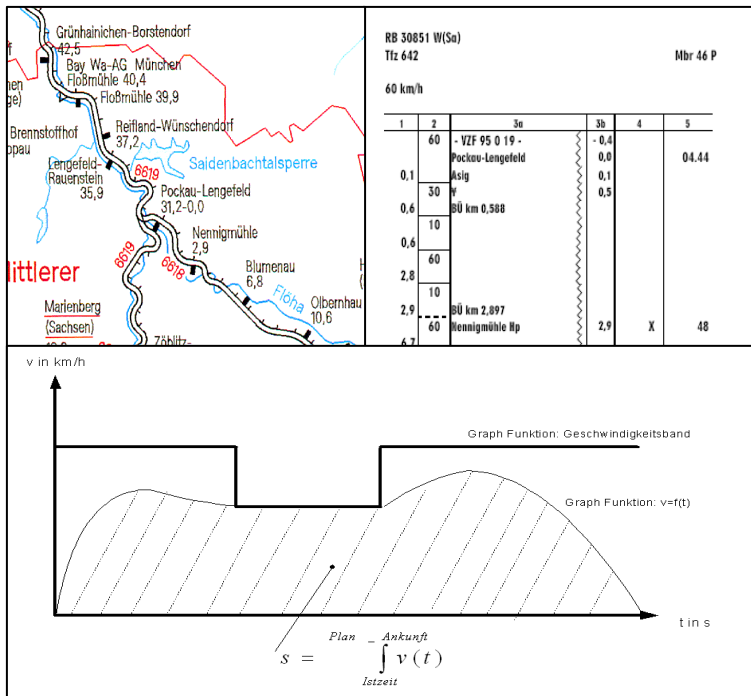


Application for the UIC Sustainability Awards 2010

Category: "Energy Efficiency and CO2"



Ecotrainbook Driver assistance system



DB RegioNetz Verkehrs GmbH

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P.R-RNV

Frankfurt, 28.04.2010

Ecotrainbook is the result of the successful cooperation between DB Systel and DB RegioNetz for the optimisation of regional rail traffic



The EcoTrainBook system solution was developed by DB Systel and DB RegioNetz Verkehrs GmbH-Erzgebirgsbahn, for use in local rail passenger traffic.

The system offers the following functions:

- **Energy efficient driving**
based on speed recommendations for low fuel consumption
- **Transmission of timetable data and delay forecasts in real time** on the basis of the commonly recognised VDV interface (DB internal/external)
- **Improvement in operating communications**
Direct dial via intelligent on board directory (train and location-specific numbers)
- **User-specific modules**
Consumption data capture for diesel and water; instructions database; official reports

Ecotrainbook makes possible a direct reduction in costs (energy savings), real time customer information and optimised operations processes (1)



The benefits of the Ecotrainbook functions in overview:

- **Energy efficient driving**

The speed recommendations in the Ecotrainbook systems have led where it has been used (DB AG - Erzgebirgsbahn, Arriva Deutschland GmbH - Vogtlandbahn) to measurable energy savings

Benefit: savings in diesel consumption of an average of 4%

- **Improvements in operating communications**

The intelligent on board directory enables easy, fast, secure communication between the driver, movements supervisor and control centre, both in normal running and when things go wrong

Benefit: high level of staff satisfaction and acceptance amongst users (drivers)

Ecotrainbook makes possible a direct reduction in costs (energy savings), real time customer information and optimised operations processes (2)



The benefits of the Ecotrainbook functions in overview:

- **Transmission of timetable data and delay forecasts in real time**

By supporting the commonly recognised VDV interface, customers and orderers can be supplied with real time information about timetables and likely delays.

Benefit: Improvement of the intermodal information offer

Orderers and customers receive real time train information

- **User-specific modules**

Ecotrainbook is a high performance on-board computer with with a large touch display. The following additional applications are already functional:

Benefits:

Diesel consumption data analysis e.g. for the detection of damaged engines.

→ Analysis of engine coolant consumption

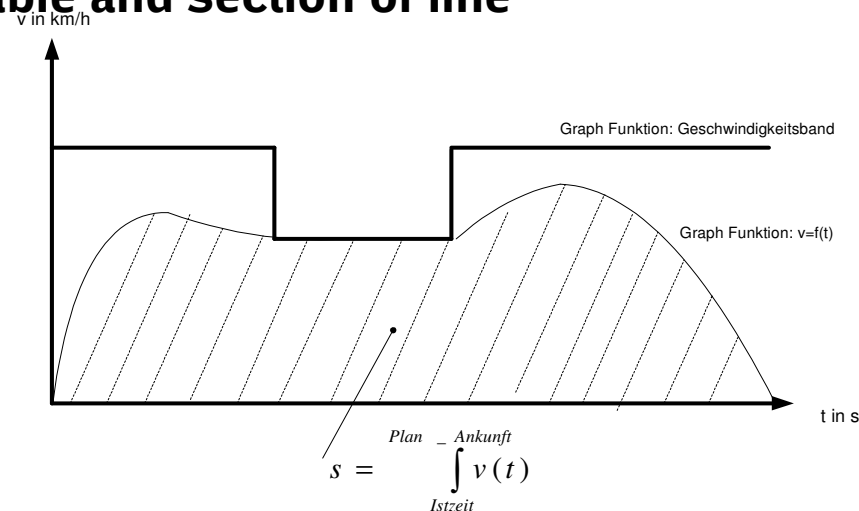
All necessary official documents (instructions) are stored on Fassi.

The traction unit's energy consumption can be reduced by up to 8 % through the following factors:

- Minimising speed changes
- Reducing the maximum running speed
- Continuous calculations to support the driver

On average, savings of ca. 4 % are achieved.

Optimisation occurs by means of the calculation of a so-called Riemann integral within the limits timetable and section of line



Basic function of the system – cab display

Eco Train Book® DB Telematik 2006:Anzeigemodul

8000
km 034,884

05.09.2006
14:04:14

V max=40 km/h -32

31

031 0

BF **LA** **ZU** **EX**

V= 40 Buch Eintrag km:34,8
wechselt in 516 m nach
V= 50 Buch Eintrag km:0,6

30818:Mbr 90 P Vmax=120 Tzf642

1	2		3b	4	an	ab	7	8	9	10
	40	Vejprty	< 34.8			14.04				
		Asig	< 34.9							
		Bahnverw.grenze	< 35.4							
0.6	-----		< 0.6							
	50	Bärenstein Hp	< 0.9		14.06	14.06				
8.88	-----		< 8.9							
	20	BÜ in km 8,882	< 8.9							
8.9	-----		<							
	50		<							

LA Eintrag

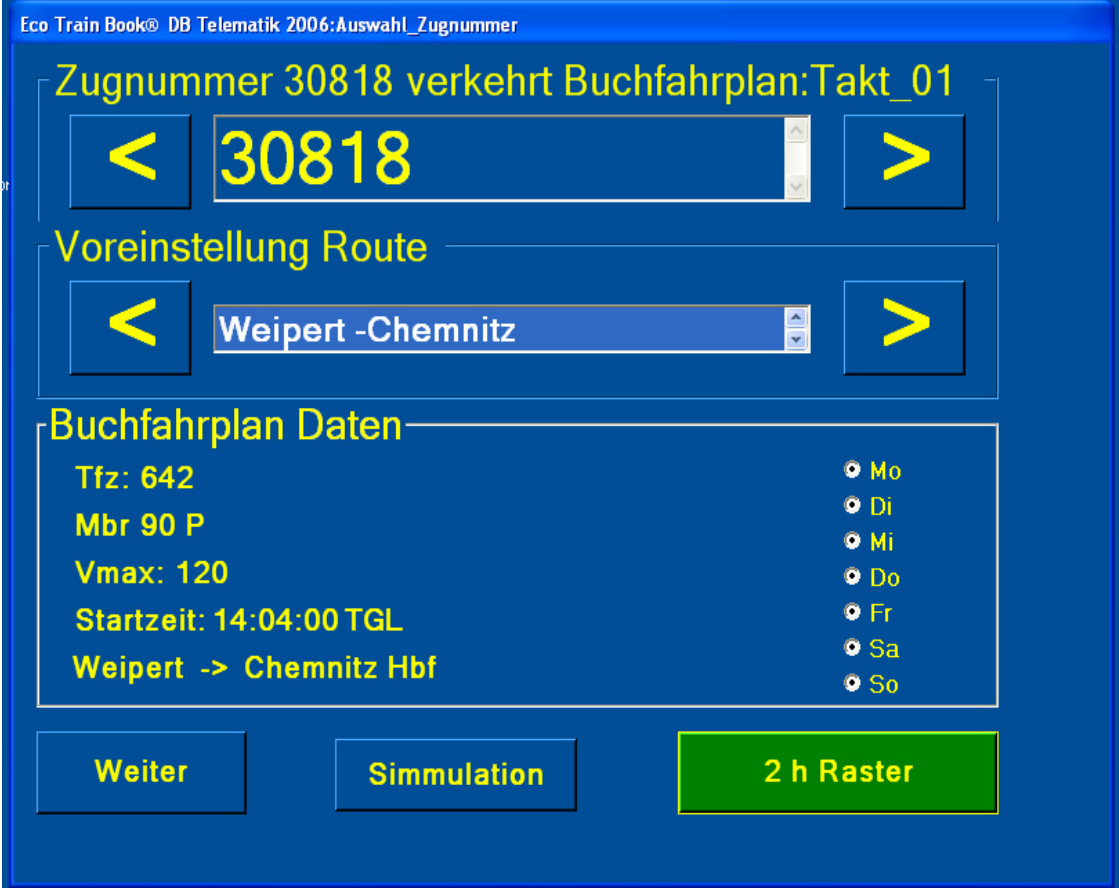
BärensteinGrenz-Annab-Buchh u Bf	-	-	↔	-	Zwischen Vejprty und Annab-B. u Bf Sonderheft der Erzgebir
Cranzahl-Annab-Buchh u Bf	-	Cranzahl - Annaberg u Bf:Bremsweg neu 400 m	↔	-	-
Cranzahl-Annab-Buchh Süd	15,3 - 15,4	Absturzgefahr	↔	-	Geländer nicht vorhanden

← Displays energy-optimal speed
Acoustic recommendation to coast (neutral position)

← Working timetable display incl. ATC operation

← Displays speed-restricted route sections

Basic function of the system – train number selection



The screenshot shows the 'Eco Train Book' interface with the following elements:

- Header:** Eco Train Book® DB Telematik 2006:Auswahl_Zugnummer
- Section 1:** Zugnummer 30818 verkehrt Buchfahrplan:Takt_01. Below it is a text input field containing '30818' with left and right arrow buttons.
- Section 2:** Voreinstellung Route. Below it is a text input field containing 'Weipert -Chemnitz' with left and right arrow buttons.
- Section 3:** Buchfahrplan Daten. This section contains:
 - Tfz: 642
 - Mbr 90 P
 - Vmax: 120
 - Startzeit: 14:04:00 TGL
 - Weipert -> Chemnitz Hbf
 - A list of days with radio buttons: Mo, Di, Mi, Do, Fr, Sa, So.
- Bottom Buttons:** 'Weiter', 'Simulation', and '2 h Raster'.

Annotations on the right side of the screenshot:

- An arrow points from the '30818' input field to a box labeled 'Train number selection'.
- An arrow points from the 'Weipert -Chemnitz' input field to a box labeled 'Pre-selection of working timetable area'.
- An arrow points from the '2 h Raster' button to a box labeled 'Constraint on departure time +/- 2 hrs'.

Basic function of the system – overview of speed-restricted sections

FAS System DB Telematik 2006:Langsamfahrstellen

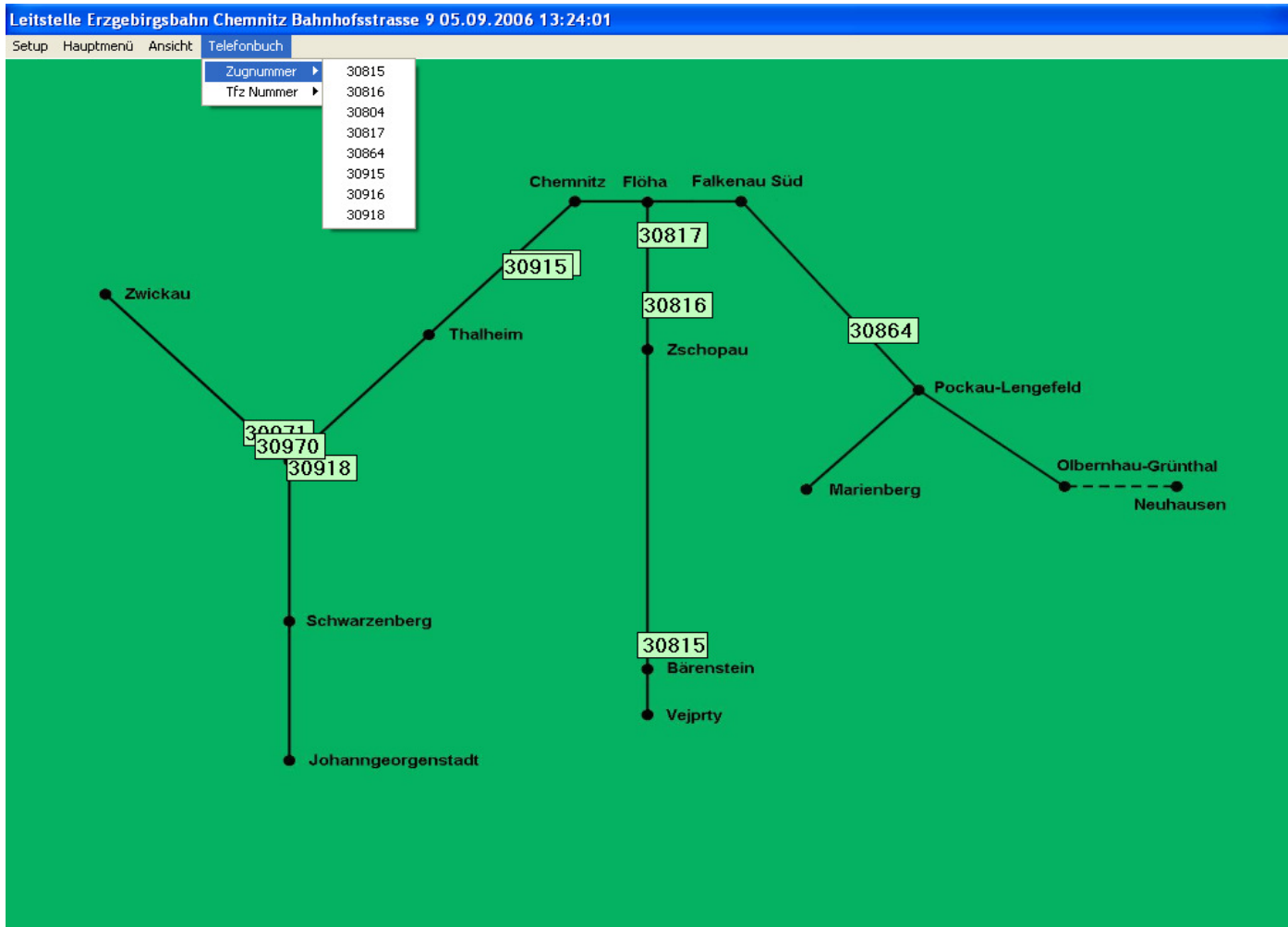
Anfang Weiter Zurück zur Anzeige

Übersicht der Langsamfahrstellen

LA Eintrag

BärensteinGrenz-Annab-Buchh u Bf	-	-	↔	-	Zwischen Vejprty und Annab-B. u Bf Sonderheft der Erzgebir
Cranzahl-Annab-Buchh u Bf	-	Cranzahl - Annaberg u Bf:Bremsweg neu 400 m	↔	-	-
Cranzahl-Annab-Buchh Süd	15,3 - 15,4	Absturzgefahr	↔	-	Geländer nicht vorhanden
Annab-BuchhSüd	Esig 15A 15,71	neu	↓	-	-
Schönfeld-Wiesa-Wolkenstein	6,8 - 7,3 500 m	40	↔	-	Oberbaumangel
Schönfeld-Wiesa-Wolkenstein	7,2 - 7,3	Absturzgefahr	↔	-	Geländer defekt
Schönfeld-Wiesa-Wolkenstein	7,8 - 7,9	Absturzgefahr	↔	-	Geländer defekt
Schönfeld-Wiesa-Wolkenstein	8,5 - 8,6 100 m	30	↓	-	- Lf 1 wiederholt am BahnsteigendeOberbaumangel
Wolkenstein	13,3 - 13,9 700 m	20	↔	gilt nur für nicht dchg Hgl	- Lf 1/2Fzv 1,5/2Oberbaumangel

Basic function of the system – control centre main view



Overview of all active traction units on the route network

Phone calls to drivers by mouse click

Overview of delay times for every train number and subsequent trains

What are the major advantages compared to other commercial solutions?

- Access to detailed track data (position, gradient, speed, train path elements) via GSM/GPS improves reliability of the system
- Database stores tractive resistance for all train path elements
- Access to timetable database and actual positioning
 - Calculation of speed recommendation optimized for energy consumption and timetable (considering actual delays!)
 - 4-10 % reduction of fuel consumption
- First solution of a driver assistance system for multiple units and locos deployed in regional transport
- Exchange of timetable data and delay forecasts on the basis of the commonly recognized VDV interface (DB internal/external)
 - Automatic information of the local train/bus operators of terminal arrival times to harmonize connections
 - Increase of the passenger comfort