The Challenge

CATO, Computer Aided Train Operation, is a Research and Development project run by Transrail and financed by the Swedish National Rail Administration and also MTAB (operating iron ore trains in northern Sweden.

The scope of the project is to develop a foundation for a future traffic management system allowing trains to run as efficiently as possible considering the overall traffic situation on a rail line. Optimisation criteria may be reduction of energy or power consumption, optimisation of line capacity, reduction of wear etc. The idea is to do this optimisation without increase of running times, but by utilisation of slack in the time table or time slack occuring in the day-to-day traffic. Instead of idle time in front of signals or at sidings, the time shall be used for optimal running.

Our Solution

Optimal operation of the traffic and the individual trains cannot be achieved by a conventional signalling system. The driver needs to know at what time the train shall arrive to a station or a signal, and this time may depend on the daily traffic situation. Furthermore, he needs to know how he shall run the train in order to arrive at the correct time and he needs early information in order to choose the best speed profile.

The concept of CATO is feed computers at the traffic control centres with information about the current traffic situation such as delays, performance parameters for the individual trains etc. The computers then calculate target points (position, time, speed) for each train. This information together with track data ahead is sent to the trains via GSM-R radio. Onboard the train, the optimal speed profile to the next target point is calculated and presented to the driver.

We are convinced that train driving techniques as presented above will be quite commonly used in the future even if the system may seem complex today. Not only will it allow optimal running of the train, but it will also relieve the drivers from the stress of causing delays and not driving in the best way.

The aim of the CATO project is in fact not to develop a final product, but to develop a specification or standard by which various suppliers can develop this type of systems. The system encompasses various areas of railway equipment supply. Thus, a generally agreed system and interface specification is a necessary basis for development and delivery of this type of products. We, and our sponsors, hope the CATO project will create such key to the future.

Implementation year:

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