

Verkehr und Umwelt
Wechselwirkungen Schweiz - Europa
Nationales Forschungsprogramm 41

Transport et environnement
Interactions Suisse - Europe
Programme national de recherche 41

Transport and Environment
Interactions Switzerland/Europe
National Research Programme 41

Bericht/Project A9

Netzwerk Langsamverkehr (Hg.)
Réseau piétons-vélos (éd.)

Pedestrian and cycle traffic

**Standard of knowledge, measures and potentials
towards a reorientation of transport politics**

Die Zukunft gehört dem Fussgänger- und Veloverkehr

**Stand des Wissens - Massnahmen - Potentiale
- Schritte zu einer verkehrspolitischen Neuausrichtung**

Pedestrian and cycle traffic

(Die Zukunft gehört dem Fussgänger- und Veloverkehr)

Project A9 of the
National Research Programme (NRP) 41
'Transport and Environment'

Author:

Netzwerk Langsamverkehr (Publisher)

(Network Pedestrian and cycle traffic)

Ulrich Seewer

Bundesamt für Raumentwicklung (ARE)

Bundeshaus Nord

CH-3003 Bern

phone: +41 31 322 55 66, fax: +41 31 322 78 06

e-mail: ulrich.seewer@gs-uvek.admin.ch

Publisher:

National Research Programm NRP 41:

Transport and Environment

Bern, 2000

Summary

About the Project

The project, entitled „Strategies for the promotion of pedestrian and cycle traffic – obstacles to implementation“, was facilitated by the Swiss National Fund within the NFP 41 framework „Traffic and the Environment“. Additional support was provided by the Federal Office for Public Health, the Federal Office for Education and Science within the COST programme, and by the Federal Office for Environment, Forests and Countryside.

Various researchers from universities and private organisations contributed their expertise in answering the questions presented about „slow“ moving traffic. The importance of pedestrian and cycle traffic, its advantages and related problems, the scope for action and obstacles, were discussed mainly on the basis of existing literature. This *state-of-the-art* report reflects current research results, and develops effective actions and guidance for overcoming existing obstacles on the basis of known measures to exploit all potential solutions. Additionally, a major emphasis was placed on implementation. Shortcomings in research were established, and the results are intended to be both practical and scientific.

The research report firstly examines the importance of pedestrian and cycle traffic by means of existing statistics, and demonstrates gaps in statistical studies. The report continues with firm proposals for action for traffic planning in favour of cycle traffic. The following two chapters examine more closely the situation of children, elderly people and women. These groups are especially reliant on an environment favouring pedestrian and cycle traffic. The promotion of pedestrian and cycle traffic offers great potential. Two studies calculate possible savings through regional planning for the effective restriction of widely dispersed settlements. The report then estimates the energy-saving and environmental benefit provided by the opportunity for increased pedestrian and cycle traffic, and illustrates the health benefit offered by promoting pedestrian and cycle traffic. Finally, the report discusses the economic benefits as arguments in favour of the promotion of pedestrian and cycle traffic. As the research of benefits still contains large gaps, many statements can only be based on estimates. Land use and urban development planning present an important means for the promotion of pedestrian and cycle traffic, and can create preconditions for urban and traffic planning based on environmentally-friendly transportation. A further chapter discusses the numerous obstacles preventing political decisions in favour of pedestrian and cycle traffic. The final synthesis demonstrates why pedestrian and cycle traffic should be promoted within the programme „Pedestrian and Cycle Traffic 2000plus“. The report concludes with a summary of gaps in research.

The lectures presenting the research results at the Lausanne conference on 6 November 1998 are summarised in a separate volume.

Problems with counting feet and wheels

Almost everybody travels on foot virtually every day. No other means of transport has so many potential and actual users. Although Switzerland has more cycles than cars, less information exists about pedestrian and cycle traffic than about motorised individual traffic or public transport. The data presented here, however, points out the eminent importance of pedestrian and cycle traffic for the entire transportation scenario.

Pedestrian and cycle traffic statistics have long been neglected. Whenever data on pedestrian and cycle traffic has been gathered its importance has been systematically underestimated in most cases. This is partly because polls were/are carried out during the winter months (census) resulting in a concentration on commuter statistics, and partly because only whole journeys or trips were recorded instead of stages, as during the micro census on traffic behaviour up to 1989.

Since the stage concept was introduced during the micro census of 1994, more reliable data on walking and cycling have become available. According to this, over a period of six years more than 50 per cent of all Swiss journeys were unmotorised: 43 per cent on foot and 7 per cent by cycle. Pedestrian traffic is highest in fields such as shopping and education (over 50 per cent), and lowest in business traffic. Cycle traffic reaches 18 per cent (education) and 3 per cent (business) respectively. The average journey distance travelled on foot is 0.8km, and 3.0km cycled. The average daily distance per head of population is 1.5km on foot and 0.9km cycled. Almost one third of all pedestrian and cycle journeys are longer than 500 metres or 2km respectively. Four per cent of distances are covered on foot and 3 per cent by cycle. After the reaching a low of 210 cycles per 1,000 capita in 1970, a new peak was reached in 1996 with 520 cycles per 1,000 capita, with large differences between regions: the German-speaking part of Switzerland has twice as many cycles per capita than in the French and Italian regions. The percentage of cycles per capita in Switzerland is near the international average.

There are many reasons for the lack of data in statistical publications in relation to pedestrian and cycle traffic. At best, data is available but has not been analysed. Actual gaps exist where no specific data on pedestrian and cycle traffic was gathered or where research objectives were not adequately formulated. The most important areas showing insufficient data are - the network of cycling routes, the availability of cycle parking, the structure of the cycle fleet and specific travelling performance, proportion of households whose members can reach the most important targets on foot or by cycle, the costs and financing of pedestrian and cycle traffic.

Actions on the road

It is vital to integrate pedestrian and cycle traffic into a strategy for sustainable transport. Both means of transport suffer from the dominating and, in some areas, still increasing motorised traffic. The high speeds of motorised vehicles jeopardise the safety of all participants in traffic. Transport facilities are unattractive and uncomfortable for pedestrians and cyclists, and diversions and obstacles are commonplace. The scope of action for pedestrians is restricted by the lack of personal safety, and cyclists are reluctant to use valuable cycles because of the risk of theft. The image of cycling has been improved by the mountain-bike, but neither cyclists nor pedestrians are recognised as traffic participants in their own rights.

Actions for the promotion of pedestrian and cycle traffic need to build on overall concepts. Approaches for such concepts provide notions such as the city with slow-moving traffic, or the pedestrian and cycle friendly city. Important elements in this context are, among others, consistent public relations campaigns in connection with pilot projects to evaluate and implement new measures or strategies. Efficient promotion of pedestrian and cycle traffic will, however, always depend on numerous unspectacular and individual actions for improvement of the transport network and infrastructure facilities. These include an increase in the quality and density of the road network. Safety, attractiveness, and comfort need to be addressed. Key points are junctions and crossroads. Central factors are - efficient action for the slowing-down of traffic over wide areas; attractive layouts of public areas; and the provision of sufficient and well-equipped parking facilities for cycles. Finally, interchanges with other means of transport need to be improved. In addition to attractive access to bus and tram stops, cycle traffic could especially benefit from a range of services offered. Furthermore, action is required in the fields of technology and service, and for the development of an institutional and financial framework.

Children

During the 1980s, the strong increase of traffic volumes and high travelling speeds pushed children off the streets. In particular, the previously common habit of Swiss children playing in less busy streets has now become almost impossible. About 30 per cent of Swiss children aged 5 can only play in the streets near their homes if they are supervised. The situation in rural areas is hardly any better than in urban environments. Public playgrounds for younger children are arguably no substitute for the lack of playing facilities near their homes.

This scenario is not reflected by official statistics. Apparently, they assume that it goes without saying that children can no longer play in the streets. Statistics do not reflect the reduction of playing facilities – on the contrary, the decrease of accidents involving

children over recent decades has been registered as a success and a result of political and educational measures. The decrease is not attributed to the fact that there are now fewer children playing on the streets than before. Most investigations of traffic accidents involving children assume a priori that the child in question is the guilty party.

These social conditions are informed by more recent findings that the loss of playing facilities in residential areas has grave consequences for younger children, and are responsible for the social isolation of children in urban and rural residential areas. Studies of a group of children have demonstrated that growing up to the age of 5 in a residential area with no facilities for unsupervised playing can cause significant shortcomings in mobility and social development. These children also tend to be less independent.

The actions to be taken are obvious - a speed limit of 30km/hr (18m/hr) in built-up areas would allow children to visit their friends in the neighbourhood. Children would be safer on their way to kindergarten or school. Walking-pace speed limits, or the banning of traffic in residential areas, would allow play in the streets. These spaces are crucial if we want to provide our children with an environment for healthy development and gradual integration in our society.

Women and elderly people

Women, in comparison with men, show different mobility behaviour because of their differing needs for mobility and, consequently, for different transport systems. Fewer women than men have a driving licence or a car of their own, they utilise public transport more frequently and they cycle and walk more often. This proportion increases with age. Women tend to have a more complex travelling pattern because they often combine travelling to and from work with service travelling for themselves and others.

For women, travelling takes longer and is more complex as a result of mixed travel patterns. Women are affected in their mobility especially if children and elderly people cannot move independently in public areas, or if insufficient traffic planning disrupts their social contacts. For this reason, service travelling has increased by 60 per cent since 1969.

Women-friendly traffic planning includes the increase of personal safety in public areas, i.e. the reduction of accident risks for children, elderly people and women, a reduction of emissions, and the avoidance of molestation. It also includes a utility mix in built-up areas, the reduction of obstacles, and adequate timetables for public transport.

Elderly people represent a highly disparate group. Their walking speeds, and therefore their action radius, decrease with age. Women, in particular, are affected in achieving

their activities as they get older and more insecure in public areas. Elderly people are especially affected by the consequences of motorised traffic.

The most important social and health consequences of traffic are probably fear, stress, noise and air pollution, and social de-mixing. Mental well being, and its effects on health, could be a key problem in utilising public areas. As far as costs are concerned, only a series of possible criteria resulting from mobility problems can be listed.

The opportunities for women and elderly people to participate in traffic and regional planning should be improved, and analyses of shortcomings should be prepared with the following interdisciplinary approach. Traffic and regional planning, together with medical research, needs to investigate the total unpaid labour, including the associated travelling and financial expenditures, for the maintenance of a social infrastructure. Today's statistics lack data on the travelling of women and elderly people, and their importance for traffic research and planning.

Mobility costs and residential structures – a case study

Multiple and increasing demands for mobility in a complex and diversified society can be satisfied in a variety of different ways according to residential structures. While many journeys within compact settlements can be made through the „environmental network“ (pedestrian and cycle traffic, possibly in combination with public transport), dispersed settlement structures necessitate the utilisation of motorised individual transport. Apart from various external factors, this requires a range of development costs for network operators and users.

The project, „Development Costs“, reflects the connections between residential structure and scale of development costs (network costs and mobility costs). This demonstrates the savings potential of compact residential areas in comparison with dispersed settlements, and provides the basis for discussions and decisions about „Switzerland as a Planning Region“.

The research discussed the development costs of two case studies - a community on the edge of the settlement cluster of St. Gallen (Häggenschwil), and a district within the city of St. Gallen. Besides the network costs, the mobility costs for „work“ as the basic living function, i.e. commuter mobility, are shown. The result is a cost difference of approx. SFr 5,000 per capita per year.

Given the assumption that the remaining basic living functions would result in similar cost differences, and given the simplified assumption that in Switzerland about 2 million

people live in residential areas comparable to the case study of Häggenschwil, or generating even higher costs for commuter mobility - the savings potential through more efficient regional planning, for individual mobility alone, could amount to ca. SFr 10 billion per annum. Such an increase in efficiency of at least 3 per cent of the gross national product would undoubtedly be an interesting aspect of regional planning and national economy that would deserve much more attention in the future.

Opportunities: Alternative transport, Energy saving, Environmental protection, Health

A comparison of European countries and cities shows that the proportions of pedestrian and cycle traffic can vary significantly. The proportion of pedestrian traffic in various Swiss cities, for instance, varies between 15 and 30 per cent, and the proportion of cycle traffic between 7 and 25 per cent (number of trips). This comparison of modal splits points to unexploited opportunity. European studies show achievable increase of 30 to 100 per cent for cycle traffic (number of trips), depending on actions planned, on the time span, and on measures planned for other means of transport. It would also be possible to increase the travelling performance (number of kilometres/miles travelled) even in countries such as the Netherlands with their traditionally very high proportion of cycles. Because of the lack of research, the potential for Switzerland can only be estimated roughly. For urban areas, the authors estimate a potential of 20 per cent for pedestrian traffic and 40 per cent for cycle traffic if major plans are implemented for these means of transport, within a time span of about 10 years (s. figure 1: future I, potential I). If additional restrictive measures for individual motorised vehicles, and for combinations with public transport, were realised, we would estimate a potential of up to 40 per cent for pedestrian traffic and up to 200 per cent for cycle traffic, based on a time span of 20 years (s. figure 1: future II, potential II).

Means of transport	Present	Future I	Potential I	Future II	Potential II
Walking	25%	30%	20%	35%	40%
Cycle	10%	15%	50%	20%	200%
Public transport	15%	15%	0%	20%	30%
Individual motorised vehicles	50%	40%	-20%	25%	-50%
Total	100%	100%		100%	

Figure 1: Opportunity for increased pedestrian and cycle traffic: modal split, number of trips (source: own presentation)

Experience from various European countries shows that measures need to be taken on all levels in order to realise the potential of pedestrian and cycle traffic - action on the roads in favour of pedestrian and cycle traffic; action „in the minds“; measures for the restriction of individual motorised vehicles; and regional planning in order to shorten journey distances.

The potentially realistic benefits in terms of energy and the environment (air pollution, noise, and land usage) are very significant. Pedestrian and cycle traffic offers the advantage of replacing short journeys otherwise travelled by individual motorised vehicles. The gain in residential and living quality would also be significant if these opportunities could be realised. The health benefit is very high for persons travelling short distances daily on foot or by cycle. In addition, savings in the health sector could be achieved if hospitalisation costs could be reduced through the development of more pedestrian and cycle-friendly residential areas.

Firm research findings are unavailable for Switzerland in relation to the realistic opportunity for increased pedestrian and cycle traffic, and in particular the potential benefits for energy, environmental, health and economic factors.

The Economic Opportunity

Considerable opportunities in relation to transportation costs could be realised through a shift of individual motorised traffic to pedestrian and cycle traffic (s. figure 2) for the following reasons:

- Fewer costly infrastructure facilities.
- Lower capital and operating costs for more cost-efficient vehicles.
- Only human energy is used, without damage to the environment.
- Health improvements through increased physical exercise.
- Reduction of land use.

Opportunities are not clearly favourable only in the domains of „consequential costs of accidents“ and „time spent in traffic“ – but the results depend on the measures adopted to promote walking and cycling.

The opportunity for pedestrian and cycle traffic in relation to Gross National Product and employment are smaller than for transport costs. The following results could be expected from a partial modal split in favour of pedestrian and cycle traffic:

- Savings in transport costs.
- These savings can be spent in other sectors.
- Imports in the automotive sector are larger than average. A reduction would have positive effects on the Gross National Product, especially in Switzerland where no automobiles are produced.

- The automotive sector is less labour-intensive than average. Employment figures would increase by more than the Gross National Product. This may not necessarily be the case in Switzerland where the automotive industry is focused on the more labour-intensive maintenance and repair sectors.

Cost category	Shifting individual motorised traffic to eco-mobility (walking, cycling and public transport)		Shifting individual motorised traffic to pedestrian and cycle traffic	
	Monetary	Non-monetary	Monetary	Non-monetary
Infrastructure	---		?	
Vehicles and their maintenance	?		++	
Health services	+++		++	
Police and law	+		+	
Damage to buildings	++		+	
Loss of production	++		+	
Land usage		?		+
Impact on environment and countryside		++		+
Consequential cost of accidents		++		+
Time spent in traffic		?		?
Restrictions of mobility		+		+
Economic reduction potential:	+++ high	++ medium	+	little
---	increased additional costs	?	effects dependent on action plans	

Figure 2: Transport costs – reduction opportunity (source: own presentation)

In comparison with individual motorised vehicles, pedestrian and cycle traffic in combination with public transport offers proven advantages in transport costs and macro-economy. No calculations are available for Switzerland to demonstrate the impact of modal splits on value added and employment.

Urban development based on eco-mobility¹

Land use and urban development planning are key elements for the promotion of pedestrian and cycle traffic. These key elements determine the location of residential and working areas, of leisure and shopping facilities, and determine therefore the distance of journeys and the choice of transportation means.

Statistics show that daily transport in urban sprawl is longer, and the proportion of car traffic is higher, than in high-density urban areas where journeys are short and the

¹ walking, cycling and public transport

majority of them can be made on foot, by cycle, or by public transport. In such infrastructures, people without cars can reach their targets without difficulty, but cars can also get almost anywhere. In dispersed settlements the residents depend on their cars. People without cars are severely restricted in their movements. Air and land pollution, noise, land consumption and impermeability of soils as well as land contamination, destruction of micro-climates and landscapes, separation of residential areas and division of biotopes are further negative consequences of a development focused on individual traffic.

Public authorities realised as early as the 1960s that such development should not continue in this way. The spreading of settlements, however, could not be stopped in the following years. For investors, it continues to be more rewarding to build on green-field sites than to increase density by in-fill of existing residential areas and to recycle brown-field sites.

Therefore, land use planning must intensify efforts, and utilise the existing legal framework for action that not all Cantons can, or want to, exploit to the full. Some Cantons, such as Berne, implement the existing instruments consistently. However, the Swiss law on land use and urban planning does not provide binding guidelines on urban development at a national level.

The role of land use planning cannot be increased without the expression of a public concern. Interestingly, land use planning is currently hardly a burning issue with the public, although everybody is affected by it on a daily basis. This could be explained by the lack of large, important projects. The report „Guidelines for Switzerland as a Planning Region“ (Grundzüge der Raumordnung Schweiz/Rapport sur les Grandes lignes de l’organisation du territoire suisse), passed by the Federal Government in 1996, could form the basis for such a project. The last public discussion on land use and urban planning took place in the mid-70s when a referendum was held on this subject. Since the rejection of the referendum, all has gone quiet. A revision of the land use planning law, and the necessary discussions on this subject, could be the occasion to set up the essential new public debate.

Overcoming institutional obstacles

Numerous institutional obstacles obstruct a more pedestrian and cycle-friendly traffic policy:

- Terminology and definitions of traffic remain orientated towards motorised traffic and cause, in combination with the lack of data, a neglect of pedestrian and cycle traffic in decisions on traffic planning.

- In general, long-distance traffic is overvalued, and pedestrian and cycle traffic is undervalued. There is a far smaller proportion of longer distance journeys than is generally assumed. The major proportion of daily mobility travel takes place over short and regional distances, and is frequently on foot or cycle.
- Transport policy and investments are focused on long-distance travel. As this type of transport policy ties up large funds, less money is available for important safety measures for pedestrian and cycle traffic.
- No mechanisms are available to fund pedestrian and cyclist infrastructure and to recover the costs from motorised traffic which creates the need for essential safety measures.
- Pedestrian and cyclist concerns are only minimally institutionalised in government and administrative bodies at all political levels. There is also inadequate consideration of both means of transport in education and research.
- The focus of the present transportation laws and road construction standards on motorised traffic presents a continuing obstacle for traffic regulations or construction plans in favour of pedestrian and cycle traffic.
- The Federal Government level does not consider itself responsible for pedestrian and cycle traffic and at lower, local, levels the financial and legal scope for action is limited.
- Organisation of pedestrians and cyclists is limited in comparison with other traffic participants, with the result that their interests are inadequately represented in politics, in administration, and in the public domain.

Synthesis: A future for noiseless mobility

Four factors argue for the promotion of pedestrian and cycle traffic:

- The promotion of pedestrian and cycle traffic offers significant opportunities: alternative transport, energy savings, protection of the environment, economic and health benefits.
- Many efficient measures for the promotion of pedestrian and cycle traffic are available and awaiting implementation.
- Land use and urban planning provide key instruments to secure or reintroduce settlement structures orientated at pedestrian and cycle traffic.
- The promotion of pedestrian and cycle traffic would especially benefit children, women, and elderly people.

On the other hand, there are many reasons and obstacles preventing or hindering adequate promotion of pedestrian and cycle traffic:

- Biased recognition of everyday mobility and traffic problems.
- Lack of funding mechanisms that are available to other traffic participants.
- Insufficient institutionalisation of pedestrian and cyclist concerns in government bodies.
- Inadequate distribution of tasks and responsibilities between different political levels.

Intensive promotion of pedestrian and cycle traffic is crucial for a sustainable transport policy that is only possible within the framework of a federal government programme. For Switzerland, a programme to be called „Pedestrian and Cycle Traffic 2000plus“ is suggested, which could also be applied to other countries. Such a programme would involve – under the guidance of one main office for pedestrian and cycle traffic – several federal offices responsible for interest groups and other government levels, affecting a variety of political sectors and responsibilities. A further element of the programme is the creation of awareness of the issues of pedestrian and cycle traffic, in combination with specific proposals for action.

Research in the area of pedestrian and cycle traffic can only become institutionalised if sufficient resources are made available to close the many research gaps in basic data, possible action, and strategy options.