
Abstract of diploma thesis

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Topic: **Developing a method for safety evaluation of shared-space-areas**

Thema: Entwicklung einer Methode zur Sicherheitsbewertung von Shared-Space-Bereichen

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The usage of the term shared space has recently increased in urban traffic planning concepts. The demographic change and the inner-city rise of bicycle and pedestrian traffic are reasons for the interest in new traffic planning concepts. The basic idea of the Dutch traffic planner Hans Monderman, who developed the shared space idea, is to create, next to the fast traffic network, some slow traffic areas, that are more adapted to the people's needs, in order to make the driver feel as a guest among people and adjust their driving behaviour. Additionally, the excessive regulations and the high number of traffic signs are supposed to be reduced in these areas as far as possible, which is why mostly the basic rules of the Highway Code are valid only. Therefore, the technical legal traffic behaviour gives way for a social traffic and staying behaviour. But are these areas compatible with legal requirements and is it true that the road user's partially requested insecurity contributes to more security? This paper gives an overview and identifies necessary tools that are useful for assessing the safety of shared space areas. For this purpose, their philosophy and development are discussed and some different design examples are described first. In doing so, it becomes clear that the possibilities of shared space are almost endless, as the by Keuning Instituut protected term "shared space" stands for everything that leads to more courtesy on the roads and is developed with the institute and the local citizens. The best known implementations of shared space, however, consist in relatively short sections with a high amount of cyclists and pedestrians and extensive or linear demand for crossings, because these situations are ideal for mixed traffic areas.

For the possibility of implementation the legal schemes and differences in Highway Codes of Germany, Austria, the Netherlands, Switzerland and Great Britain are examined. It becomes obvious that the requirement for courtesy towards weaker road users is anchored to different degrees in the various countries' regulations. This is why shared spaces do not everywhere have to be equally successful. It should be noted, that according to valid Highway Codes there is no randomness and no real equality of road users, as often desired and described. The feasibility of a naked street, which includes shared

space and “Gemeinschaftsstraße” (“community road”), is always based on the basic rules of the Highway Code, which means that motorized transport retains the right of way, however, on the condition of special courtesy.

The implementation as a traffic-reduced business area and therefore as a pace zone (10/20/30km/h) is comparable. In declaring a traffic-reduced area “Spielstraße” (“play street”) or in creating a “Begegnungszone” (“encounter zone”), like in Switzerland, the general right of way is transferred to pedestrians. It is notable that the signs should be chosen according to the purpose and the prevalent traffic situation, but particularly appropriate to the road user’s proportion. In order to develop a method for safety evaluation, all procedures which can be used to obtain security-related data are described first. For this purpose measurements, counts, observations and especially user surveys and analysis of accident data are helpful. For planning a new mixed traffic area also simulations based on social force models can be useful. Using this method, data that co-determines, whether an implementation as a shared space is useful and can guarantee sufficient safety can be obtained. In order to evaluate this, the context of objective and subjective safety plays an important role, as the effective safety is greater, the more insecure you feel in a statistically relatively safe area because uncertainty contributes to a safe and considerate behaviour. This principle is the essential basis of the shared space philosophy. However, relevant factors related to safety are additionally to the situational formation especially the users’ satisfaction. Planning and implementation that are perfectly adapted to the needs of the main users, lead to a high acceptance of the measure and influence the behaviour of road users among each others, which is mainly responsible for whether a mixed traffic area is safe or not. The consistent design can help to create a safe area, when the surface materials and markings contribute to the fact that low free speeds are chosen. The velocity has a huge impact on the security, because according to it the required braking distance increases sharply, and the vehicle’s impact speed affects the severity of injury for cyclists and pedestrians. Furthermore, in a mixed traffic area it is often useful to create additional safe lateral spaces only for pedestrians and cyclists, using soft, optical separation. The most important point related to safety is still the driver’s behaviour itself, which in addition to the driver’s mentality can be best influenced by direct constructional measures, less effective by controlling the subconscious level, and only slightly by traffic regulation with traffic signs. Thus it is obvious, that shared spaces can only work safely, if the considerate behaviour of road users is supported by good visibilities and an implementation that promotes low speeds. Special consideration is required for people with visual disabilities, because the new flat design as a mixed traffic area deprives them the usual orientation features, such as edges of kerbs. Therefore, tactile detectable delimited lateral spaces and a guidance system for blind persons are required. The individual safety issues can be questioned by structured investigation. For this purpose, questions are formulated which

allow a safety evaluation by stepwise processing and represent the actual method. Finally, this approach is applied to two different shared space implementations in order to analyze their security aspects. The “Opernplatz” in Duisburg was designated as a reduced-traffic area, despite the very high motorized traffic volume of approximately 14,000 vehicles/24h. The short section and the high pedestrian traffic (ca. 500 pedestrians/hour) are a reason why the transformation into a mixed traffic space is working relatively good and safe. In Bohmte a road with 13,000 vehicles/24h was converted into a shared space under an EU infrastructure funding. This street, which belongs to the category of “Naked Street”, does not require any additional traffic sign, wherefore only the basic rules of the Highway Code are valid. The consistent design with equal heights and dividing elements, leads to the fact, that the motorized traffic speed is somewhat lower than in the original hard separation of vehicle types by means of high kerbs. The improved visibility and the road users’ mutual respect has as a consequence that the safety issue in this area is not deteriorated. Quite the contrary, the previously often existing congestions at the crossing points used to cause frequent collisions, which now disappeared due to a more flowing traffic. Finally, it should be noted that additionally to an analysis of accident data before and after a transformation into a shared space, the exact causes need to be questioned. Only in doing so, safety statements can be revealed. Above all, however, the sense of security, particularly of vulnerable road users, must always be investigated by means of surveys. If the users are early involved in the planning process and if their needs are respected, shared space can make a new safe and attractive inner-city atmosphere.

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