

## **Cycling to School – School Travel Planning in the City of Dresden (UrBike-Framework)**

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Cycling to School – School Travel Planning in the City of Dresden  
(UrBike-Framework)

*Abstract*

*The city of Dresden participates in the European project “UrBike – maximizing the urban integration of bicycles”. One objective of the Dresden approach to this topic is to increase the use of bicycles on the way to school.*

*For pupils, cycling means freedom and independence from transport servicing through parents. The bicycle can provide fast and easy access to daily activities including school. Nevertheless, an important reason for not using the bicycle on these routes are safety considerations especially from the parents.*

*Looking at quality and safety on the bicycle connections to school, the “Cycling to School” project in Dresden is encouraging children of secondary schools to deal with cycling topics. The educational concept involves development of cycling school travel plans (CSTP) through pupils on their own. A project group containing representatives of the transportation department, road construction department, police, NGO's and university is supporting pupils and teachers on this demanding task. Guiding manuals for pupils as well as for teachers are provided. Basic elements for the development of bicycle school travel plans are surveys amongst schoolmates, accident data analysis, on-site investigations and traffic surveys. The draft version is to be revised and approved by the traffic authority.*

*The plans will show suggested bicycle travel routes and dangerous spots. They demonstrate that safety is taken seriously. Pupil's suggestions for improving bicycle conditions are given a high priority by the responsible authorities.*

*The described program should be part of an overall concept extracting the viewpoint from pure children's road safety training towards mobility education. This stimulates basic abilities to break off habitualised travel behaviour allowing an intelligent and responsible choice of travel mode. Future tasks will also deal with better implementation of mobility education like the “Cycling to School” project into traditional patterns of curricula in schools.*

## 1. INTRODUCTION

The city of Dresden participates in the European project “UrBike – Maximizing the Urban Integration of Bicycles”. In the project the 9 European cities Sevilla (Spain), Florence (Italy), Frederiksberg (Denmark), Dresden (Germany), Tallinn (Estonia), Budapest (Hungary), Kielce (Poland), Xanthi (Greece), and Mesa Yitonia (Cyprus) cooperate to share experiences in developing strategies to promote bicycle use. The common challenge is to keep cities accessible for everybody. Considering the advantages of the bicycles, their promotion is one efficient way to fight urban traffic problems. Consequently, the UrBike project tackles a contemporary question: How to get more people using their bikes instead of cars? This is not only an environmental issue, but also an economic one as well. Public costs of car use - like health costs, space costs for public parking but also reduced value of city quarters due to noise and air pollution - cut a big hole to city budget.

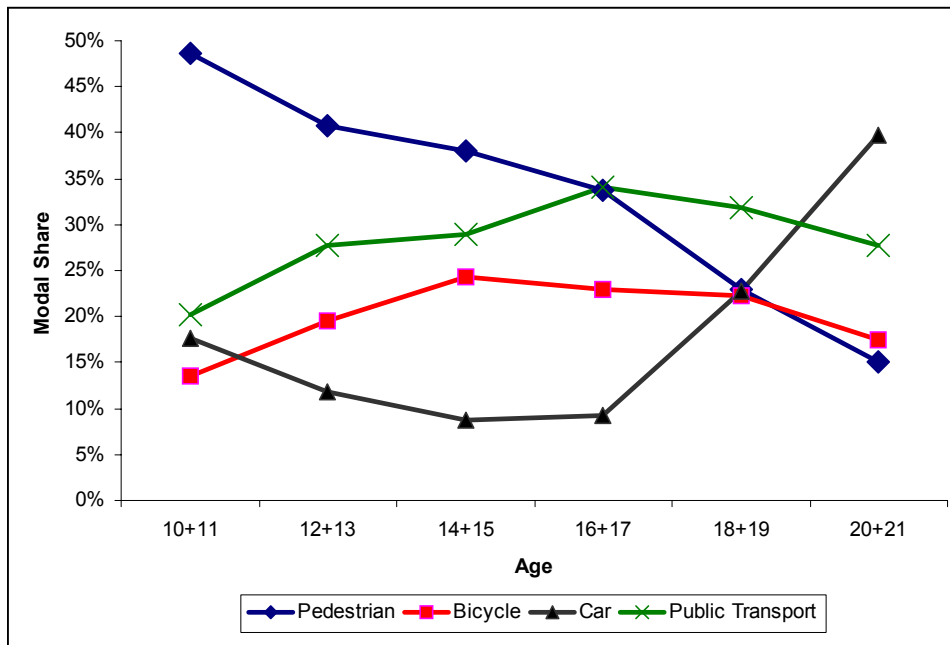
Each of the 9 cities has found its own specific approach for improving the urban integration of bicycles. Dresden strategy concentrates on soft measures for promoting bicycle use. An important feature involves integration of all social actors on cycling round tables. This is to establish a network of local authorities, companies and associations to make cycling more attractive and improve conditions for bicycle use. One of the three working fields specifically chosen is the bicycle use on the way to school. This paper will describe the idea and realisation of the “Cycling to School” subproject within the UrBike framework in Dresden.

## 2. SCIENTIFIC BACKGROUND

Starting cycle promotion means to tackle the “chicken-and-egg” problem. A bicycle friendly environment will influence people to consider the bike option for their daily trips. But only the force of a great number of bicycle users will be able to create and improve a bicycle friendly environment. This happens for example through local actions, petitions, media presence, and most notably, through, simple presence of bicycles on the streets. Who can imagine better advertisement than cyclists enjoying their bike ride on daily trips and telling their families, classmates or colleagues about their experiences? In that context, really effective cycle promotion has to aim for initialising a long-lasting and self-energising process: convincing people of the advantages of bicycle riding so they will act for their cycling interests in the future. The question is, where and how to start promotion in order to achieve best results for a bicycle friendly environment.

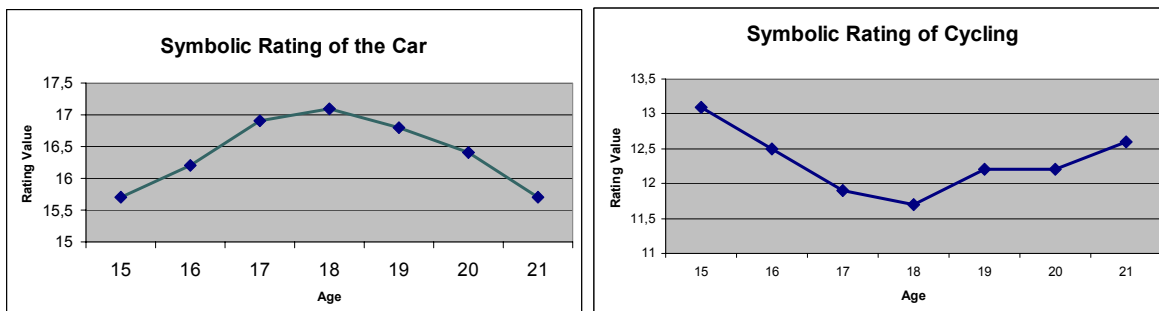
Habits play an important role in travel mode choice. Rethinking and changing travel behaviour for daily trips is much more complicated than maintaining the actual status. Hence it is self-evident to look at the group with the highest bicycle use in Germany: pupils between 10 and 18 years in age. Children are the “natural” users of environmentally sound transport modes like cycling. For independent mobility they are enforced to walk, cycle or use public transport. If we can maintain the positive emotions and experiences through adolescence, this can yield to a more conscious, intelligent, and responsible choice of transport mode during the whole life. On a long-term basis, it might include choice of housing location and possibly workplace as well.

Figure 1 shows the modal share for trips to school and other educational institutions versus age. The data is based on the transportation behaviour survey ‘Mobility in Cities – SrV 2003’ for East German cities. With increasing age, pupils become less dependent on the parents car transport service. The bicycle stands for new freedom and independence in a positive context. Cycling can provide easy and fast access to daily activities including school. But due to safety considerations, many pupils do not get permission of their parents to go to school by bicycle. This is quite understandable. In addition to the lack of experience, particularly young pupils up to 14 years of age still have concentration difficulties in complex traffic situations. Apparent efforts to improve safety on bicycle routes to school can help young cyclists and convince parents to permit bicycle use their children.



**Figure 1: Modal Share by Age, Trip Purpose Education, East German Cities, Source: (SrV 2003)**

The age of the possible driving licence (18 years) represents an overthrow in travel behaviour. While car use explodes, the share of all other travel modes decreases. One important reason seems to be the changing attitude towards other travel alternatives. Figure 2 shows the symbolic rating of transport means from a study of 4 400 young people in Germany (Hunnecke 2001). Approaching the age of 18, thinking changes towards cars, especially within the peer group discussions. This goes with a decreasing significance of cycling. The car is becoming status symbol - which is the bicycle not any more. In the following years a less emotional and much more rational evaluation is shown. But due to changing mobility requirements and already existing habits of the older ones, this will not reverse the modal share trend as seen on Figure 1.



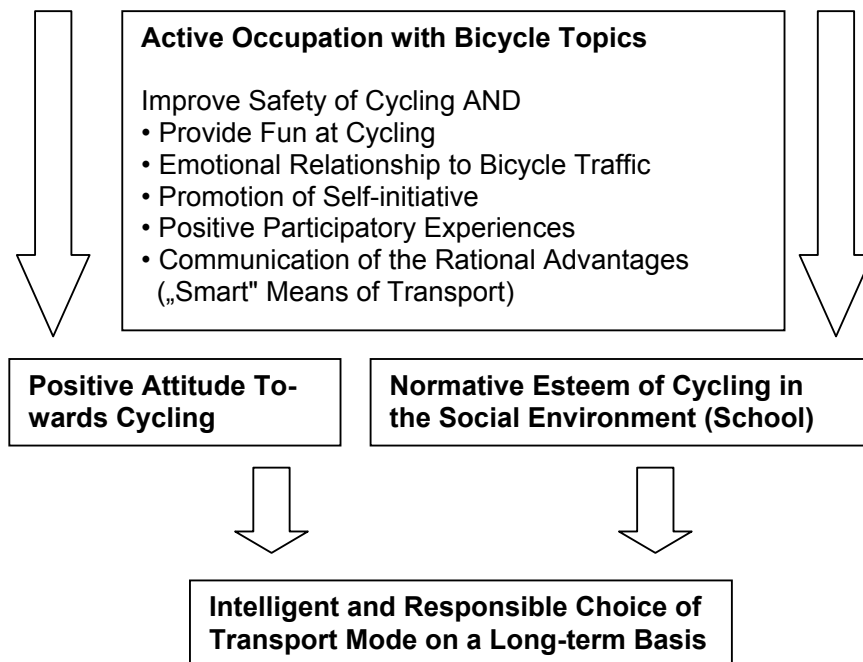
**Figure 2: Symbolic Rating of the Car and Cycling, Source: (Hunnecke 2001)**

What can mobility education contribute to achieve a high level of bicycle use among young people? Using an educational framework, own activities of pupils in the field of bicycle topics will improve knowledge - but more important, intensify the personal relation to bicycle traffic. In order to be successful, the approach should cover the logic level (cycling as an fast and flexible mode of transport for distances up to 5 km) as well as affective aspects (emotional binding, uprising the social status of the bicycle).

### 3. EDUCATIONAL CONCEPT

At the present time, Dresden school authority provides school travel plans for primary schools. These plans give orientation to parents and young pupils (age 6-11) for safe walking routes to school. School travel plans for secondary schools (age 10-19) are not yet available. Therefore, the "Cycling to School" project emphasizes on the development of cycling school travel plans (CSTP) for secondary schools. But in contrast to the mentioned school travel plans for primary schools, main work on the plans will be done by a working group of pupils themselves. Why? First of all it seems obvious to engage professional engineers to produce high quality plans (even neglecting the shortage of time and money in public authorities). But the content has to find its way to the mind of the pupils. Perception of self-made work or the work of schoolmates is much stronger than a strange plan delivered by the school authority.

Figure 3 gives an overview on the educational concept of the "Cycling to School" project. The concept aims to provoke a strong attitude to cycling and sustainable traffic issues in general. Of course, safety is not the most attractive topic for pupils. But if the question of motivation is solved, it implies high public acceptance and support. The project offers opportunities to self-determined investigations and real changes of the school environment. An UrBike project group containing representatives of the transportation department, road construction department, police, NGO's and the university is supporting pupils and teacher on this demanding task. The UrBike project group provides a guiding manual and organisational help like important contacts, presentations, public relations, and competitions/awards.



**Figure 3: Cycling School Travel Planning, Educational Concept**

An important question is, how the working group of pupils will work. In Dresden, there are different possible types of introduction:

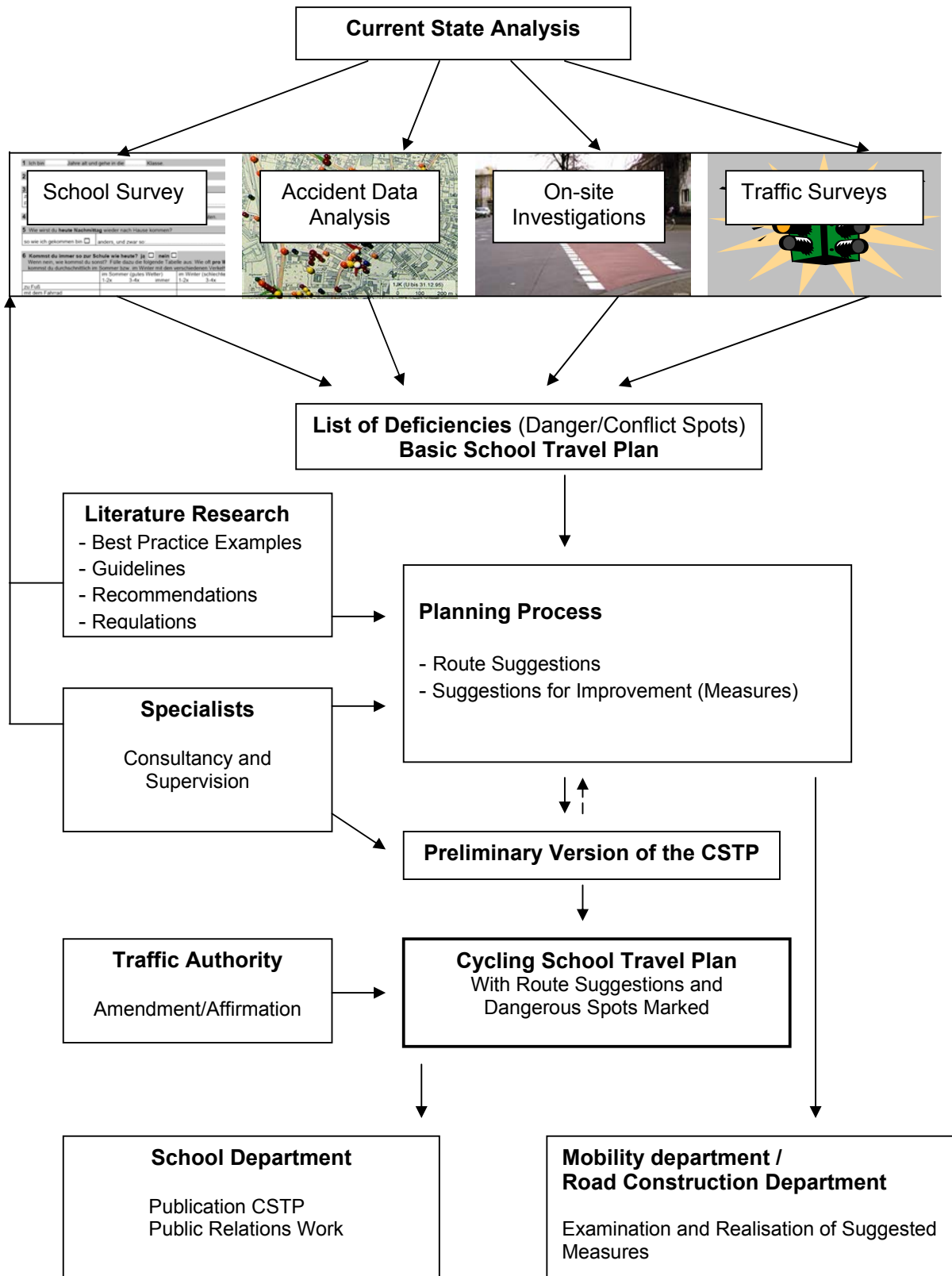
- Obligatory school topics, interdisciplinary work,
- Semi-obligatory ("Neigungskurs"),
- Facultative team work .

#### **4. DESCRIPTION OF THE PROJECT**

Possibilities to emphasise cycling issues in the school context are really diverse. The following description will concentrate on core task of the "Cycling to School project" – the development of cycling school travel plans through a working group of pupils at secondary schools in Dresden.

Figure 4 gives a general overview of the project work laid down on the guiding manual. Through different surveys and investigations, pupils will analyse the current state of bicycle conditions in the school environment including currently used routes of their schoolmates. The collected results will be summarised in a "basic school travel plan" and a "list of deficiencies", both forming the base for the planning process towards the CSTP. Various departments of the city administration support the process and organize revision, affirmation and publication of the developed cycling school travel plan as well as examination and maybe realisation of pupil's suggested measures. Besides the responsible teacher, external specialists accompany the activities.

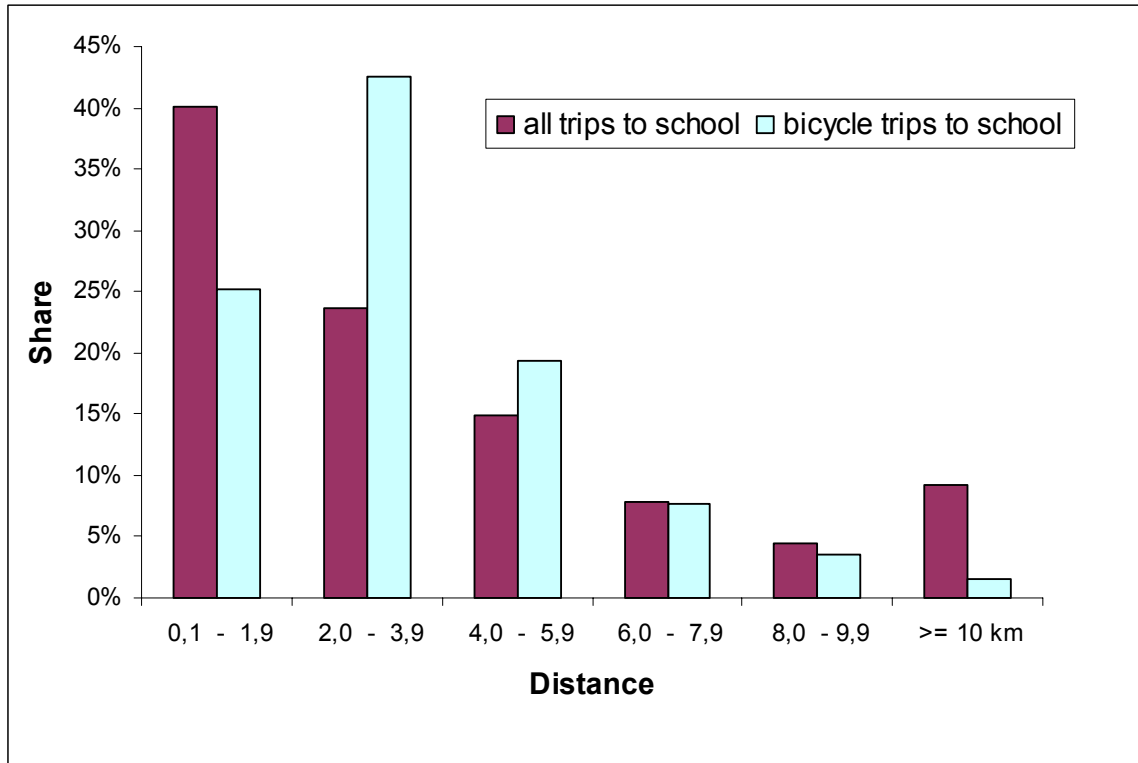
Following pages will describe the project technically in more detail.



**Figure 4: Pupils Develop a Cycling School Travel Plan, Project Scheme**

### **Step 1: School survey**

The first step of the project will be to find out about the school catchment area, the current cycle routes already being used by the pupils and the problems along these routes. Independent of surrounding population density, the geographical area served by a certain school is also very much depending on school type, school profile and image. The distance from home to school also determines the feasibility to use a bicycle. For most cases in cities like Dresden a circle of about 15 to 20 km in diameter describes the main catchment area for bicycle trips to school. Figure 5 shows the trip length distribution for bicycle trips to school in East German cities as a result of the transportation behaviour survey 'Mobility in cities – SrV 2003'.



**Figure 5: Trip Length Distribution for Bicycle Trips to School, East German Cities, Source: (SrV 2003)**

While common bicycle network planning starts with drawing so called “desire lines” which connect important destinations, for CSTP development it is adequate to base the net on the already used routes. This information is gathered by asking the pupils. The “Cycling to School” working group of pupils will conduct a school survey under their school mates. In order to increase motivation of participating pupils, we found it useful in the project not to provide ready made questionnaires. So pupils develop their own questionnaire with their specific viewpoint and maybe extended problem areas. The minimum content for CSTP development has to cover at least two questions:

- If you use a bike at all, which route do you use for your school trip from home to school?
- What problems concerning safety and other items do you encounter on your bicycle ride to school?

There are many more possible questions to be added to the questionnaire, for example regarding travel mode (in summer or winter), suggestions for improving bicycle use, reasons to use a bike or not, attitude of parents etc. These additional questions can be used to implement classmates with no bicycle use at all into the survey, for example focusing on the circumstances to change their transportation behaviour.



To receive information about the cycle route used to school from each schoolmate, the use of a city map is recommended. A copy of the section containing the main bicycle trip catchment area shall be placed on the back side of the questionnaire. In the survey, pupils are asked to draw a line for their commonly used route.

Of course, admission and support of the school authority and protection of data privacy has to be assured for the survey. Distribution and collection of the questionnaires are to be organised with help of the teacher's board.

## **Step 2: Accident Data Analysis**

Regarding road safety, results from the school survey deliver data about subjective risk assessment. Pupils will mention spots where they feel unsafe. This might – or might not – correspond with the existing (objective) risk represented by the official accident data.

Accident data collection through the police force in Germany is standardised and organised by law. Amongst others, police records contain information about cause, type and category of accidents, degree of injuries, and travel modes of involved parties. Accident records had been pinned manually onto a map in the central police office over the past decades. Now the data is available electronically and is based on modern Geographic Information Systems. Nevertheless, pupils will still have to find their way to the responsible police officer in order to get help for data analysis. It is a valuable step for pupils to get in contact with the “real world” by organizing, analyzing and evaluating the bicycle accident data of the school environment. Of course the local police department should support the project as they do in Dresden.

Another source of accident data might be the accident record book of the school. Due to insurance requirements, the school advisory board has to keep a record about every accident at school. This regulation applies to accidents on the way to school as well. But sometimes the data is not detailed enough to determine accident hot spots. Data privacy regulations will restrict the use as well.

By comparing the information about subjective and objective danger, it is to consider that most bicycle accidents with only minor injuries or damages do not get into police records. Additionally, as the police accident data set usually covers a three years time period, only a small number of severe accidents are assigned to a certain street or crossroad. This might be enough to identify hot spots for bicycle accidents, but cannot give a statistically valid impression for risk assessment.

One possible result of accident data analysis might be the fact that apparently unsafe looking spots will not correspond with the number of recorded accidents. This is, because the pupils perception of danger is automatically leading to risk aversive behaviour. Nevertheless these spots are to be marked at the CSTP, too.

## **Step 3: On-site Investigations**

An important element of the practical work is the on-site visit of the ascertained danger spots. Additionally it will be useful to examine the main routes of bike use resulting from the school survey. First thoughts on how to make bicycle trips to school safer and more convenient will be observed, for example by considering alternative routes, signposting, marking, infrastructural changes, campaigns and other measures. This, however, requires a whole knowledge of possible bike policy measures, bicycle related regulations and recommendations. Pupils in the working group need time to enter the topic. Further support of external experts proves really helpful.

In addition to the guiding manuals for pupils and teacher, we provide a collection of selected materials for the project containing important papers, for example the “German National Cycling Plan 2002-2012” or the “Recommendations for Bicycle Paths (ERA 95)”. Another important source for

investigation is the Internet. The guiding manual delivers the most important sources, because the available information is really diverse and useful information are not easy to find. On the other hand young people show an astonishing competence in computer handling.

Thus, based on the necessary background information pupils monitor local situation by using drawings, pictures or videos of problematic spots and develop their own solutions to the encountered problems. It is an important participatory and hence motivating aspect that Dresden Mobility Department has assured quick examination and – if it makes sense - realization of the pupils suggestions.

#### **Step 4: Traffic Surveys**

Traffic engineers have developed a variety of methods to research different traffic situations. Depending on available time for the project and complexity of the question, pupils can use special counts or partly simplified surveys for more detailed investigations. For example, the legitimacy of bicycle traffic solutions like separated/non-separated bicycle lanes depend on the daily traffic volume for motorised vehicles on the street. Also, the number of dangerous situations within a certain area and time period could be counted and categorised in order to investigate traffic problems in detail. The discussed traffic surveys are suggested to be undertaken with the consultancy of traffic engineers and specialists from city administration or the university. Nevertheless, step 4 is not obligatory for the project and can be skipped for the benefit of faster progress.

#### **Step 5: Basic School Travel Plan and List of Deficiencies**

Every cycle route drawn by the schoolmates during the school survey has to be transferred onto one single map, called the basic school travel plan. For multiple used routes, the thickness of the lines should correspond to the number of schoolmates using a certain section of a street. Dangerous or other problematic spots located during steps 1 - 4 of the project are to be marked on the plan and further described in the list of deficiencies. The basic school travel plan and the list of deficiencies summarise the activities from different pupil groups and complete the current state analysis.

#### **Step 6: Planning Process**

The planning process will concentrate on the main routes of cycle use within the main bicycle trip catchment area. As already mentioned, the current used cycle routes of the schoolmates make up the base network for the CSTP. It connects the pupil's homes and school on well accepted routes and reflects the daily experience of many families. But due to habits, subjective viewpoints and restricted local knowledge, this experience may be limited. During the planning process the working group of pupils tries to improve the routes regarding safety without forgetting security, comfort, directness or attractiveness. While considering alternative routes, directness is important to keep in mind. Detours exceeding 10% in length should be avoided. Our experience shows that practical and well accepted alternatives to the current used routes are rarely found.

Therefore the more important part of the planning process deals with the deficiencies of existing routes, particularly spots with a high number of reported accidents. Based on the knowledge of steps 1-4 and further on-site visits, pupils access the spots and develop solutions. These can be modifications of cycle routing or proposals for measures to be carried out by the authorities. In most cases, at least designation of the hot spots on the CSTP will draw attention on problematic locations. In order to identify problems and solutions, it is advisable to mark exact route suggestions on streets for both riding directions including detailed suggestions for crossing.

## **Step 7: Affirmation and Printing**

The CSTP is being developed mainly from the working group of pupils with help of external expertise. Capabilities of pupils are quite different – as well as the knowledge level of teachers. Highest quality and perfect execution cannot be expected from a school project. Therefore, careful verification and affirmation of the CSTP through the traffic authority is needed.

It is advisable to provide copies of the approved CSTP for every pupil at the school. Professional printing will show a high respect for the work of the pupil on the project and will have an positive influence on the desired bond to sustainable traffic.

## **5. EXPERIENCES**

Pupils will get familiar with bicycle policy and practice through the project. This is the main objective of the project. However the interesting question is, to what degree pupils will be capable of fulfilling a traffic engineer's task. Unfortunately the question cannot be answered as the described project is still ongoing. The first draft of a guiding manual is currently being tested on two secondary schools in Dresden.

First experiences show that motivation of the teacher is a successful key for the project. Therefore, we started to develop a far more comprehensive guiding manual for teachers containing detailed information and examples for surveys and plans. This will save time for organisation and preparation of different parts of the project.

Implementation of the CSTP development into a framework of other bicycle related topics like bicycle tours or bicycle technology proved effective for a class with a lower level of enthusiasm. Depending on the weather, lessons could be switched between indoor and outdoor in that case.

## **6. FUTURE TASKS**

In our social environment, the transport issue is of increasing importance. As it is in most countries, the share of the transport sector on energy consumption, environmental pollution and CO<sub>2</sub>-Emissions in Germany have increased significantly. The current trend in car use and spatial structure creates dependencies which make it hard to meet the requirements of sustainable development. Only long term engagement with problems and solutions of transport starting in childhood can break off traditional patterns of travel replacing habitualised behaviour by integrated and multiple travel mode.

The described program represents only one possibility to implement issues of sustainable transportation into school activities. Mobility education aiming to teach knowledge and abilities for an intelligent and responsible choice of travel mode needs to contain coordinated modules for different age groups.

At present, only children's road safety training at primary schools is widespread part of the curricula on schools in Germany. These activities target on the child's behaviour to avoid dangerous situations, but excludes responsibility of other road users. Future curricula will have to include extended perspectives. At the present time, a wide range of materials for mobility education for young people exists. But a wide application of this material is missing because of the exclusion from valid curricula.

Some states like Lower Saxony and Hamburg are pioneers for an extended and coordinated use of mobility education in Germany. The current debate on promotion of full time schools ("Ganztagesschulen") in Germany is supporting the introduction of mobility projects like the "Cycling to School" project in Dresden.



## References

Ahrens, G.-A., Böhmer, T. 2005. *The European UrBike-project: Integration of Bicycle Traffic in the City of Dresden*. paper presented at VeloCity Conference Dublin, May 31st – June 3rd 2005

Federal Ministry of Transport, Building and Housing. 2002. National cycling plan 2002-2012. *Ride your bike! Measures to promote cycling in Germany*. [Online]. Available: [www.nationaler-radverkehrsplan.de/eu-bund-laender/bund/DF7097-english.pdf](http://www.nationaler-radverkehrsplan.de/eu-bund-laender/bund/DF7097-english.pdf) [20 December 2005]

Forschungsgesellschaft für das Straßen- und Verkehrswesen (FGSV).1995. *Empfehlungen für Radverkehrsanlagen (ERA 95)*

Huber, A., Winter, M., Böhmer, T. 2004. Kundenbindung von Anfang an: Mobilitätsbildung an Schulen. *Der Nahverkehr* 3/2004. Alba-Fachverlag Düsseldorf

Ministry for Science and Culture of Lower Saxony. 2004. *Curriculum Mobilität* [Online]. Available: [www.curriculum-mobilitaet.de/](http://www.curriculum-mobilitaet.de/) [20 December 2005]

Technische Universität Dresden, Transportation and Infrastructure Planning (vip). 2003. *Transportation behaviour survey 'Mobility in cities – SrV 2003'*

M. Hunnecke, C. Tully, D. Bäumer: Mobilität von Jugendlichen, Opladen 2002