

LEADER: The complete solution for driver assistance and driver training for energy efficient train operation

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Abstract

Increasing energy costs as well as a strong need to strengthen competitiveness against other railway operators but also against other means of transportation are the key drivers for railway operators to ask for driver assistance systems as well as for enhanced driver training concepts: A request which has been satisfied by Knorr-Bremse's LEADER system since more than ten years.

Due to heavy loads, longer stopping distances than road traffic and time table and signalling influenced operation the real behaviour of a train is difficult to be exact predicted by the driver. In addition the drivers' performance is also dependant on their level of education, their experience and the personal condition on that day. There are two ways of supporting drivers to reach a high efficiency in train driving: a good driver training and support in making decisions through a driver assistant system. The later gives additional information like grades, speed limits and optimised speed profiles to the driver that enables him to look further ahead and herewith to allow him to drive energy efficiently.

In the field of driver training simulators are getting more and more accepted as adequate tool to educate drivers under various conditions. Virtual reality allows simulating situations which can not easily be trained in a real environment. Simulator runs allow also a dedicated training of drivers with a focus on energy efficient driving style.

The LEADER system combines both aspects: A driver assistant helps the train drivers to handle their vehicle efficiently and simulators allow an advanced driver training. In a worldwide unique approach LEADER offers the advantages of both systems and a clear additional benefit through an interface between both systems. Using the driver assistant system including an event recorder individual strengths and weaknesses of drivers can be analysed and subsequently addressed in a later driver training. Realistic situations where a driver shows individual need for improvement can be generated and efficiently trained.

Efficient train operation helps operators to reduce cost but it also creates benefit for the environment. In 2008 LEADER equipped trains helped to reduce the CO₂ emissions by about 150 thousand tons. LEADER is applicable to both freight and passenger trains. This paper shows the results of more than 10 years of field application in the freight market as well as new developments for the passenger train market.

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