
Abstract

The aim is to describe the Swedish freeway capacity model, both present and new models. By using new and extended empirical data new models have been developed and existing models have been improved. The result is a new freeway model in the new Swedish Capacity Manual. The manual for freeway facilities include a time-space model for bottleneck analysis of urban and rural freeways.

The work has been based on the documentation for the present models. The models have also been compared to other international models to check the reasonableness. The project includes three parts, freeway mainline section, freeway weaving and freeway merging.

The review of the models revealed several deficiencies.

- The Swedish capacity model for main line section doesn't take into account the gradient, which is an important factor and is one of the most significant parameters according to German experiences.
- Another large knowledge gap is the fact that the capacity model doesn't take into account lane width and distance to obstacle.
- The model for weaving has one large weakness, it is based on empirical data where the on-ramp flow is almost equal with the off-ramp flow. The model has then been design with a total weaving flow, which means that the model is insensitive to flow cases where e.g. the on-ramp flow is much larger than the off-ramp flow.
- The model for on-ramp merging does only take into account the on-ramp flow, other international models also have ramp length.

The work with the new capacity models during 1998-2001 had a lack of empirical data, which gave the result that relation between different parameters where difficult to find. E.g. the weaving model has only 6 hours empirical data. The models should preferable add the following parameters:

- Gradient for main line
- Lane width
- Distance to obstacle
- Separate on- and off-ramp flow in the weaving model
- On-ramp length

With the data collection system STRESS, new data have been analyzed and a new model for oversaturated conditions has been developed. Also a new model for capacity in weaving segments has been developed. The new model takes into account both on-ramp and off-ramp flow. The model for link capacity has been further developed with a parameter that takes into account the gradient.

A time-space model for calculation and identification of bottlenecks has also been developed. The time-space model should be answering the following questions:

- How to calculate the emergence of bottlenecks in a system of adjacent interchanges?
- Which bottlenecks arise because of geometric design?
- How to conduct an analysis of the geometric configuration's impact on the occurrence of the bottleneck?
- How to model the changes in the geometric design to eliminate or reduce the bottleneck in time and/or place?

CV:

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Educational Background and Professional Memberships:

M.Sc. Civil Engineering Lund Institute of Technology (LTH) 1995 and Licentiate of Technology at Royal Institute of Technology (KTH) 2002.

2009- Movea Trafikkonsult AB. 2004-2009 Vägverket (Trafikverket), 2003-2004 Vägverket Konsult, 2000-2003 (Part time 2000-2001) Vägverket (Trafikverket), Vägverket Region Stockholm, 1998-2001 (Part time) Väg-och transportforskningsinstitutet (VTI), 1995-2000 Vägverket (Trafikverket), 1994-1995 Lunds Universitet, Lunds Tekniska Högskola,

Key Qualifications, Skills and Experience:

Works mainly with traffic engineering / traffic analysis, ITS and road design. Has 15 years of experience in the area of road design, traffic engineering/traffic analysis and ITS. Has been one of those people who have developed, written and promoted the Swedish road design guideline in the past one and a half decades.

During the past few years around the turn of the last century, Per completed his licentiate thesis at KTH in the field of micro-simulation. Per worked also with the development of intelligent transport systems at the Swedish Road Administration Region of Stockholm for a few years in the early 2000s. Consulting experience is from a time as a consultant to the then National Road Administration Consulting Company in Stockholm (current Vectura).

Per has participated in several national projects, as well as in EU projects and other international projects, often as an expert or project manager. Per has also organized major conferences in the transport sector, and have given presentations at major international conferences. Furthermore, he is a lecturer at graduate and post graduate seminars.

