

SAFEGUARDING MOBILITY OF ELDERLY PEOPLE IN NON-MOTORISED TRAFFIC,

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ABSTRACT

Walking still plays the most important role in the life of senior citizens. Due to limitations and restrictions because of ageing and disabilities, walking gets even more important in high age and therefore for more weak traffic participants. But studies show: Elderly people tend to use the car, if the environment is not properly designed for their needs. As accident rates indicate, the needs of non-motorised elderly people are not considered appropriately yet. They are particularly endangered due to decreasing physical strength during accidents and falls. In the year 2005 approx. half of all killed pedestrians and cyclists in Germany were at least 65 years old!

A research project at the University of Wuppertal showed out typical conflict situations with severe injuries for elderly people. An accident analysis was combined with interviews and focus rounds. From the results, requirements of non-motorised elderly people concerning the infrastructure could be derived. Overall, traffic for non-motorised elderly people has to get safer and more attractive. With the help of a "local mobility safeguarding plan" every city is able to find problem areas with a shortcoming analysis. From this, choice and priority of suitable measures for improvement on the objective and subjective safety of elderly people can be elaborated. The use of this planning process should lead to an integrated work to gain a sustainable urban development and a compliant urban mobility.

1. INITIAL SITUATION

The mobility of senior citizens gains on importance on account of demographic, economic and social developments. With the rising life span there grows the wish for active participation of the group 65 and older in social life. In this regard also the wish for lasting and independent mobility increases. Securing the mobility of this group owns beside an individual also a social and economic dimension. Many elderly people have mobility or activity restrictions. The architectural and social environment is up to now not concerning these developments barrier-free enough. Especially for one of the weakest group of participants, elderly pedestrians, there are many things to improve (see Picture 1).

The evaluation of numerous safety audits, which were carried out in the context of the auditor trainings at the Institute for Road Traffic Planning and Engineering (SVPT) at the University of Wuppertal was the starting point for the implementation of the above mentioned project. Thereby it could be assessed that during the planning and up to the structural conversion of road traffic facilities deficits exist in numbers. In many cases weaker traffic participants suffer from theses deficits, especially children and elderly people. Besides, the problem is how to ascertain the concrete needs of elderly people. Especially under consideration of limited financial resources of local authorities elicitation and evaluation of reasonable measures become more and more important.



Picture 1 – Elderly pedestrians face problems because of inadequate facility design
(Photo: Aslaksen)

This development and the unsatisfying situation of senior citizens in traffic lead to the idea, to initiate a research project. The project was commissioned by the Eugen-Otto-Butz-Stiftung, a foundation spending money in projects concerned with traffic safety and mobility education. The project was processed by SVPT together with NeumannConsult (Münster), a bureau concerned with barrier-free traffic design and with the Research Centre of Eugen-Otto-Butz-Stiftung at Institute ASER e. V., Wuppertal.

2. PROCEDURE AND RESULTS

2.1. Survey area

Within the framework of the project the following two main aims should be examined:

- What are special problems of non-motorised elderly people when participating in traffic?
- What are the demands of elderly people concerning to the road- and road-environment design?
- How far are the interests of non-motorised elderly taken into account in the present planning practice? How do we plan today for our tomorrow?

Aim of the survey was to create guidelines for infrastructure design to enable non-motorized senior citizens a secure and independent mobility as long as possible.

In order to reach concrete results the main studies were processed in three selected cities in North Rhine-Westphalia, a country of Germany. These cities should represent a certain type of city to produce transferable results, if possible. The selection was based on various criteria, as for example city size, structure, centrality as well as percentage of people older than 65 and modal split. The following cities were selected:

- Gelsenkirchen (larger city with approx. 270.000 inhabitants),
- Siegen (medium-sized city with approx. 108.000 inhabitants, hilly area) and
- Lüdinghausen (small town with approx. 24.000 inhabitants, lowland).

In order to determine the needs and problems of non-motorised elderly people, the following different methods were used:

- Two-step interviews,
- focus groups (supervised discussion),
- journals of trips and
- accident analyses with special focus on elderly people involved.

In addition, it should be checked to what extent the requirements of the elderly pedestrians and elderly cyclists are taken into account at the planning and design of road traffic facilities up to now. For this purpose the most important German regulations for the figuration of traffic facilities were analyzed in respect of details concerning the design appropriate for elderly and mobility-restricted people, too. Furthermore, the utilization of these regulations as well as the degree of the participation of elderly people at the planning process was checked within the three cities.

1.1.1 Interviews

The interviews (see Picture 2) were carried out in two stages. In total almost 500 persons were interviewed in the three cities. Within the first interviews the general demographic data was surveyed. For example kind and manner of possible physical restrictions, the preferred means of transport as well as the respondent's opinion of the traffic facility design. The latter was determined by finding out about importance and the contentment of different features. The most frequent answers referred to pedestrian needs, no matter what means of transport elderly people were using. Furthermore, concrete problematic areas for further investigation were identified in the three cities.



Picture 2 – Elderly cyclist being interviewed (Foto: Wood)

The interviews led to a picture that has to be distinguished between the different age-groups. A tendency could be seen, that older people do often not have any distinctive sensibility for problems appearing when moving in the streets. They rather make themselves responsible when difficulties occur. Among the younger volumes the demand for an adaptation of the traffic facilities adequate to their needs can be noticed. In addition, it became clear, that e. g. social safety as well as lacking regard of other traffic participants are important components for non-motorised mobility of elderly.

One point was the so-called mayor question (“If I was a mayor, I would like to...”). This is a proven instrument to get a quick response of what people are really interested in. Some of the results were

- advance traffic signals and refuges/pedestrian crossings,

- appoint city-service and police more often,
- sensitize fellow citizens,
- care for road maintenance,
- barrier-free sidewalks and
- establish more traffic calming.

As follow-up a second questioning was processed within the most mentioned areas, which were rated as problematic. This was used for shortcoming analysis as well as the effectiveness of experience of these places. A partly standardised questionnaire with open and closed questions was used. The complexity of the areas and the safety felt by the seniors was determined using a semantic differential.

1.1.2 *Focus groups*

In all three cities focus rounds with participation of elderly people and interest representatives were carried out (see Picture 3). In the focus rounds free discussions took place and were supervised and moderated by a traffic psychologist. In these rounds deficits could be elaborated from the viewpoint of the older people when moving with different means of transport.



Picture 3 – Example for angst-spaces mentioned in the focus rounds (Photo: SVPT)

As in the interviews turned out concrete mobility hindrances of elderly people, regarding to social safety (e. g. angst-spaces, see Picture 3). For example the “policeman round the corner” was missed as a contact person. The results of the focus groups were completing the results of the interviews, but in a more detailed way.

1.1.3 *Reports of trips*

As a supplement to the questioning and conversation rounds reports of trips were filled out voluntarily by some elderly people. In these papers the senior citizens had to report their daily walking trips or cycle trips in detail for one week. Possible difficulties occurring during moving had to be named. With this method further deficits and hindrances in traffic facility design could be determined and located. The reports were in parts very detailed and were a good complement to the focus groups and interviews.

1.1.4 *Planning practice*

The most important literature in Germany, which was published for the planning and building of traffic facilities, was checked with regard to the details concerning the design

appropriate for elderly people, especially non-motorised traffic. A wide spectrum of literature is relevant: guidelines and standards up to recommendations and relevant expert literature of associations concerned with handicapped needs. Simultaneously a questioning of city planners and traffic designers in the three cities was carried out.

It turned out that there is a great number of publications in particular for a barrier-free traffic design. But the requirements of elderly people are in most cases not mentioned explicit. It could be guessed, that normally the publications are state of the art and for that consider the needs of all groups of traffic participants, including the needs of the elderly.

It could be asserted, that only few publications were used. Maybe sometimes they are not known by the planners. The smaller the city, the less publications were used. In smaller cities they use more general guidelines. This is because of merged field of activities of one department. In bigger cities departments are more specialised and because of that use more specialised guidelines. Another point could be the funding for publications of the local authority.

The difficult applicability of the design propositions in the practice, in particular at the reconstruction of existing traffic areas, was criticized. Because of different demands also target conflicts occur frequently. Sometimes specific groups are preferred in the regulations (for ex-ample blind people and wheelchair drivers). Supports are missing in order to find agreements without discriminating one group because of favouring another.

The participation of the elderly at the planning process is handled very differently. To some extent a senior advisory board can influence urban planning, but sometimes this advisory board only has a consultative character. Sometimes stakeholders of certain groups of handicapped people have a greater influence. If there are no stakeholders for certain groups, their needs may not be considered. This leads to a preference of the needs of some handicapped.

Last but not least the personal attitude of the involved planner is very important. It could be called the "human factor".

1.1.5 *Analysis of accidents*

For the analysis of accidents with elderly people involved, another eight cities and municipalities of different size were included in order to get a greater database. The accidents caused by elderly people in a five-year-period were examined. In the three initial cities the accidents elderly pedestrians or cyclists were involved in without causing the accident were evaluated additionally. Only accidents implicating the injury of a person were considered.

Most accidents were caused by elderly drivers (70 %). Another 15 % of the accidents were caused by elderly cyclists, 9 % by elderly pedestrians. A tendency is recognisable, that in bigger cities more elderly pedestrians cause accidents. In most cases they were involved in accidents when trying to cross at places without secured refuge in streets where cars drive with greater excess-speed.

Elderly cyclists

Cyclists are besides priority disregards involved in many driving accidents (types no. 1xx, see Figure 1). Those are accidents, when the driver's losing control of his vehicle. There were some hints, because of the accident type and the accident cause, that bad road maintenance may play a certain role. Unfortunately many accident causes were not

exactly specified by the policemen. The accident file only mentioned “Other mistakes of the driver”. Additionally a lot of elderly people mentioned bad road maintenance as a problem during the interviews and focus rounds, this would exactly match the thesis.

A lot of accidents were caused by turning into a road or crossing it (types no. 3xx). Many of those accidents happened because lack of refuges. Elderly cyclists e. g. met with an accident when coming from a T-junction trying to reach a cycle lane on the opposite side of the street. Lack of safe refuges for elderly cyclists could also be proved when looking at the number of accident-no. 371. This accident happened on mid-block sections, when elderly cyclists were trying to reach the opposing lane.

Another hint of inadequate infrastructural facility design could be accident type no. 342 (see Figure 1). This is an accident when a cyclist could have moved on a cycle lane into the wrong direction and bumped into a car crossing the cycle lane. It could be a hint that the street is a barrier and not very pervious for crossing traffic.

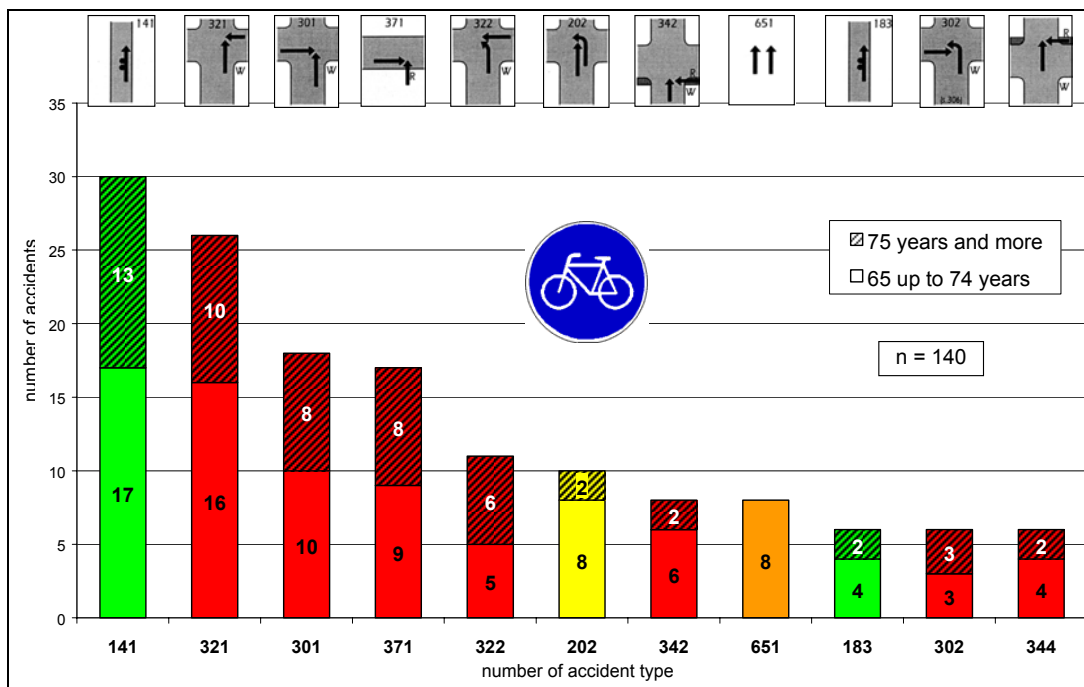


Figure 1 – Most frequent accidents caused by elderly cyclists in selected German cities (2000 – 2004) (Figure: SVPT)

Elderly pedestrians

Bad road condition was mentioned as an important matter of fact by elderly pedestrians during the interviews and focus rounds, too. But in general accidents of pedestrians without participation of other means of transport are not collected by the police. For example, if an elderly pedestrian stumbles and falls and is getting injured, this will be only reported to the accident assurance. So those accidents are not mentioned in the official accident statistics and there is an estimated number of unknown cases. This is the reason why it could not be proved by common accident analysis, that bad road maintenance plays an important role for pedestrian accidents. Another point is stumbling about obstacles or edges. Because of the raising number of visually impaired people, high-contrast design could prevent from some of those accidents.

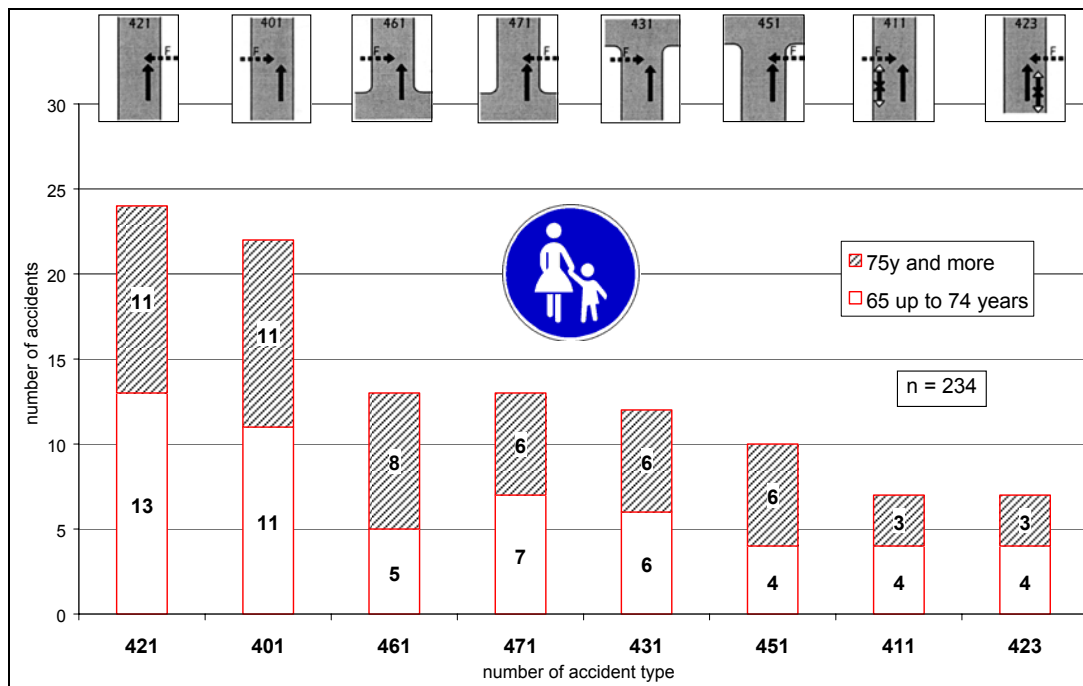


Figure 2 – Most frequent conflict situations caused by elderly pedestrians in selected German cities (2000 – 2004) (Figure: SVPT)

Most accidents caused by elderly pedestrians were caused when trying to cross the street at mid-block (see Figure 2). There is a lack of refuges, zebra crossings or signalled crossings. Line-of-sight obstructions played a subordinate role for accidents. In most cases elderly pedestrians were crossing the street at places without suddenly emerging from behind obstacles. A lot of the analysed accidents happened at bigger main roads with higher speed level.

Comparison with general accident situation

In the three initial cities maps were made from the collected accident data in order to visualize and recognize black spots. These were subjected to a closer investigation in order to be able to identify possible deficits in the traffic design which have an influence on the origin of the conflict situation. The evaluation showed only few black spots of non-motorised elderly. One reason was that the overall amount of investigated accidents was little by number. The located black spots of the elderly people coincided in some cases with the general black spots. Additionally the accident accumulations were compared with the problematic areas elevated within the interviews. Those match in some cases, in other cases a different scene turned out.

This shows that only a mix of methods could lead to assured results and all of the problem areas could be identified. Some localities were classified as complex by the elderly people but did not show any conspicuousness in the accident analysis. It can be guessed, that some avoidance strategy is relevant. Certain spaces are consciously avoided by elderly people, because they know they could face some problems there.

3. RECOMMENDATIONS FOR THE PLANNING PROCESS

The future need for action for the consideration of the requirements of non-motorised elderly people in respect of road design is to subdivide into a procedural and a measure-related part. The current traffic planning process is therefore to be completed by following aspects:

Mobility protection plans

Local authorities should create mobility protection plans for elderly people in the future. With participation of the affected groups of elderly and disabled, experts should process a local shortcoming analysis. Those analysis forms the basis for the choice and prioritization of suitable measures for the mobility protection and improvement of the objective and subjective road safety of elderly pedestrians and cyclists. A mobility protection could help to

- identify and analyse problems,
- expose positives and deficits,
- process requirements and
- develop measures and evaluate them.

Integrated planning

The road design is currently fixed on single plans. It is to be complemented by considerations of a wider area. Therefore the trips and particularly the chains of trips of non-motorised elderly people have more to be taken into account. It does not suffice, for example, to drop curbs without regarding the accessibility of entrance to public buildings.

Definition of routes

Especially for pedestrians and cyclists the definition and implementation of routes is an important business. Barrier-free planning therefore should not be restricted to new building measures. Instead of this, local authorities have to determine routes, which take the trips of older persons into account and therefore have to be build barrier-free. On these routes existing facilities should be reshaped step by step. On the other hand specific and extensive measures to consider mobility restricted people's need outside those routes could be neglected after an individual case examination.

Enlarged accident analyses

The usual methods for the evaluation of accidents are to be expanded by specific procedures for the analysis of accidents with involvement of elderly people. Since the accident situation of this group is not always identical with the accident situation in general, the usual announcement of accident accumulations does not suffice in order to guarantee the road safety of elderly people. Accidental maps have to consider a longer time period than usual to show specific black spots with involvement of elderly people.

Mix of methods for the shortcoming analysis

The evaluation of accidents does not suffice in order to be able to show shortcoming situations from the point of view of elderly people. Beside the accident analysis further suitable procedures have to be used. Those have to be used to show elderly people's problems with the existing road design. As complement interviews and focus rounds are adequate methods.

Sensitisation of designers and decision makers

Traffic planning processes aim at the present very much to dimensioning and capacity. This is to the detriment of weak, non-motorised traffic participants, especially elderly pedestrians. Responsible actors have to be informed about specific needs of elderly people and they have to be trained in order to be able to arrange the always necessary appreciation of values comprehensively under knowledge of all needs.

Within the framework of the measure development, attention is to be paid to the following requirements:

Design for all

Measures which do justice to all target groups should be used at new building plans and at the defined routes. Fundamentally the „two-sense-principle“ is to be used so that in every individual case at least two senses, for example with tactile ascertainable elements and optically contrasting elements, should be appealed.

A sustainable traffic design should not aim on special handicaps or certain attributes like age. The requirements of all traffic participants should be taken into account. But, public space is too complex to fulfil the needs of all requirements. Therefore traffic design should consider all needs and available resources and find optimized solutions, which accord to minimum criteria for a barrier-free design.

Change of viewpoint

While planning traffic areas, it has to be taken into account that the target group will change in the future. For example there will be less blind and more visually handicapped persons, less deaf but more aurally handicapped persons and less wheelchair drivers but more persons with a mobility handicap.

High-contrast design

The architecturally preferred and often used “grey-in-grey-design” is particularly to be replaced by contrasts. There a lot of possible variations for high-contrast elements – contrasting safety splitting strips are required for example between pedestrian areas and cycle-lanes on the same level. Stumbling of elderly pedestrians and elderly cyclists could be prevented by marking steps and edges.



Picture 4 – Example for high-contrast design to prevent stumbling (heightened light-rail crossing a pedestrian crossing) (Photos: Boenke)

Local mobility protection plans with measures as mentioned above should help to close the gap between requirements of the user and law on the one hand and possibilities of traffic de-sign on the other hand. The measures taken into account to improve mobility of elderly people are as a general rule useful to all traffic participants and help to plan safe and sustain-able.

To get to the heart of it, the following principles could lead to an safer mobility of non-motorised elderly traffic:

- Slow down traffic,
- make traffic more recognizable,
- make traffic facilities for pedestrians and cyclists more visible,
- make facilities for those weak users safer and
- sensitize fellow citizens.

When following those principles non-motorised mobility of elderly people could help to gain a long-lasting mobility.