % (PT).

Table 2.8: Number of pedestrians fatalities by gender and country, 2006

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<th>Total</th>
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<td>110</td>
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<td>59</td>
</tr>
<tr>
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<td>25</td>
<td>49</td>
</tr>
<tr>
<td>FR</td>
<td>225</td>
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<td>Number</td>
<td>Percentage</td>
</tr>
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<td>------------</td>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
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<td>39</td>
<td>56</td>
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<tr>
<td>PT</td>
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<td>93</td>
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<td>34</td>
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<td>UK</td>
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Source: CARE  
Date of query: March 2008  
* Data 2004  
** Data 2003

---

### Distribution of pedestrians fatalities by gender, 2006

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<th>Country</th>
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<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
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<th>100%</th>
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Legend:  
- Female  
- Male
Table 2.9: Percentage change in pedestrians fatalities by gender in EU-11 (1997 and 2006)

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Source: CARE
Date of query: March 2008
Country excluded: Estonia
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Source: CARE  
Date of query: March 2008  
* Data 2004  
** Data 2003
Table 2.11: Percentage change in male pedestrians fatalities, 2006 compared to 1997

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Source: CARE
Date of query: March 2008
* Data 2004
** Data 2003
The distribution of pedestrians fatalities by type of area (2006) presents some differences among the countries, since the number of fatalities inside urban areas vary from 48,8 % (ES) to 75,9 % (IT), although in general there are more fatalities in urban areas than in rural ones. In EU-11 the number of fatalities decreased in the last ten years, both inside urban areas (-34,31 %) and outside urban areas (-37,21 %).

Table 2.12: Number of pedestrians fatalities by type of area and country, 2006

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<th>Country</th>
<th>Inside urban area</th>
<th>Outside urban area</th>
<th>Total</th>
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<td>45</td>
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<td>26,67</td>
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<td>100</td>
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<td>27,34</td>
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<td>IT*</td>
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<td>171</td>
<td>710</td>
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<td>75,92</td>
<td>24,08</td>
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<td>97</td>
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<td>34,02</td>
<td>100</td>
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<td>PT</td>
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<td>156</td>
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<tr>
<td>Country</td>
<td>Inside urban area</td>
<td>Outside urban area</td>
<td>Total</td>
</tr>
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<td>------------------</td>
<td>--------------------</td>
<td>-------</td>
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<td>65,67</td>
<td>34,33</td>
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<td>66,68</td>
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</tr>
</tbody>
</table>

Source: CARE
Date of query: March 2008

Table 2.13: Percentage change in pedestrians fatalities by type of area in EU-11 (1997 and 2006)
Period of time

The distribution of pedestrians fatalities by month (2006) presents some differences among the countries; in EU-12 the number of fatalities vary from 6 % (April) to 13,2 % (December). Generally pedestrians fatalities are most frequent from October to December and least frequent from April to June. The share of the months October to December is especially high in northern countries (Belgium, Finland, Sweden). The increased pedestrian fatalities during the winter compared to other seasons, are probably caused by the higher danger for pedestrians in darkness. The time of darkness/twilight is longer than in other seasons and compared to vehicles that use lights, pedestrians are much less visible. In EU-11 the number of fatalities decreased in the last ten years and the range of the percentage change of the months goes from - 25,38 % (December) to - 41,35 % (July). The distribution of pedestrians fatalities by day of the week (2006) is homogeneous too; in EU-12 the number of fatalities vary from 13,5 % (Sunday) to 16,5 % (Friday). In EU-11 the number of fatalities
decreased in the last ten years and the range of the percentage change of the days goes from – 33,09 % (Sunday) to – 40,05 % (Saturday).

### Table 2.14: Number of pedestrians fatalities by month and country, 2006

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
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<td>15,45</td>
<td>13,64</td>
<td>11,82</td>
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</table>

Source: CARE  
Date of query: March 2008  
* Data 2004  
** Data 2003
**Table 2.15: Percentage change in pedestrians fatalities by month in EU-11 (1997 and 2006)**

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<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>Total</th>
<th>Source: CARE</th>
<th>Date of query: March 2008</th>
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</tbody>
</table>

**Distribution of pedestrians fatalities by month, EU-11 (1997 and 2006)**

- **EU-11 (1997):**
  - November: 11.2
  - October: 9.4
  - September: 9.9
  - August: 7.6
  - July: 7.6
  - June: 8.8
  - May: 9.9
  - April: 7.4
  - March: 6.7
  - February: 6.7
  - January: 9.9

- **EU-11 (2006):**
  - November: 13.2
  - October: 9.9
  - September: 9.3
  - August: 7.2
  - July: 6.9
  - June: 6.8
  - May: 6.7
  - April: 7.4
  - March: 6.1
  - February: 7.9
  - January: 7.9
Table 2.16: Number of pedestrians fatalities by day of the week and country, 2006

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<th>Country</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
<th>Total</th>
</tr>
</thead>
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<td>19</td>
<td>16</td>
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<td>122</td>
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<td>9</td>
<td>9</td>
<td>7</td>
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<td>9</td>
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<td>8</td>
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</table>

The table shows the number of pedestrian fatalities by day of the week and country, with corresponding percentages. The data is compared to 1997.
### Table 2.17: Percentage change in pedestrians fatalities by day of the week in EU-11 (1997 and 2006)

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</tr>
</thead>
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<td>13.73</td>
<td>15.18</td>
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Source: CARE
Date of query: March 2008
Country excluded: Estonia
Weather conditions

The distribution of pedestrians fatalities by weather conditions (2006) presents some differences among the countries; particularly the number of fatalities in dry conditions vary from 69,7 % (IT) to 93,3 % (EE) and those in rain conditions from 6,4 % (HE) to 22,2 % (SE). In EU-11 the number of fatalities decreased in the last ten years and the percentage change are the following: - 37,3 (dry) / - 37,5 (rain) / - 43,1 (fog or mist) / - 22,2 (snow, sleet, hail) / - 28,6 (strong wind).
Table 2.18: Number of pedestrians fatalities by weather conditions and country, 2006

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<th>Dry</th>
<th>Fog or mist</th>
<th>Rain</th>
<th>Snow, sleet, hail</th>
<th>Strong wind</th>
<th>Other</th>
<th>Total</th>
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Source: CARE
Date of query: March 2008
* Data 2004
** Data 2003
Table 2.19: Percentage change in pedestrians fatalities by weather conditions in EU-11 (1997 and 2006)

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Source: CARE
Date of query: March 2008
Country excluded: Estonia
The distribution of pedestrians fatalities by type of junction (2006) presents some differences among the countries; particularly the number of fatalities "not at junctions" vary from 10 % (SE) to 83,6 % (FR) and those at crossroads from 6,2 % (FR) to 85,0 % (SE). In EU-6 the number of fatalities decreased in the last ten years (except at roundabout intersections, where they have increased: + 11,54 %) and the percentage change are the following: - 37,2 (no junction) / - 39,8 (crossroad) / - 44,6 (T or Y junction).
Table 2.20: Number of pedestrians fatalities by type of junction and country, 2006

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<td>Roundabout</td>
<td>T or Y junction</td>
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Source: CARE
Date of query: March 2008
* Data 2003
Table 2.21: Percentage change in pedestrians fatalities by type of junction in EU-6 (1997 and 2006)

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</table>

Source: CARE
Date of query: March 2008
Country excluded: Estonia

Distribution of pedestrians fatalities by type of junction, EU-6 (1997 and 2006)

- Other
- Crossroad
- No junction
2.3.2 Number of all injured pedestrians

- **Time series (1997 – 2006)**

In 2006, 151655 pedestrians were injured in road traffic accidents in the EU-19 (most the country involved in the COST Action - except for Serbia). The annual absolute values by country from 1997 to 2006 do not provide significant information and to compare countries the respective population size has been taken into account to calculate injured pedestrians rates. In 2006, the rate varies from 103,59 injured pedestrians by million inhabitants in the Netherlands to 589,33 injured pedestrians by million inhabitants in Portugal, which means a factor of 5 difference between the best and worst performing countries. The following figures show the trend of the number of injured pedestrians per million inhabitants. Considering the EU-19, in the last ten years there has been a decrease from 449,29 to 330,79 injured pedestrians per million inhabitants. Respect the 2006 value (330,79), there are countries performing better (NL, NO, FI) and worse (PT, AT, UK). The percentage change in injured pedestrians per million inhabitants (1997 - 2006) it is also plotted and there some countries that have seen an increase (BE, EE, IT, NL, SE), although the majority reported a decrease (Poland distinguishes itself by a change of – 72,4 %).

<table>
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### Table 2.23: Annual number of (all) injured pedestrians per million inhabitants by country, 1997 - 2006

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Source: National Reports  
Date of query: March 2008  
* Data 2004  
** Data 2005
Annual number of injured pedestrians per million inhabitants by country (AT - IL), 1997 - 2006

Annual number of injured pedestrians per million inhabitants by country (IT - UK), 1997 - 2006
Table 2.24: Percentage change in (all) injured pedestrians per million inhabitants by country, 2006 compared to 1997

<table>
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<tr>
<th>Country</th>
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<th>2006</th>
<th>% change</th>
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<td>358,49</td>
<td>31,53</td>
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Source: National Reports
Date of query: March 2008
* Data 2004; ** Data 2005
Seriously injured pedestrians

As regards seriously injured pedestrians (compared to all seriously injured pedestrians), most countries reported a decrease (except for Belgium, France and Greece). The countries with the highest values in 2006 are Portugal (17.8%) and the United Kingdom (22.2%). Focusing on the absolute values, percentage changes are settled in a range that goes from +22.4% (FR) to −67.6% (PT).

Table 2.25: Percentage change in seriously injured pedestrians, 2006 compared to 1997

<table>
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<tr>
<th>Country</th>
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<th>Change [%]</th>
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Table 2.25: Percentage change in injured pedestrians per million inhabitants by country, 2006 compared to 1997

Percentage change in injured pedestrians per million inhabitants by country, 2006 compared to 1997
<table>
<thead>
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<th>Country</th>
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<th>2006</th>
<th>Change</th>
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<tr>
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<td>11,50</td>
<td>-1,00</td>
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<td>All</td>
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<td>364</td>
<td>0,00</td>
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<tr>
<td>UK</td>
<td>Pedestrians in %</td>
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<td>22,24</td>
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<td>-27,63</td>
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Source: CARE  
Date of query: March 2008  
* Data 2003
As regards slightly injured pedestrians (compared to all slightly injured pedestrians), most countries reported a decrease (except for Belgium, Greece and Sweden). The countries with the highest values in 2006 are Portugal (11.1\%) and Greece (13.3\%). Focusing on the absolute values, percentage changes are settled in a range that goes from +33.6\% (SE) to –46.3\% (FR).

Table 2.26: Percentage change in slightly injured pedestrians, 2006 compared to 1997

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</table>

Source: CARE
Date of query: March 2008
* Data 2003
2.3.3 Number of pedestrians accidents

- Pedestrians fatal accidents

As regards pedestrians fatal accidents (compared to all fatal accidents), most countries reported a decrease (except for Austria and Belgium). The countries with the highest values in 2006 are Greece (18.5 %) and the United Kingdom (23 %). Focusing on the absolute values, percentage changes are settled in a range that goes from –13.2 % (IT) to –67.6 % (PT).

Table 2.27: Percentage change in pedestrians fatal accidents, 2006 compared to 1997

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Source: CARE
Date of query: March 2008
* Data 2004
** Data 2003
Pedestrians injury accidents

As regards pedestrians injury accidents (compared to all injury accidents), most countries reported a decrease (except for Belgium, France and Greece). The countries with the highest values in 2006 are Greece (17.9%) and France (17%). Focusing on the absolute values, percentage changes are settled in a range that goes from +18% (SE) to -36% (FI).

Table 2.28: Percentage change in pedestrians injury accidents, 2006 compared to 1997

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### Pedestrians in % and Pedestrians

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</table>

Source: CARE
Date of query: March 2008
* Data 2004
** Data 2003

---

### Percentage of Pedestrians Injury Accidents (Compared to All Injury Accidents) by Country, 1997 and 2006

![Percentage of Pedestrians Injury Accidents Chart](chart_url)
3 20 Pedestrian-friendly cities

Conditions for pedestrians vary widely from country to country. There are differences in climate, in spatial conditions, quantity and composition of traffic, legal position, culture regarding walking and presence in public space, etc. This asks for different solutions for different countries. Focusing on the "spatial environment" [Pizza Model, R. Methorst – Appendix A] a qualitative analysis of 20 European pedestrian-friendly cities is developed in this chapter with the objective of stress differences and similarities among the countries within PQN framework.

![Diagram showing Walkability, PQNs, Context, Interventions, Connected, Convivial, Conspicuous, Comfortable, Convenient]

3.1 Definitions

In order to compare the countries from a qualitative point of view it is necessary to define a priori a series of issues that concern in the analysis, that means:

- Definition of PQNs items
- Definition of interventions items
- Definition of context items

As regards these classifications, they have been elaborated after reviewing examples mentioned in literature and are the result of a personal (and subjective) interpretation within PQN issue.
3.1.1 Definitions of PQNs items

Almost the entire population is a pedestrian at some time, therefore the term ‘pedestrian’ encompasses a wide range of people who may have very little in common with one another as individuals. Accordingly successful pedestrian environments must accommodate users with considerable variance in age, ability, experience and comprehension.

From literature it appears that with regard to needs there is a large number of theories and classifications [Maslov, 1953 – Alderfer, 1969 – Van Hagen, 2006]. The walkability analysis within the STSM is founded on the 5 C’s principle, that is frequently used to classify and prioritize pedestrians’ needs [TfL, London]. As Risser (2003) stated, quality for pedestrians is subjective and depends on the options for choices, the ease of the realisation process and possibly the comfort and pleasure derived from the activities on the one hand and social, economical, political and environmental factors and the perception of these conditions on the other hand.

Therefore the walkability of an area can be characterized by the 5 C’s, which is that walking networks and facilities should be connected, convivial, conspicuous, comfortable and convenient. Pedestrians’ quality needs are translated in these five basic requirements that have to be satisfied to ensure the walkability of an area. The five items are summed up here in succession.

**CONNECTED**

*Definition*  
The property of the infrastructure network that links trip origins to desired destinations, thus making it possible for persons to get where they want to go, as well as the extent of linkages between different routes and network.

*Features*  
- Undisturbed route between origin and destinations (yes/no)
- Absence of obstacles and obstructions
- Access to public transport nodes (bus stops, railway stations)

**CONVIVIAL**

*Definition*  
Convivial public space means that its design and facilities support an agreeable sojourn, that it is liveable, endurable, tolerable. Convivial public space feels safe and inviting for pedestrians.

*Features*  
- Absence of conflicts with other means of transportations (car, bicycle, moped, segway) and absence of threats and assaults
- Absence of rubbish, potholes, roots, damaged surface
- Adequate street furniture, benches, “places to stop”

**CONSPICUOUS**

*Definition*  
The measure to which an object or a facility is noticeable or eye-catching in terms of clear and legible routs, signing and information.

*Features*  
- Lighting and visibility
- Delineation and legibility
- Traffic signs: information and orientation
COMFORTABLE

**Definition**

The extent to which walking is accommodated to competences and abilities of all types of pedestrians. In ‘objective’ functional terms comfort refers to observable usability, where pedestrians can use spaces or facilities without the apparent need to strain oneself.

**Features**

- Well maintained footpaths of adequate widths, smooth surface and with few obstacles (steps, mud,…)
- Attractive landscape design and architecture and provision of rest places opportunities
- Absence of noise and fumes from motor traffic

CONVENIENT

**Definition**

The measure to which public space or a facility suits the pedestrians' special needs, i.e. that is saves time or frustration.

**Features**

- Road crossing opportunities: location, type, waiting time
- Walkable distances between key destination and directness
- Absence of barriers, changing level (steps and slopes) and discomfort

3.1.2 Definitions of interventions items

Focusing on the "spatial environment" slice of the Pizza model, interventions concern the improvement of the overall urban quality of the space in which pedestrians move and they can be classified through different criteria, as below:

◊ **Stage**
  - National
  - Regional
  - Provincial
  - Municipal
  - Borough

◊ **Scale**
  - Urban scale
  - Street scale
  - Site Scale

◊ **Type:**
  - Technical (infrastructural, design, urbanistic, ICT,...)
  - Non technical (policies, laws,...)
Step of the process
- Knowledge
- Research
- Data
- Policy
- Pilot project
- Design
- Implementation
- Validation
- Management
- Maintenance

A specific interventions can be inserted in more than one of these classifications, since the latter are interrelated.

On the basis of literature examples and of the Inclusive Mobility Guidelines published by the Department for Transport (UK) in 2002, the walkability analysis is based on the scale classification, in order to comply it to the 3-layers of the Pizza Model. Therefore the interventions will be split up in three items:

**Item 1 Site**

- **Crossings Interventions**
  - Provide adequate location (not too close to the intersections or too far away)
  - Provide adequate waiting time, crossing times, information technology (if signalised)
  - Provide adequate capacity (waiting areas, refuges, midblock islands)
  - Provide traffic calming measures (humps, roundabouts, curb extensions, raised crossings, intersection radii, rumble strips)
  - Provide dropped kerbs, ramps, at-grade crossings
  - Prevent car parking and obstacles
  - Provide adequate legibility: marking, colour, surface, tactile information
  - Provide maintenance, cleanliness (surface, litter, markings, furniture)

- **Public Transport Waiting Areas Interventions**
  - Provide adequate location (not in curve)
  - Provide adequate space (platform)
  - Provide adequate equipment (shelters, seatings, benches)
  - Provide protections from traffic
  - Provide dropped kerbs, ramps
  - Reduce gaps between the transport access point (i.e door) and the footway/stand.
  - Provide adequate lighting
  - Provide maintenance, cleanliness

**Item 2 Network**

- **Links Interventions**
  - Provide sidewalks with proper width, gradient (steepness) and surface
  - Provide adequate street furniture location
  - Reduce kerb parking
  - Provide dropped kerbs, signalized driveway, building entrances recognizable
  - Provide adequate buffer between walking paths and car/bicycle lane (planter strips, parking lanes)
  - Provide information and orientation signage
  - Provide adequate lighting
  - Provide maintenance, cleanliness (surface, litter, graffiti)
 Routes Interventions

- Prevent barriers (adequate location of fences, guardrails, parking lots, street furniture)
- Provide traffic calming measures (road narrowings, chicanes, half and full street closures /cul-de-sac, lateral shifts)
- Create an attractive walking environment (planting of trees, play equipment, public art, fountains, statues, street cafes)
- Provide adequate linking with Public Transport Waiting Areas
- Provide adequate pedestrian bridges, overpasses, underpasses
- Provide orientation signage (maps)
- Provide adequate lighting
- Provide maintenance, cleanliness (surface, litter, graffiti)

Item 3 Space

Public Spaces (rest areas, meeting places, squares) Interventions

- Prevent barriers (adequate location of large complexes of buildings, gated areas)
- Provide street furniture (benches, litterbins) and lighting
- Provide information and orientation signage (maps)
- Provide parking measures
- Provide green areas
- Reduce noise and emissions levels
- Preserve historic centers and promote tourism
- Provide maintenance, cleanliness

Special Zones (school, residential areas,...) Interventions

- Provide traffic calming measures in school zones
- Plan Home zones (30 km/h)
- Plan Car free zones (specially in the city center and in residential areas)
- Adopt speed limits (specially in school and hospital zones)
- Prevent big heavy vehicles' transit in central zones
- Plan a pedestrianisation of the city center
- Establish Road/Park Princing measures
- Provide adequate facilities in interchange zones (stations)

3.1.3 Definitions of context items

After a literature review regarding the context issue related to pedestrians, the following items are seen as the most opportune in the framework of this walkability analysis. The reason of this subdivision is due to the will to have coherency with the 3-layers approach of the Pizza model. Therefore the context issues will be split up in three items:

Item 1 : Site

Buildings

How hight are they?
Are blocks compact?
How are they oriented and aligned respect to the sidewalk?
Road intersections

How many intersections are there?
Which type of intersections are there?
Which is the density?

Architectonical and historical buildings

Are there historical buildings?
Are there architectonical buildings?
Are there heritage sites?

Item 2: Network

Road network characteristic

How wide are the roads?
What is the speed limit?
Have the roads a clear function?

Topography

Is the terrain flat?
Which is the altimetric profile?
Are there substantial height differences?

Presence of barriers, like streams / rivers / etc

Are there rivers or streams?
Are there channels?
Are there lakes?

Item 3: Space

Climate conditions

What is the average temperature in winter and summer?
What about the wind and the precipitations?
What about humidity?

Urban design

Which is the city planning?
Are there special districts?
What about the old town?

Distribution of commercial activities, residential zones and essential destinations

What is the amount of the urban sprawl?
Which is the residential density?
Where are located shops for daily necessities, health centres, schools, bank/post offices, playgrounds and public transport stops?
3.2 The 20 cities

The qualitative approach is carried out through the study of 20 pedestrian friendly cities, one for each country participating in the COST Action. The choice of the cities is anticipated by a wide review of examples from all the countries, in order to end up with 20 good options, although there are other cities that are remarkable for “pedestrians interventions” in all the twenty countries.

The following 20 cities have been selected:

Austria Graz
Belgium Gent
Czech Republic Praha
Estonia Tallinn
Finland Helsinki
France Strasbourg
Germany Berlin
Greece Athens
Hungary Pécs
Israel Haifa
Italy Modena
Netherlands Delft
Norway Oslo
Poland Krakow
Portugal Lisboa
Serbia Belgrade
Spain Barcelona
Sweden Lund
Switzerland Geneve
United Kingdom Leeds

Each city is analyzed from a qualitative point of view with regard to context and interventions issues and a common format has been used to summarize the main findings.

♦ Context issues
A qualitative description of the context (“spatial environment”) is provided; the subdivision in three layers is the framework, since there are reported information about buildings / intersections / architectonical and historical buildings (SITE), road network characteristics / topography / presence of rivers, etc (NETWORK) and climate conditions / urban design / ditribution of commercial activities / residential zones and essential destinations (SPACE).

♦ Interventions issues
A list of the interventions regarding PQN and “spatial environment” is then provided. Measures are summarized giving a concise overview of PQN interventions. Obviously there are some cities that have more detailed description, but this is unavoidable since on the Internet not all information is available for all cities and the STSM was too short to collect extra material.

♦ References
It is reported all material used in the analysis, specifying its source.
Location of the 20 pedestrian-friendly cities
Context item

SITE

The city centre presents quite compacted buildings, where many little shops and coffehouses are located. There are currently 228 buildings in Graz that are classified as highrise buildings (a building is classified as being highrise if the floor of at least one room is 22 metres above ground level). There are some new high rise buildings in the pipeline, specially for administration and office buildings, hotels, restaurants and entertainment facilities, commercial and service institutions, residential buildings and garages as well as businesses. Graz was the Cultural Capital of Europe for 2003 and has one of the best-preserved city centres in Central Europe. In 1999 it was added to the UNESCO list of World Cultural Heritage Sites. Its historical buildings (an 11th-century castle, the 15th-century Gothic Cathedral,...) and monuments give a unique character. In 2003 numerous architectural highlights were built, of which the Kunsthaus (House of Art), the Helmut List Hall, the Stadthalle (event and congress hall) and the Literaturhaus (House of Literature) are some of the most important.

NETWORK

The city centre streets are quite narrow and mainly there are one-way streets. An extensive public transport network (tram and bus) is widespread all over the city and the surrounding areas, thus making Graz an easy city to navigate without a car. Graz is located in a shallow basin at the rim of the Alps along the Mur valley. The city is divided into two parts by the River Mur. With regard to the topography, the city itself is relatively flat. However the old town is built around the Schlossberg Park, the hill with the clock tower (472 m high) which can be also reached by feet (260 steps).

SPACE

Due to its position south east of the Alps, the weather in Graz is Mediterranean influenced. However, this milder climate is detrimental to the air quality in Graz as it makes the city prone to smog in winter.

The centre of the city is the Hauptplatz, the main square, which was built in the Middle Ages as a trapezoidal market square. The urban complex forming the historic center of the city is an exceptional example of a harmonious integration of architectural styles from successive periods. Graz is divided into 17 districts and the southern part of the city has been established as a development zone by the spatial planning guidelines of the City of Graz and the city development plan. The urban sprawl phenomenon affected the city of Graz too in the last 30 years. The trend of the development bears a heavy impact on the land use in the immediate surroundings of Graz. Built up areas include multy-storey buildings, family buildings ans industrial areas. This shift in residence location towards the hinterland is due to a variety of factors, including for example shifts in real estate prices and, increasingly, environmental considerations.
**Interventions items**

**Implemented strolling zones**

Graz has one of the largest pedestrian precincts among European cities, but for years the neighbouring districts were strongly affected by heavy individual motorised traffic. Accessibility of the precincts through these surrounding areas was neither safe nor attractive: the objective of this measure was to implement four strolling zones in central Graz, thereby improving the quality of living and attractiveness of the city, to promote sustainable alternatives to private cars in the city centre such as walking and biking and to reduce emissions and noise in the city centre. The pedestrian areas will be extended with differentiated access restrictions through an "**onion-skin system**" of pedestrian precincts, bike access precincts, the missing link strolling zone and beyond that the city wide speed limit of 30 km/h for certain suitable areas (car traffic will not be excluded totally from inner city traffic). Remarkable for the improvement of the quality of the neighbouring districts is also the **Green Light Graz Project** (since 2005), that aimed at modernize **street lighting** along the main traffic routes. 718 lamps in main streets were renewed and provided with state-of-the art technologies and control engineering. The **Grünes Netz Graz Project** (2007) also is a strategic element in the city planning and provides for potentially establishing **foot and cycling path connections**, as well as the **planting of green spaces**.

**Pedestrianisation**

The **Space for People Project** was carried out about ten years ago and create in the city an attractive walking environment through a series of interventions: provision of **large slabs and small cobbles** (Färberplatz), **public art** (Glockenspielplatz), **lifting of cobblestones’ levels** (Stempfergasse), **market places** (Tummelplatz), **good street lighting** (Jakominiplatz), **planting of trees** (Lendplatz),… Furthermore since autumn 2004 attempts are undertaken to attach the **zebra crossings in transverse direction** in order to motivate thereby the driver better for stopping before the protection way. In addition this device must have the index "marking of a protection way", if traffic light regulation is not provided. The Space for People concept could, however, not stop negative international trends such as shrinking numbers of residents in the old town, retail business changes and various functions shifting away from the city centre. Nonetheless, the conditions were created for the inner city to preserve its vitality and encourage non-motorized trips. Nowadays most of the planners for the Graz squares and open spaces belong to the 'Graz School of Architecture', major importance has been assigned to networking individual locations (also across the river). The aim of this implemented pedestrianisation is to allow people to walk (or cycle) in a safe and pleasant city area and to decrease pollution and noise levels in the historic core of the city ("**Programme for particulate matter reduction in the province of Styria**", 2004). The latest interventions regard **pedestrianisation of suburban district centres**, thus increasing priority and mobility for pedestrians.

**Customer friendly stops for bus and tram**

In Graz, there are 800 stops for bus and tram and most of them have become userfriendly through **CIVITAS-Trendsetter Project** (2006). A catalogue of existing stops and their equipment was set up and the most important stops (at end of lines, at important interlinkages between PT lines or other modes) were selected to get **rebuilt**. The specific intervention were planned with the mobility and vision of impaired people as the main target group. Originally, it was planned to equip all stops with maps of
the neighborhood, but due to personnel shortage this was skipped. In cases of stops at crossings, the whole crossings were rebuilt in parallel with the stops, in order to guarantee a safe pedestrian crossings to get to the stop. Waiting shelters were set up and some stops have been equipped with a "real-time information system" and with a bike rack for B&R. As regards the handicapped, systems to enter buses or tram with drivers support instead of automated systems (they often do not work in the colder seasons and often require wheelchair users to get down onto the road) have been established. There are no maps or overviews about stops in braille, because it is assumed that the individual disabled receives a training anyway in how to get around the city. Specific measures were planned to avoid that broad waiting area get in conflict with pedestrians and equipment with curbstones, which allows buses to stop only with a gap of few centimeters from the sidewalk, were provided.

**Mobility Management**

In Graz, mobility management has been given priority for several years, specially for companies, schools and big events. Particularly the city has several locations for events (one of which is the new City Hall used for fairs and big concerts) and a study was made to analyse the potential for a modal shift and the most efficient turning points for action. As regards the schools, mobility management measures were implemented in 2002 – 2006 in primary schools and consisted of different interventions in "pedestrian frame": analysis of the school neighbourhood with respect to traffic safety, collecting "green miles" while walking or biking to school, car free month, painting the streets,... Significant Projects that were carried out are TAPESTRY (2003) and MOSCHUS (since 1998). MOSCHUS (Mobility management in schools in Graz and Linz) aim is to reduce car traffic next to the schools and included the installation of a car stopping point for parents in order to divert car traffic from the school surroundings and the initialisation of a parents circle to accompany the children on their way to school (by foot). Remarkable is also a national behaviour change campaign (GOAL – Gesund Ohne Auto und Lärm, 2000 - 2003) that implemented its pilot project in the City of Graz in 2001. In this frame one of the aims was to enhance walking and cycling through activities in schools and kindergartens and to focus on mobility behaviour for short distances mainly in residential areas ("Lärm im Stadtgebiet").

**Speed reduction and less car use interventions**

The city of Graz aims at a higher traffic safety for pedestrians and people using non-motorised modes of transport. One of the strategies focuses on the speed reduction of passenger cars, as they are the main risk for pedestrians and bikers. A second focus lies on the reduction of car use in favour of more sustainable modes. The measures undertaken consisted of various tasks. Graz has introduced 30 km/h speed limit on the majority of the streets, including those with the right of way too (here cars were allowed to go 50 km/h). Particularly this device has been implemented in residential zones. At 10 different sections noise measurements took place to compare the situations before and after: the obtained results vary between a realised noise reductions of 0.2 dB up to 1.9 dB. Afterwards the concept of the car free day was changed: from closing down bigger parts of the inner city streets it was reduced to temporary closures of sections of streets in 2004. Finally speed control devices were spread all around the city, which inform drivers how fast they go without taking legal action against them in case they are too fast. It has proven a valuable and fairly simple awareness raising and speed reduction tool.
Interventions that turn attention to **inner urban freight transport** has been implemented, as well as complete restrictions on heavy goods vehicles through movements (**Green city logistics Project**).

**Integrated pricing strategy for parking zones**

Parking spaces in central areas are rare and subject to a fee; there are a number of **underground car parks** in the city centre too. In 2004 it was introduced a new parking system that makes a differentiation between polluting and non-polluting vehicles: non-polluting vehicles are those that fulfil the Euro IV norm and other cars that emit less than 140 g (130 g for diesel vehicles) CO₂ per driven kilometre. Owners of low emission cars can register and get a so called "Umweltjeton", an environmental token that permit them to get a decreased parking tariff. The objective of this measure is to develop a new parking model system in the city centre, thus reducing noise and emissions levels, congestion and therefore improving pedestrians environment. To reduce traffic congestion in the center a **shortage of parking facilities** and a provision of adequate **P&R structure** was planned in parallel. In Graz, 'City of short distances' is not just a slogan, but reality: parking and walking (riding) one can get to the center quicker than by car (the old town of Graz is reachable within 20 minute walk from the main train station).

**Footbridge**

The old town, on the western bank of the river, is connected with the new town, on the eastern bank, by **seven footbridges** across the Mur River. Particularly the Mursteg footbridge is fit for pedestrians and bicyclists. Notable is the Murinsel (Mur Island), a construction of steel that was built in 2003 and developed itself as an attraction and a popular sight of Graz. The open part of the construction can also be used as a resting place, while the closed part includes a coffee house and a playground for children. This pedestrian bridge connect the shores of the river and at the same time is an object of both art and architecture that embrace the visual surroundings.

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Context items

SITE

Buildings are very compact, both in the city’s center (reflecting the medieval past of Gent) and in the outskirts. Its history characterizes the center of the city, where lots of places of interest can be found. The Belfry and the towers of Saint Bavo Cathedral and other churches are some examples of the city skyline. Much of the city’s medieval and baroque architecture remains intact and is well preserved and restored, as well as the castle (Gravensteen). The city boasts an Opera House, 18 museums, 100 churches and over 400 historical buildings. Modern architecture examples are also present, as the university building (Boekentoren), and a lot of little shops and restaurants are widespread in the city.

NETWORK

As regards road network, the city is accessible by two of the country’s main roads (E40, E17) and has two ringways: R4 that connects the outskirts of the city with each other and the surrounding villages and R40 that connects the different downtown quarters with each other and provides access to the main avenues. The city is flat and there aren’t height differences that could impede walking or other mode of transportation. The city's medieval core is cradled within a loop of the River Leie and the city has an extensive network of canals and endless streets. Gent is connected to the sea by the Gent-Terneuzen Canal, also known as the “Sea Canal” (Zeekanaal): the city has an important harbour, which is very centrally located as to the Northwest European hinterland with excellent connections by road and rail as well as by inland waterways.

SPACE

The city has a moderate oceanic climate, which means that rain and wind are frequent, but snow and ice are not. The city of Ghent has a complex structure reflecting a long evolution, dating back to the Middle Ages; the city centre covers a large area and comprises many squares and narrow streets, with the River Leie running through its centre. During the 1980s, the city centre suffered the impacts of increasing car traffic, including congestion, air pollution and noise and the city’s streets and squares were designed over the years to accommodate car traffic (becoming increasingly unattractive). Nowadays they have been renovated with the aim of making the city centre more attractive to residents and visitors. Particularly two districts are important: Graslei and Patershol. The first once was a bank of a flourishing harbour and now beautiful medieval houses are along side of it (now there are mostly restaurants housed in them). The second quarter is a network of little medieval streets, that were renovated after the II World War; now it is one of the city’s trendiest areas with upmarket cafes, restaurants and shops. To reduce suburbanisation, services and employment are concentrated around the harbour in the north (employment), the city centre (employment and services) and the south of the city (employment and services). Gent has used these principles in its land use destination policies This policy of concentration of functions in and around the city enhance the use of sustainable modes of transport.
Interventions items

Pedestrianisation

Gent is an accessible and pleasant city to live in, thanks to the "City Centre Mobility Scheme", which the City Council approved in 1996. In 1997 part of the city centre was pedestrianised, so that Gent has the largest car-less centre in Belgium (35 ha, 12 ha of which is public space). This extensive pedestrianised area was created with the objective of prioritise vulnerable road-users and public transport. By, for instance, imposing loading and unloading restrictions between 11 a.m. and 6 p.m., traffic in the heart of the city is kept to a minimum during most of the day and the pedestrians and cyclists wanting to visit the many commercial, cultural and social facilities in the city centre have the space freely to enjoy all the city has to offer. Traders and the local residents within the pedestrianised area can obtain special permits to enter this area with a motor vehicle. However the permit does not allow to park or to drive through the traffic-free area as a shortcut from a location on one side of the pedestrianised zone to a location on the other. There are some exemptions: people with disabilities, elderly people who have difficulty walking and people with restricted mobility. To prevent abuse, the border of the city centre is controlled by automatic bollards. Furthermore special attention is given to the links between the different pedestrian areas in non-pedestrianized streets, which are often traffic calmed. The city has invested also in pedestrian infrastructure like footpaths, pavements surface and small piles introduced in order to keep cars off the pavement. The extension of the pedestrian area has increased both safety and attractiveness for pedestrians in the inner town and the fact that pedestrian routes are considered as a whole (including non-pedestrianized streets) is especially increasing the attractiveness of walking in the city centre.

30 km/h zones

In different parts of the city traffic calming measures were introduced within the creation of 30 km/h zones: the city has now become a place where all light forms of transport are able to move freely and safely. The streets have been redesigned to meet the needs and desires of pedestrians and public transport users. Within the areas surrounding the pedestrianised centre, traffic has been calmed by the creation of a 30 km/h zone, in order to increase the safety of pedestrians and cyclists. Particularly, speed limits have been introduced in 1400 streets, especially in residential and school areas. The speed limit is valid for buses, but not for trams. Trams are considered rail, not road vehicles; as a consequence the (road) traffic code is not applicable to trams. The measure was introduced by putting up the obligatory traffic signs at the entrances of the area. Furthermore in the pedestrianised area speed limits have been reduced to 5 km/h (for those with permitted motorised access). On the ring road the maximum speed remains 50 km/h. To calm traffic outside 30 km/h zones, a different measure was introduced, that means raised intersections. These platforms are not only built in residential streets, but also in streets that occupy a higher rank in the road hierarchy. On these roads the conflicts between traffic and local use of the streets are often worse than in purely residential areas.

Safe School Environment

To increase safety on pedestrian crossings near school entrances, Gent has implemented different speed reducing measures. 30 km/h zones is one example, but more effective was the introduction of
plateaux to decrease the speed of car traffic. Other devices are road narrowing at pedestrian crossings, punctual illumination of the zebra crossings and flashing lights. School environment safety programmes includes also parking restrictions (e.g. parking is forbidden in front of school gates) and other non-infrastructural measures, such as authorised traffic guards. An increase in traffic safety near school entrances through speed reducing measures and parking restrictions also improves safety for cyclists. The only negative side of these interventions is the cost, since the speed reducing measures require the reconstruction of roads.

Parking routes and park-zones

By far the most important measure to make Gent a pleasant city for pedestrians is to keep through-traffic out of the city centre. This traffic must make use of the city's ring road and the P-route (parking route). Signs along the ring road indicate which car parks are nearby and how many spaces are still available in them. This P-route operates in a clockwise and an anti-clockwise direction around the city centre. Upon leaving the city centre the main exit points (ancient city gates) are sign-posted (Brugsepoort, Brusselsepoort, Sint-Lievenspoort, etc.). These P-routes around the city centre ensure optimal accessibility to all destinations and especially to underground parking garages. The Mobility Scheme has provided for easy car parking nearby so that every visitor is able to park their car within a walking distance of 400 m from their destination (some people have difficulty walking, the weather is not always pleasant and carrying heavy shopping is not much fun). Nowadays driving through the city centre is impossible and moreover surface parking has been reduced considerably. Furthermore the paid parking system increases the turnover of cars in the parking spaces, since the maximum time limit (for ordinary users) is 2 hours and cars stay no longer than is strictly necessary. Special provision has been made for residents that have a permit which allow them unlimited parking in the designated areas.

Public Transport improvement

In Gent priority is given to public transport, but in an indirect way, through a reduction of car traffic in the pedestrian area, resulting in more space for public transport that can access to the pedestrianised zone. The city has enhanced public transport through a number of measures that all aim at speeding up service: bus and tram lanes have been combined together and the public transport network has been improved through more frequent service. Kerbs and all kinds of obstacles are being removed and streets and squares are being re-surfaced to make them comfortable for pedestrians. The restriction of private car road space in the city centre and the reduction of the supply of on-street parking spaces are the basis for PT improvement, since the additional road space that became available by this means is re-allocated to public transport. And this is another kind of interventions that help Gent to ensure pedestrians’ quality needs.
Pedestrian bridge

In the center of Gent lies **Saint Michael's bridge**, the most monumental bridge in Ghent from which the famous Gent's towers can be admired. Near the bridge, alongside the Leie river, there are two **pedestrian streets** where cafés and restaurants have been set up. Particularly, **Graslei** was part of the medieval harbour of the city and now it is integrated in the pedestrian area. The place has been completely refurbished during the second half of the 1990's and is now an attractive place in the heart of the city centre. Graslei is the arrival and departure place for tourist boats which cross the city centre; it is mainly paved with cobblestones which could make access for wheelchairs or buggies less evident. Its location in the historic heart of the city centre and the opportunities to sit down and relax make it a popular meeting place.

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Context items

SITE

Praha’s old center is building compact and in recent years a trend is observable in increasing housing construction in the outskirts, where multi-purpose complexes encircle the core of the city (the Czechs wish to have shops and services at hand and the trend is to concentrate housing and work at one and the same place). Pankrác district has become one of the most important business districts in the country and here the highest buildings can be found. This development contrasts with Praha’s historical cityscape, although UNESCO Committee and the City Hall reached some compromises four years ago. Since 1992, the entire historical centre of Praha has been included in the UNESCO list of World Heritage Sites. Much of the post-communism reconstruction and regeneration of Praha has been driven by tourism, as ancient buildings have been transformed into fine restaurants and stylish hotels. The Old Town, the castle, the squares, the churches’ towers and spires are some of the city’s attractions.

NETWORK

Praha is built on both banks of the Vltava river which runs through the city in the length of 30 km and is used for waterway transport of goods as well as passengers. As for geomorphology, there is the flat relief of the high-raised areas on one hand, contrasting with the sharp valleys of the Vltava River and its tributaries on the other hand. The most broken topography originated on the left bank of the river. The highest point is the flattened landscape southwest of the Zličín town part (399 m above sea level), while the lowest point is the surface of the Vltava river at the north edge of the city in the Suchdol town part where the river leaves the territory of Praha (177 m above sea level). Therefore, the maximum altitude difference exceeds 200 m within a rather small area. As regards road network, thanks to its highly central location both within the Czech Republic and Europe, the city plays the role of a transport crossroads as well as a target destination of goods and persons movement. Praha is situated at an intersection of important transit roads, it is connected to 5 routes of the European road network and has a direct connection to the North Sea (the Hamburg port) too.

SPACE

The climate in Praha is mild with warm summers and cold winters. In winter, the daily temperature averages around the freezing point and falls at night into −4 °C (26 °F). Snow is rare in Praha during winter. Because of the bad ventilation conditions of Praha relief and big traffic emissions are exceeded the limits for health protection of the suspended particulate matter, nitrogen dioxide, carbon monoxide, ground-level ozone and benzene. Since 2001, Praha has been divided into 22 administrative districts in order to control and plan the city’s development. The city centre comprises four areas (Old Town, New Town, Jewish Quarter, Lesser Quarter), spanning both banks of the Vltava river and many public parks can be found there, as well as shops with basic goods, services and schools. In the district of Southern Town there are many estates, with the majority of its inhabitants commuting to the city centre for work, culture, and other amenities. From a spatial organization point of view, the fragmentation of the built-up area (partially due to the large parks and forests surrounding) and the existence of large high-density panel housing projects in the suburbs contribute to the dispersion of the population. More efficient land use utilization is one of the objectives of Praha’s strategy, as well as the maintenance of a reliable Integrated Public Transport.
Interventions items

Pedestrian crossings

In 2004, a project within the research plan "Reduction of the number and severity of road accidents" was carried out with the aim of analyse pedestrians problems and design road safety measures at pedestrian crossings. System solutions contributing to reduce the number and severity of pedestrian road accidents were identified. In 2006 an original system to protect pedestrians from irresponsible drivers was installed in some districts: when some car will approach a pedestrian crossing near the school or near a bus stop too fast, the traffic sign will start to twinkle intensely to warn the driver. In other districts there are special large coloured surfaces on the roads in front of the crossings, where most accidents happened in the past. The coloured surface (20 meters large) is rough and it enables the drivers to stop the car more easily. There are also special lights reacting to movement of pedestrians on several crossings, these lights start to twinkle when a person is crossing the road. The lack of traffic lights is a matter of fact in Praha and one of the main cause of pedestrians’ accidents (and the situation was worse when, seven years ago, pedestrians didn't even have right of way on crosswalks). It is planned to install 200 new traffic lights in 10 coming years and in 2006 there were a total of 491 traffic signals devices in operation (212 work connected to the Principal Traffic Control Centre). Of the total number, 76 independent pedestrian crossings are in operation and 382 intersections have acoustic signalisation installed for the blind.

Pedestrian bridge and pedestrian tunnel

Charles Bridge (Karluv most) is the oldest bridge in Praha and is only open to pedestrians. Both ends of the bridge are fortified by towers and sculptural groups of the saints are set on the bridge piers, most of them baroque-style, erected around 1700. The bridge is 515 meters long and 10 meters wide and connects the Old Town and Malá Strana. The bridge is pedestrian only and in cobblestone, it is normally packed with people all day long, especially during the spring and summer months (there is a great view here of the castle). It is also popular with Czech artists, musicians and souvenir vendors whose stands line both sides of the bridge year-round. Nowadays it is running the bridge’s reconstruction, which will be completed in 2020; the bridge remains open to visitors during the reconstruction with the passage only being narrowed in certain parts. A footpath from the banks of the Vitava river to the Praha’s Castle passes through an 84 metre long elliptical pedestrian tunnel. The rectangular opening gives way to an oval section that is stretched rather high, making the extremely long and narrow opening appear more generous in size and less claustrophobic for those passing through. The internal vaulted surface is constructed of brickwork, giving the tunnel its unique and site-specific character. Furthermore half of the floor is made up of steel grating, allowing the stream - located at about the halfway point of the tunnel - passing underneath to be seen and heard.
Since 1991, the number of cars as well as the car traffic volumes in Praha have grown at an explosive rate and one of the means by which Praha is trying to solve this situation is the introduction of P+R parking places, which enable to combine a car journey in the outer city zone with a public transport mode into the downtown area. The concept of P+R parking places is part of both the urban planning of the City of Praha and urban planning policy of Praha's region. P+R parking places are located principally in a short walking distance from rapid transit stations, mainly rail public transport with a good connection to the city street network. By newly built metro stations in the border zone the construction of P+R parking places has been part of the metro framework. A more difficult situation has occurred near already built stations of public transport where there were no longer available vacant lots and urban planning therefore presupposes a construction of P+R parking places in above ground or subterranean properties. Furthermore Praha Transport Policy contains principles of transport infrastructure developments improving the quality of Public Transport and regulation of car traffic with the aim of influencing the modal split while favouring public transport. Several effort have been made regarding passengers with impaired mobility, making Public Transport accessible and available for these groups of citizens through proper platforms, ramps and waiting areas. In addition to this device, paid parking zones have been introduced in the central part of Praha: they operates at certain hours and there are three different tariffs related to different average occupancy of the lots (short, mid and long term).

Traffic calming interventions

Recent trends in the Czech Republic have seen an increase in travel undertaken by car at the expense of non-motorised modes. The National Transport Policy recognises that more attention needs to paid to non-motorised modes, as these have been neglected in the past, and can have social and environmental benefits particularly in terms of reduced emissions and energy efficiency. The Institute of Transportation Engineering of the City of Prague (ÚDI Praha) is a specialized organisation that concerns with engineering, design and consulting activities in the field of city transportation and traffic engineering for the City of Praha. One of its activities is to implement a traffic calming programme. Each year a number of measures are taken across the city to increase the safety of pedestrian traffic, particularly in the area of tram stops and at places where larger numbers of pedestrians cross the driving lanes on the roads. Modifications in 2006 dealt with structurally implementing speed thresholds, modifying tram stops and access to them, implementing accentuated road signs that better designate zebra crossings, creating central traffic islands and narrowing roads at zebra crossings in some cases. Sections and parts of local paths serving mainly for pedestrians have been gradually repaired also in some districts. And traffic-safety equipment (crash barriers, guard rails, areas on central traffic islands, road mirrors, coarsening roadways at zebra crossings) have been installed. However Praha is far from the recommended speed of 30 km/h in the inner city and in residential zones: giving pedestrians’ priority in road environment is a slow process.

Pedestrian zones

Praha Traffic Policy is based on the priority to public transport, development of traffic infrastructure and regulation of car traffic, particularly in the centre of the town. Approximately one quarter of all of the inner-city routes in Praha are solely pedestrian. It is the city centre area that have seen the greatest gradual expansion of pedestrian zones and other types of steadied traffic on roads on which better conditions can be made for pedestrians' movement and relaxation. The pedestrian precinct in...
the centre of Praha (the Republic Square) is strictly closed to cars since October 2006, with the only exceptions of cars with a special licence and cars for disabled persons. Charles Square, the largest square not only in Praha but also in the whole Czech Republic, was closed for tram in autumn 2007, because of the necessity to maintain the tracks in the square. In 2006 Praha participated at the European Car Free Day: pedestrians and cyclists could enjoy the usually busy streets just for themselves. Furthermore Praha has expanded its environmental zone. Before the project (Institute of Transport Engineering of The City of Prague) the city had an access restriction zone for vehicles over 3.5 tons in the inner city centre and a larger zone around this zone with access restriction for vehicles over 6 tons. Since there was a need to curb negative environmental impact from the traffic, the city decided to widen the zone prohibited for vehicles over 6 tons (the environmental zone was extended to almost the double size). This successful measure has resulted in less heavy traffic and thus less pollution and road wear and tear. The evaluation of the extended zones shows significant reductions of energy use and emissions of CO2, NOx and particles as well as reduction of noise levels.

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Context items

SITE

With its 380,000 inhabitants Tallinn is also the largest city in Estonia. Tallinn, a major port of long standing has a strong tradition and history. The picturesque Old Town, included in the UNESCO World Heritage List, is a unique pearl of medieval architecture accentuated with tall towers. Within a five-minute walk of the city centre there is the modern City. During the last ten years, Tallinn has been modernized to a significant degree and its city space has become more attractive thanks to the construction of many new buildings and the repair and renovation of old ones (2004 - restoration of the Cathedral). Tallinn's medieval Old Town presents unique structures, such as St Olav's Church, which was the tallest building in the medieval world, and beautiful towers. The city center is compact and a web of winding cobbledstone narrow streets make the area explorable by foot. Shops, bars and restaurants around the Town Hall Square are also present: Tallinn tries to preserve its traditions, but also to be open to innovations and to integrate them successful with the existing living environment.

NETWORK

The city lies on the southern coast of the Gulf of Finland, only 70 km south of Helsinki. The length of the coastline is 46 kilometre and a large lake is also present: Lake Ülemiste, which covers 9.6 km² and is the main source of the city's drinking water. The land distance between the Lake Ülemiste and the Gulf is only 1.8 km thus causing a bottleneck for transport connections between the eastern (Viimsi, Pirita, Lasnamäe) and central or western parts of the city. Unlike many other large towns, the only significant river in Tallinn is located in Pirita (a city district counted as a suburb). A limestone cliff runs through the city and the highest point of Tallinn, which is 64 meters above the sea level, is situated in the district of Nõmme, in the south-western part of the city. At the historical heart of the city is the hill of Toompea, which is covered in cobbled streets and filled with medieval houses and alleyways. As regards road network, several projects have been carried out for the reconstruction of old links and unfinished portions.

SPACE

As regards the climate, Tallinn is characterized by a fairly cold winter and a moderately warm summer. Although it doesn't always snow in winter, there tends to be about 10 cm of snow on the ground consistently from late December through to the beginning of March. In Tallinn very little public intervention in the urban development have been carried out and the residential projects realised since 1995 imply increasing socio-spatial differentiation. Housing complexes line up along Tallinn's radial road system and form distinguishable quarters. Enlarge the city space is the motor of new investment and in Tallinn's outskirts extensive construction has been carried out since years. The urban sprawl and the fragmentary expansion of residential areas seems not to stop and more and more urban commuters move to the countryside. Another matter of fact in the City of Tallinn Planning is the development of the port area and the expansion of city space to the sea. Nowadays approximately half of the population lives within the 2 km coastal zone. Finally, nearly a quarter of Tallinn's area is covered by greenery, one half of which is forest, and the other half are parks in the city centre.
Interventions items

Walkways, crossings and street lighting

Pedestrians’ paths have been better considered in the last years and the city provided a few under and overpasses at some intersections too, although many places still lack safe pedestrian connections and this is a serious issue for the accessibility of users with limited mobility. Currently several effort are being made towards parks walkaways and connections with the Old Town, in order to create an accessible (and pleasant) environment. However gaps are evident with regard of signalized crossings, as pedestrians often have to deal with several traffic lights and long delays. Problems are also evident at non-signalized crossings, which are often related to very wide crossing distance on the street, bad lighting and road marking and a lack of safety measures (barriers, refugee islands, etc.), thus causing relatively high driving speeds on crossings. Sometimes an irrelevant speed limits are used (up to 70 km/h at non-signalized crossings). Interventions have been undertaken with regards of pedestrians’ buffer from cars and bicycles, but the major efforts can be seen in street lighting issue.

In the interest of security for pedestrians and of traffic, Tallinn has implemented standardized and energy-saving lighting in the city streets, parks, landscaped areas and other public areas. Currently there are 39647 lighting fixtures in the city. At the same time, nearly 6000 lighting fixtures need to be installed or replaced on poorly light streets, interior blocks, landscaped areas or parks in the city. During last few years the special spot lighting has been introduced on some pedestrian crossings, in order to make pedestrians more visible and improve safety.

Parking regulation

The rapid economic growth of the city has imposed large structural changes on the urban context, since the number of private cars has increased rapidly. To reduce the parking load on streets with intensive traffic in the city centre, the paid parking area in the city was enlarged in 2004, and the parking fees were adjusted (but first 15 minutes parking is free). Parking on streets in the city centre, downtown, the Old Town and the Pirita (summer period only) area must be paid for and as a result of this measure, the traffic conditions on many streets have improved. A reduction of the surface parking lots was also planned and this helped public transport system too. Parking Cards for ‘Mobility Impaired Persons’ can be provided, so that they are allowed to park their vehicles free from charge in special lots. This is worthwhile to mention that parking payments could be made in different ways- using the slot machines, prepaid cards or- which is most popular- mobile phones.

Pedestrian zone

To increase the safety of pedestrians the city spaces requires traffic regulations and that’s why in the last years the pedestrian zone of the Old Town has been expanded. Nowadays not all the Old Town is car-free and, compared with other European cities, Tallinn’s pedestrian zone includes only a modest network of streets, but improvements are planned for the future. In this zone special interventions have been implemented with the aim of increase the comfort of pedestrians and the quality of the
environment: provision of benches, re-surfacing and/or maintenance of footpaths, etc. Furthermore in this area the speed limit of 20 km/h is in use and nowadays there is a proposal to introduce the speed limit of 40 km/h in CBD of Tallinn. To calm the traffic is extremely basic in Tallinn’s context, because of its weather and road conditions. Further the old part of the city has been graded as UNESCO world heritage and it appears urgent to prevent it from the damage caused by traffic. One of the reasons is the congestion in the city centre due to the growing number of cars that have also caused deterioration of the public transport service.

**Integrated Local Transport**

Since the reindependence of Estonia in 1991 Tallinn has experienced large changes. First the economic downturn and then the rapid economic growth have imposed large structural changes on the city and its transport system. The number of private cars has been growing rapidly and the collective transport network has not developed in the same pace as the private modes, facing huge competition. Between 1990 and 2000 the public transport use fell from 250 to 94 million and the modal share of the public transport in Tallinn collapsed from 77% to 31%. The worsening quality of public transport has affected virtually everybody in the city, but most of all women, children and elderly people who are most dependent on it. The massive shift to private car use has worsened the city environment dramatically. Within the framework of the European Commission initiative “Cooperation for the Promotion of Sustainable Urban Development”, Tallinn is developing a Sustainable Transportation Plan (2004 - 2010), where the development of the city’s Public Transport is one of its main objectives. In order to bring the public transportation network into compliance with the needs of life and business activities (and with pedestrian issue too), improvements in PT service level and quality has been planned. Interventions included in this frame are the increase of public transport lanes, the implementation of real time management and control system (dedicated PT lanes and traffic signal priority), the introduction of new tariffs for buses and trams,... Tallinn is also participating in the SMILE Project of the CIVITAS II Program (2005 – 2009) and support is provided for experimenting with new solutions for improving public transportation and making it more environmentally (and pedestrian) friendly.

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Context items

SITE

The cityscape is characterized by tall and symmetrical buildings. Engel, one of the city's main designers, projected over 30 public buildings in Helsinki as well as a great number of private houses. All these buildings, especially the historical centre, have had a huge impact on all later developments in the city. The city opens up to the sea and the shoreline is mostly artificial, due to former and existing harbour and industrial activities. These have been largely replaced by residential and commercial land-uses, and this trend is accelerating as the new goods harbour will be opened in Vuosaari in 2008, in the Eastern periphery of the city.

NETWORK

In Helsinki the clear grid pattern used to design the city's streets is remarkable. The network of straight, symmetrical wide streets, which make finding any address a simple task, is the creation of the designers Johan Albrecht Ehrenström and Carl Ludvig Engel. Streets are classified as main, collector and access streets. The principle is that, whenever possible, through-traffic is eliminated or minimised on access streets and traffic is led to the main and collector street network. The terrain is flat, thus walking and biking around town is popular. Helsinki's geographical location is on a narrow peninsula jutting out into the Baltic Sea and has many kilometres of coastline; most of its central districts are near the seaside. There are links by bridge and ferry with nearby islands (e.g.: Suomenlinna – UNESCO World Heritage Site) and the city centre is built around the main passenger harbor, Eteläsatama.

SPACE

The city has a temperate continental climate, but it should be noticed that during the winter the temperature oscillates around 0 degrees Celsius, producing both ice and wet snow, which makes walking both unpleasant and dangerous at times (especially for the elderly). Because of the latitude, day lasts less than six hours in the winter solstice, and the very cloudy weather accentuates the darkness. However Helsinki enjoys very long days in summer. Helsinki is set apart from other big historical cities by the great physical presence of nature. Even in the most densely-built districts of the city center, dense parks have been introduced to liven up the landscape (Kaivopuisto Park, Kaisaniemi Park, Old Church Park,...). Helsinki's geographical location has had a significant effect on its urban structure: Helsinki now forms a kind of half wheel with the centre at the hub. The city is divided into 33 districts, which may comprise several neighbourhoods. The southern districts are older and contain most of the city's main tourist attractions. Punavuori and the slightly more northern district of Kallio were traditionally working class districts, though Punavuori has tried to improve its image in recent years. The City Hall quarter - the Lion Block - lies in the heart of Helsinki's Neoclassical town centre. Here all the buildings are, apart from a few shops and offices, now occupied by the City of Helsinki. The main objective of the land use policy is to densify the city structure in order to reduce the need for travelling and increase possibilities for public transport as well as for walking and cycling.
Interventions items

Design, construction and maintenance of accessible living surroundings

Creating a safe and accessible environment strengthens residents’ wellbeing and enhances a society’s overall quality of life: this is the aim of “The Helsinki for All” Project (2003 – 2011), which was established by the Helsinki City Board and headed by the Public Works Department. Particularly, the SuRaKu (from the Finnish words for “design”, “construction”, and “maintenance”) programme, aims to create a set of accessibility guidelines for the design, construction and maintenance of the city’s public street, park and yard areas. Interventions that are set in the Guidelines regards pedestrian (and cycle) paths, as well as Public Transport areas, parks information panels, building’s entrance areas and walkway bypassing construction sites. Precisely they include clear separation between pedestrian and cycle paths, resting places at side and material differentiated from pathway, paths’ intersections clearly marked with different materials, lampposts on same side of pathway direct movement, tree branches that do not impede movement, PT platform’s edge markings clearly perceivable, furnishings clearly located in their own zone, clear signage at sufficient height, adequate lighting, parks information panels set back from pathway, different paving material; guide rails lead to panels, relief map and other information identifiable, building’s entrance clearly visible, ramps as well as stairs at entrance, street furniture in separate zone, bollards for traffic barriers marked clearly, sufficiently wide ramps, protective fences,…

Public Transport and Interchange zones improvements

Public transportation is generally a hotly debated subject in the local politics of the metropolitan area of Helsinki. As regard the city itself, it has a well-functioning public transit system. Several efforts have been made in interchange zones, providing adequate infrastructural measures (platforms with ramps, lifts,…), as well as high-quality PT routes and terminals with unobstructed structures (e.g.: Helsinki Central railway station and Kamppi form the main hubs for public transportation). Furthemore the introduction of Park-and-Ride facilities at railway stations and on trunk routes of buses has improved PT service and mobility needs, as well as environment conditions (air quality). Moreover new employer-subsidised commuter tickets have been introduced in the Helsinki metropolitan area at the beginning of 2006. The goal of the new ticket system is to increase public transport attractiveness.

City Centre: parking and heavy goods vehicles

Helsinki aims to reduce cars’ circulation and give priority to public transport and non-motorized transport (walking, cycling). Several interventions have been undertaken, such as the creation of car-free zones in the town centre, the increase of the cost of using cars (environmental tax, parking costs), the introduction of heavy goods vehicles measures, the promoting of sustainable development,… Parking in Helsinki is subject to a charge in nearly every street during working days and also on Saturdays in the inner city streets. It is allowed only on marked parking spaces and the streets in Helsinki inner city have been divided into three parking payment zones (with different fees). Car owners living in the inner city can obtain a residential parking permit that entitles them to park in the residential parking spaces within the zone free-of-charge. The residential parking scheme is in use in the inner city area.
In suburban areas, parking on the sides of the street is free. However, especially in new residential areas, local parking bans restrict parking. As already pointed out, commuter parking is a convenient way to avoid parking problems in the city centre, since the areas reserved for parking are located close to public transport stops and stations. As regards heavy goods vehicles (length over 12 meters), they are not allowed on the streets of the City Centre. The restriction does not concern buses and HGV’s with a special permission. These measures were undertaken in order to create a safe road environment and to achieve “cycling objectives” too, like increasing the use of bicycles and reducing number of cycling accidents.

Green areas and the townscape

Taking care of the cleanliness of the city and of other factors connected with the pleasantness of the Helsinki immediate surroundings has been improved through the cooperation of the residents and enterprises during the last years. Many initiatives for fostering historic, architectural and scenic values and for the protection of locally significant sites have been undertaken. The Public Works Department takes care of the construction of new parks and their renovation too. The Department also restores seashore beaches, nature reserves, parks of various manor houses in addition to rivers and brooks. The maintenance of the green areas consists of sanitation, caring for the vegetation and the maintenance of fixtures, equipment and walking paths. Remarkable in the city is Esplanade Park, which consists of two active streets – Northern and Southern Esplanade – and a longitudinal, boulevard-like park between them. The park has been renovated (statues, benches, cafes and ice-cream kiosks,...) and made accessible both by foot and by bike, thus becoming a waterfront green passage from the centre to market square and a popular meeting place. Furthermore the “Park of the Week” Project has been carried out: it was organised by the cities of Espoo, Helsinki and Vantaa in conjunction with the national Green Year 2008 with the purpose to enhance residents’ awareness and appreciation of parks. Furthermore the city has over 60 playgrounds open all year round and they have been strongly renovated (with the addition of play structures), since they are meeting places for citizens of all ages and provide a wonderful environment for pedestrians’ relaxation.

A safe residential environment

Speed limits were lowered in 2004 and currently on most of the city centre's streets the limit is 30 km/h; on the larger thoroughfares, main and collector streets, the it is generally 40 km/h. In housing areas it is also kept at 30 km/h, thus creating the possibilities for a safer environment for children, youth, the mobility impaired and the elderly. Moreover since 1998 the City of Helsinki have decided to have the zero-tolerance policy regarding all walls graffiti in residential areas. The actors who participate in the costs of “Anti Graffiti Project” are City of Helsinki, City of Espoo and some private real estate owners in Helsinki. The Anti Graffiti Project aims to reduce the graffiti vandalism, prevent children to fall into graffiti vandalism and give correct information about graffiti vandalism. Residents in the areas with lot of graffiti had a feeling of unsafe, specially women and older people. Furthermore in such areas real estate owners were afraid of price fall of their property; also companies wanted to move away from “graffiti areas” and new companies did not wanted to come to those areas. Pedestrian structural interventions have also be undertaken, such as route and kerbs maintenance, the construction of overpasses and underpasses for the most problematic points, road and street sweeping (as a measure against high particle concentrations caused by road dust).
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Context items

SITE

The city is known for its historical building, its Cathedral and its medieval cityscape (particularly in the Petite France district and in the streets and squares surrounding the Cathedral). The Cathedral is the highest medieval building in Europe. Strasbourg features a number of prominent parks too (Parc de l'Orangerie, Parc de la Citadelle,...). The city centre ("La Grande Île") is on the UNESCO world heritage list and the European District is one of many examples of Strasbourg's modern architecture (the building of European Parliament and of European Court of Human Rights).

NETWORK

Strasbourg is situated on the Ill River, which passes through a series of locks and channels in the picturesque old town, including the Petite France district. Several channels encircle the city centre indeed, creating a dense network. At the crossroads of the Paris-Munich and Hamburg-Milan motorway axes, the geographical location of Strasbourg offers rapid access to all of the cities in the Upper Rhine cross-border region and to the principal cities of Northern, Eastern and Southern Europe. Under rules brought in on 24 February 1992, through traffic can no longer cross central Strasbourg.

SPACE

The city is situated in the Rhine valley, approximately 20 kilometers east of the Vosges Mountains and 25 kilometers west of the Black Forest. Winds coming from either direction being often deflected by these natural barriers, the average annual precipitation is low and the perceived summer temperatures can be high. The defective natural ventilation also makes Strasbourg one of the most atmospherically polluted cities of France. Strasbourg is characterized by its parks and garden, like the Parc de l'Orangerie, that is the city's largest and oldest park. The city was German between 1871 and 1918, and keeps some urban characteristics from that period, i.e. the urban plan in the east and the railway station. The major part of the city development is in the west (residential area) and in the south (activities). The historic city centre of Strasbourg is easily defined, as it is a small island found in the river Ill (1 x 1.5 km).
Interventions items

Pedestrian area

The overall objective of encouraging people to get around town on foot is a firm goal of the city Urban Planning. The historical town centre’s pedestrian area was extended when work was carried out on tram’s lines in 2000. The area is 2.8 hectares running from the Cathedral to Petite France district. Particularly, these interventions interested some streets near the railway station and some squares (Place de la République, place des Halles). The railway station square includes a huge pedestrian area providing access to the railway station and to the tram station (pedestrians cross the square at street level and are no longer obliged to take the underpass, as they formerly had to); moreover road traffic has been reorganised here. This interventions were carried out aiming at making it possible to enjoy discovering the city's urban heritage on foot, in a more peaceful and less polluted environment. Cyclists are authorised to use the pedestrian area on condition that the cyclist slows down when pedestrians are present (with it being understood that pedestrians retain priority) and should dismount if the crowd density requires this. However, there are some categories of vehicles (residents’ vehicles, ambulances, etc) that are authorised to enter the streets and squares covered by the pedestrian area system under certain circumstances, and only for the amount of time strictly necessary for urgent service related or professional requirements.

Public space and parking policy

In the 90s, a number of squares were fully reconstructed to make walking more comfortable and more enjoyable including surfacing work, urban furniture and vegetation, etc. The implementation of new tram’s lines has been providential in this frame. Place de la République was completely restructured to eliminate vehicular through traffic and the square is now served by the tram. In the middle of the pedestrian area, the square has now become popular with pedestrians and a wide range of entertainment can always be found there including terraces during the summer, the Christmas market, street entertainers, exhibitions, etc. The hegemony of the car is reduced by banning through-traffic from the city centre, improving public transport and reorganised open spaces has been the objective of the City of Strasbourg. Furthermore, Strasbourg Transport Policy introduced over the years Park and Ride facilities and parking management with the objective to reduce the need for private car use and to encourage a "multi-mode" approach. Particularly, the amount of parking facilities in the downtown area and the location of the new car-park buildings on the outer edge of the central area were stabilised, as well as the extension of parking pricing to all the streets of the central district (short-stay paid parking), going together with the setting up of a special reduced fee for the residents. As regards P+R, Strasbourg Urban Council has also approved a service where purchases are delivered from the store to the car park within one hour, thus avoiding that shoppers have to carry their purchases around until they return to the car.

30 zone and school areas

In this respect, a series of measures have been gradually put in place by the Strasbourg Urban Community during the last years. They aimed at drawing up a specific schedule of conditions to guarantee the safety of pedestrians: the edge of pavements cuts the entrance to the "30 zone", which is marked out by an area featuring red paving stones. In this zone can be found also raised
pedestrian crossings that make it necessary for cars to slow down. Since January 1999, the "Grande Ile" (Strasbourg’s epicentre) has been in the "30 zone". This makes it possible for pedestrians (and cyclists) to get around more comfortably and safely, reducing the leading part played by private cars. Strasbourg has turned its attention to school areas too and the main interventions were aimed at schools’ entrances, particular sites where the safety of pedestrian children has to be assured. They included the creation of pedestrian crossing areas with traffic lights, police officers stationed to see pedestrians safely across, the creation of a "buffer zone" between the school door and the street and the installation of safety barriers between the exit and the street.

Pedestrian environment

Thanks to the implementation of new tram’s lines in 2000, the appearance of the town along the tram route has improved. More than 2600 new trees have been planted along the tram lines and around its surroundings (including hornbeams, wild cherry, lime trees, ailantus, chestnut and ash trees, etc.). Parking limitations along the road, the widening of numerous footpaths, and pavement edges lowered to road level leave more room for pedestrians, making it easier for prams and wheelchairs to get around, while at the same time encouraging urban entertainment features with stalls and terraces to capture the attention of passers-by. Art works has been widespread all through the city aiming at restoring the cityscape and creating a meeting place in the city centre. Place Kléber proves that the construction of a light rail track can go hand in hand with improving the design, fittings and functions of central city areas. New tram’s lines have improved the quality of the city's public open space, creating a comfortable and enjoyable environment for pedestrians, consistent with the objective of the Communauté Urbaine de Strasbourg (Strasbourg Urban Community): improve urban mobility while promoting public transport and non-polluting means of transport (walking, cycling, electric vehicles).

Footbridge

Strasbourg is also characterized by the Passerelle Mimram (2004), the footbridge that is the central element of the "Jardin des Deux Rives" ("Garden of Two Banks"). This one was created on both sides of the Rhine and the footbridge is the link. The bridge is a structure intended for pedestrians, handicapped and cyclist and is the work of Marc Mimram, Parisian architect who already has with his credit the creation of many bridges and footbridges in France. The building is composed of two aprons which meet in the center and form a place of relaxation and a new point of view on the Rhine. The length of the pedestrians crossing is 281 m.

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GERMANY

Context items

SITE

Berlin has relatively few high-rise buildings, but there are several monuments with observation decks (Reichstag, Berliner Funkturm, Berliner Fernsehturm,…). The Fernsehturm (TV tower) is the second highest building in the European Union at 368 m. Berlin is best known for its numerous museums, palaces and other sites of historic interest (Berliner Dom, Brandenburg Gate,…). The city’s architecture is quite varied: though badly damaged in the final years of World War II, Berlin has reconstructed itself greatly. Berlin's cityscape is composed of a mosaic of districts. The wide streets and their distance from the buildings, their trees and the size, position and incorporation of squares into the street grid also play an important role. In the outskirts small housing estates, detached and terraced houses with gardens and large residential complexes determine the city landscape here. In the suburban quarters of the eastern districts in particular there is still a large number of distinctive open space structures and plenty of gardens planted with vegetation typical for the area.

NETWORK

The city center lies along the Spree river; in Spandau, Berlin's westernmost borough, the Spree meets the river Havel, which flows from north to south through western Berlin. The course of the Havel is more like a chain of lakes. A series of lakes also feeds into the upper Spree, which flows through the Großer Müggelsee in eastern Berlin. Substantial parts of present-day Berlin extend onto the low plateaus on both sides of the Spree Valley. The highest elevations in Berlin are the Teufelsberg and the Müggelberge, two hills that have an elevation of about 115 meters. As regards the road network, the city has developed a complex transportation infrastructure before the World War II and the political reunification of East and West Berlin has led to the reintegration with the surrounding region. 5334 kilometers of roads run through Berlin, of which 66 kilometers are motorways.

SPACE

The climate of Berlin is transitional between oceanic and continental. Dispersion conditions associated with winds from west and north are in general more favourable than easterly and southerly winds. Berlin landscape is characterized by its diversity: the City Council Land Use Plan (FNP) aims to maintain this diversity in the overall urban development process and to make a contribution to environmentally viable urban design. Its main objectives are improving the quality of open space in the inner city, increasing the quality of life in the various districts (12) and preserving the typical overall appearance of the landscape. The heavily built-up inner city, which arose during the German Empire, is surrounded by the inner park ring, a belt of public parks. Planning activities are currently focussed on the north-east of Berlin, where the quality of the landscape and corresponding recreational opportunities are particularly poor. A large recreation area is being developed on an area of over 3200 hectares in the Berlin sector of the Barnim district. Nowadays improvements of the accessibility of infrastructure for daily use and commuters trips, that means improvements in the Public Transport System, is one of the way to face toward urban sprawl in Berlin area.
Interventions items

LED Traffic Lights

East-berliners made their own history with the design of the unique Ampelmännchen (crossing-light men), a short, chubby, hatted figure stepping smartly out or standing. This symbol has survived after the fall of the Berlin Wall to indicate not only when it is safe to cross but also that you are in the former East Berlin territory. Nowadays the installation of LED technology is bringing the Ost-Ampelmänn to (former) West Berlin. The city is replacing old traffic lamps with Light-emitting Diode (LED) lights to achieve 70-90 % better energy efficiency, as well as significant maintenance savings (the old light-bulbs needed replacing several times a year, while the LED lamps will be cleaned only once per year and have a guaranteed five-year lifespan with an expectation of double that). The observation is spreading that as the new LED lights go in, the East Berlin crossing man is going in too. In addition, Berlin traffic control is setting an example for the benefits of the young market for competitive power providers in Germany: today the Berlin traffic lights are powered exclusively by eco-friendly electricity, through a special contract. Several measures are being undertaken for blind pedestrian too, particularly the installation of touch sensitive buttons and audible signals. In some signals has been added a countdown timer to the pedestrian signal head too: the timer provides a visual aid that counts down the time remaining for pedestrians to cross the intersection safely. Other remarkable engineering measures in crossings are the midblock refuge islands that are used with long road sections.

Environmental zones

At the first of January 2008 the city of Berlin introduced the “environmental zone” (Umwelt Zone), that is the centrepiece of the Clean Air and Action Plan. The objective of this intervention is to provide a healthy environment to the people living here reducing traffic-related emissions. Access into these zone is restricted to vehicles meeting certain exhaust gas standards: vehicles with particularly high emission levels (PM 10 and NO2) have to stay outside the major streets of the city. Particularly the environmental zone includes the inner city of Berlin within the suburban rail ring, which is is about 88 km² of a very densely built-up area with one million residents. Since the suburban rail ring is the boundary of the environmental zone the bridges underneath and above the suburban rail tracks are marked with special traffic signs. The southern part of the city motorway, which is located within the suburban rail ring, does not belong to the environmental zone. It can be used freely, because the motorway ring is also used as a way to bypass the environmental zone. A new traffic sign has been introduced for the environmental zone in the Road Traffic Regulations and an additional sign specifies the coloured windscreen stickers that entitle vehicles to use the environmental zone. The four pollutant classes follow the Euro standards for vehicles with diesel engines. There are some exemptions for mobile machinery and equipment, work machines, two - and three - wheeled motor vehicles, ambulance cars, motor vehicles driven by, or carrying persons with serious mobility impairments, helpless or blind persons who have a severe disablement document, police vehicles, ...
Pedestrian bridges and pedestrian tunnel

Around ninety new bridges have been completed and dilapidated bridges have been repaired in the first ten years after the fall of the Wall. The majority of these are pedestrian bridges (some are pedestrian only). They provide good connection and accessibility to the city and are urban planning elements with a special claim to design; furthermore the integration of the few remaining historical bridges constitutes a special challenge. In Berlin a pedestrian tunnel was constructed in Alexanderplatz within a large Project that adjusted the traffic system several years ago, but in 2006/07 the crossroad Karl-Liebknecht-Straße/ Memhardstraße and the square were restructured and the tunnel was substituted by new crosswalks above ground.

Traffic Calming measures

The "Berlin 1010 Traffic Safety Programme" has the ambitious goal of reducing the number of serious accident injuries and traffic deaths by 30% between 2004 and 2010. Pedestrians are a special group within road users and measures need therefore to be further strengthened. In order to create a safe environment for pedestrians (and not only), traffic calming measures have been and will be implemented across the whole of Berlin, especially around schools and hospitals, as well as residential areas. A frequent device is the speed cushion, or so called 'Berlin plate' or 'Berlin pillow'. Speed cushions are narrow rectangular humps which allow wide tracked vehicles, such as buses and large emergency vehicles, to straddle or partially straddle it. They minimise the discomfort for passengers and reduce car's speed. Other device used is to narrow the roads, at crossings and not only (Gehwegvorstreckungen). They prevent illegal parking and create a safe environment for pedestrians. In addition, 30 km/h speed limit has been introduced in selected main roads. These interventions are strongly been implemented in school areas, where a safe road environment is neccessary to prevent children's accidents. Here traffic engineering (30 km/h, traffic calming measures, safe crossing and paths,...) come with traffic law enforcement (parking laws), as well as road safety education, parents and car driver information,etc.

Car-free quarters

Berlin is not a car-free model city, but currently the "Umwelt Zone" measure and projects with sustainable transportation concepts (low car housing, car-reduced quarters, projects with integrated car sharing services, etc.) can help the traffic system and pedestrians’ safety. There are some quarters that have planned and/or realized car-free projects (Treptow, Tempelhof), but there are many other potentials car-free sites. However in residential areas speed reduction has been extended and there are also optically car-free quarters, where parking and traffic is not allowd inside (with exceptions for the usual special cases like emergency or deliveries of goods). Here private parking is
only possible at the edge and/or underground, where a usual number of parking places is provided. The Swiss concept of “Begegnungszonen” is the model for Berlin’s districts. Furthermore in the inner city exist several pedestrian areas (Fußgängerzonen), where passengers enjoy the peaceful atmosphere in the public street space and the possibility of communication, not disturbed by traffic noise and waste gases (e.g.: Mitte). Nowadays there are more discussions and initiatives for new pedestrian zones, in order to follow Local Agenda 21 measures and give pedestrians’ a safe and comfortable city.

Walkways: landscaping, fencing, orientation

Landscaping shall enhance the features and conditions unique to each site and Berlin has introduced many elements to provide a pleasant environment during the last years. Some examples are the combination of shade and street trees, shrubs, planting beds, well-kept grasses and ground covers. Landscaping is required in the city center, as well as in residential areas and it is necessary along footpaths adjacent to parking areas in order to provide adequate screening. Bicycle paths also are used to create a buffer between sidewalks and roads; protection is often provided by fencing and railing too. Afterwards concrete bollards in Berlin ensure that motorists can’t cut the corner and accidentally drive up onto the sidewalk. They also provide pedestrians with a clear, visual signal for where the border is between street and sidewalk space. In places where driveways allow motor vehicles to cross the sidewalk, bollards are used to ensure that the vehicles stay in line and drive slowly. Finally Berlin pedestrian routes are well signalized and orientation maps and signals are widespread in the city, thus allowing pedestrian to reach destinations easily.

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Geography Grade 11: Mobility and Transport
Context items

SITE

Athens historical and cultural importance is undoubted and is represented by a number of ancient monuments and works of art, the most famous of all the Parthenon on the Acropolis. The city also retains a vast variety of Roman and Byzantine monuments; landmarks of the modern era are also present. In the CBD the buildings are compact, as well as in the residential areas of Athens. Due to the city's spatial development and to the streets network, intersections' density is high (and that is significant, since pedestrians' accident occur mainly at this sites, in Athens).

NETWORK

Athens sprawls across the central plain of Attica basin and is surrounded by mountains. Mount Parnitha, in particular, is the tallest of the city (1453 m) and has been declared a national park. This flat valley is crossed by two rivers and there are some hills, like the Licabetus and the Acropolis, that give Athens its unique landmark. As regards the road network, its maintenance is inadequate (both inside and outside urban areas), although several actions concerning road environment improvement are included in the 2006-2010 Strategic Plan (identification and treatment of hazardous locations, improvement of road markings and signalization, improvement of lighting conditions,...).

SPACE

Athens climate is typical mediterranean, with the greatest amounts of precipitation mainly occurring from mid-October to mid-April. Due to its location, the Athenian climate is much drier compared to most of the rest of Mediterranean Europe. The modern city of Athens consists of what was once a conglomeration of distinct towns and villages that gradually expanded and merged into a single large metropolis. Particularly, the Athens Olympic Village (2004), which is located in the north-east of the city, became a residential area following the games. In recent years, the Athens City Council has undertaken a series of measures for urban regeneration in some districts. An example is Metaxourgio district, whose houses were abandoned and/or occupied by illegal immigrants. As regard Land Use Policy, the more specific goals and directions are the enhancement of the City's historical elements, the lessening of disparities in the redistribution of social amenities and the quality of environment through the re-orientation of land uses, functions and investment activities to favour West Athens and other degraded areas.
Interventions items

Sidewalks and parking

When the city of Athens was selected to host the Olympic Games (2004), the City Council implemented measures to provide an interconnected pedestrian circulation network in the city. Improvements on sidewalks’ conditions are one of the main actions undertaken to create an accessible city for pedestrians. Sidewalks have been enlarged and new disabled-friendly pavements were laid, several ramps at crossings for wheelchair users have been placed too and existing sidewalks have been connected through new segments. Interventions have been made in order to prevent cafes and bars to "invade" sidewalks (and the squares and open spaces too) with tables and chairs, impeding pedestrians passages. The Ministry of the Environment, Planning and Public Works (YPEHODE) permits tables and chairs to take up 4.5 meters of the squares under its control, but the difficulty is that the Municipality does not have sufficient inspectors to check how many spaces each cafe can legally fill. Furthermore in the last years the major effort was to prevent illegal parking on sidewalks, since barriers and restrictions were not too incisive. The Municipality of Athens has implemented a Parking Policy, in order to improve the environmental quality of some areas of the city and give pedestrians safe and convenient spaces to walk. Particularly in the Central Business District short term parking has been created, as well as paid parking. Some special parking places, reserved for visitors, shoppers and delivery vehicles, have also been created and residents can park and pay a reduced fee.

Pedestrianisation

Since June 1982, private car traffic has been restricted in the Athens Central Area, in order to decrease the number of private cars in the most congested and polluted area of the city. A central area with a radius of approximately 2,5 kilometers was defined and license plate based traffic restrictions were implemented. The programme limited access to the city centre on certain days (odd/even) to cars whose license plates ended in certain numbers (odd/even). During the first two years taxis were also restricted, but no longer. Buses, bicycles and motorcycles have always been allowed unrestricted access. This measure has never been modified and has caused many side-effects (such as the purchase of a second car, which assures daily entrance). It must be updated and made more stringent. Currently, the city plans to pedestrianize the 19th-century center, which coincides with the commercial center, adjacent to the archaeological sites. Some 40 hectares have already been pedestrianized but more money needs to be found in order to complete the repaving of streets. The planned replacement of asphalt paving with stone paving would help to make it clear that the area is no longer the domain of cars. The strongest interventions were carried out in 2004 (Olympic Games), when cars were pushed out of the center, asphalt was removed from the roads and pedestrianized areas were expanded. Athens’ objective is to create a comfortable and pleasant environment for pedestrians and liberate the city center from cars’ pollution and noise. Athens is not a car-free model city, but interventions are going on. Time is needed, since the city has to deal with difficulties linked to traffic congestion, auto dependence, the absence of a dedicated cycling and public transport infrastructure, etc. Finally the pedestrianization scheme include the reconnection of the excavated areas in the center of Athens with the existing pedestrianized streets of the modern center.

Traffic Cells

In the 90s the Traffic Cell Programme was included in the Structural Plan and Program for Environmental Protection in the Greater Area of Athens which was established by law in 1985. These
traffic cells were implemented in different areas in the city, from the heart of the capital (the Central Business District) to typical residential areas such as Thisio and Plaka. Objectives of this measure were the **improvement of environmental quality, safety enhancement**, public transport operation of mini-buses as well as **parking regulations**. Post implementation analysis shows a decrease of 75% on traffic flows inside the CBD (since barriers were placed at the main entrances, it's obvious that through traffic was eliminated) and an increase of 5% at the ring road around the CBD. In this ‘cells’ specific **interventions on sidewalks** have been planned and traffic calming measures (**roundabouts, speed humps**) have been implemented, in order to provide a more functional and safe road network.

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**Context items**

**SITE**

A combination of European and Middle Eastern heritage permeates Pécs with its streets, its churches and historical buildings. Nearly all of the most important architectural monuments of Pécs are tower-like: the TV tower, the Cathedral, the tower of the City Hall and the silhouette of the High House (80 m high). It is a priority of the City of Pécs to develop a high-quality reception environment until 2010 (Pécs as European Capital of Culture): new buildings will be constructed and the existing ones will be renovated. An example is the ‘Grand Exhibition Hall’ that will host the grand exhibitions in 2010. The hotel developments of the Pécs Micro Region are another issue that has to be taken into account in this frame.

**NETWORK**

The city is located at the South side of the Mecsek mountain in the Carpathian Basin and the terrain is quite hilly. As regards the road network, since in 2010 Pécs will be the European Capital of Culture, several interventions have been planned. Particularly by 2010 the Dunaújváros-Bóly, part of the M6 motorway connecting Pécs and Budapest, and the Bóly-Pécs M60 clearway will have been finished. The reconstruction and maintenance of roads are in progress and economical effort have been provided during the last years.

**SPACE**

Pécs has a mediterranean climate; usually January is the coldest month, while the high summer months of July and August are warmest. Thanks to the “European Capital of Culture” project the urban design and land use of the city will be changed and improved. Several districts are currently being enlarged and renovated. For example: in Zsolnay Cultural District the building complex will be restored and connected to the center, the Pécs Industrial Park is being expanded, in Balkány District improvements have been planned,.... The city built-up area is going to increase, due to several projects that are being carried out in different areas. New buildings will be constructed for administrative, public accommodation, servicing, cultural, health, trading or leisure time purposes. Residential blocks, hotels, offices and trading and servicing functions are other objectives in the Urban Plan for the southern city area.
Interventions items

Car-free zones

A car-free zone in the inner city, around the UNESCO protected monuments, has been established (CIVITAS - Trendsetter initiative - 2007). The objectives are to decrease traffic and number of private cars in the city centre, as well as to decrease the air and noise pollution in the centre, so that make the center healthier and more attractive for pedestrians. Traffic signs and tables, blocking the roads and using jet-polls, as well as strict municipal police control serve the implementation of the measure. In this zone, private cars are banned and delivery vehicles must have permission to enter; only residents and cars for the disabled are allowed. Some parts of the inner city now have no traffic at all and in other parts (especially shopping zones) there has been an 80% reduction. Furthermore a speed-limit of 30 km/h in the “World Heritage Zone” and a limitation of access of freighters over 6 tons has been also introduced in the area. The measure has fulfilled its objectives; the targeted reduction in traffic and air/noise pollution has been met. Furthermore a new bicycle road has been established and the existing strolling zone has been extended. The plan is to extend the car-free zone to the whole city centre inside the medieval city wall by 2010. An increase of green areas will complete the transformation of a more attractive city centre.

Zone-model parking

The zone-model parking system aims at reducing the large number of cars visiting the city centre which results congestions, significant air and noise pollution, damages to the UNESCO protected sites and consequently a insufficient environment for pedestrians (CIVITAS - Trendsetter initiative - 2007). The zone-model parking system was established in the central areas of Pécs, closely linked to the car-free zone and the access limited zone. The new parking system has cut the city into four zones: Red zone for the core of the inner city (expensive parking with limited parking time), Blue zone adjacent to the red zone (moderately priced parking), Yellow zone for the distant parts of the city centre (rather low parking fee) and Green zone for outside the city centre (free parking). Moreover, P+R facilities changes in the system (prices and time limitations) were introduced. Complementary actions of the establishment of the zone-model has been included in the project, that means small scale infrastructure developments, such as positioning of the traffic signs and tables, painting of the necessary traffic modifications on the asphalt, positioning of the new parking tickets machines and the necessary building works,... What can be noticed is the decrease in the average time of parking in the centre (- 20 to 30 %) and the reduction of air and noise (- 3%) pollution in the centre, thus providing a better environment for pedestrians (and not only...). Finally, it has been officially declared that the money gained by the parking fees will be spend on new parking infrastructure.

Public space: rehabilitation

The City of Pécs, being the European Capital of Culture, will attract particular attention in 2010 from all corners of Europe (and the world) and several interventions have been planned to give the city a living and attractive space. The city structure will undergo changes due to the investments of the “European Capital of Culture” project and Pécs will gain a new outlook: new buildings, streets and squares will be transformed in the centre. Currently, the revitalisation of the downtown area and the
rehabilitation of the public squares and green areas are being implemented. Particularly, the reconstruction of the pedestrian square (Sétatér), one of the cosiest and most popular places of the city, required a large economical effort. Interventions focus mainly on the rehabilitation of the public area of the North-South axis of the downtown (conversion of the squares and streets from Széchenyi Square to the main railway station into a new, high-quality square series) and in the renewal of the Múzeum Street, unique in South-Eastern Europe, uniting several museums. Parallel run the interventions focusing on Public Transportation, that means the introduction of fixed track transportation modes and the perspective of fuel change for the existing bus fleet. To provide environmentally friendly transport solutions for the citizens, a new traffic and transportation strategy has been implemented between 2007 and 2013.

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Context items

SITE

The city has many museums and cultural centers (the most notable of which is the Bahá'í World Centre), as well as restored quarters, historic sites, and beaches. Buildings and street characteristics change in Haifa, due to the city spatial structure. The lowest part of Haifa ("the city") includes business buildings and shopping streets. The middle part of Haifa ("Hadar") is the commercial one and here there are shops and restaurants. The top of Haifa ("The Carmel") is more touristic and here the Haifa University Towers, the Technion (Israel's University of Technology), the refurbished German Colony, the Stella Maris Church and some museums can be found. Construction of new hotels (including a totally new hotel district down near the shore) is already under way.

NETWORK

The city is a seaport located on Israel’s Mediterranean coastline in the Bay of Haifa, about 90 km north of Tel Aviv. Haifa is built on the slopes of the historic Mount Carmel and many of its main streets are sinuous switchbacks, curving and recurving to accommodate the steep slopes of the mount. As regards the road network, Highway 2 is the coastal road which links Haifa with Tel Aviv from the South; other more minor roads link Haifa to the East and North. In the past, traffic travelling along Highway 2 to the north of Haifa would have to pass through the downtown area of the city, but currently the “Carmel Tunnels” are under construction and this traffic will re-route through tunnels under Mount Carmel, cutting down on congestion in the downtown area of the city (the project’s expected completion is in late 2010).

SPACE

Haifa has a mediterranean climate with hot, humid summers and cool, rainy winters. Snow is rare and humidity tends to be high all year round. The city is split over three tiers. The lowest is the center of commerce and industry including Haifa Port. The middle level is located on the slopes of Mount Carmel and consists of older residential neighborhoods, whilst the upper level consists of modern neighborhoods looking over the lower tiers. Public transport (bus, subway) and long flights of stairs connect these levels. Being surrounded by water, it became a port city, and therefore it has a large shipping industrial area - including a large high-tech park on the western and northern sides. On the eastern side of the peninsula, there is a small bay which also is mostly industrial. More recently, the most western part of Haifa (which is the part that faces the Mediterranean ocean) has introduced a slew of fancy hotels and a large shopping complex to boost tourists.
Interventions items

Pedestrian precinct and residential areas

In Haifa a pedestrian precinct has been established, where mainly shops and public buildings are located. Nordau precinct is basically a pedestrian mall (“midrachov”) in the city. In recent years, a number of ultra-modern shopping centres have sprung up all around the city. An example is Hadar Hacarmel, with its tree-lined boulevards and scores of sidewalk cafes. In residential areas several effort have been made to create a safe and pleasant environment for pedestrians and other road users. Particularly, traffic calmed areas has been implemented: here the speed limit is 25 km/h (or 30 km/h). As regards parking lots, since Haifa is on a hill and its spatial structure is quite particular, they are limited.

Crossing interventions

Many regulations exist deciding on the priorities of the pedestrians while crossing; however many efforts will be necessary in the future, since pedestrians accidents at crossing are still numerous (but within the country frame, the numbers are not so bad). In Haifa three basic pedestrian crossing provisions are common at signalized intersections: an uncontrolled (but marked) crossing at a right-turn filtering lane, a pedestrian crossing phase concurrent with the vehicle phase (which may produce conflicts with turning vehicles) and an exclusive pedestrian phase, completely separating pedestrians from turning vehicles. Currently, new technologies are being introduced.

Pedestrian routes

Haifa has a unique topography and there are stairways that cut through the streets, from the top of the Carmel down to the historic old city. There are maps of these "stair trails" that can help pedestrians to navigate in this particular city. Where it is possible (downtown), sidewalks and walkways have been planned and constructed. There are also some strolling zones, like Louis Promenade, which runs along Yefeh Nof Street (also called Panorama Road), that fit well with pedestrians’ quality needs. The above mentioned walkway, which passes through a lovely shady park, offers a stunning view of the lower city and Haifa Bay. The Louis Promenade, known to one and all as “the Tayelet,” is probably one of the few flat stretches of land that can be found in the city.

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Context items

SITE

The historical town center presents arcades, churches, palaces and other architectonical monuments. The Cathedral, together with Piazza Grande and the Ghirlandina tower, is included by UNESCO among the "Wealth of Mankind". Restaurants and shops can be found in the center too. In its outskirts, the built structure is quite compact, mixed with small green areas surrounding the blocks of flats.

NETWORK

The city is characterized by a flat orography, as it is located in the Po Plain. It is bounded by two rivers, Secchia and Panaro (both affluents of the Po river). The Apennines are located in the southern parts of Modena, some 10 kilometers away from the main city area. As regards the road network, the city is at the cross-roads between the Brenner motorway and the Autostrada del Sole and the local vehicular traffic scheme is based on a grid of more quiet inner, residential axes. Most roads in the centre are cobbled, while the outskirts are the usual tarmac.

SPACE

Modena has the typical climate of the Padana Plain region: very hot summers and cold winter with fog. Its geographical location is related to pollution problems caused by traffic. The city land use policy scheme is based on the following issue: conservation of the historical central areas, conservation or upgrading of the residential areas and new housing development or housing rehabilitation on the outskirts. Recently, business districts have been built in the city outskirts. The sustainable mobility system, which Modena has implemented during the last ten years, set up in this context.
Interventions items

Traffic calming devices

Since 1998 the City of Modena has been implemented a series of interventions aimed at reducing car’s speed and creating a safe road environment for residents (and pedestrians). As some traffic calming devices are not included in the Italian Traffic Code, they were implemented as experimental devices, with the approval of the Ministry of Public Works. Some streets have been wholly redesigned with traffic calming devices, with a special focus on intersections (raised and/or narrowed). Particularly these measures were implemented in residential areas. An example is Via Pisani in the outskirts of the city, which was characterised by heavy traffic flows, thus giving its inhabitants an unsafe place to live. Since traffic measures were implemented in this area, pedestrians circulation has been improved. Moreover, residential parking areas were redefined and lower speed limits (30 km/h) were introduced, as well as new pedestrian paths (allowing connections to the main points such as schools, the square and parks) and a re-planning of the main square (appropriate street furnishing, improve of disabled people accessibility). Furthermore, from 2002 to 2006 the “Sicurezza Stradale” Programme was carried out in the city. It aimed at improving non-motorised transport and at increasing vulnerable road users’ safety, mainly in residential and school areas. Interventions that have been undertaken are: new pedestrian paths, increase crossings’ safety with new traffic lights, roundabouts.

Mobility Management in schools

To promote walking in educational trips (from and to school), the city of Modena has carried out several initiatives during the last years. Mobility Management in school is one of the first issue in the Sustainable Mobility Policy of the city, which aims at reducing car traffic and congestion, thus giving a safe and healthy environment for pedestrians (mainly). Initiatives such as “Walk and bike to school” events (even if they last a week only) and educational and training programmes are being carried out with this objective. Particularly in 2006, on the occasion of the European Week of the Sustainable Mobility, the “Let’s collect green miles” initiative was carried out. In that day, the pupils of some schools went to school by walking all together, collecting green miles (to reach the 20.570 Green Miles corresponding to the kilometre distance between Emilia-Romagna and Kyoto). The initiative also included parents training and children education on special topics (traffic, climate, etc). Furthermore in some districts have been installed signals with legible and easy symbols for children, in order to get them used to dealing with road environment.

Pedestrian precinct

Modena centre has a traffic-limited area (Zona a traffico limitato = ZTL) that means a pedestrian “island”. The introduction of the traffic restrictions area run parallel at parking management. Parking in the city centre is charged and in the most important areas, fees are not hourly rated but progressively (the third hour costs double the fee of the second hour). The availability of the parking lots is limited and the city has supported private companies to build underground private parking facilities in or close to the city centre, in order to decrease congestion and air pollution, thus creating a healthy and safe environment for people and pedestrians (mainly). There are special permits for residents and disabled persons with regards to transit and parking in ZTL. Moreover, Park & Ride facilities have
been developed around the railway and bus stations, in order to increase intermodality and promote Public Transport, bicycling and walking. To incentivate P&R parking spaces are free or the pricing scheme is absent on the area instead of on the distance in km and on the possibility to use different transport modes with the same ticket. The development of Public Transport System is also basic in pedestrian frame, since it increase Modena's sustainable mobility policy and provide a better environment where people can walk. PT quality has been improved since 1998 (Quality Plan for Public Transport) in Modena and in the region of Emilia Romagna; main interventions are adding new tram lines, upgrading the existing bus lines and improving inter-modality.

Green areas and noise prevention

Modena is characterized by a good presence of green, due to public green areas, to the trees that line the streets and to the little private front gardens. The city environmental policy has included the enlargement of green areas since the 90s. Interventions have been undertaken in several districts and also aimed at providing public furniture, such as benches, pedestrian lighting, shelter, playground elements, fences, tree planting, etc. Pedestrian paths have been also planed and constructed around school areas, thus improving walking environment. Children (and not only) have been involved in the process and in projects ("Laboratori di urbanistica partecipata") too, thus increasing their knowledge of road environment and public space. The city's environmental policy also includes the reduction of pollution and noise, especially in the city centre and in the semi-central residential areas. Beyond low speed zones, the city has introduced noise barriers, porous road surfaces, car-free areas and has built new blocks using them as noise barriers. The "Noise abatement Action Plan" adopted by the City od Modena (1999) have improved the quality of the community environment. Pedestrians are a special group in this context, since walking in a pleasant and non-rumorous place is one of their 'quality needs'.

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Context items

SITE

The city centre retains many old and historical buildings, like the *Oude Kerk* (Old Church), the *Nieuwe Kerk* (New Church) and the City Hall. The center of Delft has some museums and tourist shops too; here the buildings are quite compact and high. Residential districts are located in Delft’s outskirts (flats and large detached houses).

NETWORK

As regards “road network”, Delft can be reached easily by car (it is situated centrally between Rotterdam and The Hague and the road infrastructure is adequate), although the access to the historic town centre is restricted and pedestrians and cyclists have priority. Canals run through the center, creating the particular streets’ grid of Delft, and at the south of the city the triangular-shaped harbor “The Kolk” is located.

SPACE

The climate in Delft is frequently windy and cloudy, with low temperatures and high humidity. The city has seven districts; the Old Town distinguishes for its landmarks (*Oude Kerk, Nieuwe Kerk*), while recently the *Poptahof district* (in the south-west) is being renovated to enhance the quality of life in terms of cleanliness, no damage and safety. Particularly in this area of the city, projects have been carried out in order to renovate public space, as well as estates, public parks & gardens and water features. Remarkable it is also the re-development of the southern part of the inner city and the “University area”.

Interventions items

Traffic calming and school routes

Traffic calming devices were introduced in the late 1960s in Delft, aiming at reducing cars’ speed and cut-through traffic in urban streets. Pedestrian environment in Delft has improved with traffic calming devices and nowadays is one of the best examples in European context. To slow traffic and cars’ volume in the city, tables and speed humps have been placed and road narrowings and chicanes have also introduced. Particularly, these devices are implemented around school, where children safety is considered a main issue. In this areas streets have been re-designed widening sidewalks, curbing speed and enhancing crossability: the objective is to enable children to reach independently schools (but also shops, playgrounds, sports facilities, library, etc). Together with engineering measures, walking programmes and initiatives are carried out in Delft. The city introduced the “Sweets tile school route” in some districts (2006): children from primary schools were invited to design their own safe route to school guided by teachers and parents. "Kindlint” is a safe route system implemented by the City Council to allow children to walk and ride their bicycle independently. Delft can be considered a children-friendly city and several efforts have been made during the last years, in order to give them a safe and pleasant environment where to walk and live. Delft City Council systematically includes children and parents in the evaluation of local traffic safety and the development of transportation improvements that support children’s independent mobility.

Home Zones

The introduction of woonerven (Home Zones) was a breakthrough to protect residential areas from speeding motor vehicles. In the 70’s Delft started a process of redefining and redesigning streets, turning them into Home Zones and giving priority to soft modes (walking, cycling). Particular interventions in these zones included curbing speed, giving pedestrians the full width, planting trees, public lighting in accordance to the streetscape, giving inhabitants a small semi-private zone on the housefront with greenery and benches. Traffic calming devices were implemented too, where cars are allowed to pass through. However vehicle traffic is prevented from moving freely through the use of one-way streets, physical traffic diverters, and dead-end streets. The limit of 30 km/h have also be introduced in these areas (since 1983), thus providing a safe environment for pedestrians. In Delft, Home Zones have been designated on selected streets in the city centre and in neighborhoods. Particularly, this measures guarantee a safe environment for children (“Childstreet 2005” conference), that can walk and play in spaces protected from motorized traffic.

Pedestrian area and parking

The larger part of Delft’s historic centre is a restricted-access area where cyclists and (some) cars are allowed. In the 90’s a system of parking regulation was introduced gradually, starting in the city center, spreading outwards. Inhabitants and some of the workers can use a permit while, on certain
hours, others have to pay each time. Such a system, under condition of effective maintenance, is indispensable in Delft densely-built districts to get cars volume under control. Nowadays, cars can be parked in one of the **car parks** near the centre, whose route is signposted clearly ('P-route' signs). Special parking permits are available for disabled people, that can park free of charge in all the car parks in the town centre and in special parking spaces on the edge of the pedestrianised area. **Parking lots location** have also been reviewed, since a urban street is not pedestrian-friendly as long as the streetscape is dominated by parked cars, blocking the way. Many parking space have been shifted, thus leaving more space for pedestrians and children.

**Pedestrian crossings facilities**

Pedestrian crossings measures have been developed for several years in the Netherlands (and in Delft too); particularly **traffic lights** have improved. Pedestrian **push buttons** (with audible feedback) are used at some crossing locations and they are installed near the vehicle traffic signal. A **flashing yellow indicator** has been tested in Delft in some simple situations instead of a solid red ball for pedestrian signals: the symbol used for the yellow indicator is a triangle with an exclamation point inside it, which tells pedestrians that they may cross at their own risk, but other traffic has priority. The zebra crosswalk markings are removed at such locations to avoid suggesting that pedestrians have priority in crossing; pedestrians still have the option of waiting or calling for the pedestrian green. Another device tested was a "**pedestrian sender**", which provides a means for signal preemption for vulnerable pedestrians, including the visually and mobily impaired. This device influences the traffic controller by doubling the pedestrian green time, activating an acoustic signal, and preventing conflicting traffic movements. Furthermore, zebra-striped crosswalks are commonly used at crossings, but for midblock crossings "**block crosswalks**" have been introduced. They consist in a dashed line across the roadway. Special pedestrian signing is sometimes used at zebra crossings and traffic calming devices (**speed humps**, **raised intersections**, etc) are also implemented in the city.

**Public space and walkways**

Delft City Council improved public space in the inner city and in its outskirts through a serie of 'renewal interventions'. **Playgrounds, planting areas** are widespread in the city and streets are conceived as a sequence of outdoor living-rooms in Home Zones. In public spaces have been introduced **lampposts**, as well as **seating facilities** and other **street furniture** (supports for standing and binding bikes, protectance of planting, litter bins, etc). Pedestrian environment has improved during the last ten years and Delft has become a city where pedestrians have priority. Furthermore several **shortcuts** were added for pedestrian (and cyclists too), such as new **footbridges** over the main shipping canal. A number of new paths was introduced in the city, connecting different ares (for example the railway station and the city centre).
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Context items

SITE

The inner city is characterized by a mix of old and new architecture, museums and monuments, as well as shops, hotels and restaurants. In the Old Town medieval ruins can be found, as well as the Cathedral. In the central business district of Oslo modern buildings are located, thus contrasting with the historical ones and reducing public space.

NETWORK

As regards the road network, there are two main highways running into Oslo (E6, E18) and thanks to the income of the "tall ring” measure, roads condition are quite good. Recently reconstruction projects have been carried out and planned (e.g.: the 5 St/43 ave intersection will be reconstructed with stop light crosswalks and a new bridge – 2008). The city centre is characterized by a rectangular street pattern (due to renaissance town). Oslo is situated in an amphitheater like setting, with the city centre in the bottom close to the Oslo fjord, and residential areas stretching uphill from there in all directions.

SPACE

Oslo's climate is fairly temperate thanks to warm air being wafted across the Atlantic from the Gulf Stream. Summer weather in Oslo is mild and pleasant and in winter snow is plentiful (there is usually snow 3 to 5 months of the year). The city is bounded by Oslo Central Station to the east, the Royal Castle to the west and the sea to the south. It's a fairly compact area, but to explore several of the neighbourhoods close to the centre it is necessary to use of the city's comprehensive Public Transport system. The city has several islands too and protected natural areas, even if the built-up area covers almost a third of the city.
Interventions items

Cordon Pricing

The objective of the **toll ring measure** was to collect money for road construction in the Oslo region and to limit car traffic. The implementation process has been controversial, since many inhabitants in Oslo live in the outskirts and daily commuting is a matter of fact, but finally Oslo City Council established the toll ring (1990). The ‘cordon pricing’ toll ring system consists of nineteen toll plazas situated three to eight kilometre from Oslo city centre. A single pass may be bought at a coin machine or a cash desk; there are also different kinds of electronic punch cars and electronic season tickets. Approximately 40% of all drivers in the Oslo region pass the toll ring daily. The first year after implementation the number of cars passed through toll ring plazas was reduced by 10%. The impact of this measure on the environment is very much in dispute: it is clear that streets and buildings are relieved of excess traffic, noise and air pollution, but the general enlarging of road capacity leads to an unfortunate increase in car traffic and this abuses the environment. However in the central area of Oslo the measure has provided positive benefits for pedestrian environment, since it limits the number of cars into the city improving air quality and safety. Nowadays, Oslo City Council have initiated work on a scheme for prolonged user payment.

Traffic calming devices

Traffic calming in urban streets is implemented to reduce car traffic to acceptable levels, thus creating a safe pedestrians environment. Tøyengata is an urban street in Oslo, where traffic calming measures have been implemented, together with a **reduction of parking lots**. Visitors and residents had a positive perception of the environmental quality of the street, where large share of visitors travel as pedestrians. The street has several shops with frequent goods deliveries indeed and the traffic calming project reduced commercial activities in parts of the street where most parking spaces were removed. Traffic calming devices are common features of **Zones 30**, which can be found in Oslo residential areas too. In this zones the limit speed of 30 km/h is applied, in order to slow down car traffic and increase pedestrians’ (and not only) safety. Programmes like the “European Mobility Week” (2007) are carried out to enforce intermodality, Public Transport, cycling and walking. In **school** context the City of Oslo (Agency for Road and Transport) has invited schools to register how many of their pupils are walking to school during certain weeks. This competition showed that all children can contribute to a better environment, simultaneously as they are more active, by walking to school as often as possible. During this week, conferences and media-campaign were also held (‘Streets for people’).

Parking regulation

**Parking regulations** in the inner city have been introduced too, in order to keep traffic circulating and to avoid congestion on the narrow streets. To differentiate the availability of the Oslo parking spaces the inner city is divided into Red, Yellow, Blue and Green parking payment zones. The zones have various price and time regulations during weekdays. In the streets outside the city centre, there
are both free-zones and pay-zones available. Car parks are also available in downtown areas for short time parking. These measures improve pedestrians environment, because it contributes to the ‘sustainable development’ of Oslo, reducing car use and car traffic in the central areas of the city. As regards sustainability issue, recently Oslo has carried out several project and initiatives aiming at become one of the world’s most environmentally friendly and sustainable capital cities (e.g.: Reducing greenhouse gas emissions and improving air quality – 2006, European Mobility Week – 2007).

Street lighting

In order to save energy and improve the sustainability of the City of Oslo, street lighting efficiency was improved in 2006. The interventions provided positive benefits to pedestrians issue too, as streets become more lighter and safe. Old fixtures were replaced with new high performance fixtures and the maintenance programme was reviewed (the costs were lowered). Street authorities on several levels, park & forest department and private companies with facade and street light integrated into the public power grid. Particularly, the mechanical ballasts was replaced in 55000 streetlights with electronic ballasts that communicate over existing power lines: the system remotely monitors and controls the lights, dimming them based on traffic, weather and available light (from sun or moon). It also analyzes lamp behavior and identifies lamp failures

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Context items

SITE

Krakow did not get heavily damaged in World War II and its historical and old architectural building have been preserved. The old part of the city is unscarred by skyscrapers and is full of churches and baroque buildings. The majority of historic sights, many museums and other tourist attractions as well as restaurants and cafes are located here. As regards residential houses, they consists of flats in the 20th-century downtown tenement houses and apartments in housing estates constructed in various parts of the city in the last 15 years: detached house can be found in good neighborhoods.

NETWORK

Krakow lies on the Vistula river in a valley at the foot of the Carpathian Plateau, 219 meters above sea level. The road network density in the Krakow region is some 1.7 km per square kilometre, more then twice above the national average. The condition and density of the city street network is a serious problem in Krakow. There are six national roads which radiate from the city. The construction of a ring road is seen as of great importance to facilitate road traffic flow: an expressway forming the northern section of the ring road is currently under construction, and parts of the southern bypass have already been constructed.

SPACE

Krakow enjoys a temperate climate and weather changes are frequent due to the friction of humid air masses arriving from the Atlantic Ocean and dry, continental air masses coming in from the east. Since 1991, Krakow has been divided into 18 administrative districts and the oldest are Wawel Hill, the Old Town and Kazimierz. Major districts added in the 19th and 20th centuries include Podgorze, which until 1915 was a separate town on the southern bank of the Vistula, and Nowa Huta, east of the city centre. Krakow boasts some forty public parks; Planty, a ring of about 30 gardens, encircles the central Old Town district. Remarkable are the recreational facilities of Park Jordana, which is located near three campuses and the central university library. As regards new housing trends, despite the housing density of the historical center, there are still plots available for development; housing estates on the outskirts have been built during the last years, thus Krakow citizens keep moving to the city's inner and outer suburbs.
Interventions items

Car free zone and parking scheme

In the centre of Krakow restrictions are imposed on car traffic and parking according to the following "three zones scheme". Zone A is a strictly pedestrian precinct in the very centre of historical Krakow: here there is no parking at all nor access for cars or buses, except to approach hotels in order to check in and tramlines. This zone is also open to deliver goods during certain times of the day. Zone B is a zone of limited driving, parking and hotel check in; there are parking spaces available for the inhabitants of the inner district and the maximum speed is of 20 km/h. Zone C is open to traffic, but parking is limited to two hours and is charged for during the week; the space for short term parking is kept deliberately small and the residents of this part of the city are allowed to park for a low yearly fee. This measure was implemented in order to relieve the historical centre of Krakow of the negative effects of car traffic (congestion), improving the city centre environment. The measure was implemented by the City Council on the initiative of the City's transport planning office in 1989. Particularly, the pedestrian precinct (zone A) includes the Old Town district with most its landmarks within easy walking distance. Every street and every square here lives its own life manifest in its cafes, stores, galleries, assorted culture venues and public institutions. In the last two years a conceptual project of reorganization of the traffic rules in the city centre has been developed and Zone B was enlarged (30%) and implemented ("Project of changes of traffic rules in the city centre of Krakow"). Moreover, an updated parking management scheme was implemented and at least 500 on-street parking spaces within the 2nd ring road and close to commercial underground parking lots were eliminated. Furthermore on-street enforcement made by city guards and police officers and a electronic-based system of vehicle identification have been implemented in order to prevent car users to enter restricted zones illegally.

20 km/h zones

In Krakow 20 km/h zones exist in the inner city and residential areas. This measure is always a combination of 20 km/h speed limit signs and speed humps or elevated roads and intersections: the objective is to minimise transport-related dangers for inhabitants and pedestrians. It is applied near schools, kindergartens, churches as well as in residential areas and dangerous traffic spots; it is not used where it interferes with Public Transport. Interventions were implemented after a study by the City's Transport Office and were also stimulated by citizen initiatives. The national law in Poland sets the framework for speed limits only in so far as it prescribes upper speed limits; thus cities can choose whether and to what extent they want to reduce maximum speeds. A committee consisting of members of the transport office and police, together with the local magistrate decide whether a 20 km/h zone should be built in a certain place. After approval, the measure is implemented by the city administration. Since implementation of the 20 km/h zones, the safety and the quality of life of the areas has risen markedly, Krakow has made safety a priority through its Safety Programme (Council for Road safety), which includes other pedestrian measure too, such as mid-road-barriers to prevent crossing besides zebra crossings, roundabouts that make car drivers slow down, photo radars to reduce driving speeds, etc. Walkaways all through the city were also implemented, thus facilitating walking routes. An example is the tunnel near the (main) station, that avoid pedestrians to cross a wide street. Finally, Krakow participated in the first ever European Mobility week in 2002 ("Working with people to built a liveable city"), promoting environmentally sensitive access modes and networking of places - public spaces, green areas, community parks, riverfront and neighbourhoods by improved sustainable circulation.
Interventions for the disabled

Facilities for the disabled has been implemented in Krakow since the 90s and interest buildings, public transportation and sidewalks. As regards public transportation, the municipal Public Transport utility has taken care to order new buses and streetcars with low floors, wide doors, and enough free space to accommodate wheelchairs. Public Transport platforms have been accommodated too. However the main interventions were related to sidewalks, which were settled up, re-paved and provided with ramps. The efforts to make the city wheelchair accessible were remarkable, although some high kerbs can be found in some narrow alleys in the Old Town. The Main Square is covered with flag-stones and is easily accessible for disabled too and in the summer period there are plenty of barrierless café-gardens. Other measures have been carried out on behalf of blind pedestrians, such as sound signalisation at traffic lights.

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Context items

SITE

The core of the city presents old buildings typical of historical cities. Particularly Rossio square includes monuments, fountains and important buildings. Away from the center, modern high rise building have been constructed, due to the modern changes that have been made in the city during the last twenty years. The most dynamic districts are “Bairro Alto” and “Santos”, where night life, shops, bars and clubs can be found. Downtown, streets are laid out in regular city blocks, while in other middle-age areas of the city, spared by the 1773 earthquake, keep their organic street pattern.

NETWORK

Lisboa lies at the right margin of the Tagus estuary river. The proximity of the ocean makes air pollution unnoticeable for most of the time, due to the sea winds. Topographically Lisbon developed as a ribbon along the river, and in several hills (traditionally acknowledged as seven). At the central historical, the streets are narrow and steep; some of those are stairs and not streets. By the riverside, where the downtown is located, the area is flat. The Lisboa’s S. Jorge Castle (Castelo de São Jorge) is built on the top of a hill and s a key landmark of the city. In terms of infrastructure, partially leading to EXPO 98, the easternmost edge of Lisbon experienced an ambitious programme of improvement including the construction of a new bridge over the Tagus (Vasco Da Gama bridge), a new railway link between both margins of the Tagus, the construction of a network of peripheral motorways and the extension of the underground network.

SPACE

Lisbon has a mild climate and the proximity of the Atlantic and the frequency of sea fogs keep the atmosphere humid. Lisbon is very close to ocean and that brings windy and fast-changing weather. The construction of new cultural infrastructure such as the Cultural Centre of Belém, the new facilities built for the EXPO 98 and the renovation of others combined with a high cultural tradition help to maintain the city’s cultural status. For several years, urban renovation has been an important area of intervention, several programmes were launched (some of those supported by specific EU interventions such the Urban Pilot Projects and the Urban Community Initiative) focussing in particular on the recovery of damaged urban districts and improvements of living conditions. As regards land use policy, the Lisbon Municipal Plan and Strategic Planning define intervention areas and new (public/private) partnerships aimed at upgrading the city centre by renewal of buildings while trying to maintain historic characteristics and enabling new land uses (offices and residences), regenerating the western areas along the riverside (former docks and warehouses) and those in the east side of the city (residential zone).
Interventions items

Pedestrian areas

One of the main purposes of Lisboa Municipality’s Master Urban Plan was the quality of public space, that means the increase of pedestrian areas in the city center and in new residential spaces. In the 90s several areas were converted to commercial and leisure pedestrian areas, improving the walking conditions and quality of life for those citizens living and working in the centre city area (Lisboa Municipal Director Plan). Together with the national government, Lisboa City Hall transformed a former dock and a store area into a pleasant walking space in 1992. Here restaurants, bars, etc are located and attract people, especially at night. Some shopping areas were restored and provide pedestrian zones where expensive shops and services are now located. In the downtown, Baixa shopping district is well known for its pedestrian streets. This area was completely rebuilt after the Great Earthquake of 1755, and nowadays presents elegant squares, pedestrianized streets, cafes, and shops. Over the last few years, increasing pedestrianisation and traffic calming measures in the city centre have improved pedestrian environment and air quality too. Finally, walking initiatives along several city streets and public spaces, as well as traffic free zones, has been promoted in the European Mobility Week 2007. However, since there is virtually almost no one living in downtown, at night and during weekends these pedestrian areas are empty and known as dangerous.

Green areas and public space

In 1994 Lisbon City Hall adopted the "Letter of European Cities for Sustainable Environment - Aalborg Letter" and established a Long Term Local Action Plan, which includes city gardens and public spaces improvements too. Public spaces and recreational areas are focal points for activity in Lisboa and nowadays they are safeguarded and improved. Pedestrians need to walk in an attractive and pleasant environment and such features of the city have to be taken into account. Recently walkways and open space have been improved with children’s play equipment, benches, flower beds, etc.

Parking regulation

In the last years Lisbon City Hall was confronted with the need to specify parking places in order to end the often chaotic parking along main arteries, on sidewalks, and in the historic city centre. Diverting some parking to other areas has allowed these locations (streets and plazas) to be returned to pedestrian use and has made circulation easier for cars and, above all, public transport. The building of new parking places (both underground and at the surface) near residential areas and in central areas (in commercial zones) was vital in accomplishing the above stated goals. At the same time, a new parking management and control system, which more efficiently managed the available parking space, was created and currently paid parking in streets is implemented with parking meters.
Furthermore **Park & Ride facilities** have been implemented to improve mobility in the Lisbon Metropolitan Area and provide a safe, secure and inexpensive place to park, especially on the outskirts of the city. This measure was accompanied by an improvement of Public Transport (network, coordination, punctuality). All these interventions (infrastructural and policy making) aim at diminishing traffic congestion, thus improving pedestrians environment. It is worth of notice that the Universal Exhibition "EXPO 1998" that took place in the city was responsible for many of these improvements. Finally, a "Zero Tolerance" campaign has been carried out within the European Mobility Week 2007: it aimed at forbidding car parking on side walks as well as in a second row, it included 20 main avenues, streets, squares and roundabouts all over the town.

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Context items

SITE

Belgrade has varying architecture buildings, from the centre of Zemun, typical of a Central European town, to the more modern architecture and spacious layout of New Belgrade. In Belgrade the oldest buildings date only from 19th century, due to its geographic position and frequent wars and destructions. During the period of Communist rule, much housing (blocks) was built quickly and cheaply to house the huge influx of people from the countryside following World War II.

NETWORK

As regards road network, it is inadequate and insufficiently developed, particularly during peak periods, and up to 2021, construction of about 132 km and reconstruction of 75 km of road and street network is planned. The city is located at the confluence of the Sava and the Danube Rivers and the Old Town includes the fortress towers above the confluence on the top of a small plateau. Belgrade's large new town is located on the left bank of the river Sava, while the historical core is on the right where the terrain is hilly and streets are steep.

SPACE

Belgrade has a moderate continental climate. The characteristic of Belgrade climate is also Košava - the southeast-east wind, which brings clear and dry weather and blows in autumn and winter. The centre of Old Belgrade, the centre of Zemun and the central part of New Belgrade – still developing – are the most important parts of the Central Zone of Belgrade. The city has seen a mono-centric development with great concentration of workplaces in the central zone and dispersion of the main residential zones on the fringes of the city. Economic zones are widespread in Belgrade and the urban built-up area is largely spread out. Construction of about 50000 new flats of new residential space is foreseen, as well as commercial space, out-of-town and in-town hypermarkets, bigger hotels and amusements parks. As regards urban design, the Master Plan for 2021 is directed to planning solution in order to to finishing the process of privatization of the residential and business areas, adequate commercialization of the city's historic cores as well as rounding up the residential units.
Interventions items

Pedestrian zones and Tempo Zones

Belgrade offers pedestrian zones in its centre: here can be found countless cafés and shops. These areas are totally pedestrianized and are pleasant and safe place where to walk. Knez Mihailova street is the main pedestrian (shopping) street in the downtown and is protected by law as one of the oldest and most valuable monumental complexes of the city, with a large number of representative buildings and urban houses built at the end of 1870s. It was reconstructed in six months (2001), with minimal possibilities to widen it; the results of the pedestrianization were the increase of pedestrian flow service and smaller level of pollution. This intervention runs parallel with the implementation of Tempo Zones in Belgrade. It can be distinguished among residential or access streets (Tempo 30 Zone), that are used as gathering paths for pedestrian and motor traffic, and high streets (Tempo 50 Zone), that provide undisturbed and safe pedestrian traffic on sidewalks separate from motorways. The network of the high streets defines “Tempo 50 Zones”, where the maximum allowed speed is of 50 km/h, while the entire city street network is divided into “Tempo 30 zones” or Home Zones, where the street space is shared between drivers of motor vehicles and other users including people walking and children. Home zones encourage walking and cycling within Belgrade’s neighbourhoods and improve the quality of built environment. Finally, several efforts have been made towards public space and squares, which have been redesigned and repaved.

Parking Policy

The number of available parking lots in the city center zone doesn't satisfy user needs which have to park in the center. To avoid that parked vehicles occupy a part of streets, intended for traffic flow, thus bringing into danger walking traffic, has been introduced a scheme in the city core with limited staying time and special tariffs (2003). City area where this parking system is applied is restricted by streets (Karadjordjeva, Pariska, Tadeuša Košcuška, etc). Parking places, so-called “krug dvojke”, are divided in three zones by priority. In red zone are streets near post offices, hospitals, police offices, and, generally, the most critical locations in the city; yellow zone is somewhat disencumbered and green zone is the least attractive area in the narrow city core. Almost all of the parking spaces have zones marked with green, yellow or red paint on the street too. Parking is limited to one hour in red zone, to two hours in yellow, and to three hours in green zone. As regards parking price, the system is full automated and projected so that driver pays in the shortest time without any contact with collectors. The price for parking is determined by new tariff system and depend on attractiveness of that zone. By decision of City Assemble of Belgrade, fellow-citizens which live in this area are assigned in privileged parking tickets, as well as invalids. Finally, there is a large car park with 500 spaces under the old palace in the city center.

Ramps and sidewalks

To provide an accessible environment for blind and visually impaired pedestrians is one of the main objectives of Belgrade City Council. Currently bus stop facilities are being adapted to meet such requirements. At bus stops kerbs are high to prevent vehicle climbing and parking on the pavement, while at crossing sites pedestrian ramps have been set up, which have markings for the blind and visually impaired as well. These ramps are also intended for easier movements of mother with prams, as well as for the wheel-chairs users. Moreover several efforts have been carried out to change
the usual position of light signals: they were in the middle of the crossing and has moved to the side. Special noise signals for the blind on the light signals posts enable them to have relatively safe communication during movements at the pedestrian crossings. Sidewalks have been widen too, providing more space to pedestrians and increasing the level of pedestrian movement service. Street scene has been reduced to the most essential contents: there is only the basic equipment and particular attention has turned to the protection of the lines of trees. Sidewalks’ surfaces have been marked with special path-lanes for blind and visually impaired pedestrians. Warning areas are marked by point textures, while this line texture is intended for movements "from point to point". Finally, news street lighting and illumination of some significant structures have been planned.

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Context items

SITE

Barcelona is well known for its architectural works and the city centre includes many of its historical building. Barcelona has several commercial complexes and skyscrapers (the highest being the Hotel Arts and the Torre Mapfre, 154 m). Some of the World Heritage Sites in Barcelona are Park Güell, Casa Milà and Sagrada Familia (Gaudí). Great blocks of buildings characterized the cityscape in the central districts, that are quite compact and dense. In the outskirts new residential building are located, together with renovating social housing in old neighbourhoods.

NETWORK

The city is located on a plain bordered by two rivers: the Llobregat in the south and the Besòs in the north. Barcelona is dotted with small hills (Monterols, Putget, Carmel, Rovira and Peira), and was once full of streams and small marshes. The promontory of Montjuïc is also by the coast, rising to a height of 191.7 metres. As regards the road network, the Ring Road and a number of substantial high-capacity radial routes were completed within the context of the 1992 Olympics. The city is crossed by main arteries (Avenida Diagonal, Avenida Meridiana, Gran Via) and streets form a orthogonal grid.

SPACE

Barcelona’s location on the shores of the Mediterranean means that it enjoys a warm, welcoming climate and pleasant temperatures all year round. The city is divided into ten administrative districts, among which there is the old centre, the Ciutat Vella. As regards urban structure, the Cerdà Plan for the Extension of Barcelona (1859) with its rectangular block characterized the city frame, the blocks of buildings and public spaces. Parks and beaches are some of the city’s landmarks. One of the characteristics of its urban model is the mixture of uses to which it is put: in every district of the city people live and work, do their shopping, have access to services and equipment and enjoy a wide-ranging cultural and leisure-related programme. The urban sprawl phenomenon strongly influenced Barcelona in the last 50 years and this led to loss of open space. During the 80’s, and taking advantage of Barcelona’s candidacy for the Olympic Games of 1992, the city underwent a process of large-scale renovation.
Interventions items

Restricting vehicle access

At the beginning of the 90s, the City Council of Barcelona designed a Mobility Plan in the old quarter of the city (Ciutat Vella), which foresees the creation of **zones with pedestrian priority** to improve natural mobility (on foot, by bicycle) and progressively limit the access in the quarter of passing through vehicles during the most conflictive hours. The first zone which came into operation is limited by the following streets: Princesa, Via Laietana and Passeig Isabella II. The priority zone for pedestrians limits the circulation in this area and only residents with vehicles registered in the quarter and authorised vehicles are allowed to enter it. During the hours of vehicle regulation, speed will not exceed **10 km/h** and access will be exclusively made through the 2 gates. Some retractable posts, placed in the marked streets, prohibit the entry of non-accredited vehicles. This measure has provided positive aspects for pedestrians quality needs, because a low speed area, in theory, should have a positive effect on safety and car traffic is reduced to a minimum level, thus increasing attractivity for pedestrians. Furthermore, Barcelona City Council seeks to reduce the flow of vehicles passing along the Rambla, including motorised two-wheelers, improving the pedestrian amenity of this world-famous promenade. The aim is to control the time, speed and type of vehicle that travels the section from Pg. Colom to Pça Catalunya, using a **system of cameras** to ensure an efficient enforcement. The volume of traffic per day among the Rambla includes significant numbers of public service and goods delivery vehicles and consider a full, immediate pedestrianisation of the street is not possible nowadays. A section of the Rambla has been set under control using an ANPR system, to ensure the enforcement of access restriction during the times of high pedestrian activity (11.00-20.00); only authorised vehicles are allowed to enter with a speed limits of 30 kph, while open access of the 3 off-street car parks located along the Rambla has been maintained.

School interventions

"Education for Mobility" initiative seeks to enhance safe pleasant access to and from school, making the street an inviting educational setting for the boys and girls who walk along it and, by extension, for all the other persons who walk along it as well. It began as an internal process of the school on the basis of the following main points: firstly, the integration of the school’s **educational programme** in this project with teachers, parents and children working together; secondly, the work on the project has been carried out continuously and dynamically so that the process can be revised, correcting weak points and advancing with new actions of improvement and participation. Mapping of pupils’ homes and **survey** among parents to learn about the mobility patterns of school attendance have been implemented, as well as contact with involved agents in order to reach consensus on the measures to be taken on the street and **educational-recreational activities on the street**. Furthermore teachers’ mobility handbook has been prepared by the Education Institute of the Barcelona City Council to promote the celebration of the "In town without my car!" campaign (2001). It represents an aid for classroom teachers, with ideas and reflections to prepare, live and evaluate the activities developed around "European Mobility Week" campaigns. It is not a specific course, but rather a handbook of guidelines and concrete proposals for addressing the subject of education for mobility in the classroom.
**Crossings interventions**

Since 1991 lowered kerbstone in intersections has been installed in the city centre of Barcelona: it was one of the first procedures for the adaptation of the city to all conditions in mobility, which meant the first step for a longterm plan of accessibility (Plan of Accessibility of Barcelona - 1996). The measure consists in ramps made of granite for the passage of pedestrians, which has a maximal gradient of 12% and a width of 3,2 m of passing length. The width can be variable as the ramp is made with modules of 0,4 m. On the pavement, facing the pedestrian crossing, a fluted pavement is installed, different to that of the rest of the pavement, to indicate the existence of the pedestrian crossing to blind people. This element enables the elimination of kerbs, which hinder the mobility of people in wheelchairs, and does not require the presence of other people helping disabled people to overcome the obstacle, increasing their level of personal autonomy. The autonomy of disabled people contributes to their own development and pedestrians' mobility was also improved through an urban normative on the placement of urban elements (traffic lights, wastepapers, road signs, etc). In light-controlled crossing sites another measure has been implemented, that means lower pedestrian delay. A research work on the influence of platoons in the optimisation of signal settings, working with a network of signals and green waves, enables the definition, within the ADONIS project (1999), of a formula for the calculation of the delay suffered by drivers related to cycle length and turning vehicles. The result is that an index was defined to decide upon cycle lengths, saving in waiting time for pedestrians. The minor delay will decrease the temptation to cross on red and give pedestrians better safety conditions.

**Footbridge and underpasses**

The re-urbanisation of streets and roads has seen the conversion of 162500 m² of road space into pedestrian spaces and new cycle routes (and 135000 m² of roads into green planted areas), but also pedestrian bridges and tunnel are largely implemented in the city, improving the accessibility between two parts of a quarter divided by a big infrastructure or by water. In some cases (new accesses to some urban train stations: Gran Vía, Paralelo, Sagrada Familia, etc.), elevators have been installed, reducing distances and the effort to climb stairs and ramps. To improve safety, they are usually transparent, so that the user to enter the elevator knowing if there is someone inside. The only inconvenience is the need of a more expensive up-keep. Moreover, since the elevator has its walls made of glass, dirtiness is more visible than in a conventional elevator. If this aspect is not taken into account, it can dissuade people from using it.

**Bollards on the pavement and Zone 30**

Bollards on pavements have been installed to preserve pedestrian zones from the invasion of vehicles. They prevent vehicles from partly parking on this zones and improve pedestrians’ mobility indeed: the physical impossibility to occupy this space is the most effective measure in this fight for pedestrians’ space. The most common problem is the one caused by delivery vehicles: since they only stay for a few minutes, they do not consider the fact of occupying pedestrians’ space as being a serious problem. Particularly, there are up to 5 different models of bollards. The main benefit for pedestrians is the increase of comfort and safety in displacements on foot, since vehicles hindering
passage and being able to cause damage to the most fragile road users are cleaned off from pedestrian zones. However, the bollards are fix elements that occupy the pedestrian space and may be a problem to visually disabled people, so it is important to calibrate the need of their installation, not using them indiscriminately, and the colour should be as contrasting to the paving stones as possible. The measure is one of the elements that characterized the “Zona 30”, that was extended to other (residential) areas in 2007. The speed limit provides a safer environment for pedestrians (and not only) and avoids car’s pollution too.

Access to Public Transport

The need to use all road space has moved cities to create more or less sophisticated systems which enable public transport users to have access to vehicles comfortably. Since the 90’s bus stops on pavements next to parking lines need to reserve some space for buses to approach and leave the stop. These platform has been installed in some streets of Barcelona where buses could not reach the pavement and, therefore, passengers had to descend to the road to take the bus. This proceeding is especially important for elderly people or for those people with reduced mobility. The installation of platforms is essential in those lines where buses have low platforms for wheelchairs, prams, etc. The platform improves passengers’ comfort and PT accessibility and marks physically the space reserved to the bus stop preventing other vehicles from taking up this space. This interventions are included in Barcelona 2012 Mobility Master Plan, which aims at improving Public Transport in terms of accessibility, intermodality and environmental issues.

Multiple-use lanes and parking

In order to give a concrete answer to the necessities of the different road users and with the will to improve traffic flow and mobility, the City Council of Barcelona has created the “multiple-use lane”. This lane has been designed to adapt the space use to circulation, load and unload services and resident parking, taking into account hourly demand. It is considered an effective solution for intense traffic streets with important commercial activity lacking basic arrangements for goods delivery and is already being used as such on 3720 m of Barcelona main streets. Two kinds of traffic signs have been installed in order to mark off the lane: vertical electronic panels showing messages concerning lane use at any given time and horizontal markers with 15 high intensity leds, which light up when the lane is reserved for loading and unloading operations. Parking policy has been also modified, thus improving pedestrians environment. Particularly, the City Council is tightening on-street parking controls (by duration of stay and/or price) and introducing only limited increases in public capacity. This is being undertaken in tandem with providing spaces for new residential developments and strict enforcement. (“Área verde” Project). Park and Ride facilities have been also implemented (railway stations), as well as underground car parking. Sidewalks have also been set up and widened, improving street lighting conditions, planting trees (buffer from road traffic) and providing space for leisure too. The campaign “Atenció! Tots som vianants” (“Look out! We are all pedestrians”), launched at the beginning of 2008, aims at enforcing the role of pedestrians and the need to ensure their safety, especially at crossings.
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Context items

SITE

Lund is built on a medieval network of streets and bears a cultural-historical identity provided by its old building, classical museums, art galleries and other sights. A large area in central Lund is set aside as an open-air museum of old houses. Lund is also known as a green town with a lot of scenic parks, restaurants and cafés. Most of the central buildings in Lund date from the late 19th century, when small houses were replaced by multi-storey ones.

NETWORK

The city is part of the Malmo region has no topographical barriers. It has experienced a concentric development and the hinterland has a high population density. Lund has excellent communications in all directions and the Öresund Bridge provides a direct link for cars and trains between Sweden and Denmark. The maintenance of the road network in the city is efficient: road surfaces is cleared of snow, sanded and swept as needed.

SPACE

The climate is temperate with average temperatures about 16 °C in the summer and 0 °C in the winter. In 1998 the City Council passed a new Transport Programme called LundaMaTs, which has recently updated (LundaMaTs II – 2007), and in its targets a particular issue was Lund’s land use. Particularly, this were the objectives: localisation of new activities and companies shall be managed with the objective of reducing the total transport demand and increasing the accessibility to public transport, the degree of fragmenting (sprawl) must not increase, the traffic areas per inhabitant and employee must not increase, the share of the traffic areas used for motorized traffic must not increase. As a consequence it is an objective to avoid fast urban growth, but in reality the city is growing relatively quickly compared to other Swedish cities. As regards urban design, “shared spaces” are common features in the city. This approach is based on the concept of integration, since a share space is a zone where different functions and different users live within the urban landscape.
Interventions items

Parking regulation

The parking policy (and transport policy) of the City of Lund aims at reducing car and heavy vehicles in the city and includes the following issues. Firstly, a general **parking tariff system** involves 2630 publicly accessible parking spaces (2000 on public areas, the rest on private or semi-private properties). The fees are collected on all publicly accessible spaces in the city centre (inside the city centre ring road) and some spaces outside the centre; time limits and fees are differentiated geographically (the more central the parking, the shorter the time limit and the higher the fee). The second issue regards the **availability of the parking lots** in the city centre: parking opportunity is limited, thus giving a safer and more pleasant environment to pedestrians. Despite the undersupply of parking spaces the city centre is well functioning and about 70% of visitors drive their car to one parking lot then walk around in the centre. However special street areas are reserved for vans and lorries delivering goods to shops. The areas, called delivery zones (**lastzon**), are marked on the roadway and with special traffic signs. The last issue regards **residential parking permit areas**. Within the city centre, on-street residential parking normally is not be allowed during the day. This parking is moved to off-street spaces, garages or spaces outside the city centre. In the rest of the city, residential parking has priority over commuter and visitor parking.

Speed reduction and Home Zones

General speed reduction in urban areas and minor roads is a key condition to the introduction of Home Zones. Lund is an example in the European context with regards to **speed limits** and home zones schemes. To meet the national "Zero Vision" objective (no traffic victims at all), a speed limit of 30 km/h has been introduced in the whole central area, supported by clear signs on billboards on all the approaches to the city, and in housing areas throughout the city. Other engineering measures has been implemented to create a safe and child friendly environment ("City of Children" Project – 2004/07), such as road narrowings, speed bumps, raised platforms, school ways, squares, sports grounds, street lighting, etc. In this frame pedestrian signals at crossings are also basic matters. In Lund flashing interval seems has been implemented and pedestrians rarely had to cross more than two lanes without coming to an island or median. **APS (Accessible Pedestrian Signals)** are fairly extensively installed in residential areas too. These signals provide audible and/or vibrotactile information coinciding with visual pedestrian signals and let pedestrians who are blind know precisely when the WALK interval begins. Furthermore in Lund there are typically bicycle lanes on both sides of the street; they are usually signalized separately, using small ball signals and separate pushbutton actuation. Along the streets, bicycle pathways can be seen as a buffer from road traffic, making sidewalks safer.

Pedestrian precinct in city centre

In the 90s the City Council of Lund implemented a **pedestrian precinct**, which forms an (almost) continuous network from the central station to the marketplace (**Mårtenstorget**, rebuilt 1997) via the main square (**Stortorget**) and the city bus terminal. The network exists inside a 600 x 200 m area. Some of the streets are combined bus-bicycle-pedestrian streets. In other streets, bike and/or motor vehicles with errands along the street are permitted. This pedestrianization has made the city centre
into a pleasant and popular destination for pedestrians. Furthermore a lot of outdoor cafes have flourished in recent years, giving the city a healthy, attractive and safe image. Moreover, as part of the Greater Malmö region, the City of Lund decided to implement environmental zones (within the Transport Programme LundaMaTs - 1997), that means that heavy diesel lorries and buses weighing three tonnes or more are only permitted to drive in the inner city of Lund if they meet specific environmental criteria. This measure aims at reducing noise and air pollution and consequently provide a healthy walking environment. In 2002, Lund participated in the "In town without my car!" campaign for the third time. The City also participated in the European Mobility Week initiative. The aim of Lund’s communication strategy in the framework of the European Mobility Week 2002 was to reach out to most of the households in the municipality with the programme and to give visibility to the event with advertisements and posters: in 2003 the City received the European Mobility Week Award.

**Walk to school**

The project “Walk to school” is part of LundaMaTs, the city’s sustainable transport strategy that was introduced in 1997. Since 1999, several measures have been implemented with regards to ‘walking to school’. The major reason was that it became more and more common for parents to drive their children to school. The purpose of the project “Walk to school” is to reduce carbon dioxide emissions by getting parents not to drive their children to school and pre-school, but instead to walk with them or let the children walk or cycle on their own. One starting point has been that a lot of parents choose to take their children by car to school since they think that the school routes are too un-safe. An inventory of these school routes for the youngest has been made. By doing so, the most dangerous intersections and paths have been localised. The most critical places have been assembled in a plan, which has been accepted by the Technical Committee. A consequence of this plan is that the critical places were gradually being rebuilt. New pedestrians paths were constructed too and traffic calming interventions around school zones were implemented. In addition to the street improvements a series of mobility management measures have been conducted. These measures are carried out to persuade parents to stop driving their children to school. Information at parent meetings, traffic safety work in school, walking school buses, campaigns and preventative health projects are some of them. The evaluation of the project shows that the percentage of parents that drive their children to school has reduced from 17 to 13 % since the project started.

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Context items

SITE

Genève cityscape and landmarks are characterized by its historic palaces and modern buildings (St. Pierre Cathedral, Palace of Nations). In the city centre, tightly packed buildings can be found, whereas urban suburbs are characterized by large housing blocks and small courtyards. Actually they are multi-storey buildings (the general number of stores is 8 to 11).

NETWORK

The city is the central cross-roads of Western Europe and holds a privileged geographical position; it is surrounded by main arterials and streets with heavy traffic and is also pierced by some of them. There is a ring road, which provides access to France and Genève airport. This ring (partly) helps to avoid through traffic and reduce congestion in Genève. The city is situated along the banks of Europe’s largest lake, Lake Geneva, and is bordered by the Jura Mountains to the west and the French Alps in the east; the Rhône and the Arve are the main rivers crossing the city and the area is rather flat.

SPACE

Due to the tempering effects of the lake and surrounding mountains, Genève is pleasant almost year round. September and October are the rainiest months. Genève’s urban area is relatively small, since the Lake Leman and the French border surround it. The Old Town is the core of the city and in the downtown are hosted many international organizations, including the European headquarters of the United Nations and the International Committee of the Red Cross (ICRC). Genève’s landscape is characterized by the presence of the lake and the parks. The City of Genève is called the ‘city of parks’ indeed, since has an area of 310 hectares of parks of which the following are the most famous: Parc des Bastions, Parc des Eaux Vives, Parc La Grange. In the outskirts are located residential houses and shopping malls. Suburban development has put pressure on the agricultural lands and natural environment, however they are very protected by the canton of Genève, so that campain can be found just near the town. Furthermore Genève is part of an “agglomeration plan”, which aims to plan urban development and mobility over the cantonal frontier with the canton Vaud and through the national frontier with France.
Interventions items

Traffic calming

Various measures to moderate traffic have been tested and implemented in the city of Genève during the last years. At the beginning measures were limited to a very restricted perimeter with these moderate perimeters being discontinuous, but nowadays traffic moderation devices are applied at the level of larger areas in the city districts. The introduction of Home Zones, the so-called “Begegnungszonen”, has improved pedestrian environment, since in these zones car traffic has been strongly restricted (where it is allowed, the speed limit of 20 km/h has to be respected). Traffic calming measure have been introduced too (roads narrowing) and sidewalk have been renovated and enlarged. Street furniture was implemented too and one-way streets were introduced. The objective of this scheme is to create livable and lively spaces, where cars, bicycles and pedestrians share the same space. Furthermore, Genève Pedestrian Plan (1995) introduced a series of crossings interventions in order to create a safe road environment for pedestrians: installation of road islands, change of colour/structure of pavement and lighting, speed reducers, pavement enlargement, traffic-light regulation, lowered kerbstones, etc.

Pedestrianisation and parking

In 1995 the city of Genève published its Pedestrian Plan, aiming at the improvement of pedestrians' road safety and at increasing walking. The city center has been pedestrianized and parking regulation has been carried out parallel, in order to provide pedestrian a more liveable environment, as well as the “promenades” which aimed to encourage people discovering the town on foot. Recently public parking lots have been reduced and a parking strategy was put in place by the office Cantonal des Transports and Circulation (OTC) in the last years. This one includes the introduction of two zones (white, blue) with different prices and times in the town center, as well as Park & Ride facilities. Special permits for residents and disabled people are also implemented and outside of the centre of Genève numerous free parkings for unlimited periods of time exist. Finally, Genève has been taking part in the “In town without my car!” campaign since 1999. The initiative is in line with the overall policy of the municipality on mobility and for the promotion of soft modes of transport, like walking. The European Mobility Week is another event in this frame and the city has been involved too during the last years. Themed activities and conferences were proposed and organised, aiming at enforce walking, intermodality and sustainable modes of transport among the community.

Schools interventions

Encouraging getting to school on foot (but also on bicycle or by tram) is one of the objectives of Genève Pedestrian Plan (1995). In 2005 a “Little Pedestrian Plan – Walk to my Neighbourhood School” was drawn up in the framework of the City-Friendly Mobility Week, to mark the 2005 International Walk to School Day. Pédibus associations and the Departement of Urban Planning and Urban Mobility of the City of Genève cooperate in this Plan with the aim of improving walking in school trips. Initiatives about mobility theme (Mon chemin de l’école), road training and Walking School Buses
(Pédibus) have been implemented, in order to enforce walking among children. For European Mobility Week 2005, the City of Genève organised several public debates on sustainable mobility and children’s car dependancy, moreover new pedibus lines were inaugurate. Furthermore, traffic calming interventions (roundabouts) and oversized road signs have been implemented around school areas, thus reducing cars’ speed and protecting pedestrian children in their trip to/from school.

**Footbridge and walkways**

New walkways have been implemented in the city of Genève, that means several sidewalks paths and one footbridge. Connectivity is one of the main pedestrian quality needs in urban environment and through the City Pedestrian Plan (1995) several efforts have been made in this frame. Firstly, pedestrian network has been explored and obstacles have been identified in the city centre and its outskirts; then pedestrian routes have been improved through the renewal of sidewalks and the introduction of new walkways and a continuous pedestrian mesh. Routes have been improved also through the reduction of the number of urban furniture, providing more visibility (safety) and pedestrians’ comfort.

**Open spaces**

Parks and public spaces are considered in Genève Pedestrian Plan (1995) and interventions have been implemented to create more convivial open spaces and improve safety for pedestrians within the community. Streets and squares can play their part as places for encounters and social interaction and the City Council valorized its public areas through the extension of pedestrian facilities, the introduction of new squares and playgrounds, the introduction of fountains/monuments/statues, the valorisation of entrances to parks, the improvement of walkways in green areas. The main concept in this frame is that public space is not only a place for travelling but is above all a living space, used for highly diverse purposes. A special remark is necessary concerning lighting issue, since it is a priority on the city's development agenda to enhance public spaces. Genève devoted special attention to lighting in its various forms, ranging from street lights to the lighting of particular landmarks, as well as lighting for special events. Some years ago a "lighting Project" was undertaken in the city centre, where the Place du Molard offered a unique atmosphere at nightfall. Transparent bricks, which light up at night, had been placed randomly among the paving stones of the square, creating a pleasant environment for residents and visitors. Several events have been organized in the last years (e.g.: "Les yeux de la nuit" – 2005), in order to enhance and highlight public spaces throughout the city.

**Incentive actions**

The city and the canton of Genève are active in this domain, since information, campaigns and action plans have been implemented since the beginning of the 90s. Genève has been taking part in the "In town without my car!" campaign since 1999. The initiative is in line with the overall policy of the municipality on mobility and for the promotion of soft modes of transport, like walking. The European Mobility Week is another event in this frame and the city has been involved too during the last years. Themed activities and conferences were
proposed and organised, aiming at enforce walking, intermodality and sustainable modes of transport among the community. Other initiative is “Dimanche à pied”, walking and cycling tours on theme organized during the summer by the city of Geneva with local associations.
Finally, Genève undertakes mobility management actions: the administrations of the city and the canton encourage people to reduce the use of the individual car to the profit of other less polluting means of transport. Cycling promotion usually occupies an important place in the proposed measures while walking is often promoted in relation to public transport.

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Context items

SITE

Leeds is an historical city and is crammed full of landmarks and monuments which date back many hundreds of years and are in remarkable condition (Leeds Art Gallery, St Anne's Cathedral, Town Hall, etc). The city is also one of the most fashionable places in the country with a great deal of new business and commercial building, high blocks and shopping malls. The central area is fairly compact with most of the major attractions and shops within walking distance of one another, while residential areas are widespread in the city's outskirts (where green spaces and community parks are located too).

NETWORK

As regards the road network, the City enjoys excellent north - south transport links in the form of the M1/ A1 roads and the electrified East Coast main rail line. There are more than 2600 km of roads in Leeds and the vast majority of the network is comprised of unclassified roads. Leeds is blessed with two fine rivers flowing from the west to the east through the district the River Wharfe and the River Aire. Particularly, the latter passes through the heart of the city, forming a green corridor.

SPACE

The weather in Leeds is typical of English weather and is often unpredictable. As regards land mix use, industry had started to concentrate in three main areas (mainly along the river) and better class residential areas tended to spread on the higher ground to the north. Nearer the city centre, slum clearance has progressed and the land made available has been redeveloped in various ways: later housing focused on individual designs and environmental improvements such as the estates of Ebor Gardens. Leeds city centre urban design strategy launched a Project in 2000, aiming at developing the area of the City Centre (500 ha), that means enhancing the urban design characteristics and local distinctiveness of the centre. Several investments have been made in new infrastructure, quality public spaces and streets, and mixed land uses, including new residential, supporting diversity of activity according to good urban design principles. New greenspace and environmental enhancement (tree protection programmes) have been implemented in this frame.
Interventions items

Safe Routes to Schools programme

“Safe Routes to School” is an initiative that Leeds City Council has carried out since 1998 and aims at encouraging and promoting sustainable modes of travel for school journeys, in particular walking and cycling (but also public transport where it is appropriate). In Leeds there has been a very significant growth in the use of cars to take children to school, with a consequent increase in traffic congestion and delay, localised air quality problems, noise pollution. Particularly, the Project’s objectives are to improve the road safety of young people, to promote independent mobility for children who are old enough and to encourage a transfer from car based school journeys to other modes. The main elements of the Project are the implementation of specific measures on the highway to improve safety for pedestrians (and cyclists) on the journey to school, the development of School Travel Plans and continuing support for initiatives such as Walk to School Week and Walking School Buses, general road safety promotion initiatives in the schools involved. Advices and supports for parents to change their travel mode for escort journeys and developments of a new package of pedestrian skill training including supervised practical sessions for primary years 3 and 4 and training of volunteer trainers are other interventions that enforce the need to provide (children) pedestrians a safe environment around schools. Leeds Government requires all schools to have a School Travel Plan in operation by 2010; the Education and Inspection Act 2006 has introduced a new duty for council’s to plan for future sustainable travel to school.

Home Zones

Methleys Home Zone was one of the first UK pilot Home Zone schemes (2001 – Leeds City Council and Methleys Neighbourhood Action). This area contains about 300 residential properties and houses about 700 residents. It is arranged in a compact grid pattern of 14 streets is located in Chapel Allerton in the North of Leeds city centre. Before the scheme was introduced, most of the streets were relatively wide (7 to 8,5 m), pavements narrow (1,7 – 2 m wide), the area experienced significant on-street parking, through traffic by non-residential vehicles and congestion in parts, specifically during school pick up/drop off times. The main objectives of the home zone implementation were to reduce traffic speeds within the home zone area and increase street based activity and neighbourhood involvement of residents, including increased opportunities for children’s play. The main features of the scheme included: road narrowing (to 5-6 m) and corresponding pavement area expansion, traffic calming measures (speed cushions), 20 mph speed restrictions, a new shared road surface, incorporating coloured block paving and extensive planting and HZ signing at all entry points to the zone to make non local drivers aware of the changed environment. A follow up survey of local residents showed significant improvements in terms of safety perception.

20 mph speed limit and crossings

Since 1991 Leeds City Council has introduced the limit of 20 mph (32 km/h) in several zones in line with guidance notes which were issued by central government (Department of Transport Circular 4/90 Roads, May 1991). They were implemented in selective residential areas of the City, which have poor highway safety records as a means of discouraging through traffic from using the proposed zone. The selected zones were normally residential in character and the road network within the zone generally consisted of access roads (but the inclusion of some local distributor roads was acceptable).
In order that the zones did not become too large, no road within the zone was more than 1 km from the boundary of the zone. The zones were accompanied by appropriate physical traffic calming measures, after a detailed consultation was undertaken among local residents, police and fire and ambulance services. Traffic calming devices include street closures, road humps, street narrowing and parking measures to prevent 'rat running' and slow down traffic to provide a safer street environment for pedestrians and cyclists. Furthermore, particular efforts have been made in the implementation of a 'roundabout scheme' (West Leeds Construction Ltd), within "The Britain in Bloom campaign" (2007). The national Transport Strategy also requires Leeds City Council to develop cycling and walking strategies which include improved footways and above all pedestrians crossing signals. In Leeds have been implemented Pelican crossings, Puffin crossings, Toucan crossings and in several locations pedestrian refuges have been placed. Finally, the Council has recently completed a special project to reduce the delay times for people crossing the road at signalled crossings between road junctions. The aim was to improve conditions for pedestrians crossing roads in Leeds and encourage walking as a sustainable form of transport. The project covered four years and resulted in an average 35% reduction in pedestrian waiting time at over 200 crossings.

**Pedestrianisation**

The City Centre Loop and the pedestrianisation of Briggate are all closely integrated measures, which were contained in Leeds Transport Strategy (1991). The basic aim of these schemes was to reduce traffic flows through the heart of the City, and thereby provide a more attractive and safer environment for pedestrians and cyclists. Moreover these interventions have ensured that buses, taxis and cycles receive better priority in the core of the City Centre, as well as disabled people and others with mobility difficulties, and have improved air quality in the centre by reducing the volume of through traffic. Briggate is a shopping street located in the centre and for many years was open to traffic: nowadays it is all pedestrianised, in order to create a pleasant and safe space where to walking and shopping. The City Centre Loop Road is a clockwise one-way route around the main shopping areas designed to make it easier for all traffic to get into, around, and out of the City Centre when necessary. It can be considered a pedestrian interventions too, as this scheme prevent traffic flows in the core of the city, thus ensuring priority access for pedestrians in the centre. In 1999 the "Green Transport Week" and "Car Free Day" took place in Leeds: initiatives have been carried out, such as organised car-pooling scheme, vehicle exhaust emissions tests, Walking School Buses, etc.

**Parking Policies**

Leeds City Council has implemented car parking policies too (Leeds Unitary Development Plan). The measures include the increase of the real cost of parking in the main urban centres (especially for long stay commuter parking) and the control of peripheral on-street parking through residents' parking schemes and waiting restrictions. New Park and Ride facilities were introduced too, aiming at encouraging modal transfer. The key objectives are to reduce extraneous through traffic, improving pedestrian environment and minimising vehicular/ pedestrian conflict. Particularly, Leeds Unitary Development Plan has specified the number of car parking spaces permitted for different types of development and the City Council has specified, as part of planning conditions, pricing policies to be charged by private sector car park owners and operators. Particularly, Park and Ride facilities were joint with Public Transpor Policy (East
Leeds Quality Bus Initiative - 1991 Leeds Transport Strategy), that means the development of the tram network, as well as improvements of bus stop infrastructure including bus docking, raised kerbs, high quality shelters and better lighting. New crossings to tram stops have also improved along pedestrians routes, in order to increase accessibility, and clear pedestrian routes have been maintained at tram stops to allow passage along the footway unimpeded by platforms and waiting passengers.

Street maintenance

Leeds City Council is responsible for maintaining footways and distinguishes among "reactive maintenance" (emergency and urgent repairs of potentially dangerous footway defects), "planned maintenance" and "routine maintenance". Main interventions includes footway repairs and resurfacing, kerb stones conditions, overlays, etc. Street furniture is also preserved, with particular attentions to bollards, pedestrian guard-rails, litter bins, traffic signs and equipment (excluding traffic signals) and lighting columns. As regards street lighting, Leeds City council has implemented a Street Lighting scheme since April 2006 (SEC - Southern Electric Contracting), aiming at replacing approximately 73500 street lighting columns and installing 6000 new columns over the lifetime of the scheme. This is providing Leeds with modern, high quality street lighting. The project also involves the replacement of 11,000 illuminated signs and improved lighting in tunnels, underpasses and pedestrian subways. The better and brighter street lighting will benefit all users, but particularly pedestrians, helping to improve road safety, reduce crime and the fear of crime and provide a safer more user friendly night time environment. Moreover the Project also minimises light pollution

Footbridges

Recently, a new bridge across the river Aire is lifted into position. Connecting the west end with the Holbeck area of the city, the Whitehall Bridge is the first footbridge across the River Aire to be completed this century. The lift took place in September 2007 and its constructions is included in the Planning of Whitehall Riverside, since the bridge and the waterfront lighting Project provide a more pleasant place were to cross and walk, thus satisfying the area regeneration objectives. Several other pedestrian bridges there are in Leeds, since the city is crossed by the River Aire, with the aim of improving connectivity among areas and creating a pleasant environment where to stroll and walk. The bridges over the Aire and docks have been sketched into the City Urban Design context map indeed. Particular efforts are made in the surface protection of the decks’ footways, which are usually treated with anti-graffiti paint.

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3.3 Differences and similarities

Differences and similarities among the 20 pedestrian-friendly cities can be highlighted through the help of a matrix. The concept is that a different context leads to different PQNs and interventions. Conditions for pedestrians vary widely from country to country, region to region and even city to city. There are differences in climate, in spatial conditions, quantity and composition of traffic, legal position, culture regarding walking and presence in public space, etc. These differences lead to different pedestrians’ needs and make different demands on their competences and abilities, thus tailored solutions for different countries, regions and cities are needed.

PQNs-Interventions Matrix

Focussing on the classification of PQNs and Interventions items that has been introduced in 3.1, in this section the PQN-Interventions matrix is completed and a qualitative comparison among the countries (or better, the cities) can be carried out. Once again it is stressed that the analysis focuses only on the “spatial environment” slice of the Pizza Model.

The matrix aims at pointing out the interrelations between PQNs and interventions in the 20 European cities. The matrix’s rows include Interventions Items, while the columns include PQNs Items. Therefore the rows are subdivided in the three layers (site, network, space) and each layers in its specific characteristics, as they have been defined in 3.1. The columns are subdivided in the 5 C’s (connected, convivial, conspicuous, comfortable, convenient) and each “C” in its three specific features.

The matrix is filled looking at the analysis of the 20 case-studies [3.2] and it summarizes PQN interventions implemented in the cities. The following legend is necessary to read the matrix, since each colour symbolizes a certain number of cities.

<table>
<thead>
<tr>
<th>Legend</th>
<th>1 – 4 cities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 – 8 cities</td>
</tr>
<tr>
<td></td>
<td>9 – 12 cities</td>
</tr>
<tr>
<td></td>
<td>13 – 16 cities</td>
</tr>
<tr>
<td></td>
<td>17 – 20 cities</td>
</tr>
</tbody>
</table>

Qualitative observations on how the countries (cities) perform in terms of pedestrians issue can be made with the help of this matrix. This approach is obviously objectionable, but it could be useful to have an image of PQN interventions in the European context of COST Action 358.
### Interventions

#### PQNs

<table>
<thead>
<tr>
<th>CONNECTED</th>
<th>CONVIVIAL</th>
<th>CONSPICUOUS</th>
<th>COMFORTABLE</th>
<th>CONVENIENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undisturbed route</td>
<td>Access to PT nodes</td>
<td>Absence of conflicts &amp; assaults</td>
<td>Adequate street furniture</td>
<td>Lighting and visibility</td>
</tr>
</tbody>
</table>

##### Site

- Provide adequate location
- Provide adequate signalised cr.
- Provide traffic calming measures
- Prevent car parking and obstacles
- Provide adequate parking
- Provide adequate legibility
- Provide maintenance, cleanliness
- Provide adequate sidewalks
- Provide adequate furniture location
- Reduce kerb parking
- Provide dropped kerbs, driveway
- Provide adequate traffic-buffer
- Provide information and orientation
- Provide adequate lighting
- Provide maintenance, cleanliness
- Prevent barriers
- Provide traffic calming measures
- Create an attractive environment
- Provide adequate linking with PT
- Provide pedestrian bridges...
- Provide orientation signage
- Provide adequate lighting
- Provide maintenance, cleanliness
- Prevent barriers
- Provide street furniture, lighting
- Provide information / orientation
- Provide parking measures
- Provide green areas
- Reduce noise and emissions levels
- Preserve historic centers
- Provide maintenance, cleanliness
- Provide TC in school zones
- Plan Home zones (30 km/h)
- Plan Car free zones
- Adopt speed limits
- Prevent big heavy vehicles’ transit
- Plan a pedestrianisation
- Establish Road/Park Princing m.
- Provide facilities in interchange z.
General remarks

Looking at the distribution of the coloured cells in the matrix, it is clear that there are areas with different concentrations and some voids (white cells) too. It can be noticed that interventions must be apt to warrant the 5 C’s not one by one, but contemporarily. In practice, interventions are interrelated to the 5 C’s, that means pedestrians’ quality needs, through a non-biunivocal correspondence: some PQNs can be worked out with different interventions and in the same way interventions can work out different PQNs. For example, *connectivity* is related mainly to the network level, while *convenience* is not primarily affected by space interventions. *Conviviality* and *comfortability* are more related to space interventions indeed, while *conspicuity* presents a quite homogeneous distribution among the three interventions layers.

Site interventions

As regards Crossings Interventions, several cities have implemented devices to improve crossings’ quality and some of them are remarkable in this framework. Interventions are mainly orientated to provide crossing adequate location, waiting and crossing time, information technology, capacity, as well as traffic calming measures (humps, roundabouts, curb extensions, raised crossings, intersection radii, rumble strips), dropped kerbs and ramps. Finally adequate legibility and maintenance and cleanliness programmes are also necessary. Particularly, there are six cities that distinguish themselves in this context: Graz (zebra crossings in transverse direction, rebuilt of crossings near PT waiting areas), Praha (special lights, coloured surfaces, new traffic lights, central islands, narrowing roads at zebra crossings, traffic-safety equipment), Berlin (LED traffic lights, touch sensitive buttons and audible signals, midblock refuge-islands), Delft (traffic lights, push buttons with audible feedback, traffic calming devices), Lund (islands and medians, audible information) and Genève (road islands, traffic light regulation, lowered kerbstones). Spain and the United Kingdom also improved pedestrians crossing sites through the installation of lowered kerbstones (Barcelona) and Pelican and Puffin crossings (Leeds). What can be noticed is that traffic calming measures are strongly implemented in crossing sites, in order to manage traffic impacts on walkers reducing noise, pollution, high speeds and traffic volumes. However, great efforts have been made in Eastern cities (e.g.: Tallinn, Haifa, Belgrade and Krakow), and they concern the provision of signalized crossings, as well as dropped kerbs and ramps: this explains the strong colour intensity of the 2nd and 5th rows of the matrix. In these cities the number of pedestrians fatalities at crossings is still a huge problem to date, due to the cities’ high intersections density too [context item: site]. The 3rd row is related to medians and refuge island: the light colour of the cells means that there are few cities that implemented these devices. Particularly, the major gaps can be found in Eastern cities, although this kind of interventions should be introduced more, since road width [context item: network] is a feature strongly interrelated to pedestrians accidents in these cities.

As regards Public Transport Waiting Areas Interventions (bus and tram stops, taxi ranks), they have been implemented in the twenty study cases too. Specific measures in these areas regard their location (not in curve), space (platform), equipment (shelters, seatings, benches) and the provision of ramps, dropped kerbs, lighting, etc. Some cities that have implemented such measures are Graz (rebuilt of bus and tram stops, waiting shelters, curbstones), Gent (enlarging of platforms, new locations, equipment), Barcelona (platforms, dropped kerbs, cleanliness), Praha (platforms, ramps), Helsinki (platforms) and Leeds (bus docking, raised kerbs, high quality shelters, lighting). Tallinn and Belgrade also improved PT quality in recent times and site interventions were included in their City Planning. However, not all the cities have been improved Public Transport facilities in the last years and the (light) colour intensity of the cells reflects this observation. The only context item that is significative within this intervention item is the amount of precipitations and hour of sun [context item: space], since PT equipment include shelter and special weather protection in Nordic countries mainly.
Network interventions

As regards Links Interventions, almost all cities has implemented devices to improve links’ quality. Particularly, cities in Eastern European countries focussed on these kind of interventions, which include (mainly) the provision of adequate sidewalks (width, gradient, surface), street furniture, street lighting and information signage. Examples can be found in Belgrade (sidewalk width and surface, ramps, equipment, lighting), Praha (traffic-safety equipment), Tallinn (footpaths maintenance, buffer from cars and bicycles, reduction parking lots), Athens (sidewalk width and maintenance, reduction of parking lots) and Krakow (re-paving of sidewalks, ramps). However in all cities these kind of interventions have been planned and carried out: footpaths surface and small piles (Gent), widening of footpaths and pavement edges lowered to road level (Strasbourg), concrete bollards and buffer between sidewalks and roads (Berlin), widening of sidewalks (Barcelona), footway maintenance and lighting (Leeds). The 4th row is the most intense, since the provision of dropped kerbs in ‘link interventions’ is one of the main objective of almost all the cities, while the other rows present lighter colours. Particularly, with regards to maintenance and cleanliness (8th row), Nordic countries are more involved: maintenance is important to avoid stumbling and falling accidents in countries with a snowy and icy climate. Average temperature [context item: space] is a factor that influence this item and that’s why in the North of Europe sidewalks require regular sweeping and, above all, winter maintenance.

As regards Routes Interventions, all cities has implemented devices to improve routes’ quality too. Interventions include the adequate location of fences, guardrails, parking lots, street furniture in order to prevent barriers and make pedestrians displacements more direct and convenient. Traffic calming measures (road narrowings, chicanes, half and full street closures /cul-de-sac, lateral shifts) are also included in this context, as well as the creation of an attractive walking environment (planting of trees, play equipment, public art, fountains, statues, street cafes) and the provision of linking with PT, pedestrian bridges / overpasses / underpasses, lighting and signage. Cities that distinguish themselves in this context are Graz (strolling zones, street lighting), Helsinki (route and kerbs maintenance, the construction of overpasses and underpasses, Anti Graffiti Project), Berlin (traffic calming, speed limits, orientation maps), Haifa (new walkways), Modena (traffic calming, speed limits, pedestrian paths), Delft (new pedestrian paths, reduction of parking lots, traffic calming measures), Oslo (traffic calming, street lighting), Lund (reduction of parking spaces, traffic calming, lighting) and Leeds (speed restrictions, traffic calming). Some interventions to prevent barriers and improve walkways have been carried out also in Gent, Tallinn and Praha. Context items affect routes interventions, since pedestrians aim to follow the shortest and most direct path to their destination and hilly terrain [context item: network] makes the differences (e.g.: Haifa, Athens, Lisboa). Building blocks compactness and their ground floor use [context item: site] are also determinant factors in pedestrian trips, because short blocks length (with local narrow streets and alleys) and buildings variety encourage walking. However, what can be noticed with regards to context items, is that there are common features among the cities, for example the tendency to reduce pedestrian walking distance providing proper building orientation and alignment respect to the sidewalk [context item: site] and improving the location of shops for daily necessities, schools, bank/post offices, playgrounds [context item: space]. The way in which buildings are arranged on a site creates either a vehicle-dominated or a pedestrian-oriented environment. Network planning addresses land use planning, transportation and urban form and it should provide high level of connectivity so that pedestrians can choose the most direct routes. Differences in context items are present too and they explain the light colour of the cells in the 5th, 6th and 8th rows. Footbridges and underpasses to avoid detours and provide direct walkways are related to the presence of rivers or channals [context item: network] and examples can be found in Graz, Gent, Praha, Strasbourg, Berlin, Delft, Barcelona, Genève and Leeds. Information routes by signs and maps is a feature related to the presence of historical buildings [context item: site] and the main examples come from touristic cities like Athens, Barcelona, Strasbourg, etc. Finally, route maintenance and the creation of an attractive environment are strongly related to the renewal of the city planning and urban design [context item: space] and the cities that distinguish in this case are Barcelona, Helsinki and Strasbourg.
As regards **Public Spaces Interventions**, all cities have implemented devices to improve the quality of rest areas, meeting places and squares. Measures include the adequate location of large complexes of buildings and gated areas, the provision of street furniture, lighting, green areas, parking measures. Programmes oriented to preserve historic centers and promote tourism are also considered in this frame, as well as maintenance programmes. Among the twenty study cases, both big and small cities have implemented measures towards public spaces. Remarkable are the interventions carried out in the following cities: **Graz** (planting of green spaces). **Praha** (pedestrian precinct and maintenance of squares), **Tallinn** (re-surfacing squares, benches), **Helsinki** (caring for the vegetation, maintenance of fixtures, equipment and walking paths), **Strasbourg** (reorganisation of public squares, planting of trees, art works), **Berlin** (street trees, environmental zones), **Pécs** (rehabilitation of streets and squares), **Modena** (enlargement of green areas, benches, lighting, new playgrounds), **Delft** (playgrounds, planting areas, lampposts, street furniture), **Krakow** (repaving of squares), **Lisboa** (rehabilitation of squares and city gardens, street furniture), **Belgrade** (squares redesigned and repaved), **Barcelona** (street furniture and lighting, planting trees, space for leisure) and **Genève** (new squares and playgrounds, fountains/monuments/statues, lighting). The cells with more intense colour are those related to the provision of green areas and parking measures and this could be explained by the urban design renewal [context item: space] that many cities have been carried out in recent times (**Tallinn**, **Pécs**, **Strasbourg**, **Genève**, **Leeds**). This aspect is related to the preservation of historic centers too (7th row), where the cells’ colour is quite intense: almost all the cities aim to preserve their Old Town. Furthermore, there are some (look at the lighter cells) cities that have implemented much more measures towards maintenance, lighting and street furniture (**Graz**, **Berlin**, **Leeds**); the reasons can be found in context features, such as building height and the presence of skyscrapers [context item: site]. Height contributes to the sense of enclosure of thoroughfares and the threshold when pedestrian first perceive enclosure is generally a 1:3 ratio of building height to thoroughfare width. In this cases, a more pedestrian-friendly environment can be created with the provision of adequate street furniture, lighting and footway maintenance.

As regards **Special Zones Interventions**, almost all cities has implemented devices to improve pedestrian environment in school and residential areas (mainly). Interventions include traffic calming measures in school zones, Home Zones and / or Car Free Zones planning, the implementation of speed limits, measures to prevent big heavy vehicles’ transit in central zones, parking measures and the provision of facilities in interchange zones. Pedestrianisation of the city center has been planned in almost all the twenty cases and the best examples can be found in **Graz**, **Gent**, **Praha**, **Strasbourg**, **Pécs**, **Modena**, **Delft**, **Lisboa**, **Lund**, **Genève** and **Leeds**. Interventions in school zones are largely implemented in all the cities too: **Graz** (school mobility management), **Gent** (speed limits, traffic calming, lighting), **Strasbourg** (crossings at school entrances, safety barriers), **Modena** (school mobility management, signage), **Delft** (traffic calming, walking programmes), **Barcelona** (walking mobility programmes), **Lund** (new paths, traffic calming, mobility management), **Genève** (mobility management, roundabouts, signage) and **Leeds** (Safe Routes to School). At the same time City Councils have focused on residential areas and the introduction of Home Zones or Zone 30 is widespread in several cities (particularly: **Graz**, **Gent**, **Strasbourg**, **Haifa**, **Delft**, **Oslo**, **Krakow**, **Belgrade**, **Barcelona**, **Lund**, **Genève** and **Leeds**). However, the best examples can be found in Nordic cities (e.g.: **Delft**) and the reason is that Home Zones can be set up where road hierarchy [context item: network] is well defined. Roads in Eastern countries are still multifunctional and this produces, above all in residential areas, an imbalance between the mobility of motor vehicle users and pedestrian safety. The light colour of the cells in the 3rd row ("Plan Car free zones") can be also explained looking at the cities’ road network [context item: network] and, particularly, the implementation of measure to divert through and unnecessary traffic from central area, thus reducing potential conflicts and pollution problems. Two examples among the twenty countries are **Haifa** ("Carmel Tunnels") and **Oslo** ("tall ring" measure), while Eastern countries have still much to do in this frame. Pedestrian environment is improved through parking and heavy vehicles measures too, as it has been demonstrated in several cities (look at the intense colour of the cells): **Graz**, **Gent**, **Praha**, **Helsinki**, **Athens**, **Pécs**, **Oslo**, **Krakow**, **Belgrade**, **Barcelona** and **Lund**. Finally, urban sprawl [context item: space] interested almost all the cities (although with different intensities, with the higher ones in the Eastern cities – e.g.: **Praha** and **Pécs**) and it is a context feature that is strongly related to Public Transport system planning and this emerges in the matrix, looking at the 8th row ("Provide facilities in interchange zones"): the dark colour of the cells means that almost all cities have improved these zones, since urban sprawl is a matter of facts and PT system has to be implemented to reduce car use and encourage walking trips in intermodality transport.
Further analysis

The possibility to perform a *quantitative analysis* could be taken into account too, but it has not been carried out within the STSM. Quantitative data about the cities could be collected with regards both to context and interventions items, thus trying to link PQN issue and cities’ walkability characteristics. This type of analysis would have required too much time within this STSM and that’s why only a qualitative approach was considered. Beyond the fact that some cities have no data available, the main obstacle is that quantitative data (National Travel Surveys, Local Survey and City Plans) are not always free accessible and enter into contact with experts would have required some extra time.

However, some hints are reported in the following lists for future analyses and improvements.

**Context indicators**

- Residential density
- Average building height
- Average number of intersections
- Intersections density
- Average road width
- Number of road lanes
- Altitude
- Average temperature (winter and summer)
- Average precipitation
- Built-up area
- Green area
- Portion of major destinations that can be reached by walking (time < 13 minutes)
- Percentage of households within 1 km of major destinations
- Land use mix Index

**Interventions indicators (walkability indicators)**

- Average number of crossing facilities per km of road
- Percentage of pedestrian crossings with facilities for disabled
- Percentage of crossing facilities of more than 15 m in length where no refuge is provided
- PT stops per km of road
- Sidewalks lenght
- Sidewalks width
- Percentage of roads which include footpaths on both sides
- Number of parking lots
- Percentage of interchange parking places (respect to parking places)
- Pedestrian area
- Percentage of schools which have a Safe Routes to School scheme
- Home Zones area
- Percentage of population walking to work / school / shopping (modal split)
- Percentage of trips under 1 km made by walking
- Number of pedestrian fatalities per million inhabitants
- Number of pedestrian injuries per million inhabitants
- Average daily distance walked (by purpose)
- Time spent walking (by purpose)
- Pedestrian volume
4 Additional literature: “Pedestrian children”

The literature research conducted within the STSM focuses on “pedestrian children” issue and includes a review of publications, papers, article of journal and reports from all over the world, thus enlarging the European context of the COST Action.

The literature can be divided in six subsections, as below:

► Children’s road behaviour

- Young children’s safety understanding and behaviour in traffic situations
- Children’s attentional skills and road behaviour
- Children: the forgotten citizens in city making
- Children’s understanding of other road user’s behaviour
- Traffic education of children 4-12 years old

► Children’s road safety

- Children’s Exposure to Traffic and Pedestrian Injuries
- Reducing childhood pedestrian injuries
- Children’s travel as pedestrians: an international survey of policy and practice
- Traffic Safety Facts 2004 Data
- Some children have safer childhoods than others: what makes the difference?

► Children mode choice

- Are we making our children car dependent?
- Understanding the car dependency impacts of children’s car use
- The effectiveness of initiatives to reduce children’s car use
- Where do children walk (and what do they do when they get there)?
- Children in Traffic – Mode Choice, Motor Skills, Freedom and Restrictions

► Children and walking variables

- Determinants of car travel on daily journeys to school: cross sectional survey of primary school children
- Neighborhood Schools and Sidewalk Connections
- Walking buses in Hertfordshire – results from a postal survey
- Walking and Cycling Behaviour of Children, Adolescents and Young Adults on their Way to School in Switzerland: Results from the 2000 and 1994 Travel Behaviour Microcensus.
- Johnny Walks to School—Does Jane? Sex Differences in Children’s Active Travel to School
Planning for and with children and youth: insights from children about happiness, well-being and walking

► "Walk to School" Programs

Increasing children’s safety as walkers
Achieving safer school travel in the UK
School Travel Plans in Bromley
Children leading the way to safer, healthier communities
Growth of Walk to school in the USA: identifying trends and transitions
"Walk and Roll”—The Evolution of a Successful Walk to School Program

► Walking School Bus

Promoting physical activity: going to school by the Piedibus
A methodology for evaluating walking buses as an instrument of urban transport policy
The Walking School Bus: Combining Safety, Fun and the Walk to School
Walking the walk
"Walking Bus” - Safer routes to school

Within each of these subsections, document reviews are presented alphabetically, by first author. Furthermore the review is based on the presentation format reported in Appendix B, so as to summarize the key elements for each document.
4.1 Children’s road behaviour

Title
Young children’s safety understanding and behaviour in traffic situations

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Publication Date
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Document Website

Kind of document
Paper

Short Abstract
The paper reports the results of a children's survey conducted in two traffic situation (traffic model + traffic roadsit). Special attention was given to the analysis of three components of road-crossing behaviour, that means: using a zebra crossing, stopping at the curb and looking for cars. The results showed that the children’s performance was differentially related to their safety knowledge and understanding. Differences emerged in children’s behaviour comparing the model and the real situation. This findings underline the importance of young children's training in real traffic situations, in order to learn them to behave adequately in the traffic environment.

Key Results
- Available research concerning the ways in which children cope with risky situations encountered in traffic is at the present time fairly limited. Most studies concludes that younger children have relatively little control over their attention, have less adept at localising sounds and have a narrower visual field.
- Based on literature examples, a model of children’s behaviour in traffic environment is provided. Children situational knowledge and understanding can be related to behavioural skills in three different ways: (a) the child’s understanding decides entirely how it behaves in different situation that require analogous behavioural skills, (b) the child’s knowledge of each of the different situations decides how it will behave, (c) the child’s behaviour is different situations is the result of both an understanding of how to behave and the specific knowledge of the situations.
- The paper focuses on the survey carried out in the towns of Halmstad and Lund. As regards the sample, 45 children were considered (age: 3 - 6, boys and girls). The first part of the survey dealt with a traffic model situation, that means a stiff cardboard where some traffic figures had been drawn. The children had to move a doll to various destinations, demonstrating his/her understanding of rules and safety behaviour. The second part dealt with a roadsite situation and the child was video-filmed while crossing a lightly trafficked road analogous to that in the model.
- In the statistical analysis two grouping variables (age group and sex) were considered. Dependend variables related to crossing behaviour were represented in three indices: use of zebra crossing, looking for cars, waiting at the curb. Statistical tests were done in StatView, SuperANOVA and SPSS and the paper summarizes the results in its last part. What can be noticed is that the single most significant determinant of safety knowledge, understanding and behaviour in the model was found to be the children’s age. As regards the roadsite situation behaviour, there are some differences. For example: the children used the zebra crossing in the model far more often than in the real traffic situation, the children looked around for traffic more often at the roadsite than in the model situation. These differences in behaviour indicate the importance of context for young children.
- What emerges from this survey is that young children are not capable of dealing adequately with the complexities of risky situations such as the traffic. Their skills are also specific to the situation of in which they were learned and a training in real traffic situations is required in order to ensure safe behaviour in risky situations that children will occasionally have to deal with on their own.

Key Terms
children, traffic, behaviour, crossing
Title
Children’s attentional skills and road behaviour

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2001

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Document Website
http://www.apa.org/journals/releases/xap73227.pdf

Kind of document

Short Abstract
The paper reports the results of a children’s survey on “switching attention and concentration”, two skills expected to be used by skillful pedestrians. The survey was subdivided in two stages: in the first one was examined children’s attention and concentration where they was playing a computer game, in the second one they were observed crossing roads. Interrelations between the 2 stages have been observed and are pointed out. What emerged from the study is that older children switched faster and were less distracted, children who were better at switching were more likely to show awareness of traffic when about to cross a road and children who maintained concentration when challenged by a distracting event crossed the road in a less reckless manner. Parents and educators designing safety programs should take into account the development of these skills and children pedestrian safety measures are needed in the long term.

Key Results
- The paper focuses on the role of two general attentional skills, that means on two sources of risk for children: the failure to ignore potentially distracting events outside the current focus of attention and the failure to switch attention to the road crossing task when appropriate. Afterwards it examines a study carried out on a sample of 160 children (aged 4 years 3 months-10 years). The children were balanced within each age group according to sex, parental educational level and traffic experience. The selection was based on information obtained from a short questionnaire sent to more than 1000 parents of appropriately aged children attending nine local urban and rural primary schools.

- The study included three experiments. In the first experiment children played a computer game (the Frog Game) involving attention switching. Then, to examine concentration, a subset of the children was distracted with a cartoon video while they attempted a difficult task that required matching familiar figures. In the last experiment the same subset of children were observed crossing roads on the campus at the University of Warwick (with parents); video were initially coded in terms of the occurrence of specific categories of event, which were all in principle objectively verifiable as they involved physical events such as whether the child ran or walked across a road or whether the parent held the child’s hand at a given point.

- This procedure led to relate road behavior to performance on the switching attention and concentration tasks. Both attention switching and concentration, as operationalized here, demonstrated substantial age-related variation, with younger children much less effective than older children. Switching and concentration also appear to be distinct skills, with only a moderate, nonsignificant, correlation between them, although both develop with age. Each was related to different aspects of road behavior. Children who were able to switch attention more rapidly in the computer game were more likely to appear to look at traffic when they were about to cross a road. Children who were less able to concentrate when challenged by a distracting event tended to be more impulsive, and more impulsive children tended to cross the road in a less controlled manner.

- The youngest children that were studied had weaker concentration and switching skills, which were related to road-crossing behavior. Children who were poorer on these tasks were less skilled at dealing with the road environment. This implies that young children may be at greater risk in the road environment without additional help, although our evidence does not allow us to quantify the risk associated with these factors. Such young children should be closely supervised and the road environment should be modified to accommodate their needs (e.g. with very low speed limits or the physical separation of vehicles and pedestrians).

Key Terms
children, behaviour, skills, attention, concentration
This paper addresses a program of public participation on Urban Transport issues, in which it has involved school children aged 9 to 12 in many cities and towns in the Basque Country of Spain. Their participation was channeled through drawings where they depicted the way the perceived the present reality and the way they would like it to be. These drawings were then part of the Urban Transport proposals and served to establish a public dialogue where the children's perceptions and needs are highlighted. Furthermore, on every occasion, a dialogue was established with the city or town Mayor where these issues were debated and clarified. On some other occasions, the children's requests as drawings were passed on to the team of architects working on the detailed public space transformation as a sort of “cahier des charges” for the final design.

### Key Results

- Since 1992 the **participation** of boys and girls in planning the physical environment has been implemented in the Basque Country. Particularly, some years ago it was defined a program to have boys and girls aged 9 to 12 get involved in the decision making, by their participation through the schools where the studies were taking place. The relationship between children-traffic-play is something that even though we do not really know whether or not it makes a difference in the lives of children, and at what age, the assumption is that it does.

- There are **four fundamental reasons** that explain children’s behavior within the traffic system. Firstly, children have a basic need for play and constant movement. Secondly, they have physical and perception limitations (they do not see over and beyond the cars, as they have to go to the edge of the road in order to see if there is a car coming). Then children have a hard time dividing their attention and finally, children totally forget all the instructions they received, when facing a strong impulse.

- To take into account children's vision of neighborhoods, a **drawing contest** "How is your neighborhood? How you would like it to be?" was proposed in the Basque Country. Every child had to produce a drawing on how it was and another drawing on how they would like it to be. Furthermore the mayor of the town attended the school to thank the kids for their participation, thus they could feel that someone - who is very important - is close to them to the point of listening to their wishes and requests.

- What emerged from the drawings is that the children from the urban areas present a real need for space to play and their wish for open spaces is a whole sense of the street as place of meeting and living (the idea of the street as a **multi purpose public space**). The same pattern (the increasing rates of car ownership and the longer commuting distances by cars on the roads and on the streets) were recorded in all the urban areas without influence on account of the economic level. It could be observed also clear messages of the children’s commitment to improve their neighborhood (e.g.: a new traffic light in a street otherwise unchanged).

### Key Terms

children participation, behaviour, drawing, open space, planning
**Title**
Children’s understanding of other road user’s behaviour

**Authors**
Ogawa K., Papp I.

**Publication Date**
1997

**Document Website**

**Kind of document**
Paper

**Short Abstract**
This paper summarizes the results of a study carried out in Japan (1997). The aim of the study is to reveal what children see in the road and what they think of road traffic. In Japan there are few opportunities for children to learn about traffic safety and the study was conducted with the objective of understand their perception of traffic environment and contribute to the development of traffic programmes in schools. Children’s ability of observe the traffic behaviour of other road users emerged from this study and that is an incentive to establish well-planned educational programmes, in order to raise children awareness of traffic safety.

**Key Results**
- Children obtain various kinds of knowledge and experience about road traffic besides what they learn in traffic education at school (in Japan they usually have only two classes for traffic safety during 6 years of primary school). The study carried out in Japan in 1997 tried to focus on how road traffic is reflected in children’s eyes. The aim is to understand how children see the road, thus trying to improve traffic educational programmes.
- Two surveys were carried out: “Drawing traffic situation” and “Expressing opinions about traffic problems”. In the first children (8-9 years old) were asked to draw traffic scenes, in the second children (10-11 years old) were asked to write their opinion about traffic problems choosing some topics (cars, adult behaviour, traffic accidents, police).
- The results of Survey 1 gave an idea of children perspective towards traffic issue. They drew cars, but without driver’s faces and some of them drew cars running at high speed. In Survey 2 many children focused on “traffic accidents” topic and what emerged is that children see other road users’ behaviour with a critical eye and they have much knowledge about the kind of behaviour that could lead to accidents. Some children also pointed out careless behaviour of road users: crossing without looking, drinking and driving,...
- From this study it is clear that children have the ability of observe the traffic behaviour of other road users with an objective eye and they have a general idea of dangerous situations and basic factors of traffic incidents from parents, mass media and their own experience. That’s why well-planned educational programmes are important and basic to change and improve their attitude in traffic environment.

**Key Terms**
children, perception, behaviour, traffic education
Short Abstract

This fact sheet is based on a recent literature study covering the 1995-2005 period (Dragutinovic & Twisk, 2006) and the recent EVEO study (2003 – 2006), which assessed eleven education programmes (four with primary school pupils). It focuses on the effects of traffic education programmes on children’s behaviour; both formal education programmes at schools and the education parents give their children were assessed. A number of assessed programmes showed small improvement in behaviour whereas not one programme had a negative effect. It is remarkable that two programmes apparently using the same approach had a very different effectiveness.

Key Results

- Children are essentially different from adults because a number of competences has not yet developed, so that they can’t carry out certain tasks correctly, but children learn most from everything they experience and the surroundings strongly influence their development. Furthermore the limited mental development of children is not the only thing that makes them vulnerable in traffic: there are differences in crash involvement between children from different ethnic and social-economic groups.

- Based on a series of studies the paper underlines that the mental development must determine the contents of education programmes and children’s learning during the formative years usually begins through self experience and then does an overview and understanding of traffic’s general features develop. Furthermore learning is domain specific (a child can only often put into practice that what was learned at the location where it was learned) and children learn the most from those who mean a lot to them (parents, teachers, ‘heroes’, etc).

- Children’s traffic education is essential, but education at school can provide part of the training and is basic to motivate parents andchildminders to teach the children in their company more actively about traffic and road safety. It doesn’t exist a correct age for being an independent road user: it depends on the dangers on a child’s route and on the child.

- The paper reports the results of the assessments of some international studies and the recent EVEO study in the Netherlands. The first studies are divided in two groups: “traffic clubs” (programmes in which parents play an active role practicing together with their children) and “other programmes”. It can be concluded that the crossing behaviour of pedestrians can be improved by traffic education. EVEO study was assessed by examining self-reported behaviour during a one month period following the completion of the education programme and the result is that emerged slight but significant improvement in children’s behaviour.

- A short focus on traffic education in the Netherlands is then provided. The Ministry of Education is responsible for traffic education of 4-14 years old age children and its objectives are mainly two: children must know the traffic rules and the meaning of road signs and they must be capable of safely participating in traffic as pedestrians, cyclists, and as independent users of public transport. In 2006 a questionnaire study among teachers about the traffic education offered in primary schools was carried out. In the analysis schools were divided into three groups (three socio-economic levels: high, medium, and low) and what could be noticed is that there were hardly any differences between the groups.

Key Terms

children, behaviour, traffic education
4.2 Children’s road safety

Title
Children’s Exposure to Traffic and Pedestrian Injuries

Authors
Macpherson A., Roberts I., Pless I. B.

Publication Date
1998

Document Website
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Kind of document

Short Abstract
The article reports the main findings of a Canadian study that aimed to estimate children’s exposure to traffic (number of streets crossed) and to determine the role of exposure in pedestrian injury. Questionnaires were distributed to a random sample of 4080 first- and fourth-grade children in 43 Montreal schools. When analyzed by police district, injury and exposure rates were positively correlated ($r^2 = 0.53$). Crossings were similar by sex but increases with age and were inversely related to socioeconomic status. These results suggest that although children’s exposure to traffic could be reduced by transporting them to school, a more reasonable prevention strategy involves environmental changes.

Key Results
- Child pedestrian injury is an important cause of mortality and in Canada: from 1990 to 1993, 145 children 5 to 9 years of age were killed as a result of injuries sustained in pedestrian-motor vehicle collisions. In Montreal alone, more than 200 police reports were filed in 1995 for children in this age group hit by cars. These injuries represent a serious public health problem with high economic and social costs.

- The primary aim of the study was to provide an estimate of children's exposure to traffic in Montreal. Two secondary goals were to determine factors that influence exposure and to relate exposure to injury rates. A sample was selected by means of a probability cluster design of all 282 primary public schools in Montreal; a weighted random sample of 50 schools was chosen, with weighting based on the number of students enrolled in 1993/94. Within the selected schools, all children in grades 1 and 4 present on the study day were surveyed. Data were collected in the spring of 1995 via a pretested questionnaire distributed to children in the classroom for completion at home by their parents.

- The main information requested in the questionnaire was the number and type of streets a child had crossed the previous school day. Also included were questions concerning the total time spent as a pedestrian that day, the mode of transport to and from school, and whether the child was accompanied by an adult, a teenager, or other children. The socioeconomic status of the family was determined by parents' level of education, home ownership, and number of cars. The average number of pedestrian injuries to children 5 to 12 years of age from 1990 to 1994 was obtained for each of the 23 police districts in Montreal.

- The results show that exposure to traffic appears to partially account for variation in child pedestrian injury rates. Exposure does not account, however, for differences between the sexes or for differences in age-specific rates. Boys and girls had similar exposure, but the injury rate for boys remained consistently higher. Similarly, although older children had greater exposure, younger children were more at risk for injury. Furthermore, children in relatively disadvantaged schools cross, on average, 50% more streets a day than those in nondisadvantaged schools and that they have a correspondingly higher injury rate. The study showed that children whose mother had more than a high school education crossed 30% fewer streets than children whose mother had less education. Finally, the difference in the correlation coefficient between the analysis involving the total number of streets crossed and that involving only main streets suggests that crossing main streets represents a greater risk.

Key Terms
children injury rates, exposure, questionnaire, children safety data
Reducing childhood pedestrian injuries

Schieber R. A., Vegega M. E.

2002

Centers for Disease Control and Prevention, Atlanta, Georgia
National Highway Traffic Safety Administration, Washington, DC

http://www.cdc.gov/ncipc/pub-res/childhood_pedestrian/01_preface.htm

Summary of conference

By design, our society depends heavily on motor vehicle transportation and the right to walk safely seems fundamental, especially for children: each year for more than a decade, more than 700 children have died from injuries sustained while walking, over 500 of these in traffic. Many professionals and advocates have worked for years to reduce child pedestrian deaths in the United States and what can be stated is that effective solutions to child pedestrian safety problem must have to be multifaceted and arise from a collaboration among experts from diverse fields. The report presents the interrelations between child pedestrian safety issue and sociological, individual, engineering and educational factors.

As regards sociological factors, the role of family is basic, since it helps the child develop necessary (pedestrians) safety skills. Highest level of education achieved by a parent, perhaps at least as important as income, is a primary determinant of life-style, which in turn determines many health related behaviors of the family, included walking habits. Race/ethnicity also may be important, since white children have lower rates of pedestrian injury than children of minority groups.

As regards individual factors, biopsychosocial attributes of the child (cognitive, perceptual, emotional, judgmental, and social skills) independently affect his or her ability to respond effectively to traffic, while physical attributes (height, weight, and agility) affect the child’s ability to see traffic and the driver’s ability to see the child.

As regards engineering factors, many existing engineering policies and practices are potentially detrimental to pedestrians children. Some examples are: multilane roadways that are designed to move heavy volumes of traffic, often at high speeds; intersections too wide for a child to cross in time; busy arterial streets without sidewalks; bus stops may be improperly located. Many good, specific engineering solutions exist, like maintaining sidewalks or walkways; selecting bus stop locations more carefully, establishing traffic calming measures, etc.

As regards educational factors, “pedestrian education programs” for children have been largely implemented with the aim of increasing children’s knowledge about traffic and their attitudes towards safety. The assumption is that, by building their knowledge of managing traffic and encouraging appropriate attitudes towards safety, children will be able to generalize what they learn in the classroom to real life traffic situations. Since knowledge alone is not sufficient to result in road safety, other strategies, both educational and environmental, need to be developed too (with parents’ participation it is better).

Finally, the report give some recommendations that Local Authorities should be take into account: enhance public awareness about the need for improved safety for child pedestrians while promoting the health and environmental benefits of walking, modify the behavior and attitudes of both pedestrians and drivers, modify the physical environment to better support pedestrian traffic, develop and conduct effective safe walking programs, conduct research to address gaps in knowledge and to translate research findings into effective programs and public policy, etc.

Key Terms

children accidents, road safety, factors, recommendations
A survey of OECD member countries was carried out to provide high level data on a consistent basis to identify current patterns of child road safety. The paper reports the findings relating to children, aged 0-14 years, as pedestrians. Key survey elements included analyses of fatality data, relationships between socio-economic, demographic factors and fatality rates and a questionnaire based survey. League tables based on average child pedestrian fatality rates were constructed for each OECD member country participating in the questionnaire enabling identification of the top five countries with the lowest pedestrian fatality rate as Sweden, The Netherlands, Finland, Germany, and Denmark. Few countries had quantitative information about children's travel and its absence means that assessments are difficult about children's safety and the relative risks they face, especially as pedestrians.

Key Results

- Walking is an important means of transport for children and young people, but in 2003, 2381 children and young people aged 15 and under were killed or seriously injured as pedestrians on the roads of Great Britain and of these 74 were killed. This represents 58 percent of all deaths or serious injuries in this age group resulting from road traffic accidents (Department for Transport, 2004). The Department of the Environment, Transport, and the Regions (DETR) set road safety targets to be achieved by 2010 and amongst them there is the will to reduce the number of children killed or seriously injured in traffic accidents by 50 percent by 2010 compared to the average for 1994-1998.

- The DfT commissioned an international survey with the aim of providing basic high-level data, on a consistent basis, from OECD member countries that identifies and accounts for current patterns of child road safety. It was carried out in three stages: analysis of fatality data from the IRTAD database; analysis of the relationship between socio-economic and demographic indicators, and fatality rates; questionnaire based survey of senior officials.

- Through IRTAD database, a league table was constructed for child pedestrians based on a three year average fatality rate for each country taken over the period 1996-2000. The top five performers are Sweden, The Netherlands, Italy, Finland, and Germany. Afterwards, relationships were sought between international child fatality rates and a basket of international indicators such as gross domestic product, percentage of lone parent families, child poverty index, percentage urban population, and cars per capita. The correlations were relatively weak with the strongest links associated with wealth and economic inequality in each country. Finally a questionnaire survey was conducted and the main findings were that the majority of countries did not have information on high risk groups but of those that did, the cross cutting themes of socio-economic and ethnic minority groups, young children and urban areas were identified.

- Three characteristics distinguish top countries in the League table from those doing less well: a strong approach to the introduction of infrastructure measures for pedestrian safety, including low speed limits in residential areas; conducting road safety campaigns at least once a year; and having legislation which assumes driver responsibility in an accident involving a child pedestrian. Having compulsory road safety education for children aged 6-9 years was a characteristic shared by most countries, as was the promotion of child pedestrian education and training initiatives and the commissioning of research. However there is lower research activity in less well performing countries.

Key Terms

child pedestrians, fatalities, international league tables, road safety
In 2004, there were nearly 61 million children age 14 and younger in the United States. Motor vehicle crashes are the leading cause of death for children of every age from 3 to 14 years old (based on 2002 figures, which are the latest mortality data currently available from the National Center for Health Statistics). The fact sheet focuses on pedestrians and pedalcyclists fatalities. Finally it stresses the importance of restraint use and their effectiveness. Safety reminders are also provide, since failure to read the child safety seat instructions, in addition to vehicle owner manual instructions regarding safety belts, could result in serious injury or death as a result of a failure of the child safety seat to be securely and/or properly restrained.

**Key Results**

- In 2004, there were a total of 42636 traffic fatalities in the United States. The 14 and under age group accounted for 5 percent (2157) of those traffic fatalities. This age group accounted for 4 percent (1638) of all vehicle occupant fatalities, 9 percent (246000) of all the people injured in motor vehicle crashes, and 8 percent (214000) of all the vehicle occupants injured in crashes. Particularly, a total of 442 (21%) of the fatalities among children age 14 and younger occurred in crashes involving alcohol.

- As regards pedestrians fatalities, in 2004 the 14 and under age group accounted for 363 (8%) of total pedestrians fatalities (4641). Almost one-fifth (17%) of the traffic fatalities in the 14 and under age group were pedestrians. From 1994 to 2004, the number of pedestrian fatalities in this age group decreased by 52 percent, with the 4-7 age group showing the largest decrease (59%). Of the total 363 pedestrian fatalities among children age 14 and younger in 2004, 230 (63%) of those killed were males. In 2004, a total of 68000 pedestrians were injured, 17000 of those injured were age 14 and younger, and males accounted for 58 percent (10000) of those 17000 injured. During 2004, 43 percent of the young pedestrian fatalities occurred between the hours of 4 p.m. and 8 p.m., and 81 percent occurred at non-intersection locations.

- The fact sheet reports pedalcyclists statistics too: a total of 725 pedalcyclist were killed in motor vehicle crashes in 2004 and the 14 and under age group accounted for 130 (18%) of those fatalities. Finally it focuses on restraint use and their effectiveness, pointing out the fact that shoulder safety belts, when used, reduce the risk of fatal injury to front seat occupants (age 5 and older) of passenger cars by 45 percent and the risk of moderate-to-critical injury by 50 percent. During 2004, 7810 passenger vehicle occupants age 14 and younger were involved in fatal crashes and for those children where restraint use was known, 29 percent were unrestrained; among those who were fatally injured, 50 percent were unrestrained. Among children under 5 years old, an estimated 451 lives were saved in 2004 by child restraint use. Of these 451 lives saved, 413 were associated with the use of child safety seats and 38 with the use of adult belts.

**Key Terms**

pedestrians fatalities, children injury, seat belts, safety seats
Some children have safer childhoods than others: what makes the difference?

Title

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Publication Date: 2006

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Document Website: http://www.euro.who.int/document/mediacentre/fs0106e.pdf

Kind of document: Fact sheet

Short Abstract

Awareness of the need to address injuries and reduce their related burden has progressed over time, resulting in the application of measures that are generating important gains in health in some countries. They can be regarded as models for possible adaptation in others. In the WHO European Region, every year approximately 28,000 children below 15 years of age die as a result of injuries. Of these deaths, 25,000 (89%) are attributable to unintentional injuries, the leading causes of which are road traffic injuries, drowning, poisoning, falls and fires. The paper focuses on Nordic countries’ situation: children injury mortality rate are the lowest in these countries indeed. It stresses their hegemony in ‘physical activity’ issues too; Nordic countries have pioneered the use of cost-benefit analysis to assess the economic gain of infrastructure interventions while giving due weight to health considerations.

Key Results

- Among the causes of children (below 15 years) deaths there are road traffic injuries, drowning, poisoning, falls and fires. These deaths can be avoided: if all countries had the same injury mortality rate as the country with the lowest rate, Sweden, three out of four young lives lost per year could be spared. Furthermore, the burden of injuries is unequally distributed across the WHO European Region, with the Nordic countries reporting the lowest toll.

- The paper reports Nordic countries Projects and interventions, as examples for other EU countries. Particularly it focuses on “Vision Zero” (Sweden and Norway, 1997), a new road safety policy based on the unacceptability of road deaths and severe injuries as the price paid for transport. Its strength lies in giving human life priority over mobility, and in seeing road safety as a societal responsibility. Interventions undertaken in Finland and Denmark are reported too (mainly “Transport and land-use policies”).

- Physical inactivity is a major risk factor for overweight and obesity; however only one in three young people in Europe meets the guidelines of a minimum one hour of moderate/intense physical activity per day. Nordic countries’ performance falls within this range. Particularly, Norway has approved an Action Plan on physical activity for the period 2005–2009, which implements the interaction of different sectors in attaining the same goal of good health. In particular, the transport system is working to facilitate walking and cycling through financial subsidies for the construction of pedestrian and cycle zones/tracks. Putting health at the centre of policy considerations, urban development and transport regulations can play a major role in decreasing exposures to road traffic injury risks, while at the same time increasing opportunities for cycling and walking.

Key Terms

children, fatalities, injury, health, Nordic countries
4.3 Children mode choice

Title
Are we making our children car dependent?

Authors
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Publication Date
2001

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http://www.cts.ucl.ac.uk/research/chcaruse/Dublin.pdf

Kind of document
Paper

Short Abstract
Car use is increasing in Great Britain and car use by children is growing considerably faster than that for the rest of the population. Children are making fewer, but longer trips than in previous years. The increasing use of the car by children has implications for their health and the amount of traffic on the road. It may also mean that they are more likely to be dependent on the car as adults. A number of initiatives to encourage children to consider the alternatives to the car are being taken in Britain with respect to the journey to school. However there is a need for further research into this topic to increase understanding of the relationships between children's car use and their health and potential long term car dependency. These are being investigated in a project being carried out in the Centre for Transport Studies at University College London (UCL) which is outlined in the concluding part of the paper.

Key Results

- Data from the UK National Travel Survey can be used to show some of the changes in car use over time. The following conclusions can be drawn: children are making fewer trips, but they travel further than they used to and they travel more by car than they used to; children’s car use is growing faster than adults’; most trips by children are not to or from school and non-education trips are longer than education trips, on average and more likely to be by car; the average length of education trips is increasing faster than that of non-education trips. Car’s use is similar by boys and girls when all children aged 5-16 are considered. However, when they are divided into age groups, it can be seen that in the younger age group, boys are more likely to be taken by car than girls are, whereas at age 11-16, girls are more likely to be taken by car.

- A National survey in UK (2000) shows that among the choices for car use the greater percentages are found in the followings topics: quicker/more convenient, on way to or from work, no other transport/no school transport. However these results are limited, as they are confined to the parents’ view and don’t address lifestyle choices and the complexities of family life related to car’s use.

- A list of the reasons for increasing car’s use by children is provided too: greater car availability, convenience and inertia, parental concern about road safety and abduction of their children, children’s wishes and behaviour, shortage of time associated with busier lives and lifestyles, greater participation in the workforce by women, perceived social status of car use, carrying heavy goods, school policy requiring children to be escorted to school, lack of public transport, choice of home some distance from school and leisure facilities, greater concentration of public facilities in fewer, large centres, parental choice of school at some distance from home, children participating in activities some distance from home.

- A list of the consequences for increasing car’s use to take children to school is provided as well: increase in peak period traffic congestion, increase in atmospheric pollution around schools, children with less opportunity to develop road safety and personal safety skills, lack of exercise and resulting impact on general health and well-being, children’s independence and social interaction reduced, travel habits developed early in life which are difficult to change.

- This is the background where proper measures have to be pursued in order to attract children away from the car with regards to education trips. Particularly ‘walking initiatives’ are pointed out: walking bus, personal safety training, safe route trails, walk to school campaigns. They can be forward as part of School Travel Plans (STPs) or born within specific School Travel Initiatives (STIs). The main behavioural barriers to their implementation are the parental car dependence, the parental fears from safety of children from traffic and from security of children from other people.

- The Centre for Transport Studies at UCL carried out a research project, in order to examine the effects of car use on children’s physical activity and the impacts of travel to school initiatives. In parallel piloting exercises were carried out in three schools to identify the empirical issues that will arise in the course of
the fieldwork.

**Key Terms**
children, car dependancy, education trips, walking

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**Title**
Understanding the car dependency impacts of children’s car use

**Authors**
Mackett R., Lucas L., Paskins J., Turbin J.

**Publication Date**
2002

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**Document Website**
http://www2.cege.ucl.ac.uk/cts/research/chcaruse/Cpnhqgn.pdf

**Kind of document**
Paper

**Short Abstract**
This paper describes some results from a project investigating the effects of car use on children’s health and potential car dependency. It describes the whole project in terms of its objectives and work packages and then focuses on the results from two linked surveys: one completed by children about their travel behaviour and experience and the other completed by their parents about their use of the car and attitudes to its use. The analysis shows that a majority of these children never, or hardly ever, use public transport. It is discovered that there are some children who are taken to school by car, travel to out-of-school activities by car and never, or almost never, use public transport. The effects of household car ownership, parental use of the car, and environmental education on the children’s use of public transport is investigated. Whilst the results presented in this paper are all very preliminary, they suggest that there is reason to be concerned about the levels of car use by some children.

**Key Results**

- Car use by children is growing and the situation is likely to become worse (Mackett, 2002), leading to a number of problems: less physical activity, serious implications for children health, in the long run they may grow into adults who have no experience of forms of transport other than the car.

- These important issues were studied in a project entitled ‘Reducing children's car use: the health and potential car dependency impacts’, which was carried out over a period of three years (2001 - 2004) at the Centre for Transport Studies at University College London. The paper describes the project’s objectives and procedure. As regard its objectives, the project examines the effects of car use on children's physical activity and health, the effects of car use by children on their potential long-term car dependency and develops a framework to evaluate the impacts of travel to school initiatives systematically. As regards the procedure, the project is divided into a set of work packages: the school surveys, activity monitoring, evaluation of travel to school initiatives, interviews with young adults, the effects of car use on children's cognitive and mental development, the role of women in children's travel decisions.

- The school surveys were carried out in ten schools in Hertfordshire through questionnaires for children (7-13 years old) and parents. The objective of activity monitoring was to collect data on the quantity and intensity of activity by children over a period of time which could then be linked with data about their travel patterns, lifestyles, and amounts of car use. Children kept a diary of their activities over a period of 4 days. The data will be analysed to see whether children who used the car a lot did less exercise than other children, or whether there are cases where children were taken by car to activities where they used a lot of energy. The project then focused on the evaluation of travel to school initiatives, that means studied whether specific interventions designed to encourage children to use alternatives to the car actually had significant effects. Particularly it considered the ‘Walking bus’ initiative. A detailed explanation of the evaluation-procedure is provided in the paper. Interviews with young adults were also held with groups of young adults aged about 16 to 18. This is the age at which they will be considering learning to drive and first obtaining cars: the aims was to study the extent to which previous experience such as walking to school rather than being taken there by car influenced their attitudes to the car. The effects of car use on children's cognitive and mental development were then taken into account to see whether there is a relationship between car use. The role of women in children's travel decisions was finally investigated.

- The main results from the school surveys are then summarized in the paper. It was found that a very
high proportion (67%) of the children never, or hardly ever, used public transport (of these 40% traveled to school by car). Furthermore 53% were always, or almost always, taken to out-of-school activities by car. The travel patterns of these children seemed to be dominated by the car and some of them didn’t appear to cycle very much. A major factor that underlies the dominance of the car in the children’s lives is the fact they tended to live in households with high levels of car ownership; the children who didn’t use public transport were much more likely to live in multi-car households than those who did and the children who didn’t use public transport were also more likely to live in households where the parents used the car for local trips than children who did.

- Environmental education seems to play a role in encouraging children to use alternatives to the car. Whilst such a conclusion must be regarded as tentative, it is (potentially) very important. It is finally noticed that the results presented in the paper are all very preliminary, representing only the first set of many that would be produced within the project.

**Key Terms**
children, school surveys, car dependency, public transport

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| The effectiveness of initiatives to reduce children’s car use | Centre for Transport Studies  
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**Short Abstract**
This paper has been written as part of a project entitled ‘Reducing children’s car use: the health and potential car dependency impacts’ being carried out in the Centre for Transport Studies at University College London in collaboration with others including Hertfordshire County Council, with fieldwork being carried out in Hertfordshire, an area immediately north of London. It outlines the key results of two sub-projects within it and particularly focuses on Walking Buses and its impacts on children and parents perceptions, car use, time use, long-term behaviour and physical activity. Examining the outputs from the motion sensors’ analysis to establish the impacts of walking and car use on children’s physical activity and consequently for their health, the benefits of Walking Bus are stresses once again.

**Key Results**
- The project on children’s car use had a number of sub-projects within it. Two of these were: a) Development of a framework for the evaluation of travel-to-school initiatives, using walking buses as a case study; b) Analysis of children’s activity patterns using portable motion sensors. As regards the Walking Bus evaluation, five buses in Hertfordshire were studied in depth involving headteachers, the walking bus co-ordinators, the parents, the children and the volunteers. Furthermore, a postal survey was conducted too. As regards portable motion sensors, it was possible to assess travel and activity patterns of children, since sensors combine the movements in three directions to produce total activity counts in units of vector magnitude, which can be converted to activity calories using formula programmed into the equipment using data on the age, gender, weight and height of the child. Children were also asked to keep a travel and activity diary.

- As regards the perceptions of children and their parents, the main positive outcomes for the children were the social aspects, the pleasure of walking and the increase in exercise. For the parents it was the exercise and the increase in flexibility. The main disadvantages were the loss of flexibility for some parents, and the social aspects (having to walk with people they do not like) for the children. Afterwards, the survey showed a reduction in car use for 11 of the Walking Buses and that quite a few children did not use it every day. One of the negative aspects of Walking Buses was the fact that they did consume a large amount of time for the co-ordinator and volunteers (they have to travel further or they are involved in procedural matters). Other benefits were the impacts on long-term behaviour and those on children’s physical activity.

- From the portable motion sensors’ analysis and the travel and activity diaries, some differences between the groups of children over the whole day were pointed out: the boys were more active than the girls and the older children were more active than the younger. Furthermore, it could be seen that the older
children who walk used about three times as many calories on the journey than those who used the car. The differences were much smaller for the younger children, but the walkers still used more calories than the car users.

**Key Terms**

Walking Bus evaluation, children perception, parents, volunteers, physical activity, sensors

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**Title**
Where do children walk (and what do they do when they get there)?

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**Publication Date**
2006

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**Kind of document**
Paper

**Short Abstract**
The paper reports the main findings from the project CAPABLE (Children’s Activities, Perceptions And Behaviour in the Local Environment) that was carried out at University College London (UCL) in 2006. The main focus here is on walking, and covers issues such as the trip purposes associated with walking, the differences in walking trips when the child is accompanied by an adult compared with when he or she is not, and the level of intensity of walking under different circumstances. The paper is concluded with illustrations of the richness of the data from the combined tools of activity monitor, GPS monitor and diaries. Whilst the data are rather limited in quantity, they offer comprehensive information on a relatively small number of children. From this it should be possible to understand quite a lot about how children walk, and play and how they use the local environment. This should contribute to the design of environments that encourage children to walk and play more, and so lead happier and healthier lives.

**Key Results**

- The paper presents some preliminary results from an ambitious project to understand how children interact with the local environment. In the project about 200 children aged from 8 to 11 were fitted with activity monitors, GPS (Global Positioning Satellite) monitors and asked to complete a travel and activity diary for four days. The children and their parents also completed questionnaires which cover issues such as whether the children are allowed out without an adult.

- From the diaries it was known what the children were doing and how they were travelling, and by whom they were accompanied. It was shown that the main reason children walk is to go to school, but they also walk to go to play, to clubs and to go the shops, with boys tending to walk to clubs and girls to the shops. It was found that girls tend to walk more than boys, but that more boys tend to walk unaccompanied by an adult more than girls. Of the non-school events, playing is the event that children, particularly girls, tend to walk to. Boys tend to walk to clubs much more than the girls. On the other hand, apart from school, when children walk with an adult it tends to be to the shops.

- From the activity monitors, their activity levels in terms of calories consumed per minute, were found. It was found that boys tend to walk slightly more vigorously than girls, and that children walk more vigorously when accompanied by an adult than when unaccompanied by an adult. The least vigorous walking was found to be girls going shopping unaccompanied by an adult whilst the most vigorous was boys going to clubs, accompanied by an adult.

- The GPS monitors allow the location to be established, so that it was possible to establish which sort of places children were most active in, adding to previous research into the relative levels of energy consumption in various activities such as walking, playing and sports. GPS data were rather limited in quantity, but they offer rich information on a relatively small number of children. From this it should be possible to understand quite a lot about how children walk, and play and how they use the local environment. This should then contribute to the design of environments that encourage children to walk and play more, and so lead happier and healthier lives.

**Key Terms**

children trips, walking, activity monitors, GPS, sex, adults
The paper focuses on the way to and from school, both because of environmental reasons and the concern for the children's health, but also because the way to school is seen as an important arena for social interaction and learning. During the last years, several voices have been raised in Norway, worrying about the children of today who seem to walk less than before, particularly with regard to school trips. This paper will first give a brief overview of recent surveys of mode choice among school children and then present the main results from a study conducted in year 2000 among 218 Norwegian school children aged 9 and 10 and 183 of their parents with regard to these topics: gender, leisure activities, freedom and restrictions, motor skills and children's health.

**Key Results**

- Some recent surveys (both national surveys and minor local surveys) of mode choice among Norwegian school children for the trip to and from school highlight that the highest share of car trips are found among the youngest school children. Children walk and cycle more frequently during spring and autumn compared to winter. They also walk more often on their way home from school than on their way to school.

- Most of the 9 and 10 year old children participating in the study presented in this paper, walked to school. The most important reasons for parents to bring their children to school by car were: it was practical since they were driving car to their work at the same time; the way to school was not safe enough; the children wanted the parents to bring them by car; there was a long way to school. Among these 9-10 year old children there was a majority of boys who were brought by car, thus highlighting a clear difference between boys and girls.

- About 40% of the 9-10 year old children state that they alone decide which mode to use for school and that the mothers decide to a far greater extent than the fathers do. Three of four children walked together with other children, fewer in the morning than in the afternoon, and a bit more girls than boys. About one of ten walked together with younger siblings.

- Almost 80% of the children are or have been active in sports activities, the boys more than the girls. Car is the most used mode when going to sports activities. Also scouting and course activities seem to be rather car-dependent, but the numbers of children attending these activities are low. Only very few of the children from this study seem to use public transport on a regular basis in connection with leisure time activities.

- The way to school is considered secure by most of the parents in this study. However, there are big differences between the schools. For the inner city schools 53% of the parents regard the way to school as a bit or very unsafe, while for the residential area schools 15% of the parents say the same. It is primarily the traffic conditions that cause this insecure feeling among the parents, but to some extent they do also worry about the children being assaulted by adults or being victimised by other children.

- More than 90% of the parents consider their children to have the same possibilities or better possibilities to stay and travel outdoors on their own than they used to have themselves as children. Still, almost 80% of the parents claim to put more restrictions on their own children regarding travelling on their own outdoors compared to their own experiences as children. Parents are most restrictive when it comes to going out alone when it is dark and to cycle on main roads. The boys are more restricted than the girls in all aspects, apart from being allowed to go out alone after dark.

- When studying the motor competence in children, they can be divided into three groups, the normal children, the borderline children and the clumsy children. In this study there were more children belonging to the normal group compared to what have been found in previous studies. It was also found that girls are significant better than the boys, which is normal. Dividing the children into four groups according to the participation in sport activities a correlation emerged between motor skills and the number of years taking part in organised sport activities, but the correlation was not significant.

**Key Terms**

Walk to school, children, leisure activities, motor skills
### 4.4 Children and walking variables

#### Title

Determinants of car travel on daily journeys to school: cross sectional survey of primary school children

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1998

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Paper

#### Short Abstract

The annual distance walked by children has fallen 28% since 1972, partly because car travel has replaced walking on many school journeys. Increasing car use has been linked with obesity, adverse health effects in later life, limitations on children’s independence, traffic congestion, and pollution. To inform the development of strategies to reduce school related car travel, a survey was carried out in the inner London boroughs of Camden and Islington with the aim of analyze travel patterns of urban primary school children. The paper presents the survey’s methodology and reports the main finding, giving a summary table of the determinants of car travel versus walking on daily journeys to and from primary school. The aim of the paper is to stress the importance of policies that encourage children walking, thus decreasing car’s use in school trips.

#### Key Results

- The survey was conducted in the inner London boroughs of Camden and Islington. The questionnaire asked about that day’s school journey, children’s independent travel and parental concerns. From the sampling frame of all primary schools (excluding pilot, boarding, and special schools), 31 of the 100 eligible schools were randomly selected. The sample was combined in class sizes in year 2 (ages 6-7 years) and year 5 (ages 9-10). Questionnaires, with a letter from the head teacher and a multilingual request form for translation, were distributed to pupils for completion at home.

- In the analysis, logistic regression was used, including a random effect (school) to account for cluster sampling, to estimate odds ratios and 95% confidence intervals for determinants of car travel versus walking. Pupils who used public transport were excluded. What emerged is that thirty schools (97%) agreed to participate and of 2476 enrolled children, 2086 (84%) returned usable questionnaires. Response rates were highest in independent schools (96%) and lowest in local authority schools (81%). Most children walked (69%) or travelled by car (26%); four (0.2%) cycled, and the rest travelled by bus, underground, or train (5%). Proportions were similar for the journey home. Adults accompanied 84% of children to and from school. Most children (61%) were rarely or never allowed out without an adult for school or leisure. Only 3% of bicycle owners were allowed to cycle on main roads. Ninety per cent of parents were very or quite worried about abduction or molestation and 89% were very or quite worried about traffic.

- The paper stresses the fact that the strongest predictors of car travel to school were car ownership, greater distance to school, attendance at an independent school, and parental worry about abduction (a summary table is provided). For the journey home, the strongest predictors were greater distance to school, car ownership, and attending an independent school.

#### Key Terms

children, walking, variables, journeys to school, survey
In the next few decades, communities across the United States will have to accommodate substantial increases in student enrollment. The expected boom in school construction and renovation and the related planning decisions have implications for travel and for vehicle emissions too. This publication regards a study that examined the relationship between school location, the built environment around schools, student travel to school and the emissions impacts of this travel. Students with shorter walk and bike times to school proved significantly more likely to walk or bike; students who have access to sidewalks along main roads were also more likely to walk. Neighborhood schools that can be reached by walking and biking can increase the amount of walking and biking to school, can shorten trip distances and can reduce motor vehicle emissions significantly.

Key Results
- Public schools have been increasing in size and drawing students from larger areas. Large new schools typically are placed in outlying areas, because sites are available and land prices are low. The consequence is often the decline in walking and biking to school. According to the NHTS of 2001, less than 15 percent of students between the ages of 5 and 15 walk to or from school, and only 1 percent bike. The main reason of this decline are long distances, but other factors are at work too, such as danger from traffic, the absence of sidewalks and a poor walking environment. Accompanying the decline in school walk and bike trips has been a general decline in physical activity and a rise in childhood obesity too.

- Many states and localities have launched Safe Routes to School programs, which also provide funding for sidewalks, bike lanes and other infrastructure improvements to encourage walking and biking by schoolchildren. The U.S. Department of Health and Human Services and CDC have started a Kids-Walk-to-School Campaign, to counter the rising rates of childhood obesity, diabetes, and asthma. Furthermore, Policy makers are reemphasizing the value of small, in-neighborhood schools. New investments are coming from federal, state, and local governments, as well as from foundations focused on educational performance. Small neighborhood schools are said to foster a better learning environment with higher student achievement and encourage children to walk or bike to school.

- Research that connects mode choice for the journey to school with characteristics of the built environment is sparse. The studies collectively suggest that children are more likely to walk or bike to small schools in walkable neighborhoods than to large schools in remote locations. A study of school mode choice in California found that walking and biking to school were more likely for a household living within 1 mile of the school and less likely for a household with licensed drivers who could provide rides. Some pedestrian-friendly design features had positive influences on walking and biking, such as the presence of street trees within one-quarter mile of the school. Other features, such as short blocks and mixed land uses, had negative influences.

- Finally, the paper focuses on a survey carried out in Florida to analyze the interrelation between school travel patterns and built environment. The variables describing urban form included overall density, the balance of jobs and residents, the job mix, the commercial floor area ratio, sidewalk coverage, bike lane and paved shoulder coverage, street tree coverage, and two regional accessibility measures. Moreover the best-fit model was applied to simulate mode choice probabilities for a scenario with neighborhood-based schools and complete sidewalk networks (simulation stage). The main findings are the following: students with shorter walk and bike times to school proved to be more likely to walk or bike, students traveling through areas with sidewalks on the main roads also were more likely to walk, centrally located schools to which students can walk or bike would reduce vehicle emissions significantly.

Key Terms
- school trips, neighborhood schools, built environment, survey
Walking buses in Hertfordshire – results from a postal survey

Mackett R., Lucas L., Paskins J., Turbin J.

2005

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http://www2.cege.ucl.ac.uk/cts/research/chcaruse/Walking%20bus%20report%20-%20UCL.pdf

Report

The report is concerned with the development of walking buses in Hertfordshire and a study carried out within a project being undertaken in the Centre for Transport Studies at University College London (UCL), entitled ‘Reducing children’s car use: the health and potential car dependency impacts’. There are a number of good reasons to encourage children to walk rather than go by car, in terms of their health and the environment and Walking School Bus is a fairly recent initiative to encourage children to walk to school, and thus, potentially, reduce car use. The report summarizes the main results from the study, stressing children, parents and teachers’ perceptions and pointing out differences between schools that have WSB and school that had to close them.

Questionnaires were distributed by post to the 41 schools which had set up walking buses. In addition, a questionnaire similar to the one sent to the schools with walking buses was sent to other schools in Hertfordshire with children under the age of 11. The walking buses each have an average of 14 children registered to use them, with a range from 3 to 41. On average, 10 children use each walking bus, escorted by three or four volunteers. Of the 26 walking buses for which detailed information was supplied, twelve had ceased to operate by the time of the survey. In nine cases this was because of a lack of volunteers to escort the walking bus and five walking buses closed because there were too few children.

The main reasons for setting WSB up were to reduce congestion at the school entrance, to give the children more exercise, and to increase walking to school. These were achieved in the majority of cases. Overall, about 65% of the objectives were achieved. Most of the objectives relate to shifting children from the car to walking. According to the co-ordinators, 62% of the children using walking buses used to travel to school by car (but not necessarily every day). The perceptions of the headteachers about the likely impacts of walking buses largely match the observed effects, but with the addition of improving the children’s road safety skills.

When the views of the headteachers of schools that have set up walking buses are compared with those of schools that have not, it is found that the former have greater recognition of the social aspects of walking buses whereas the latter have greater expectations in terms of reducing congestion, and improving the children’s road safety skills and mental alertness. The main reason that walking buses have not been set up at these schools is the lack of parental interest or support. For some schools the nature of the catchment area would make it difficult to recruit enough children to form a walking bus.

In Hertfordshire, the number of walking buses grew rapidly but now seems to be in decline. The key issue underlying this trend is the lack of volunteers, often associated with a shortage of children because usually the volunteers are mothers of some of the participants. There needs to be a regular process of renewal of a walking bus, with new pupils being encouraged to join, with at least some of their mothers becoming volunteers. This may not happen if the organisation of the walking bus is left to those who currently use it because they have no incentive to ensure its continuation after it ceases to meet their individual needs. Hertfordshire County Council is aware of these issues and is addressing them.

Walking school bus, questionnaire, parents, volunteers
Walking and Cycling Behaviour of Children, Adolescents and Young Adults on their Way to School in Switzerland: Results from the 2000 and 1994 Travel Behaviour Microcensus.

Martin-Diener E., Sauter D.

2005


The benefits of physical activity for health and well-being are widely recognized and active transport on the way to school and during leisure time can contribute substantially to meeting these recommendations. The paper presents the main results of the Travel Behaviour Microcensuses that were carried out in Switzerland in the years 2000 and 1994. They focus on children's travel behaviour and what emerged is that about half of the children up to the age of 15 years have 4 trips to school on a regular school day and that with older age the number of trips decreases. Furthermore, in a logistic regression model, determinants for the choice of the different modes of transport were assessed mutuantly controlling for the other variables in the model.

The Swiss Travel Behaviour Microcensus is conducted about every five years by the Federal Office of Statistics and the Federal Office for Spatial Development. In the year 2000, 29407 individuals aged 6 years and older from 27918 households were interviewed in a Computer-Assisted Telephone Interview (CATI). The paper reports the findings of a Urban Mobility Research that analyzed the travel behaviour of children and young adults using the 1994/2000 Microcensus data.

Non-mobile individuals travelled less than 25 m outside their home on the day of interest. Among children up to 12 years of age the mean number of stages is only slightly higher than the mean number of trips; the proportion of multimodal trips seems to be small in the younger age groups. Mean travel time and distance increase substantially after the age of 15. The mean distance to school among the 6-9 year old is 1,33 km, the median distance only 0,66 km. The modal choice in the different age groups reflects distances to schools on one hand and opportunities for different choices on the other hand. Walking is most common up to 12 years when children go to a local school in their neighbourhood; from the age of 10 the bicycle becomes very popular and after the age of 16 public transport becomes more important; after the age of 18, young adults can obtain their driver's licence and the increase in car use starts.

Apart from age differences there are some other socio-demographic predictors regarding the mode choice to school. Most striking are the differences between the French and the German part of the country (walking and cycling were less common in the French part). Other variables where tested, such as cars in the households, distance, gender, language region, income, degree of urbanisation, citizenship.

The results of this study suggest that in areas with high levels of walking or cycling to school, efforts must be undertaken to maintain this active transport culture. These results have to be communicated and schools and local authorities need to become sensitive and react to beginning changes in transport behaviour in their schools; initiatives like walking buses can be supported and extended until this is possible, but also other measures need to be developed, taking into account culture specific attitudes and beliefs of parents (road safety education, training).

travel survey, childrens trip, walking, modal choice, variables
Johnny Walks to School—Does Jane? Sex Differences in Children’s Active Travel to School

Mcmilian T., Day K., Boarnet M., Alfonzo M., Anderson C.

2006

http://thunder1.cudenver.edu/cye/abstract.pl?n=137

Article of journal (Children, Youth and Environments, Vol. 16, No. 1 - 2006)

Communities are traditionally built with one transportation mode and user in mind—the adult automobile driver. Recently, however, there has been an international focus on the trip to school as an opportunity to enhance children’s independent active travel. Several factors must be considered when designing programs to promote walking and bicycling. This paper examined the influence of child sex on caregivers’ decisions about travel mode choice to school. Caregivers of children in grades three to five from ten California Safe Routes to School communities were surveyed on their child’s normal travel mode to school and factors that determined travel decisions. Results indicate that the odds of walking and bicycling to school are 40 percent lower in girls than boys; however, this relationship is significantly moderated by the caregiver’s own walking behavior. The findings suggest that programs that focus on increasing children’s active travel to school should consider multiple influences on health behavior, including the neighborhood physical activity of parents.

key Results

- Literature on children’s travel is relatively limited and generally serves to highlight three main points: 1) children’s travel needs have an impact on household travel patterns due to the largely auto-dependent nature of those needs; 2) school travel is an opportunity to shift a portion of auto trips to active (walking and bicycling) travel trips if accessibility, safety and the social benefits of the experience are recognized and addressed; and 3) an active travel trip to school may still be compromised because caregivers grant differing levels of child freedom based on the child’s sex.

- Data from the 2001 National Household Travel Survey (NHTS) indicates that the private vehicle is the dominant mode of transportation for youth under 18 years of age, representing over 75 percent of all trips (McDonald 2005). Programs such as Safe Routes to School (SR2S) and Walk to School Day (WTSD) are attempts to change the physical environments and social norms associated with school travel.

- Active travel that promotes transportation independence and physical and mental health is important for all children; however, studies indicate that differences exist across genders for travel and outside independent play (Valentine 1997). In a study of Toronto teenagers (ages 14 to 16), van Vliet (1983) found that girls were driven to more places and walked more than boys, as compared to taking public transit or travel by bicycle. In addition, suburban boys had larger activity ranges than suburban girls. Other studies support the general finding that boys have more spatial freedom than girls (Tindal 1971; Hart 1979; Bjorklid 1985; Matthews 1987). Previous research by Valentine on 8 to 11-year old children’s use of public space in the United Kingdom however, found that girls were actually given more freedom since they were seen as more “sensible, logical and therefore responsible enough to manage their own safety” while the perception of boys was that they were “easily led, irrational, slow to mature and consequently... less capable of negotiating their own safety than girls”.

- The paper shows the main findings related to age issue from a Project carried out in California to evaluate SR2S (2001-04). Surveys within the Project showed that sex does affect active school travel; specifically, boys are more likely to be allowed to travel "actively" to school than girls. However, a caregiver’s own activity level changes the influence of sex on the mode choice to school: an active caregiver increases the likelihood that a female child will walk/bike to school. Caregivers who walk more may have greater familiarity with the neighborhood environment and may also provide a model for their children’s own physically active behavior. The analysis also suggests that how a family values active travel to school is an important factor in mode choice.

Key Terms

sex, school trips, children, health
**Title**
Planning for and with children and youth: insights from children about happiness, well-being and walking

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**Publication Date**
2006

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Paper

**Short Abstract**
The paper focuses on the emotional and spiritual value of walking. Children provide an insight into our understanding of the link between walking and happiness, as walking is a playful experience for them. The worldview of many adults is dominated by a “mechanistic model” in which objects (including people and machines) are not seen as productive unless they are doing things, or moving. Many adults make trips simply because they are focussed on getting to a destination. Children on the other hand, are more often able to enjoy the “places” along the way, rather than being focused on the “next task.” Evidence from positive psychology indicates that happiness and positive emotions contribute to our health and well-being. Walking school buses have been implemented in Canada and Australia and studies demonstrated that they are interrelated to children’s happiness and well-being.

**Key Results**
- The interrelation between urban form and children’s physical well-being has received increasing attention and is well documented. Furthermore transportation plays a role in children’s emotional well-being too. Nowadays heavy traffic may reduce opportunities for spontaneous play, restrict the range of children’s play activities and limit independent mobility. There is also evidence that children are taking more trips by car than children did ten or fifteen years ago; indications are that many of children’s car trips are replacing trips that were once taken by walking or cycling and this may affect both physical and emotional well-being. Studies with children indicate that happiness is integral to their experience of walking to school.

- The paper introduces the concept of planning for sustainable happiness with perspectives from the lives of children in Canada. Canada’s Centre for Sustainable Transportation has taken steps to influence policy and planning through the development of Child- and Youth-Friendly Land-Use and Transport Planning Guidelines. As regards WSB, the Ontario Walkability Study (2001) surveyed more than 6000 elementary students on International Walk to School Day 2001 (IWALK), finding that nearly 75% of Canadian children surveyed would prefer to walk or cycle to school regularly. It is not surprising that social relationships are prominent factors for happiness and life satisfaction. Children expresses feelings of happiness and connection with others and their environment during their trip to school.

- WSB in Australia are then considered and the ‘Canberra case study’ is reported as an example of promoting emotional well-being and happiness amongst primary school children. The first WSB started in 2003 in Canberra, and since then 42 WSB routes have been established. In 2006, WSBs perceptions by children and adults were investigated and what emerged are some important links between children’s involvement in Walking School Buses and happiness; particularly, children who walked had a greater level of engagement with their local environment and community.

**Key Terms**
children health, happiness, well-being, walking school bus
4.5 “Walk to School” Programs

Title
Increasing children's safety as walkers

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Kind of document
Paper

Short Abstract
A number of factors influence an individual’s choice to walk or use some other means of travel (the distance to be covered, the time available, the weight to be carried, the weather, etc). If the individual is a child, other factors come into play in addition to those mentioned above, since a child is also subject to family attitudes and fears and prejudices. This paper exposes the real risks posed by traffic to children and ways safety can be improved. It focuses on the importance of education and training activities and on the role of parents, thus demonstrating the benefits of teaching children road safety skills, creating safer environments and treating traffic more appropriately.

Key Results

- Increasing the numbers of children walking is a key objective for a number of proponents in the health, environment and active transport areas. They aim to increase the number of children walking, as well as improve the safety of children in traffic. The City of Victoria has demonstrated a collaborative approach in the development and implementation of children programs. Some examples are mentioned: Go for your life! Strategy (Kids go for your life!), Walking School Bus (VicHealth), Smogbuster Schools (EPA), TravelSmart Education (DoI) and a range of other programs which target schools and local government in order to increase the number of children walking and using other active/sustainable transport modes (e.g. cycling and public transport use) for health and environmental benefits.

- The paper reports some statistical facts related to unintentional deaths of children in the road environment. Analysis of ABS unintentional injury data (1999-2003) shows road related fatalities account for 32% of all non-intentional deaths of children aged 0 to 5 years (pre-school age) and 66% of those aged 6-12 years (primary school age). In Victoria during the period 2000-2004, 21 pedestrians aged 0-12 years were killed, 400 were seriously injured and more than 600 received other injuries. The statistics over the past five years tell us that most serious casualty crashes (i.e. victims were admitted to hospital) involving child pedestrians aged 0 to 16 years of age occur on weekdays (76%), after school (67%), in the metropolitan area (76%) and that more than half involve males (60%).

- Research shows that children are capable of learning behaviours and attitudes from a very early age, from around 6 months when they are able to sit up (Elliott, 1999). However, the evidence suggests that while children can develop knowledge in relation to critical road safety skills such as choosing safe places to cross and avoid dangerous places, they often ignore the knowledge. In essence, training skills or providing knowledge does not guarantee the desired behaviours will be used all the time (Elliott, 2004). It may not be until they are around age 10 to 12 years that they have developed the necessary skills to be independent in traffic (Oxley, 2004). The importance of consider “stages of development” in children growth is pointed out, stressing the interrelation with traffic environment.

- In its last part, the paper focuses on 5 topics. First walking promotion is discussed: walking provides a series of benefits in the areas of health, environment and community. Road safety is then considered and the Safe System approach used in Victoria is explained (the most significant means of improving pedestrian safety are: lowering the speed of vehicles, signage, parking restrictions, kerb extensions, median refuges, signalised pedestrian crossing facilities and physical separation where justified). Afterwards pedestrian education is taken into account (it addresses to drivers, parents, teachers, children), as well as pedestrian training (experiences in the real world road environment are extremely important for children). The last topic of the paper is the involvement of parents/carers, since they are responsible for the road safety education of their children as pedestrians road users.

Key Terms
children, education, training, walking, parents
Achieving safer school travel in the UK

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**Short Abstract**

This paper summarises the current UK approach to improving child road safety, focusing particularly on measures to enhance the safety of the school journey. It highlights the importance of a safe road environment, and a number of different ways in which this can be achieved, including engineering measures, often introduced via partnership work between local authorities, schools, the police, the local community, parents and children. It also reports on supporting measures, such as on-road child pedestrian and cycle training, which are becoming an increasingly common part of school activity.

**Key Results**

- Children's road safety was identified as one priority in Britain's Road Safety strategy (2000) and the current progress towards achieving the child road safety target (50% reduction in the number of children killed or seriously injured in road traffic accidents by 2010, compared with the 1994-1998 average) has been very successful so far, although there are still concerns about the safety of particular modes of travel for children (walking for instance), as it can be seen in a report examining the performance of different OECD countries.

- Improving child pedestrian safety is currently seen as the top priority and three separate reports (MVA, 1999 and 2004; Grayling et al, 2002; Christie et al, 2004) have highlighted the importance of moderating traffic to create a safe physical environment in which children can travel.

- The paper focuses on school travel because of a series of reasons: the amount of child road traffic casualties on school journeys, changes in children's school travel habits, the growth in general traffic, children's health and well-being, the reduction in children's independence,... The Department for Transport and the Department for Education and Skills concentrates on encouraging schools to adopt 'school travel plans' developed in partnership between local authorities and individual schools. The effectiveness of this work is currently being assessed and modal shift is often taken as the key indicator as to whether school travel work is successful. Safety considerations are almost always 'built in' to school initiatives, but are not always measured (partly because the number of accidents near an individual school is often very small).

- A list of measures to improve the safety of the school journey is then provided. Engineering measures are important, particularly because their effects are usually longlasting. In this frame can be distinguished three topics: school safety zones, safer routes to schools and individual engineering measures. Afterwards parking restrictions are necessary, as well as initiatives to manage traffic at the school entrance ('park away' days, 'hold back time'). In parallel it is basic to work with parents, through consultation activities via posters, noticeboards, newsletters, meetings and the school website. Finally working with children is necessary, since they are the main actors of the issue. A description of the so-called 'Kerbcraft' scheme is also provided.

**Key Terms**

children, school travel, measures, safety
Title
School Travel Plans in Bromley

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Publication Date
---

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Document Website

Kind of document
Paper

Short Abstract
The paper reports children’s measure developed and implemented in Bromley, the largest borough in London geographically. In this area there is the highest levels of car ownership nationally and School Travel Plans were necessary to reduce congestion on the school run and raise awareness of sustainable transport. School Travel Plans are not anti-car but they look at the alternatives available to parents, pupils and staff such as walking, cycling, car sharing and public transport. Some measures implemented in schools are: WOW (Walk on Wednesday), Curriculum and policy guidance, Park and stride, Curriculum & Policy Guidance, Pedometer Challenge, Car Share Incentive scheme, Congestion busting banner competition, Walking Bus, Inter-school Walking competition, The World at your Feet Bling Your Thing. Furthermore, in Bromley a monitoring programme was implemented to measure both qualitative and quantitative data to ensure Travel Plans are successful (Termly hands up surveys, Monthly monitoring of the Wow and Car Share scheme, Yearly progress reports, Curriculum links, Full school community consultation every three years).

Key Results
- School Travel Plans are a package of measures put together by schools to reduce congestion on the school run and raise awareness of sustainable transport. School Travel Plans are not anti-car and need a structured programme with full support given to development, implementation and monitoring.
- As regards development, Bromley’s Central Government targets require all schools should have a School Travel Plan by 2010 (however, in London, the Mayor of London has brought this target forward to 2009). Engaging schools can be a challenge and a sustained and targeted marketing campaign has been carried out. This is also coupled with promoting School Travel Plan conferences hosted by Transport for London, which give schools an insight into how to draft a Travel Plan. When drafting a School Travel Plan, schools complete travel surveys, so that the school community has the opportunity to express their views, both good and bad about their journey to school and their thoughts and ideas. Once the surveys have been analysed the school can devise ideas to overcome any issues that have been highlighted by the travel surveys and include them within their Travel Plan document.
- As regards implementation, Bromley’s set up a series of children’s measures. WOW (Walk on Wednesday or Walk once a Week) scheme includes postcards where children record their walk trips to school, and badges. Park & Stride encourages parents to park a short distance from the school and walk the rest of the way. Pedometer Challenge consists in wall charts where children’s walking trips are recorded, in order to define the class with the highest number of walks per child (there is a price too). Car Share Scheme is another measure incentivated in Bromley, as well as Congestion Busting Banner Competition, which encourages pupils to design the the banner for the zig-zag area in front of the school, where parking is not allowed. Walking Bus device is also implemented, taking into account of children that take a similar route to travel to school. Parent’s turnovers and reserves are also considered, and the routes are checked by a Road Safety Officer and by the police to ensure safety patterns. Finally, Inter-school Walking Competition, “The World at your Feet” Project and “Bling your Thing” Campaign are carried out: the aim of these programmes is to improve children’s knowledge about road safety and walking in an entertaining way.
- As regards monitoring, hands up surveys are carried out to record modal shift (pupils are asked how they normally travel and they respond to the relevant mode by raising their hands) and school are encouraged to maintain an evidence file which contains ‘evidence’ of all of their activities, such as lesson plans, press releases and photos linked to the Travel Plan. Furthermore, a year after the Travel Plan is written, borough School Travel Advisors go back to the school for a meeting to review their Travel Plan.

Key Terms
School Travel Plan, Walking Bus, initiatives, children competition, monitoring
## Title
Children leading the way to safer, healthier communities

## Authors
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## Publication Date
2002

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## Kind of document
Paper

## Short Abstract
The paper highlights the widespread interest in “walk to school” topic and examines the perspectives of Great Britain and the United States, the two countries who joined Canada in founding International Walk to School Day. Particularly it focuses on the Walking School Bus and to the Walkability Checklists used to identify specific problems and solutions regarding safe walking. Communities across the world are using a child’s ability to walk to school as a starting point for examining how safe and secure their communities are for all people on foot.

## Key Results
- **The first International Walk To School Day** occurred in 2000 as an outgrowth of successful national events which had been held in the UK since 1994, and in Canada and the USA since 1997. This global event promote the importance of walking children to school, raising worldwide awareness of child pedestrian issues and providing a vast accessible network for the exchange of ideas and information among the participating countries (through an international web site: www.iwalktoschool.org).

- **Walking buses** are one innovation in this framework: children walk to school in supervised groups picking up pedestrians along the way, in order to reduce unnecessary car use. Schools get together in citywide collaborations to walk en masse to or from a central location. One of the main goals of the walking buses is to raise awareness to all of the importance of walking and biking to school and to create safe and convenient ways to travel to school actively.

- In the **United Kingdom** the proportion of journeys to school made by car has almost doubled in 12 years and continues to rise, due to social factors (rising levels of car ownership, more job opportunities for mothers with young children and a wider choice of schools) and convenience ones (combining journeys to work with the school run, inclement weather and time pressures with siblings at different schools). Surveys suggest that most young children who are driven to school would prefer to walk or cycle instead (Dorset County Council 2001). It is, however, parents who generally make the final decision on how their young children get to school. In order for parents to consider walking as a viable form of transport it is vital that they are made aware of the positive benefits and that’s why local authorities have been promoting Walk To School events since 1994. A National Walk to School web site in 1999 was created too and many events reported big increases in the numbers of walkers with some having 100% of the total school population taking part.

- **In the United States** physical inactivity is one of our nation’s greatest health threats; roadways are being designed to accommodate more and more cars, thus leading to a box mentality (Children go from the box of the house to the box of the car to the box of the school). A grass roots movement has begun in the US to change walk to school habits. Participation in the US tends to be at three levels of activity: conduction of one-day Walk to School Events, long-term programs with specific goals, permanent changes and “institutionalize” walking by incorporating it into civic culture, decision-making and the personal habits of citizens. Safe Routes to School programs are gaining support in the United States and neighborhood groups, engineers and planners, community leaders and, in many cases, state transportation departments are working together.

- A common element in many programs is the use of **checklists** to identify community problems. The University of North Carolina Highway Safety Research Center develops an assessment tool for communities to use to determine the quality of the walk to school, that means how safe and easy it is to take a walk with a child. The tool includes short and long-term actions for the problems identified. Along the walk the user is prompted to address five questions, each one gets a score and adding them together an overall score come out, thus evaluating the walkability of the route and identify problems. One of the issues the checklist helps to address is poor communication that sometimes occurs between the citizen advocate and the transportation engineer.
## Key Terms
- Walk to school
- Children
- Walking checklist
- Walking school bus

## Title
Growth of Walk to school in the USA: identifying trends and transitions

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## Publication Date
2004

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http://www.walk21.com/papers/Copenhagen%202004%20Marchetti%20Growth%20of%20Walk%20to%20School%20in%20the%20USA.pdf

## Kind of document
Paper

## Short Abstract
Walk to School programs in the United States have grown rapidly and undergone major changes in recent years. The paper discusses the trends and transitions occurring in the U.S and then examines emerging opportunities for the future. Particularly it focuses on the International Walk to School Week. Furthermore, the high rates of childhood overweight and physical inactivity and the initiation of government funding designated for Safe Routes to School programs have influenced Walk to School events and their subsequent development.

## Key Results
- **Walk to School initiatives began in the United Kingdom and in 2000, the UK, Canada and the US joined together to invite countries across the globe to participate in the first International Walk to School Day.** In 2003 the day was expanded to become International Walk to School Week, an event that brings together parents, educators, children and community leaders to walk to school with the purpose of promoting a combination of safety, health, physical activity and concern for the environment.
- **In the US, the proportion of overweight children and youths (six to nineteen years of age) tripled between 1980 and 1999. Childhood overweight leads to an increased risk for adverse health conditions both in childhood and into adulthood. Obese children are more likely to be obese adults, who have an increased risk for conditions such as cardiovascular disease and hypertension; the promotion of walking is an ideal strategy to increase physical activity among children and Walk to School programs are part of the solution.**
- **In recent years, Safe Routes to School (SR2S) programs have emerged as a way to increase safe walking and bicycling to and from school. They examine conditions around schools and facilitate the planning, development, and implementation of projects and activities that improve safety and reduce traffic and air pollution in the vicinity of schools. They also include encouragement activities and safety education, as well as Walkability Checklists. The paper examines data from two surveys (2002) and what emerged is that barriers such as distance, traffic, weather and crime keep children from walking and bicycling to school. The expansion of Walk to School promotions beyond a day has helped to bring about engineering and policy changes for some communities.**
- **Finally some recommendations are given: providing building schools that accommodate walking and bicycling; sharing successful strategies among communities; continuing to extend activities beyond the International Walk to School event; leveraging these events to reach larger objectives and preparing communities for potential funding.**

## Key Terms
- Children
- International Walk to School Day
- Obesity
- Safe Route to School
"Walk and Roll"—The Evolution of a Successful Walk to School Program

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Paper

In 1999, a survey conducted at Morton Way Public School (Canada) indicated that far fewer than 60% of the students in grades one to five regularly used active means of transportation, such as walking and cycling, to get to school, even though they all lived less than a kilometre and a half away. The paper focuses on the school-wide campaign that was launched to encourage students and their parents to leave the car at home more often. The goals were to promote active, healthy lifestyles and to reduce air pollution and traffic congestion around the school. Various motivational strategies were implemented and Morton Way has actively and successfully promoted walking to school through a variety of program elements including weekly Walking Wednesdays; "Walking Weeks" (International Walk to School Week, Earth Week and Environment Week); parent-led walking school buses along designated routes; and student participation in the "IWKAL Club" and "Walk and Roll" program.

Key Results

- In 1999, the majority of the children in grades one to five at Morton Way Public School was driven to school, despite they lived within one and a half kilometres of the school. Yet far fewer than 60% of students were using active means of transportation (such as walking, cycling, roller blading or scootering) to get to school, even on the favourable weather days. Initially, there were three main reasons why walking or "rolling" to school was promoted: walking contribute to increase air quality, reduce cars around school areas and encourage students to increase their physical activity levels.

- In 2002, "Walking School Buses" were introduced at Morton Way and have continued ever since. Parent volunteers and/or staff members act as leaders and wear blue and fluorescent vests for identification. They meet students 15 minutes before school starts at set locations in the school community ("bus stops"), close to the leaders' homes. Parents leave their children at these stops and can be assured that they will arrive safely at school accompanied by a responsible adult. The Walking School Buses run (walk) every day of the "Walking Weeks" (International Walk to School Week, Earth Week and Environment Week), as well as every Wednesday. The number of participants on each Walking School Bus has grown from about 9 or 10 to over 45 on most routes.

- The majority of students prefer to walk to school and the Walking School Buses give every child the opportunity to get some exercise and join in the fun. The Walking School Bus passengers show a lot of spirit as they walk to school. Many of them carry signs and sometimes sing songs or shout cheers on the way to school. Through the "Walk and Roll" program, Morton Way has helped to build a sense of community among its members, kept the children safer on their routes to school, improved the air quality in the school vicinity and helped to increase physical activity levels of the students.

- Furthermore Morton Way selects four or more students in Grade 5 to make up a "Walk to School Committee" to strong support walking to school. Their weekly duties include attaching a "Walk to School Survey" to the attendance folder for each class on Tuesday afternoons, so that on Wednesdays they collect the surveys and calculate the percentage of students who walked in each grade level, as well as the school total. The results for each class are recorded on a chart and posted for all to see. Classes with 100% participation are announced by the Committee, as well as the percentage for each grade level.

Key Terms

Walking School Buses, International Walk to School Week, Walk to School Committee
### 4.6 Walking School Bus

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<tr>
<td>Authors</td>
<td>Rossi G., Moretti R., Pirone M., Locatelli W.</td>
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<td>Publication Date</td>
<td>2004</td>
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</tbody>
</table>

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[http://www.piedibus.it/upl/biblioteca/1116342020_piedibus%20epidemiologia%20e%20prevenzione.pdf](http://www.piedibus.it/upl/biblioteca/1116342020_piedibus%20epidemiologia%20e%20prevenzione.pdf)

#### Kind of document

Article of journal (e&l anno 28 (6), novermbre-dicembre 2004, pag. 346-349)

#### Short Abstract

In 2004/05 the Local Health Service of Lecco proposed the project called Piedibus (Walking school bus), the organisation of safe pedestrian pathways from home to school, in order to promote the increase of physical activity among children. The article describes how the project has been planned and made operational. It provides some results about the community participation and the satisfaction of students, teachers and accompanying volunteers. In October 2004, independently of weather conditions, 12 Piedibus lines, with more than 500 pupils and 90 accompanying volunteers, were running daily in the Lecco Province. The opinion of children, teachers and volunteers was in general very favourable toward the project. Teacher and volunteers outlined the social value of the project and the increase in physical activity as positive aspects of the project. The overall impact at a province level is outlined by the Media coverage with over 60 articles and numerous radio and television broadcasts.

#### Key Results

- One of the main objectives of Walking School Bus (called ‘Piedibus’ in Italy) devices is to promote physical activity among children. In Italy, obesity is a phenomenon that has risen during last years. Moreover if children get used to walking, they probably will be healthy adults. **Car dependency** in school trips leads to different consequences: car congestion around schools, pollution’s increase, children sedentarity’s increase. The ‘Piedibus’ initiative can solve some of these issue and provide some other benefits (for example, the possibility of socialization among children). Piedibus management is a complex issue however, since also the community and the institutional part are involved in.

- In the Lecco Province, **Piedibus Project** has involved 13 municipalities in 2003/04: precisely 5 WSB were set up, 12 lines run around schools and more than 500 children and 90 volunteers participated. The media also took part in the Project promoting WSB with articles, interviews and local television broadcasts. The community was very favorable towards the Project and for the next school year the Local Health Service of Lecco estimated that the number of Piedibus’s lines and users involved would have doubled.

- In order to evaluate the satisfaction of pupils, parents and teachers, a survey was carried out, which included **2 questionnaire** (children + parents&teachers). The children survey included **7 items** and pupils had to give their opinion about them (through a Likert scale with 5 options). The parents and teachers survey was based on **3 multiple-choice questions** (Piedibus positive effects, Piedibus negative effects, Piedibus management difficulties).

- The results of the surveys clearly demonstrated the Piedibus success (where it was set up). As regards the **children survey**, 70% stated that they like WSB very much (**moltissimo**), fatigue is not really perceived, while walking in a pleasant and safe environment is important. The perception of pollution and the knowledge of the terrain is quite homogeneously distributed among the five grades and finally the possibility to get with friends is perceived a lot. As regards the **parents and teachers survey**, the positive effects reported are mainly three: socialization, decrease of sedentarity and road education. The negative aspects included the climate and schoolbags’ weight, while among management difficulties emerged the lack of volunteers.

#### Key Terms

Walking School Bus, Piedibus, school survey, children
**Short Abstract**

Walking buses are a relatively new phenomenon to encourage children to use an alternative to the car to travel to school. They consist of a group of children walking in a line along a set route, escorted by adults, stopping to collect children at specific stops. There have been few systematic evaluations of their effectiveness as policy instruments. This paper describes a methodological framework to evaluate walking buses that is being developed as part of a larger project on children's car use. The paper uses preliminary data from one school to demonstrate the types of outcome that can be considered within the framework.

**Key Results**

- The Centre for Transport Studies at University College London carried out a project entitled 'Reducing children’s car use: the health and potential car dependency impacts' (2001 – 2004), in order to examine the effects of car use on children’s physical activity and health (with a special focus on the potential long-term car dependency) and to develop a framework to evaluate the impacts of travel-to-school initiatives systematically. The fieldwork was based in Hertfordshire, an area to the north of London. The project was divided into six work packages and the paper focuses only on one of these, that means "Evaluation of travel-to-school initiatives". Particularly it is confined to the evaluation of the 'walking bus' initiative.

- The methodology proposed in the paper is comprehensive and distinguish the parties involved in the initiative, in order to obtain all information necessary to assess the 'walking bus' impacts through a cost-benefit analysis: the walking bus coordinator, the headteacher, the children, the parents and the volunteers. The data collected were recorded on seven worksheets.

- From the data on children's address and that about the route of the walking bus, it will be possible to establish how much time the child takes travelling to school. This can be compared with the information about how they travelled previously and how long it took. It should also be possible to calculate the time spent by the parents currently and previously. For those who are not volunteers there will probably be a saving, but for those who are volunteers there could be an increase. The volunteers who do not have children on the walking bus will spend time on it which they did not previously. The coordinator will spend time, but much of this may also be as a volunteer. The time spent by the headteacher and by the County Council staff is not currently being included.

- There is a complication associated with the time spent on the walking bus. Usually in the economic evaluation of transport initiatives it is assumed that there is a disutility associated with time use; that is, it is assumed that people do not wish to spend time travelling, so a time saving represents a benefit. However, this is not necessarily the case here. The children may prefer to spend longer with their friends on the walking bus to travelling in a car with a parent. Similarly, the volunteers may enjoy the social aspects of the walking bus, and so may not regard this use of their time in a negative way. Another complexity that is not captured completely here, is the change in car use. It should be possible to establish the reduction in the number of trips that were previously being made by car especially to take children to school, but it is likely that many children were being dropped off at school in the course of another trip, possibly to work or to take another child to school. Such car trips will continue, possibly with a reduction in length.

- The quantitative information then were put together to facilitate the calculation of the costs and benefits: the changes in the distance travelled and time spent on each mode by the children can be summarised with a table. It also includes the change in the number of car trips each week and the net change in the time spent by the organiser, parents and volunteers. There is space for the monetary cost to be included if such information is available. The positive and negative outcomes for the parents and children can be recorded in terms of the numbers reporting each outcome.

- The methodology being proposed was experimental and some preliminary results from the case study were discussed, particularly the data collected from one of the five school. Through the interviews (children, co-ordinator and headteacher) it seems that the walking bus wasn't reducing car use very much. However, it was operating and children and parents' stated it produced positive outcomes.
Key Terms
Walking school bus, children, evaluation, transport policy

## Title
The Walking School Bus: Combining Safety, Fun and the Walk to School

## Contact Information
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Pedestrian and Bicycle Information Center

## Publication Date
2007

## Document Website

## Kind of document
Report

### Short Abstract
In the search for ways to make walking to school safer, more fun and more convenient, communities are finding that Walking School Buses can make a real differences in the United States. Safe Routes to School programs, which encourage and enable children to safely walk and bicycle to school, often include this device in their activities. The guide is intended for parents, teachers, SR2S coordinators and law enforcement officers and stresses the benefits of WSB. Particularly it focuses on the starting moment, on its development and on safety issue.

### Key Results
- A **Walking School Bus** is a group of children walking to school with one or more adults and it is a device that can encourage a healthy life-style among children. WSB programs bring different advantages for children: have fun, learn pedestrian safety, foster healthy habits and participate in physical activity, socialize with friends, etc. Parents can have benefits too, as well as schools and all community members.
- To start a WSB, two general steps can be followed: families in the same neighborhood decide to walk together and a route is designed and tested by adults. **WSB development** and its structure depend then on the community’s interests, goals and available resources. However some features have to be considered, such as the amount of time available to coordinate the program, the number of volunteers available, the level of interest among children & parents, etc. Basic requirement is that the walk route to school is as **safe** as possible; pedestrians safety skills should be taught both to adults and children. To keep WSB going it is necessary to have develop leaders, to organize programs and to reward pupils with small prizes.
- As regards **measuring impacts** of WSB, it is important to conduct children and parents surveys (above all counting children walkers). The guide describes some **real-life examples** of WSB in US communities too, thus demonstrating how WSB can be conducted and how local needs can be met.

### Key Terms
Walking School Bus, measuring impacts, safety, structure

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Walking the walk

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## Publication Date
2007

## Document Website

## Kind of document
Report
Short Abstract

Between 2001 and 2007, 58 Local Councils and partnered organisations have engaged school communities to establish Walking School Buses in Victoria. Since then, the program has gained considerable public acceptance and favourable publicity. This report analyses the main facilitating factors and barriers to WSB implementation by examining data collected between 2003 and 2005 from 12 council areas. The evaluation focuses on the organisational and the individual levels. What emerged is that the program’s health, safety and environmental messages are well known and supported by participating councils and schools. In many areas the WSB program implementation has been very successful.

Key Results

- In the period between 2001 and 2007 more than 58 Council areas have implemented WSB programs in Victoria. These programs have the potential to deliver considerable individual and community benefits in terms of health, safety, environment and social skills. The report presents an overview of WSB programs’ evaluation (2001 - 2007), focussing on the organisational and the individual levels.

- As regards the organisational level, it can be noticed that WSBs were implemented either by the City Council or external agencies (e.g.: Victoria Police, VicRoads, etc), and WSB Project officers were employed with the aim of improving WSB projects. The main findings concerned to schools’ WSB perception are then presented: what emerged is that the first perceived WSB benefits are the opportunity to encourage exercise and active lifestyle, to teach road safety and pedestrian skills and to decrease traffic congestion around schools. The most frequently reasons for WSB programs withdrawal were the lack of volunteers engagement and the lack of interest from parents.

- As regards the individual level, two issues were explored: the frequency of walking and walking distance (WSB don’t operate every day / the average route length is 1,3 km and the average WSB travel time is 28 minutes) and WSB enrolment rate (over 3 years, 2003 – 2005, it increased from 2,6 to 5,8 %).

Key Terms

Walking School Bus, benefit, perception, children, walking distance
"Safer Routes to School" Project has been running in Stoke-on-Trent for years. It aims to generate a more sustainable approach to pupil and teacher travel, to improve the safety of school journeys, to reduce the number of car trips to and from school, to reduce the number of pedestrian casualties, to increase children’s independent mobility and responsibility, to improve children’s health. The main actions within this frame are the development of School Travel Plans, pedestrians training, Local Studies that involve parents and pupils, Walking Buses.

- Pedestrian trainings have been piloted by the City Council and particularly the “Kerbcraft” scheme (for Junior School children) provides practical instruction in three basic pedestrians skills: crossing roads, dealing with parking cars, using safer crossing places and general pavement behaviour. These courses are organised by the Transportation and Road Safety Group, which also provides study packs, workbooks and video covering the main aspects required for improving children’s road safety skills. The training culminates in an observed walk after which a certificate is awarded.

- The City Council has implemented a range of engineering measures to create a safer environment for pedestrians: traffic calming, pelican crossing, puffin crossing, toucan crossing,… Local Studies have also been carried out, in order to encourage children to play the role of traffic engineering and develop their own safety scheme in areas around the school.

- The City Council organises a “Walk to School” annual event (it lasts a week) in order to encourage parents to leave their cars at home and walk to school with their children. Resources, including booklet and leaflet information, are provided in support of this event. Schools that have set up fixed Walking Buses are still few, but the number is increasing. “Walking Bus” consists of a group of children who are escorted by adults on the journeys to and from school. Buses can run every day or just some days a week and follow a set route stopping at agreed pick up points in the local neighbourhood, collecting and returning children at the beginning and end of the school day. There are usually two adults: the ‘driver’ that leads the the bus and the ‘conductor ‘ that walks at the end of the bus; they receive training to ensure safety. Only the children that have registered to the Walking Bus can join it and they usually wear fluorescent jackets. Advantages of this device are the reduction in the number of cars outside school, the safer environment around schools, a better development in road safety and pedestrian skills for children, the possibility to get more exercise, the possi,…

Key Terms
children, school, education, training, walking bus
Appendix A

The “Pizza model” (R. Methorst, 2003)

Traffic can be conceived as a system. People travel from A to B. If they do not do this on foot, they use a vehicle for it. With that vehicle, they travel on roads. Those roads in turn are part of the spatial environment. The road network and the (immediate) environment are usually referred to with the concept infrastructure. When several vehicles make use of the road network, there have to be rules to ensure that this proceeds smoothly and safely. This means that the traffic has to be organised. The system components are thus:

- **Person**
  In order to use the road in a certain role, one must have the knowledge needed for that role, insight, skills and attitudes.

- **Vehicle**
  The vehicle must be able to move and be steered or operated, that is to say, move in all directions and slow down and speed up. The vehicle must also offer protection to the occupants.

- **Environment**
  The roads (infrastructure) must be made in such a way and the road environment must be laid out in such a way that people can reach their destination smoothly and safely, regardless of the role (pedestrian, cyclist, moped rider, car driver, public transport user etc.) in which they do that.

- **Organisation**
  The traffic needs to be organised. There is a difference between (1) the official rules (the traffic regulations) and the monitoring of compliance with these (enforcement) and (2) the implicit code about how one should behave in traffic, or how it should be arranged and organised. In the latter case, this is the culture, norms and values that exist.

The level of road safety thus depends on the sum of the qualities of the components person, vehicle, environment and organisation. The ‘Pizza model’ shows that there are different levels in the interaction of the components and the possibilities of influence (measures, policy). In the model, those levels can be seen as ‘layers’:

**Core = micro level**

At the lowest interaction level, the central elements are the individual road user, the vehicle, the physical environment and the people in the environment (other road users whom the individual road user has to deal with). Road safety measures have already been taken for all those components. In the case of the person (road user and people in the environment) one might think of traffic education, e.g. teaching safe crossing routines to small children, and driving courses, such as the Platform for Elderly and Mobility BROEM courses for elderly people. As regards the vehicle, one might think of active safety provisions, such as brakes, ABS and power steering and of passive safety provisions, such as seatbelts, air bags and crumple zones, knee protectors for skaters, and helmets for cyclists. In the case of the physical environment (infrastructure) one can think of fly-over crossings, zebra crossings, separated cycle paths, roundabouts, special road surfaces, road signs on and alongside the road, the design of verges etc. If one looks no further than the immediate cause of accidents, it seems obvious to aim the arrows mainly at the component ‘person’. After all, in the vast majority of accidents people have not done something completely right (conscious or unconscious sub-optimal action). However, this is a short sighted view of the matter. Firstly, far from all accidents can be prevented by training, education and public information. Secondly, one should not look only at the immediate cause of an accident, but also at the underlying causes. The underlying causes are circumstances that encourage the making of mistakes. These circumstances are often connected with defective quality of vehicles, the road and road environment or the organisation of the traffic. Moreover, the different components of the system have a mutual influence upon each other.
1st layer = meso level

The meso level is formed by the layer around the core. This concerns the influence that is exerted indirectly on the core. Thus, the company (e.g. a bus company) for which one works, or the school, the family, the society for elderly people can exert influence on the quality of the individual road users. The safety policy in this case does not focus directly on the road user, but on the group to which one as an individual road user belongs. Often this will not relate so much to regulations, but stimuli from the government side intended to prompt the group concerned to itself do something about promoting road safety. Policy at the meso level with respect to vehicles focuses on transport concepts: bicycles, mopeds, cars, vehicles for the disabled, light rail, vans, trains, passenger ships etc. This policy often touches the vehicle industry and transport organisations. The aim of the safety policy is to give the safety of vehicles a prominent place in the development of all kinds of vehicles. Here too, the concern is not so much with legislation and regulations, but with increasing the role played by safety in the vehicle market and vehicle industry. Next to physical environment at the meso level is the word ‘networks’. In the core, the question is how infrastructure should be constructed from the standpoint of safety. The question at the meso level is where (e.g. in new construction districts, around schools, near industry parks etc.) from the standpoint of safety, roads can best be constructed. The key question here is often how, by offering attractive routes, one can prevent conflicts with other road users, especially conflicts between vulnerable groups and motorised traffic.

Next to people in the environment at the meso level is the word ‘standards’. At the micro level, the concern is the interaction between road users. This interaction is determined by compliance with traffic regulations and more general rules of conduct that people use in traffic. The desire to behave safely in traffic is largely determined by the standards (norms) that one has. At the meso level, the concern is to bring about a safety culture on the road, in which taking account of vulnerable road users is an important factor. Publicity campaigns play a major role here.

Outer layer = macro level

At the macro level the pizza slice of the individual road user relates to the social preconditions that allow the groups to do something about their own safety. This might be, for instance, the space that a school is given to dedicate to traffic education, the priority given by the police to the enforcement of traffic violations when, in particular, vulnerable groups are disadvantaged. Another example: if profit margins of companies are low, and people have to compete on price, then it can happen that the attention to safety can decline in companies offering passenger transport. For the pizza slice of the vehicle, the outer area is ‘mobility needs’. Road safety policy at this level focuses on influencing the number of trips (preferably fewer) and the choice of mode of travel (preferably the safest) and the volume of the mobility need. Fewer vehicles on the road results in great safety. On the other hand: to emphasise taking away the driving licence can mean that the (elderly) car driver concerned is forced to travel using a mode that is much more risky for them, such as the bicycle, or is ‘forced’ to use a rather unsafe four-wheeled moped. The outermost part of the pizza slice physical environment is characterised by Spatial Planning. Here the safety policy focuses on the location of residential areas, schools and companies. The aim here is that it should not be possible for traffic flows to exist between those different locations, which would entail an increased risk, such as a main road between a residential area and a school. Thus, from the safety standpoint it is attractive to encourage elderly people to live in the proximity of the facilities that they use frequently. The word ‘values’ refers to the importance attached by society to road safety in traffic and passenger transport. For example, how does the importance of road safety relate to issues such as health and justice. This heading also covers how high road safety stands on the political agenda.

Finally, terms are positioned next to the axes of this pizza model. Internal means that it concerns the individual road user or the vehicle. External means that it concerns the social and the physical environment. On the left is the word ‘person’ and on the right the word ‘technology’. The top half of the pizza thus relates to the individual qualities and the lower half to the collective qualities. On the left half are the qualities of the person, both personal and social. On the right are the qualities of the ‘hardware’, the vehicle and the roads. Traditionally the road safety policy has mainly aimed at the core of the pizza, or the concrete measures that can be realised within the relatively short term and that produce relatively fast results. The middle level concerns mainly measures that are more far-reaching, take substantially more preparation, in the order of magnitude of 3 to 5 years, and usually do not result in demonstrable effects in the short term. In the outermost layer, processes take place gradually but very slowly. It can sometimes take thirty years for a change to have noticeable effects. The Vulnerable Road Users project does not focus primarily on short-term effects, but on the prospects offered by measures taken in the areas of the middle and outermost layers.
# Appendix B

## Presentation Format (Literature review)

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## Key Results

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<th>Key Terms</th>
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Appendix C

Country Reports Questionnaire’s template

Country Report

1. Facts and figures

Available statistics

Demography:
- which statistics available?
- collection method?
- which years?
- quality of the data?

Transport and travel data
- which statistics available?
- collection method?
- which definitions?
- which years?
- quality of the data?

(Urban) Land Use
- which statistics available?
- collection method?
- which definitions?
- which years?
- quality of the data?

Health & competences
- which statistics available?
- collection method?
- which definitions?
- which years?
- quality of the data?

Time spending
- which statistics available?
- collection method?
- which definitions?
- which years?
- quality of the data?

Safety
- which statistics available?
- collection method?
- which definitions?
- which years?
- quality of the data (reporting rates)?

NB. Data must be inserted in the Countries Report Excel-file.

2. (Recent) publications on pedestrian issues
What publications are there nationally regarding the general and specific research questions?

Per publication:
- author(s)
3. Current research projects
Which projects are currently carried out? Please indicate per project, if known:
- Research topics or title of project
- Expected results and products, when?
- Names of institutes
- Name(s) of researcher(s)
- Contact details (organisation, name, address, telephone, e-mail)
- Research context (part of larger project?)
- Amount of money, time and staff involved

4. Policy statements
Current (published) policy statements regarding pedestrians and walking
- National government White Papers and Policy Notes (National, Regional and Local Transport and Traffic plans)
- Land Use plans
- Health sector plans
- Education sector plans (incl. walking to school)
- Statements of political parties / party scientific bureaus

5. Legal position of pedestrians
A short review of regulations regarding walking, the pedestrian and handicapped persons in:
- Land Use Planning Acts
- Traffic rules and traffic signs with regard to pedestrians and the handicapped
- Rules regarding behaviour towards the handicapped
- Transportation rules & pedestrians
- Guidelines and legislation for road authorities with regard to pedestrians and facilities for the handicapped (traffic management, management, maintenance, design, traffic lights guidelines etc.)
- Health & Safety regulations
- Education rules and legislation
- Jurisprudence
- Liability rules
- Enforcement practise.

6. Best Practises
Which Best Practises examples do you know of in your country?
Please indicate per example:
- the issue (i.e. pedestrian policy, safe crossing, Design for All, supportive authorities, Walk to School,...)
- what is the quality?
- who is responsible / initiator / owner?
- where is it?
- available documentation
- contact information.

7. Innovations
What innovations can be spotted in your country with regard to
- Education and communication
- ‘traditional’ technical innovations
  - Pedestrian safety and vehicles
  - New forms of transport
  - Outdoor gadgets
Infrastructural innovations
- public space design innovations
- Intelligent technical innovations
- Organisation & implementation methods
- Research methods

8. General Atmosphere
The general atmosphere can be described using statement samples from the media and on the internet regarding:
- The attitude towards pedestrians by other road users
- Spotted behaviour of pedestrians and others towards pedestrians
- Perception of the living environment and the quality of public space
- Positions taken in discussions regarding walking and pedestrians

Is there a Pedestrians Association or related NGO? What is its position?

SWOT analysis of pedestrian situation in the country (Strengths, Weaknesses, Opportunities, Threats).
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