



The German Highway Capacity Manual – HBS 2010

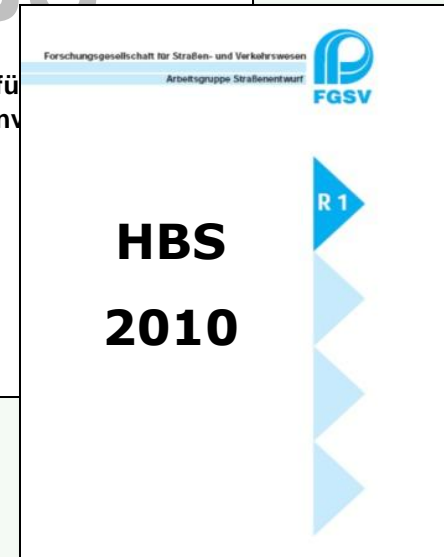
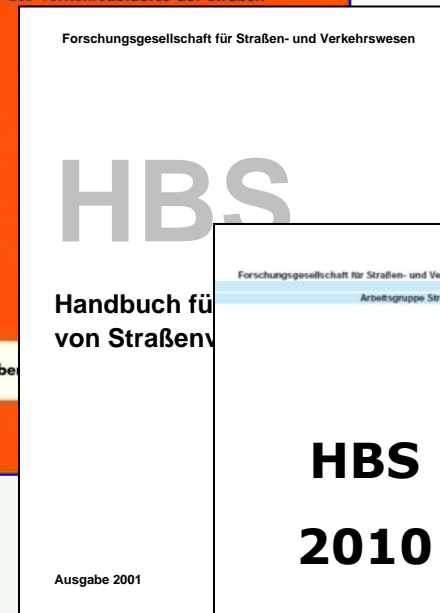
**Capacity Seminar in Stockholm
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History of the German Highway Capacity Manual

- 1993 Research Report from Ruhr-University, Bochum
- 1998 Additional Research by Ruhr-University, Bochum
- ...
- 2001 1st German Highway Capacity Manual (HBS)
- 2010? 2nd German Highway Capacity Manual (HBS)



Planning Stages

Planning Stage	Result
Requirement Planning (Bedarfsplanung)	Federal Transport Infrastructure Plan
Pre-Planning (Vorplanung)	Selected Line/Route
Design Planning (Entwurfsplanung)	Approval by Federal Ministry
Approval Planning (Genehmigungsplanung)	Approved Plan
Execution Planning (Ausführungsplanung)	Execution

HBS

Federal Transport Infrastructure Plan

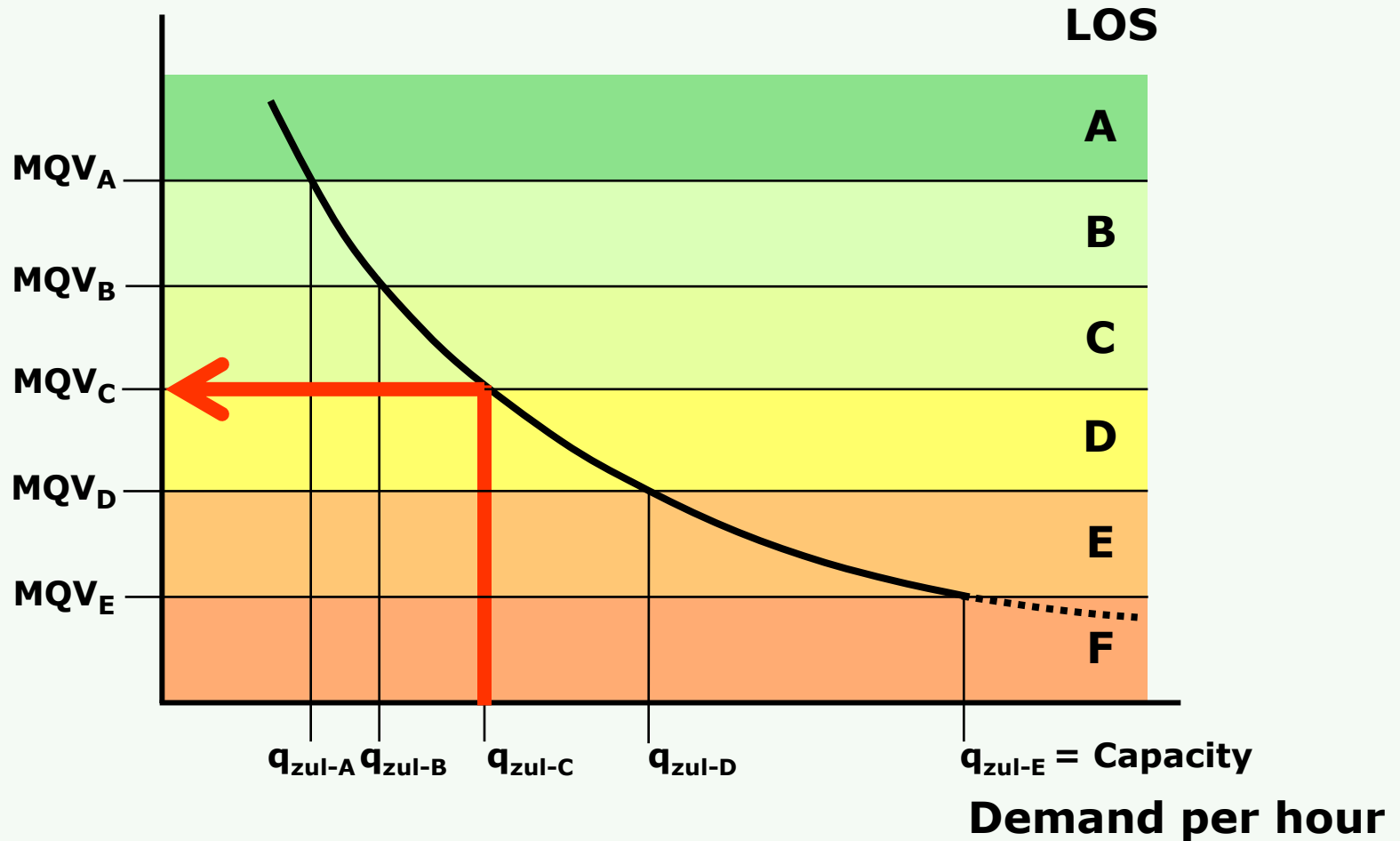
- framework investment plan, no decisions on funding
- basis for multi-annual plans containing projects and funding
- decided by Federal Government (last 2003)
- contains projects suggested by Federal States
- is based on a global demand prediction by transport mode with OD-matrices on district level (new 2025)
- is based on a uniform route choice model
- is based on a uniform assessment framework (benefit-cost analysis + spatial impact assessment + environmental risk assessment)



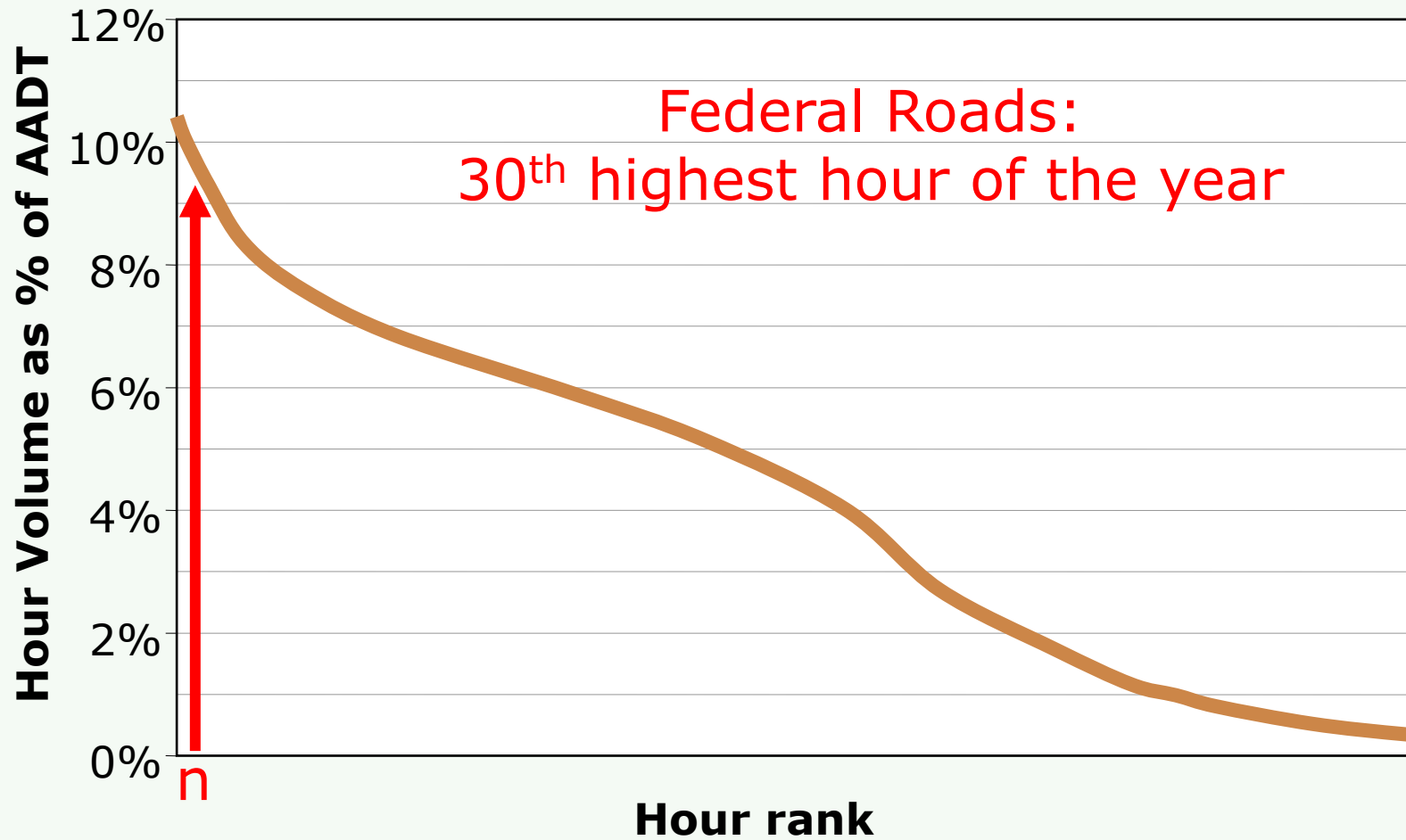
Average daily weekday traffic (AWDT)

Quality of Service

LOS-Criterium



Relevant Peak-Hour



Research on Peak-Hour

Ongoing research project at Ruhr-University, Bochum:

comparison of different peak-hour concepts with travel time expenses over a full year

- 30th, 50th, or 100th highest hour of the year
- nth hour of weekday traffic and mth hour of recreational traffic

Ongoing research project on peak-hours on rural roads:

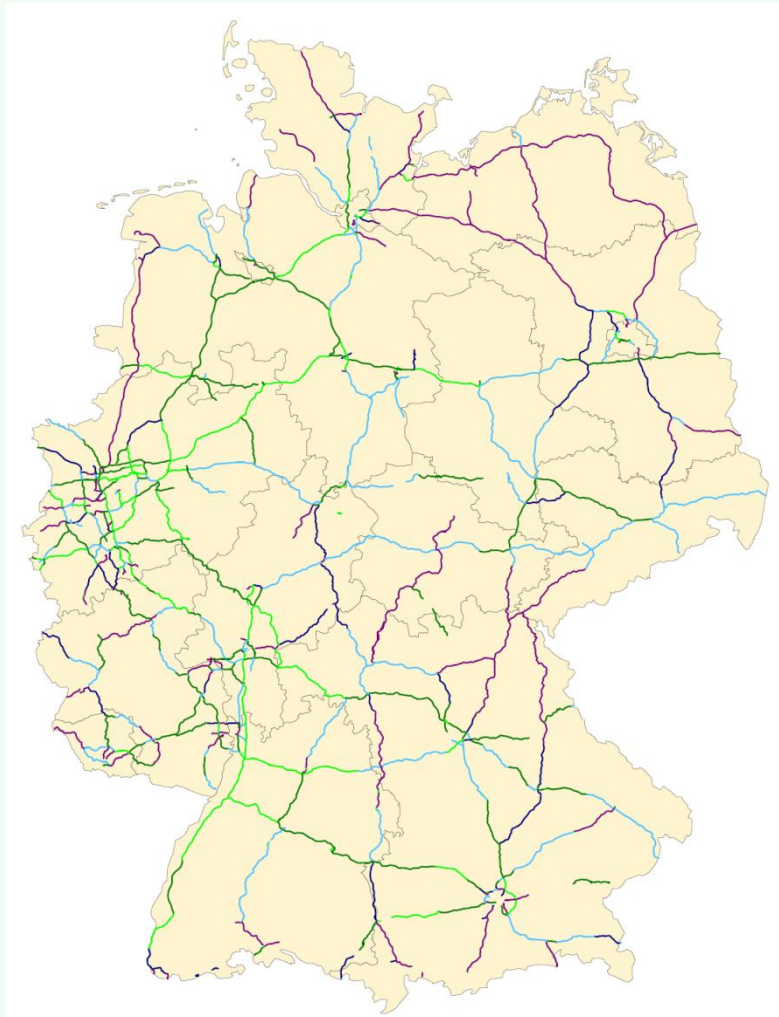
Develop a demand/volume estimate for rural roads based on short-term manual counts at the site and permanent counts elsewhere

Peak-Hour Estimates for Motorways

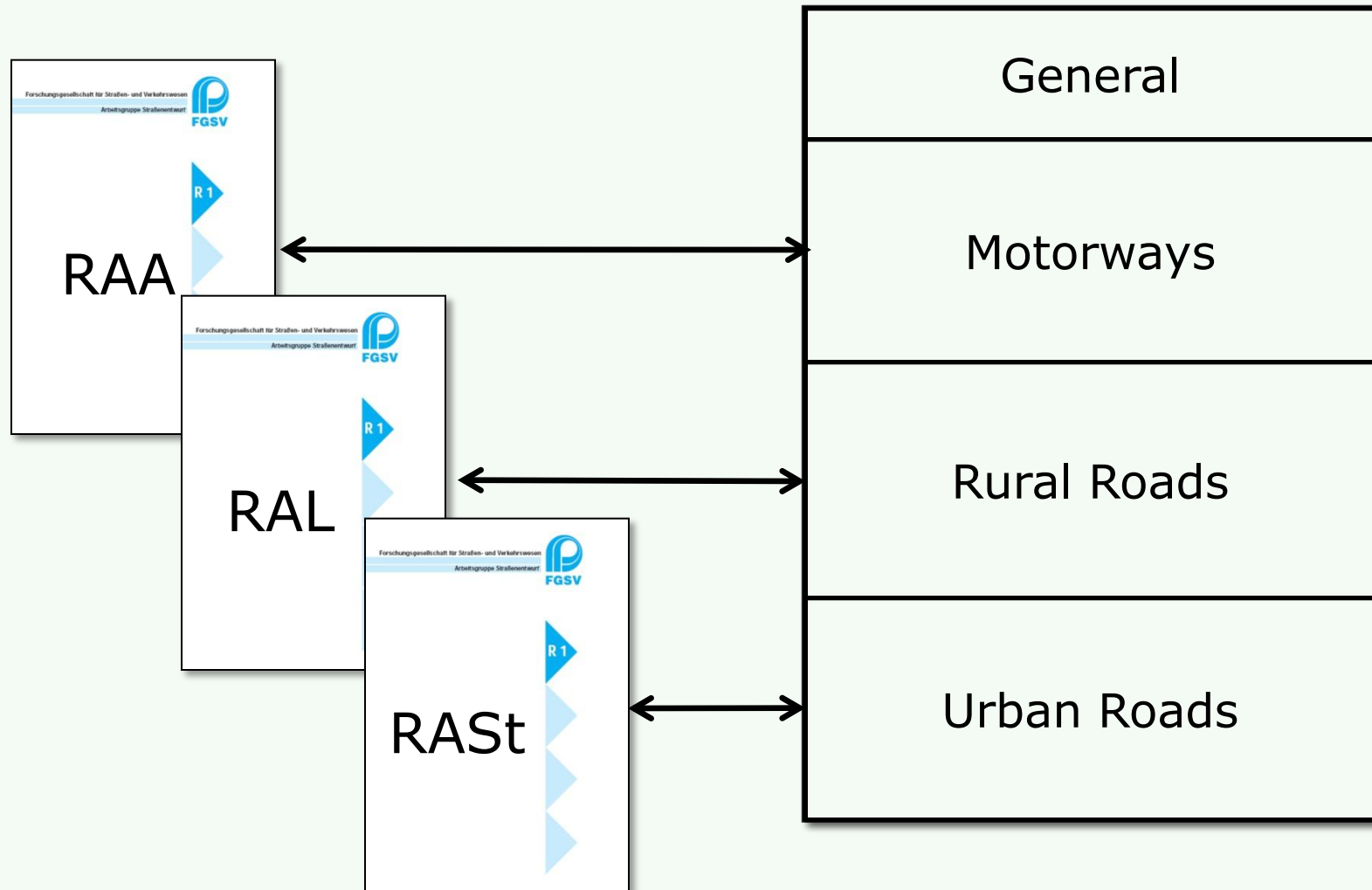
Estimate for the peak-hour volume on German motorways for 2007

Peak-hour as % of AADT

-  Up to 10
-  10 to 11
-  11 to 12
-  12 to 13
-  13 and more



Structure of the HBS 2010





Motorway LOS-Criterium

$$\text{Demand-Capacity Ratio } a = \frac{q_B}{C}$$

LOS	Demand-Capacity Ratio a
A	up to 0,30
B	up to 0,55
C	up to 0,75
D	up to 0,90
E	up to 1
F	-

for motorway segments, ramps and weaving

Adjustments to Motorway Segment Capacity

Tables of different Capacities as a function of

- Commuter/recreational traffic
- Number of lanes
- Gradient
- Speed limits
- Portion of heavy vehicles

Speeds on Motorways

- Speeds are not needed for LOS of motorway segments.
- Speeds are needed for the assessment of so-called network segments (on motorways from interchange to interchange).
- Speeds on network segments should be compared to thresholds from the Network Guideline.
- For HBS 2010 a separate LOS for network segments is in discussion, e.g. travel time index or travel speed index (research in progress).

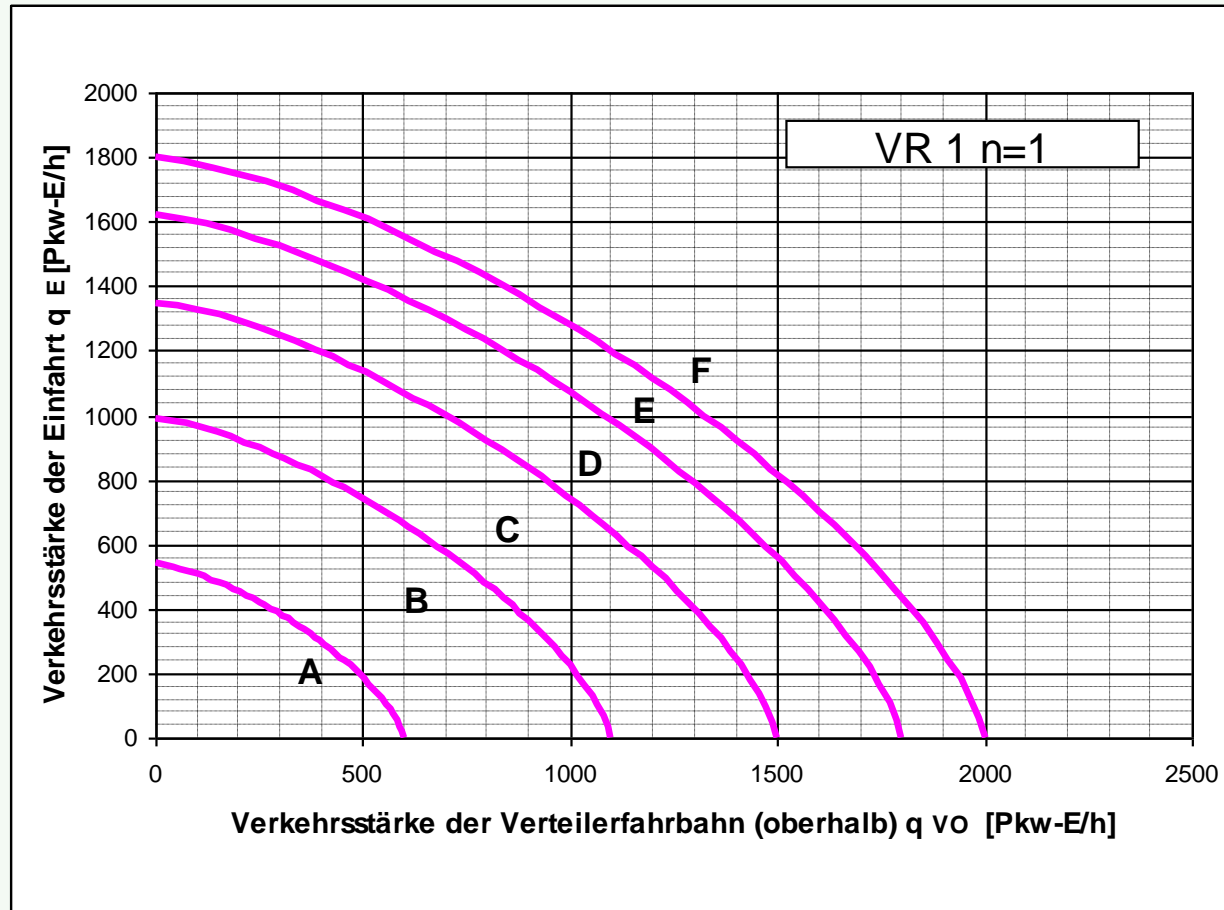
Ramps and Weaving

Definition of critical areas:



Weakest part determines LOS.

Diagrams for Ramps an Weaving



New
theoretical
model by Wu

Rural Road Segments

- New methodology: LOS separate for each direction
- Research for 2-lane highways still in progress
- Findings for 3-lane highways already published
- For 4-lane rural highways only speeds will be provided
- LOS criteria = density per direction

Unsignalized Intersections

- Based on gap acceptance model
- New formulas by Wu combining gap acceptance with conflict matrix model
- Ongoing research to determine parameters for urban roads including pedestrian influence

Network Segments

- Chapters planned for motorways, rural roads, and urban roads
- Modeling congestion still not solved.
- For intersections additional delays shall be added.

Alternative Methods

- shall be mentioned in each chapter.
- shall provide the necessary data to determine the LOS (e.g. demand-capacity ratio)
- require a description how to determine the parameter from empirical/simulated data
- empirical analysis as well as micro and macroscopic simulations may be possible
- basic requirements of the models are to be mentioned.