

# The German Guidelines for Integrated Network Design – Binding Accessibility Standards (RIN)

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# The German Guidelines for Integrated Network Design – binding accessibility standards (RIN)

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## Background

The “Guidelines for Integrated Network Design” (RIN) formulate standards for all transport modes and for all spatial levels reaching from the macro level of connecting agglomerations to the micro level of securing a local supply of infrastructure for pedestrian, bicycle, public and car transport. The RIN mainly focus on passenger transport. This includes car, public transport (railways, underground rail, tram and bus), bicycle and pedestrian transport modes as well as the design of linkage points for intermodal transport (Park+Ride, Rail+Fly and Bike+Ride). The RIN orientate these standards directly towards the system of central locations identified as suitable bases for the spatial components of a basic accessibility. Additionally, the RIN are an attempt to integrate scientific knowledge of transport planning into a highly binding planning guideline.

The backgrounds are target values for journey times between central locations. They are derived from spatial planning considerations and have been used in German transport planning for many years. Figure 1 shows these target values. Journey time includes getting to transport from home, waiting and travel time, and getting from transport to final destination. The listed target values are not a quality criterion for transport planning on their own. However, they form the basis for assessing the quality of infrastructure supply with the help of speed-based target values for specific network elements and for assessing the quality of complete transport routes between central locations.

## Conceptual framework and theoretical underpinnings

The RIN suggest targets for connecting central locations to each other and to residential areas. The following are goals of the RIN:

- Guarantee the supply function for people living within the catchment areas of central locations;
- Guarantee the exchange function between central locations;
- Support the development of population structures that are concentrated on the system of central locations;
- Support the special importance of the interconnection between national and international agglomerations.

The RIN are assigned the highest category in the publications of the German Research Society on Roads and Transport (FGSV) and are thus strongly binding for German authorities and transport planners. They were announced by the German Federal Transport Ministry with the request that they be applied to trunk roads. The RIN are the first part of a highly complex set of guidelines that sets standards for all steps of infrastructure design; from network design to the alignment and assessment of specific street sections.

## Operational aspects

The starting point for the RIN is the system of central locations. The combination of this system and the target values for journey times between central locations and residential areas builds the basis for the functional structuring of the transport network. In addition, it is the basis for the development of quality requirements for the transport networks and linkage points in the RIN. Each network section is classified according to:

- Its importance: level of connector function (LCF), and;
- Its function (road category).

The LCF is derived from the level of central locations to be connected. Six levels of connector function are defined to describe the significance of connection routes. These levels are valid for all modes of transport as long as they are relevant for the respective mode. The importance of a connection results from the importance of the locations to be connected. The RIN distinguish between connections related to the service functions for residential locations in catchment areas and connections that enable exchange between central locations.

In the second step a road category is assigned to each network segment in addition to the LCF. Roads may have combinations of functions imposed on them in terms of the expectations set by the adjoining land-uses. A road category is assigned to each road section in accordance with the following criteria:

- Road type (motorways, country roads, urban roads);
- Location (outside built-up areas, bordering built-up areas, within built-up areas);
- Type of adjoining land-use (non-built-up, built-up);
- Main road or access road;
- The RIN develop similar categorizations for Public Transport, bicycle and pedestrian traffic.

Central locations are connected by a series of network elements that together form a transport route. The quality of the transport route can only be improved by upgrading the composing elements of the route. Quality requirements for specific network elements can be derived from target values for the transport routes. The RIN operationalize these quality requirements by standard distance ranges and target values for car, public transport and cycling travel speed on the network elements. These requirements are formulated at a micro level of specific network elements. Nevertheless, they help to guarantee the exchange function and the supply function of central locations as they are derived from spatial planning considerations. In addition to the criteria that are related to specific network sections, the RIN introduce criteria for assessing the service quality of complete transport routes between central locations and between central locations and residential areas. The goal of these criteria is to obtain a picture of the overall quality of the network for different transport modes. Relevant criteria for connection quality at this macro level are journey time, costs, directness, temporal and spatial availability of transport services, reliability, safety and comfort. The RIN set target values especially for journey time and directness and work with the six levels of service quality from A to F like school grades.

## Relevance for planning practice

Transport policy should not concentrate primarily on improving traffic, but rather on the underlying purpose, that is, on the activities that can be carried out with the help of transport and on the needs that can be satisfied by those activities. The definition of the concepts of basic needs and basic mobility is a normative task and changes over time and between regions. However, this definition is required to formulate concrete standards that guarantee the satisfaction of certain needs, the basic necessity of which is beyond dispute.

These standards should describe opportunities provided by the transport and the spatial system as well as specific needs of certain groups of people. Accessibility standards are a suitable means of describing these components of basic mobility. The system of central locations is an appropriate basis for designing the spatial components of the standards system. It must be broken down into spatially low levels of centrality to guarantee the local supply of daily goods and services. Standards are necessary for the system's structure and the facilities of central locations.

These standards are set with the RIN. They are binding for the whole country and are used in transport planning processes especially on the federal and regional level. While the standards concerning connections by car are set very near to the current situation the main focus of the RIN is enhancing the quality of public transport and of the "slow modes" (pedestrian and bicycle) with the aims to enable all people to make use of the standards and to reduce the environmental impacts of transportation.

## Strengths and limitations

The RIN are a successful example of designing the transport components of such a system of accessibility standards. The RIN deal with the design of transport networks for public, private motorized, bicycle and pedestrian modes of transport. Firstly, the RIN establish the functional structure and hierarchy of the transport network. Secondly, the RIN develop quality requirements for the development of specific network elements. These are derived from the general requirements, which result from spatial planning considerations and functional structuring of the transport network. Standard distance ranges and car speeds are used as criteria to describe these quality requirements. Thirdly, the RIN develop indicators for assessing the service quality of complete transport routes (connections between central locations and to residential areas). Service quality

levels are determined for point-to-point speed and the ratio of private to public travel time. This approach allows the transport routes to be assessed as "good" or "bad" from the user's point of view. It has been applied in planning practice like in Transport Plans for the region of Stuttgart (Figure 1), Rhine-Main-Area or Thüringen.

Hence, the RIN shows that it is possible to develop a comprehensive system of standards that is not only clear and pragmatic, but that also includes all transport modes and all spatial levels from a detailed micro level to the macro accessibility of agglomerations. As such, the RIN are an important component of basic mobility and thus form an important component of sustainable transport development. This component must be supplemented with criteria for the spatial elements of basic mobility and by criteria for the environmental and economic aspects of sustainable transportation development.

So far this system is limited on passenger transport. An implementation of standards for freight transport modes will be developed in the next years. It could be used easily so that there are no limitations. One lack at the moment is that this guideline is recognized by traffic planners but not very well known by geographical or spatial experts.

## References

Forschungsgesellschaft für das Straßen- und Verkehrswesen FGSV (2008) Richtlinien für die integrierte Netzgestaltung RIN. FGSV: Köln.

## Tables and Figures

**Table 1** Target values for accessibility to central locations from residential areas

Central Location	Journey time [min]	
	Car	Public Transport
Basic centres (BC)	≤20	≤20
Mid-level centres (MC)	≤30	≤45
Upper-level centres (UC)	≤60	≤90

Source: FGSV (2008)

**Table 2** Target values for accessibility to central locations from neighbouring central locations

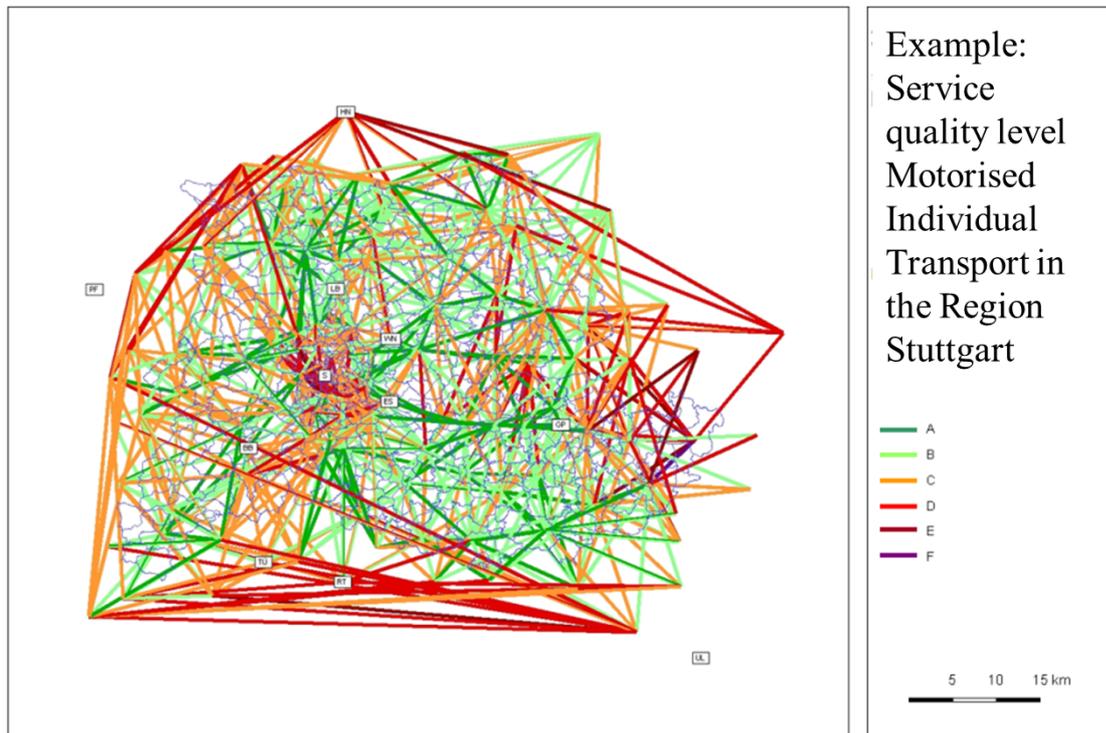
Central location	Journey time to nearest neighbour [min]	
	Car	Public Transport
Basic centres (BC)	≤25	≤40
Mid-level centres (MC)	≤45	≤65
Upper-level centres (UC)	≤120	≤150
Agglomerations (A)	≤180	≤180

Source: FGSV (2008)

**Table 3** Categories for bicycle infrastructure and target values for travel speed for daily traffic

Category	Sub-Category		Standard range [km]	Target speed [km/h]	
AR	Outside built-up areas	AR II	Interregional bicycle connection	10-70	20-30
		AR III	Regional bicycle connection	5-35	20-30
		AR IV	Local bicycle connection	Up to 15	20-30
		IR II	Inner-municipal express bicycle connection	-	15-25
IR	Inside built-up areas	IR III	Inner-municipal standard bicycle connection	-	15-20
		IR IV	Inner-municipal bicycle connections	-	15-20
		IR V	Inner-municipal bicycle connections	-	-

Source: FGSV (2008)



**Figure 1** Example of the Stuttgart Region: Quality Levels from A to F for the accessibility by motorised individual transport