Abstract

Bicycle traffic gained more and more popularity amongst citizens in the last few years. Due to climate change, it also became more important in political discussions. Current network planning and its guidelines are not sufficient anymore for the changes in traffic policies. The “Richtlinien für integrierte Netzgestaltung” (RIN) 2008 is applicable for all means of traffic. For bicycle traffic and its unique features, it is essential to rework the RIN.

The thesis strives for improving the RIN 2008 to make it more appropriable for communal bicycle traffic. The improvements will be applied to administrative district Grafschaft Bentheim. Bentheim already has a good bicycle infrastructure and a bicycle modal split of 31,4%.

First the criteria for bicycle route selection are worked out. For cyclist safety is an important aspect. Safety is mostly influenced by the available infrastructure. The concept “Level of Traffic Stress” classifies the edges regarding their safety. To optimize the routing, safety and resistance are combined to find the safest route for cyclists. Apart from safety, the state of the infrastructure should be included, e.g. the quality of the road surface. Direct routes are preferred, gradients must be avoided. While reworking the RIN 2008, it is important to include the distance, in which bicycle traffic has a significant potential to become more relevant. Public transport and car traffic are categorized for further distances, the bicycle traffic is not. For a start, supraregional routes are being analysed. For distances below 20 km, the bicycle traffic has a higher potential if infrastructure is improved. For distances over 20 km, the potential decreases. When creating a connection matrix, this circumstance should be included. This means connecting only places next to each other. Beelines and the geographical cross-hatch patterns are used to define corridors for network-allocation.

Different tools are used for the allocations and to find the optimal routes. These tools are PGRouting, Open-Source Routing Machine, Brouter and Bikengrowth. They all have the same basis, OpenStreetMap. If more data is available, it is being used as well, e.g., Elevation data. To conclude, if more data would be obtainable, the optimization would have more substance. Missing data is replaced by assumptions.

For Grafschaft Bentheim, the application of the RIN 2008 shows, that bicycle routes often use the same route as the individual transport. These streets follow along the direct routes and already have bicycle infrastructure. This infrastructure must be im-

proved to raise the safety for the cyclists. The tool Bikengrowth shows the need for a planned scheme if the bicycle-network is expanded. Otherwise, the quality of connections will worsen. Network-planning should always be supraregional to prevent bad network-quality. Bikengrowth uses triangulation, which leads to connections, that are not as direct as desired. In cases like these, the geographical connection is the best option. These connections are based on the RIN 2008. For touristic routes, geographical connections are the better choice, because for tourists, sightseeing is more important than a direct route. Points of interest can be found in specific routingtools. At last, the connection to important public transportation-stops is worked out. This can be done by using routing-tools and schedules for public transportation networks. Two examples, which are used in this thesis, are OpenTripPlaner and R5. For higher ranking places ZO, the stops are connected to the ZO. For lower-ranking ZO, the stops are connected to the higher-ranking ZO. These connections must be below 10 km, otherwise their potential is too small.

More research is needed to review “SAQ-Kurven”. SAQ-Kurven are used to define the quality of connections. More quality-characteristics must be worked out. The metrics of Bikengrowth could be used for this. Better data of bicycle infrastructure must be published to improve the quality of the worked out routes.