

Safe and Secure Cities for Ageing Generations: Environmental Urban Walking Conditions in Post Covid Era

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1 Abstract

Historically walking was the dominant transport mode in Czech cities for centuries. That is why our cities, their size and shape were designed besides other important things like defence according needs of pedestrians. All the amenities were situated in walking distance and public space and all the pedestrian routes were designed to enable easy waking and social life in public realm.

This was dramatically changed during and after industrial revolution. Mass production and advent of motorised transport changed the size and fabric of the Central European city. New transport infrastructure and fast development of means of transport enabled unlimited urban growth and dramatically changed the relation between locations of people's activities within the fast developing city structure. Unlimited growth of individual car ownership after 1989 resulted in much longer distances, need for commuting and then in car dependency of town's inhabitants and visitors. In Central and Eastern Europe the changes were much faster, in two decades they reached the same level of automobilisation and automobile related problems as their counterpart in West Europe. Because of short time for accommodation and unprepared infrastructure, the problems seem worse. But Central and Eastern European state and regional transport authorities did not learn much from the latest, more environment-oriented development in the West Europe.

Unsolved problems like climate change, growing congestions and environmental pollution of our cities call for short and long-term solutions to sustain mobility and good urban environmental quality for their inhabitants. The visions for liveable and sustainable cities are connected with many demanded and sometimes predicted changes like transport mode shift from motorised transport to public transport and non-motorised transport, synergy of integrated land use and transportation planning, transit oriented development and user friendly design and sensitive renovation of European cities for their inhabitants and visitors

2 Keywords

Transport, mobility, accessibility, senior citizens, safety, security, walking

3 Introduction – Impact of transport on the development of Czech and Moravian settlements and urban areas

In the 20th century motorisation based development transformed the urban landscape, in consequence the majority of the population in EU became car-dependent. Cars give them the feeling of freedom and security. However, in the 60's, problems were recognised. The enormous increase of car traffic in our towns has meant more mobility for its inhabitants and higher intensity of residential distribution of functions (See Fig. 1). At the same time, however, it has created a series of conflicting situations in people's everyday lives; it has disrupted their living environment, and it has disturbed the functional purpose of towns as self-contained entities. (ROBES, M. 2002)

Bad environmental conditions for inhabitants, especially pedestrians and the current unsatisfactory state of urban public spaces have a number of causes in many European cities. One of them is the incompatible discrepancy between historic traditionally structured urban design, and the present-day requirements created by increased car traffic volume (KURFURST, Petr 2002). The physical environment of towns and cities was developed for less demanding mode of traffic – in the first place walking. Additional problems are caused by the uneven distribution of urban activities, which is

growing at an unacceptable pace at the present time. (GEHL, Jan.: 2000) According our last estimation, the distance to services in some Czech cities has prolonged five times since WWII. (SCHMEIDLER K.: 2008). This distribution is strongly affected by a strict segregation of living functions. Traffic origins and destinations have spread throughout a large area, resulting in an enormous growth of internal urban motorised traffic and decline of walking (see Fig. 2). The current state is also due to the application of predominantly technically oriented solutions to problems that have shown no respect for sensitive urban planning and environmental requirements of local people. (PATRIK, Miroslav 1997)

4 Changing Urban Structure

Essential changes in the settlement structural patterns of European countries have affected the style and life quality of their inhabitants. This is particularly applicable to children, senior citizens, the handicapped, and to woman who are generally of ill health, less wealthy, more vulnerable and less mobile.

Since the 1960s, a new phenomenon has begun to occur as shown in the statistics of cities and urban areas of Europe: the largest cities have stopped growing and marks of de-concentration have arisen. At this time, geographers of settlements have come up with the “general theory of modern urban development”. According to this theory (Van den BERG, L., DREWETT, R., KLAASSEN, L.H., ROSSI, A., VIJVERBERG, C.H.T. (1982), which is based on the assumption that the development of cities consists of successive phases of urban development. That serves as a general model; certain cycles are always repeated in all examples of urban development; first of all appearing in innovative centres, and then extending to the rest of the world. This concept is in compliance with the general theory specifying that urban process is determined by economic progress, industrialization and transport infrastructure development, which crucially impact the optimum location of populations and their activities. The determination of optimum location is more or less independent of the political system or the social and economic establishment. These only constitute side and modifying factors. The basic urbanization model is also slightly modified by the historic and national features of different regions.

5 Spatial Development based on Proximity of Places of Activities

New technologies and new spatial development patterns altered cities into something more than mere centres of religion and government. Settlement structure changed significantly: apart from the development of a capital or several major elements, a number of industrial cities were formed. In the cities themselves, residential development was centred within the walking proximity of factories and businesses - due to underdeveloped public transport. Further along, urban growth was achieved as a result of the development of public transport, the building of railways, the construction of water supply and sewage networks, and the establishment of basic forms of residential development and city formation. A typical developmental pattern or form was that of the radial-concentric city - a star-shaped urban conglomeration from which the roads extend in the shape of arms. Industrial urban development culminated with the establishment of coherent urbanized areas. The term conurbation is sometimes used. Even though rapidly growing conurbations and related travel demand may seem to be the greatest problem today, this is debatable. The share of urban population in Europe has exceeded eighty percent; which means that Europe as a whole has reached the “ceiling of urban development.” No further development is awaited in this direction.

In early stages of pre industrial and also industrial urban development walking was widely used. In that time people were used to walk 15 kilometres to reach their working place. Places of work, home, cultural and religious activities and leisure were built mostly in proximity and other modes were very expensive for majority of the population. In Central Europe and Eastern Europe in particular, this process bears some special features that differ from the general model when compared to Western Europe. Changes have often been delayed by several decades; and the transformation of the settlement structure was not so aggressive – due to various political factors, and the slow pace of agricultural production modernization. The term “suburban development” is used to describe situations in former socialist countries. The level of infrastructure is not in balance with the amount of urban population, so

newcomers therefore, usually settle in housing estates on the outskirts of the cities. (STANKOVA Eva, (2008).

In communist states as Czechoslovakia was, walking was widely supported by the government, because good physical shape of the population was important precondition for “healthy nation”, the military defence purposes, pre-military training and military service. Walking competitions were organised on mass basis like “One hundred kilometres walking” for adults and “fifty kilometres walking” for children and youth. Walking path network was built extensively. From that time Czechoslovakia and Czech Republic had one of the best marked net of walking paths in the world. Walking was seen as important leisure activity for masses.

6 Suburban development and car dependency increase

This suburban development is the accompanying phenomenon to a new phase of the socio-economic revolution, where the focus of economic activity is shifted from industrial production to a services economy that has a high demand for knowledge, skill, mobility, and the supply of information. (3)

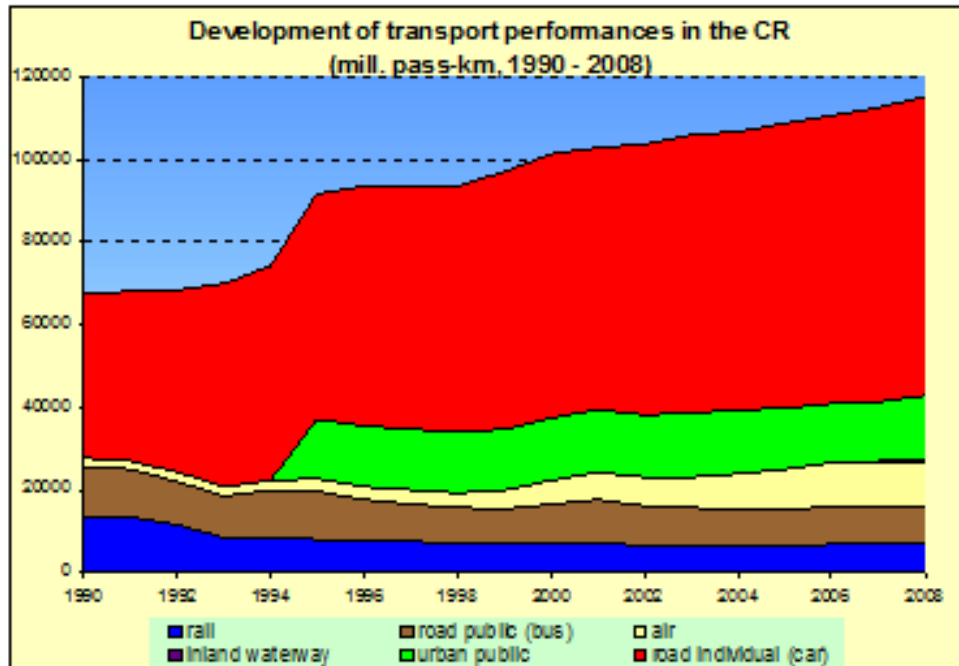
The 2nd phase changes in the settlement structure patterns are thus induced by the changes in economy and society. This process is influenced by the attenuation of heavy industry and the departure of workers to the tertiary sector and light industry production on assembly lines requiring single-floor industrial halls with spacious area. Administrative and research parks with pilot operations have thereby followed industrial parks to suburban locations which allows them to take advantage of newer, faster roads; cheaper construction plots and ample parking space; and avoidance of the drawbacks of the city, such as congestions, bad quality of environment, crime, growing poverty in central areas, and other negative phenomena. Administrative parks represent cheap locations for companies that are not established yet and need cheap start-up conditions. Due to intensity of investment and international business development, new, mainly warehouse and commercial constructions proliferate “in the green belt” in clusters of urban conglomeration. Shopping centres have grown almost spontaneously in suburban locations. Outward-bound roads and motorways are surrounded by tens of kilometres of sheet-metal auto dealerships, assembly halls, warehouses and shops. Cities are thereby chaotically extended at the expense of traditionally agriculturally utilized countryside; which again intensifies negative ecological pressure on agricultural production.

We are witnessing the slowing pace of a traditionally rapid urban development, typical of the first post-war period. Extensive urban development is slowing, and increasing numbers of the population are leaving large cities; on the other hand, living environment and infrastructure in the suburbs is improving (shops and facilities have followed people). As a result, the number of job opportunities has grown and the income of people living there has increased (mostly middle-age, qualified, “white-collar”). Tertiary aspects affecting the society in most advanced countries have led to changed housing requirements. People who have an opportunity to obtain individual means of transport change their places of living. The increased use of the private automobile has enabled greater groups of the population to move quickly between home and workplace. Leaving the city is becoming more characteristic of a wealthier population for whom satellite or villa towns, adjacent to suburban areas or neighbouring villages, are built in proximity to larger cities. The term “social exclusiveness” is starting to be used for the new locations experiencing the increased concentration of socially similar groups. Newcomers usually do not integrate with the original village population because of their considerable socio-economic differences. “Walled communities” emerge with their exclusively owned environment.

The uncontrolled growth of cities further reinforces all unhealthy social trends regarding both power consumption and protection of agricultural areas. Weekend trips by the city population to the country walks will begin to resemble the movement of nations that pollute the environment with exhalations - if, however, it is at all enabled by the collapsing transport system. Under these circumstances we need to view countryside utilization and the structure of population distribution more pragmatically because this view highlights transport requirements. The cities suffer from the fact that in many places in Central and Eastern Europe private automobiles have encroached upon areas traditionally and exclusively inhabited by pedestrians. Cars have taken over roads, pavements, squares and

embankments. The reason for this has been the desire to be able to reach any point by car, which often equates to a feeling of freedom. The following applies here: the denser the population within the city, the lower the requirements for transport and the greater space for free countryside, wild nature and walking. (STANKOVA Eva, a kol. 2008)

Fig. 1: Table illustrates the fast increase of individual car use In Czech republic and decline of other transport modes during two decades. Source RNDr. Jan Tecl, CDV, Brno, 2010

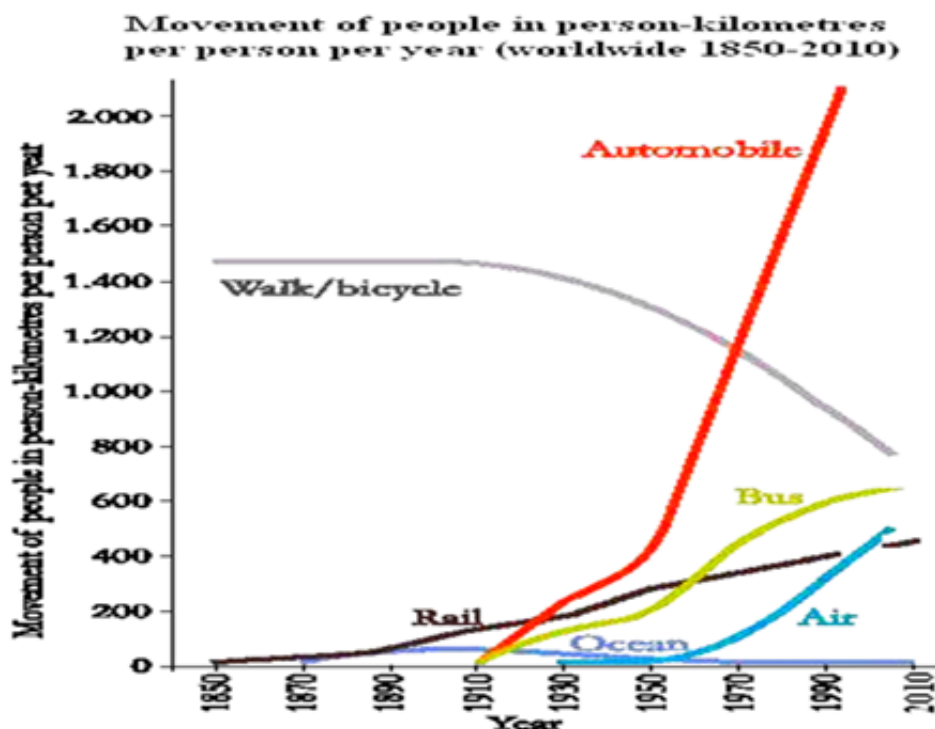


Suburban development, depicting the growth of the city at its outskirts, is closely linked to the process of spatial specialization and segregation. It connotes the concentration of certain branches of industry in certain parts of the city, and the concentration of certain groups of population into specific zones of the urban structure. The specialization and segregation, for example, lead to an increased distance between homes and places of work. Since these processes are usually not coordinated, and occur independently of the existing transport system, distances are ever increasing, putting pressure on the use of private cars to the disadvantage of public transport and walking. This is a gradual process in which public transport loses its validity, and subsequently, ceases. As a result, numerous categories of population, children, teenagers, mothers with children and senior citizens in particular, have aggravated access to transport and their spatial mobility decreases. (SCHMEIDLER, Karel. (2008)

7 Urban De-development and decline of walking in cities

The growing role of tertiary sector (services) and present Covid pandemic contributes to the migration of the population to smaller suburban settlements. Companies providing services also migrate to places with cheaper land and labour costs. This trend has instigated an immense development of distant transmission of information (faxes, mobile telephones, computers connected in networks, the Internet, telecommunication satellites, etc.). Thanks to telecommunication technology, both company and financial operations can be controlled from distant locations. Due to traffic congestions, inner parts of cities are becoming less accessible to their inhabitants. This is accompanied by the unregulated growth of cities, crises of transport systems and increased use of individual cars due to the construction of commercial shopping centres and residential zones, and sometimes due to non-coordinated residential building (see Tab. 1).

Fig. 2: Table illustrates the fast increase of motorised modes of transport and decline of walking during last hundred years. Source Jan Perner Faculty of Transportation, University of Pardubice, Czech Republic adopted by RNDr. Jan Tecl, CDV, Brno, Czech Republic, 2010



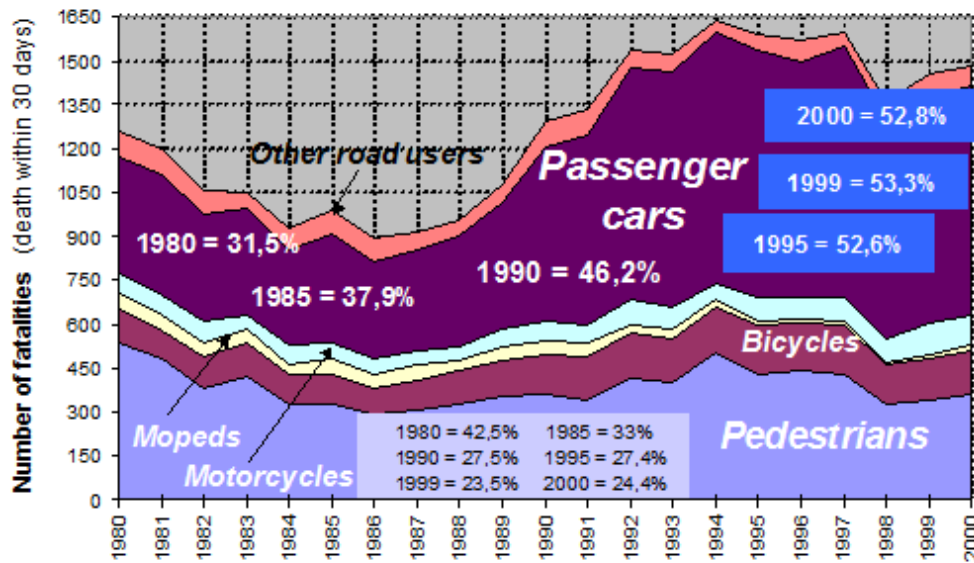
Tab. 1: Transport performances of the passenger public and individual transport in the Czech Republic (mill. pass-km)

Passenger transport	2000	2001	2002	2003	2004	2005	2006	2007	2008
transport performance (mill. pass-km)*	101 352	102 921	103 636	105 984	106 940	108 607	110 617	112 801	115 181
rail	7 300	7 299	6 597	6 518	6 590	6 667	6 922	6 900	6 803
road public (bus)	9 351	10 608	9 668	9 449	8 516	8 608	9 501	9 519	9 351
air	5 865	6 399	6 895	7 096	8 815	9 736	10 233	10 477	10 749
inland waterway	8	8	17	22	22	22	18	13	17
urban public	14 889	15 138	15 170	15 540	15 427	14 935	14 313	14 353	15 881
public total*	37 412	39 451	38 346	38 624	39 370	39 967	40 987	41 261	42 801
road individual (car)	63 940	63 470	65 290	67 360	67 570	68 640	69 630	71 540	72 380

Right from the beginning of car transport development pedestrians have been paid less attention; with the growing number of vehicles and roads for these vehicles their position is becoming even worse. Unequal position of pedestrians is also emphasized by their significantly greater vulnerability in the road traffic as compared to other road users (see Fig. 3).

Fig. 3: Table illustrates the increase of fatalities after societal changes in 1989 and stable portion of vulnerable road users - pedestrians killed in the same time. Source RNDr. Jan Tecl, CDV, Brno, 2010

Fatalities according to category of the road users in the Czech Republic (1980 - 2000)



To deal with the issues of traffic and parking, costly transport and parking facilities have been built. Conditions for enabling the transport to become more intense are also being established. In consequence we are witnessing a massive mobility of people and devastation of the environment even beyond the borders of the affected regions. The historic centres of cities are often damaged and the internal environment is deteriorating. It is paradoxical that the construction of freeways that connect developing suburban locations with the central part of the city are contributing to the destruction of the central parts of the city by enhancing the dispersion of the functions crucial for the health of urban centres. It means that if the concentration of retail, light industrial production, recreational, cultural and educational functions vital for urban livelihood decrease; city centres will be destroyed. The road system supports spatial distribution of population, but also enables the shift of vital activities to new, more distant centres. (SCHMEIDLER, K. 2009)

Another problem has been created by the ill-considered and non-regulated growth of administrative buildings in European city centres. Where new buildings could not be built, old buildings were used. It was bad fortune for people who lived there, senior citizens in particular. Adjacent historic squares then automatically became parking places. We recognize such derelict places according to their negative effect upon pedestrians (see Fig. 4). Buildings are often so close to the roads that there is no space left for sidewalks and walking. Great distances do not enable access other than by auto, to some these places. We are all familiar with these situations of the shopping centres at the outskirts of our cities. Very little has been gained by this approach, and the tendency of inhabitants to leave cities is increasing as the cities become uninhabitable; all negative aspects of civilization are often concentrated there. This induces an increased desire of people to spend as little free time in cities as possible; and they have more and more free time. Urban population thus leaves the city, first to places in their immediate vicinity. Due to the extending suburban areas, however, they are forced to drive longer distances in their objective or subjective effort to come in contact with intact nature environs, and to spend time in untouched countryside. The increased use of private cars dramatically damages the environment; this phenomenon has also begun to encroach upon areas that had been unaffected. The term “urban sprawl” is used to describe this tendency. Shopping and cultural centres are also built outside the city in the proximity of motorways because of the availability of mass customer parking space. And this again aggravates transport conditions (congestions, combustion gases and dustiness, incidents, traffic accidents etc.) near large cities.

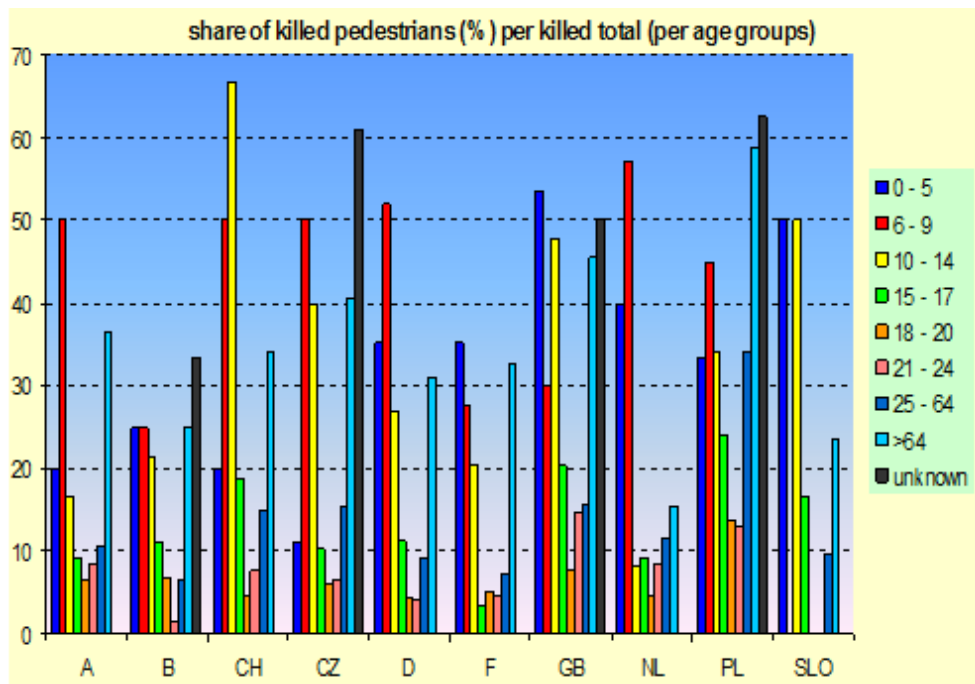
Fig. 4: Negative prognosis of the future – artist view of the future state, when no countermeasures will be applied



In European cities senior citizens comprise a relatively big portion of inner city inhabitants. Due to uncontrolled urban development and inappropriate urban planning policies, they have lost direct access to the facilities they need to live (shopping, sport, leisure and medical care).(OECD, 2001) Cities are endangered by the flight of investment from central portions, the so-called “urban sprawl”; growing social separation arising from different income levels and social statuses, deteriorating living environment in cities, loss of agricultural land and original rural environments, and erosion of architectural monuments. The image of city centres is aggravating; the press refers to the “crisis of cities”, “decline”, “pathology”, “alienation” and decreasing investments in these areas. Changed accessibility and deteriorated quality of the environment (noise, air pollution, traffic vibration, etc.) limits walking and sojourn in public spaces and may induce greater migration. People of a higher economic status move out of these locations because they feel they are becoming less habitable. The population migrates to less urbanized places which have, however, easy accessibility. Then it is followed by services that contribute to the rapid development of new settlements, often at the expense of the quality of the environment. Increased mobility becomes a feature of the era; it has, however, some drawbacks. In reality, attachment to a certain place is not restricting; it enables, for example, intensification of human relationships. Every year several hundred thousand inhabitants leave our large cities.

The settlement network thus becomes more balanced. The city centre population is quickly declining; the same applies to the number of job opportunities. As a result, we experience the transformation of formerly overpopulated inner parts and transition zones. Some parts of the city lose their function or become inhabited by groups of lower status. These groups occupy the emptied areas, and, consequently, social problems begin to occur. In the last twenty years, the power of globalisation has given rise to a stronger social polarization, which is mainly distinct in urban residential areas: they experience considerable social fragmentation and segregation. Sooner or later there will be no other option but to rehabilitate the living areas that have become redundant. In some places this process is so far advanced that some functionless areas have been grassed over or restored.

Fig. 5: Table illustrates high vulnerability of pedestrians (children, youngsters and elderly) in some european countries. Source: RNDr. Jan Tecl, CDV, Brno, 2010



8 Restoration of pedestrian friendly cities

Negative tendencies in many prognoses prevail. Individual car ownership still grows in Central Europe and building of transport infrastructure and huge transit related constructions follows. Social life is more atomised, city inhabitants still prefer privacy at home than intensive social life in streets. Leisure activities tend to be more passive, demanding less physical activities and movement. Physical shape of urban people is often deteriorating, because they move much less having sedentary professions, jobs and hobbies. Especially warning is fast deteriorating physical shape of young people as children physicians and military physicians say. Regular walking is from the point of view of positive influence on human body not possible to substitute. (children's physician MD. Pavel Stejskal, Czech republic) According his statement, the average distance made by Czech people by walking is about one or two kilometres every day. It is much less than previous generation did. About 80 years ago people when walking to work made about 15 kilometres distance. Low physical activity and unhealthy lifestyles resulting in high percentage of obesity with related illnesses in young age that shrink abilities to move. This is a vicious circle. These circumstances have been highlighted more frequently only in recent years, when suitable solutions have been searched on the worldwide scale particularly with regard to making especially the roads in towns safer and friendlier to pedestrians.

To stop dangerous tendencies many strategies were searched and designed. Their aim is to make cities liveable places again, restructure important activities, use sustainable transport modes and reverse the negative trends that endangered living conditions. According theory used they can be summed under common description urban redevelopment.

Urban redevelopment is closely linked to the world economy: some cities have evolved into special, positive situations and have become nodes of increased information flow and capital (which gave rise to the term "nodal urban development"). The new expansion of some city centres may be caused by the decline of traditional industries and the increased role of information processing and services. Another factor is the response of large cities to suburban de-development: restoring central parts, adopting legislative measures slowing suburban de-development, decreasing volume of transport (microelectrotechnics) and more even distribution of job opportunities in the city structure. An effort to make the cities attractive again is quite apparent; it is being done with the application of permanently sustainable development procedures; prevention and restriction of social exclusiveness; cooperation among managers, and new approaches to cooperation and mediation. Urban development has become a tool for making cities more attractive for business, investment, tourism, and for increasing real estate values in the highly competitive global market. This is demonstrated by a

renewal of the formal image of the cities, for example by restoring liveable public spaces, walkable street systems, urban avenues, embankments and squares for municipal celebrations; building new, and restoring old parks; or building shopping streets and green areas. This brings some groups of the population back to the cities (yuppies – young urban professional people). To make this trend sustainable, central urban parts are renovated to become attractive for light industry, business, tourism and walking. In newly restored inner parts of the cities, more solvent groups move to renovated houses, thus pushing lower classes out of that housing market (gentrification). Administration offices and businesses often replace habitable units. It is not always necessary to tear down older buildings; it is often possible to find new uses for old warehouses, breweries or assembly halls. These buildings, abandoned in the past by the middle class and businesses, are offered by prudent and enterprising administrations of some cities to attract companies and international capital to re-invest in these locations. The effort aims at the restoration of existing city centres with coherent urban regions, the reconfiguration of rapidly growing large city suburbs to communities with positive neighbouring relationships, and maintaining the natural environment and architectural legacy of past generations. This process is described in different ways: revitalization; gentrification; renewal - where the transformation is of the negative, “dead”, “poor” and “non-productive” environment into something positive: “live”, is emphasized; and the quality of the environment and the commercial price of land is increased in a costly manner; which results in situations where city centres adopt the apparent features of sub-urban administrative parks.

At the beginning of this 21st century, some places in Europe are experiencing the renaissance of cities. Urban developers, developers, local self-governments as well as citizens take great interest in the new urban development and its approaches; this particularly applies to the regions in which damage was incurred by an uncoordinated city growth during the last decades. Many consider the new urban development as the approach which will bring benefit to all involved; the city growth is channelled into such a physical form that suits the current city structure, does not increase requirements for the use of private cars, is less demanding in terms of finances for services, and saves land and natural resources. City centres were often considered bad and, therefore ignored and abandoned, have, after repeated waves of suburban development, again become the centres of vibrant life. The renewed cities have restricted individual car transport, supported and redeveloped public transport, walking and cycling, intermodal and ecological transport and have given preference to pedestrian comfort over cars (see Fig. 7). This was based on the fact that between 10 and 20 % of all car trips barely are walking distance there is considerable room for reducing ecologically disadvantageous car use and replacing it by walking. Important part of this is reduction of traffic accidents of pedestrians in cities. Pedestrians are very vulnerable cityscape users and liveability of public space is directly linked with traffic calming, pedestrianisation of streets and other measures protecting pedestrians. Some cities have made substantial achievement in this field (see Fig. 6).

We can see increased investments and economic movement, which instigate the growth of job opportunities in city pedestrianised centres. We are witnesses to the expansion of cultural facilities, innovation of retail, growth of urban tourism, and the consequent new image of some cities or their parts. New “urban” or “street” sports have been reinvented (for example street ball, skateboarding, jogging, roller skating), social, conference and entertainment complexes have been built. The demand for habitation has risen, which may result in increased population numbers. An important objective is to maintain a certain share of residential habitation in city centres to prevent the commuter phenomena that renders the city dead at night. Permanent inhabitants provide the feeling of occupancy, community, warmth and life; which is mainly felt at night when the streets are enhanced by the light from windows.

It is important that public opinion has also altered. The attitude toward cities is changing. The image of city centres is improving; they are being mentioned in a number of articles in the press and other mass media. Despite the burden of the heritage of the past; economic, social and cultural forces have arisen, and have united in the name of traditional city values and urban life. Scattered house building developments that promote ‘sub-urban sprawl’ are being criticized, and the disadvantages of suburban lifestyles are being discussed. This controversy includes the boredom and stereotypical aspects of suburban areas, and their negative impact on children and adolescents. There is often a saturated

demand for habitation in suburban areas and upon their commercial facilities. On the other hand, new job opportunities in urban locations have increased the purchasing power of urban populations. Demographic characteristics are changing and new types of family structure and ways of living are arising. More qualified and wealthier populations need diversity and stimulation, it searches for “the spirit of community” and the “the identity of place”. Environmental awareness is increasing as well as a protective approach to city values. The cities, thereby, re-attract people who wish to live and work in social atmospheres, or visit them for tourism or cultural reasons.

The generalized findings of individual cases of successful urban re-development show that the ideal would be to have a compact city with the sustainable multimodal mobility that protects the living environment. Such a city would not only be able to stop the drain of people from it; but might even increase the population. This would have positive consequences on social diversity, protection of land resources, concentration and optimisation of urban services, possibilities for the building of intra-city optimised transport routes, and the construction of cycling routes and pedestrian zones. The use of high quality city public transport would increase. It has been proven that the intra-city passenger transport by personal auto can be limited by the introduction of effective multimodal transport; and can decrease the volume of private transport by up to 20-30%. Walking is of course advantageous from an ecological point of view; it produces no ex-hausts and little noise. Compact urban structures and mobility that protects the environment will also result in a higher economic effectiveness by making the city centres more attractive; and lower the cost of infrastructure and public transport routes.

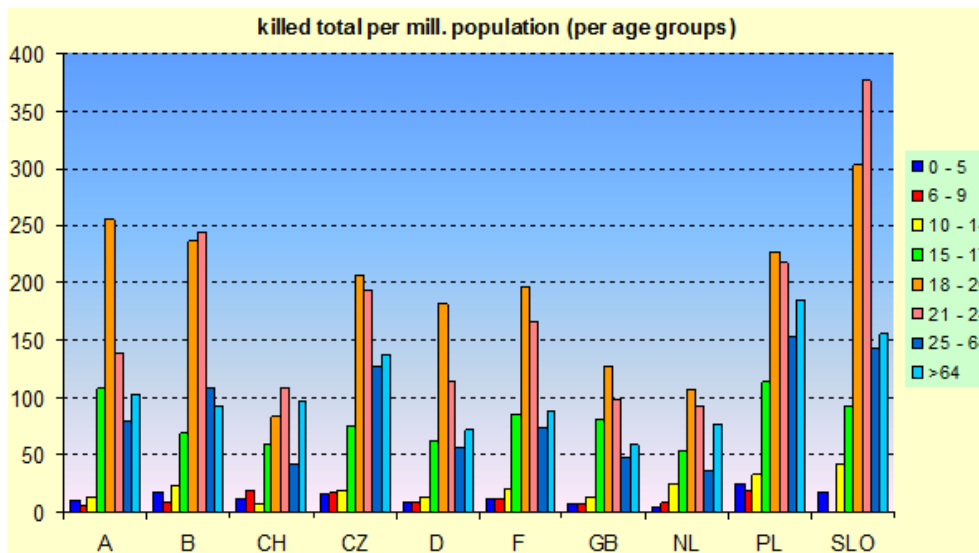
9 Changes that affect walking

The initial demographic assumptions are critical: Czech demographic changes in the last decade have led transport planners, architects, urban planners, and politicians to reconsider the concept of city space adequate to the period and the changed condition. Some user-groups continue to increase, which impacts the architectural creativity of residential spaces. One group is fast ageing population. Every year, Europeans spend over 500 billion Euros for transport. Losses caused by delays and incidents are estimated at 150 milliard ECU a year. New solutions are therefore sought that would enable the reduction of the high incident rate, traffic congestions and air pollution. The only solution for the future will probably be a more consistent, more flexible and more effective traffic management using intelligent traffic systems. (MOLLENKOPF, H. 2005)

This will, of course, affect the needs of inhabitants related to urban space and its conditions for sojourn and walkability. Many older people make their journeys by walking. European policy regarding the elderly aims at maintaining their mobility. This is a central element of their integration in society. Senior citizens want to stay autonomous and independent as far as possible. Without the possibility to maintain mobility, senior citizens cannot lead an independent life, with many other problems, such as isolation and health problems as a consequence. However, pedestrian casualty rates are much higher among people over 60 compared with younger adults, and fatalities of people aged 75 and over account for a quarter of all pedestrian fatalities (see Fig. 5). Although walking and cycling are recommended to older people as the best way to keep fit and healthy, the safety and security conditions are often difficult for older persons.

Results of our research confirm our statement that walking is the most important transport mode. Many investigations point out the subjective view of elderly road users, focussing on the importance of social relations and social behaviour in the public areas. There are plenty of suggestions and ideas of older people concerning the improvement of public spaces, streets, walking and cycling paths and their connections to other means of transportation.

Fig. 6: Table illustrates the achievement of respective countries according pro-pedestrian policy and restructurisation of urban spaces. Source: RNDr. Jan Tecl, Brno, CDV, Czech Republic



10 Recommendations How to create pedestrians friendly city

10.1 Related to Urban Planning and Design

The pedestrianisation of European historic city centres started and in Venice, at the 1st International Making Cities Liveable Conference in 1985, walkability as one prerequisite of liveable city was named. Nowadays, walkability is a principal concept in sustainable urban planning and design. All over the world professionals try to design cities, neighbourhoods and places not around cars but for people. There are three arguments that maintain the importance of walkability. The economic one says that in a walking city inhabitants spend less money on transportation and invest more on housing and local recreational opportunity etc. People want to be there. Human friendly urban spaces represent a new lifestyle and allow education, commerce and tourism to develop. The environmental impact of walkability is evident if we compare the carbon mapping of dense walking centres and suburbs. Nevertheless, the walking environment has a great impact on society, social cohesion seems stronger, and the city is for everyone: children, the elderly and low income people can also use it. At the same time, walking works against inactivity which is a real factor of the American and European healthcare and mental caused by obesity.

Walking, as pedestrian transportation became the main topic of multidisciplinary urban studies, projects and policies. To encourage walking the built environment must be adapted to the needs of users, of which the feeling of security is one of the most important. In every walkability measurement the safety is present. For example, the Walkonomics rating system combines eight factors: road safety and ease of crossing in relation to the transport, sidewalk quality, smart solution and attractiveness as a design and maintenance question, hilliness according to accessibility, navigation by signalisation, fun and relaxing functions, and last but not least the fear of crime is measured by crime statistics, the presence of police, lighting and the signs of vandalism. The Walk Score, a successful company that provides a numerical walkability index in the US, Canada and Australia for “live where you love”, plays an important role in the real estate market. Data are available about walking, transit, biking, travel time, public transport, car and bike sharing in the neighbourhood, points of interest and people friendliness. However, making cities socially and physically safe is one of the most important fundamentals of walkability, likeability, liveability and sustainability.

10.2 City for Pedestrians - General principles

- Walking is the most elementary human movement.
- To provide for pedestrian access to and clear routes across all parts of the city, network set up.
- To assert comfortable routes both from the technical parameters point of view and with regard to user friendliness of the proposed solutions

- To give preference to single level crossings inside the city with application of modern safety and calming down elements. Even though single level crossings reduce automobile traffic fluency they provide to pedestrians the needed user comfort and safety if designed correctly
- Multilevel crossings should be designed to minimise loss drops and provide for facilities for persons with reduced mobility and orientation

10.3 System Approach

System design of pedestrian routes

- To provide for comfortable foot connections of all city quarters to the city centre
- To provide for foot connections between the individual residential and other urban areas of the city
- To provide for foot connections to the city outskirts with facilities for rest and recreations of the citizens
- To provide for foot connections to the surrounding municipalities on demand

10.4 Safety

Conditions for safe pedestrian movement

- To assert application of modern elements of traffic calming down, such as raised pedestrian crossings, slow-down islands, elements for reduction of passage speed etc. Traffic professionals exercise long-term efforts at introduction of modern traffic calming down and traffic safety elements to practice
- To provide for location of pedestrian crossings to natural pedestrian routes the most inconvenient way from the pedestrian safety point of view is the current practice of placement of pedestrian crossings in the crossroads off the adjacent pavement line. The pedestrians then continue along their natural routes, cross the street off the crossing situated behind the block corner and thus the inconveniently situated crossings do not add to pedestrian safety, rather making the situation even worse
- To provide for protected pedestrian crossings on access routes to schools and healthcare institutions
- To prefer separation of foot and cycling paths rather than to build joint pedestrian/cycling paths

10.5 Technical Standard

Conditions of technical standard of pedestrian routes

- To provide for conditions for use of public foot areas pursuant to Decree no 369/2001 Coll., of the Ministry for Regional Development on general technical requirements for use of buildings by persons with restricted mobility and orientation
- The condition of wheelchair access is one of the basic requirements for public spaces. Some important areas in the city centres still wait for implementation of this requirement.
- To provide for conditions for use of public buildings pursuant to Decree no 139/2001 Coll., of the Ministry for Regional Development on general technical requirements for use of buildings by persons with restricted mobility and orientation
- To provide for conditions for use of city transport stops pursuant to Decree no 139/2001 Coll., of the Ministry for Regional Development on general technical requirements for use of buildings by persons with restricted mobility and orientation; to resolve shortening and improvement of transfer routes in the changing nodes
- By preventive and consequent actions to create conditions for quality of foot traffic along pavements and other public areas not to be negatively affected by objects forming obstacles to

pedestrian movement. In addition to mobile obstacles, often permanently placed on the pavement, though, there are fixed objects in the form of pillars, switchboard and fuse boxes and other technological equipment

10.6 Pleasant Feel

Usability and aesthetic quality of pedestrian areas

- To support development of foot traffic by emphasis on aesthetic quality of foot paths
- To support development of foot traffic by equipment of foot paths, foot areas, squares and parks with suitable street contents

Conveniently placed, aesthetically well designed and functional benches represent the most frequently used street contents

- To support development of foot traffic by equipment of foot paths and areas with greenery, especially shading

The shadow of the trees planted along foot paths creates pleasant environment attracting people to walks in the street

- To develop residential function of the current urban space and parks by intense maintenance or reconstruction of the urban areas; with the aim to increase their usability value for short-term recreation

The development of residential function of public areas not only pleasantly enlivens the urban environment for also favourable affects increase of intensity of foot traffic.

Fig. 7: Table illustrates the remodeling of street space in Brno for pedestrians, example of pro-pedestrian policy and restructuring of urban spaces. Source: Architect G. Kopacik, Brno, FA VUT, Czech Republic



11 Conclusion

The experience with traffic control and planning the development of towns has demonstrated that supporting walking as a transport mode and ensuring harmony between traffic and town infrastructure presents one of the most serious problems of contemporary communal policy. This problem involves two levels of treatment. On the social level it is a question of the social, economic and cultural problems in the processes of town planning; it is of the possibility to control these processes, and in this way orchestrate the restructuring, remodelling and sometimes growth of towns. Furthermore, it

is a question of value orientation of the society in its approach to economic development, to the protection and creation of the living environment, and to the development of sustainable traffic modes. At the level of operational and developmental control of the town it is then a question of selecting the optimum sustainable multimodal traffic system, of ensuring the pedestrian and traffic safety, and of removing or minimalizing the negative influences of traffic on the urban environment by support of non-motorised traffic modes. This is especially possible with regard to ensuring the harmony between the town structure and the traffic network including pedestrian pathways, and in maintaining a balance between an organized operational exploitation, and the determination and development of an acceptable level of urban growth in a given area.

The basic requirement for a purposeful planning process is the understanding of the multi-layered mechanism of urban transport, pedestrians' users' needs and their effects on the urban structure and urban environment. Over the last few decades, basic research has gained a better understanding of the regularities and cause/effect relationships regarding mobility, urban development and transport. Of particular interest are the complex, dynamic, and time lag determined connections between sustainable traffic, land-use, urban planning, and their effect upon environment.

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