UIC capacity management methods
– the Mälar line case

Capacity calculations Sweden
UIC Capacity Management 3
Final report

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Summary

In a joint project with participants from Germany (DB Netz), France (SNCF), Netherlands (Prorail), Austria (ÖBB), Switzerland (SBB), Czech (CD), Italy and Sweden (Banverket) a leaflet, UIC 406, has been written for capacity calculations. The chapters are introduction, definitions, calculation of capacity consumption and application.

In the project UIC capacity management 3 the task was to study the relation between capacity consumption, time supplements and punctuality. This was done by calculating capacity consumption and traffic simulations according to a common protocol.

The chosen line was Stockholm – Västerås. The capacity calculations were made for the line section Kungsängen – Karlberg. Three traffic alternatives were constructed. Alternative 1 is traffic of today. In alternative 2 and 3 more trains have been added. For each alternative capacity consumption was calculated. Capacity consumption was 62 % alt 1, 72 % alt 2 and 76% alt 3.

The next step was to calculate time supplements. Time supplements for regional, long distance and freight traffic is in the interval 3 minutes to 4 minutes. For commuter traffic the time supplements is less than 1 minute.

The traffic simulations were made by using the tool RailSys. The model is a description of the Railway system with infrastructure, rolling stock, signalling systems, dispatching algorithm and disturbances.

Two kinds of traffic simulations were made: basic delay and primary delay.

The traffic simulations of basic delay were made by two alternatives: with time supplements and without time supplements. The traffic simulation result for punctuality is delta delay. Delta delay is the difference in punctuality when passing the line section. By compensating with high time supplements the punctuality is almost the same for all alternatives. For the alternative with no time supplements there is a close correlation between capacity consumption and punctuality.

The traffic simulations with a primary delay were made at the beginning of the hour with most trains. The traffic simulation results for punctuality are recovery time for the system and number of disturbed trains. The traffic simulations show a close correlation between capacity consumption and punctuality.