



Panel 1

Specification and verification of energy consumption

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**Markus Meyer, emkamatik GmbH
markus.meyer@emkamatik.com**

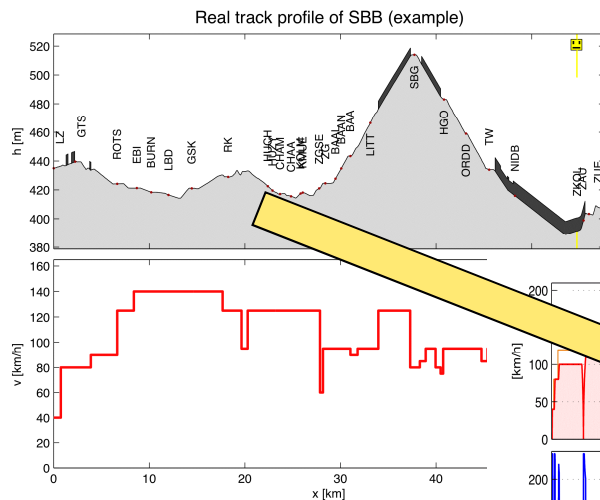
Scope of TecRec 100_001

- Definition of a harmonised procedure for
 - specification
 - and verificationof the energy consumption of railway rolling stock during the procurement process
- Agreed by rolling stock manufacturers (UNIFE) and railway operators (UIC)
- Including aspects of
 - rolling stock
 - infrastructure
 - operation

Table of contents of TecRec 100_001

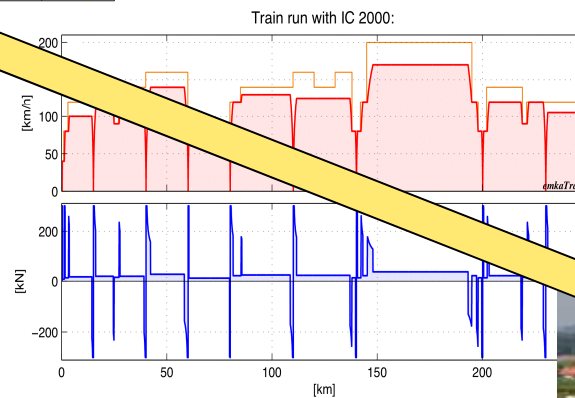
- 1 Scope
- 2 Normative references
- 3 Terms, definitions abbreviations
- 4 General description of the methodology
- 5 Infrastructure description**
- 6 Operational requirements**
- 7 Simulation**
- 8 Verification**
- 9 Post processing

The core of TecRec 100_001



5, 6 Definition of infrastructure and timetable (purchaser)

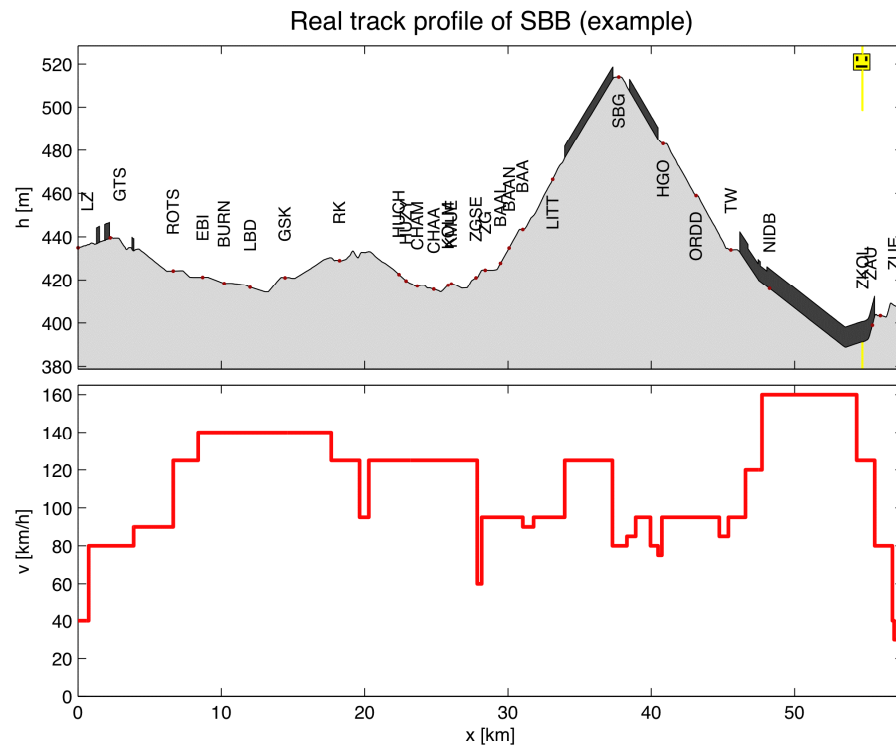
7 Simulation of energy consumption (manufacturer)



8 Verification by measurement on the same railway line (during type tests)



5 Infrastructure data



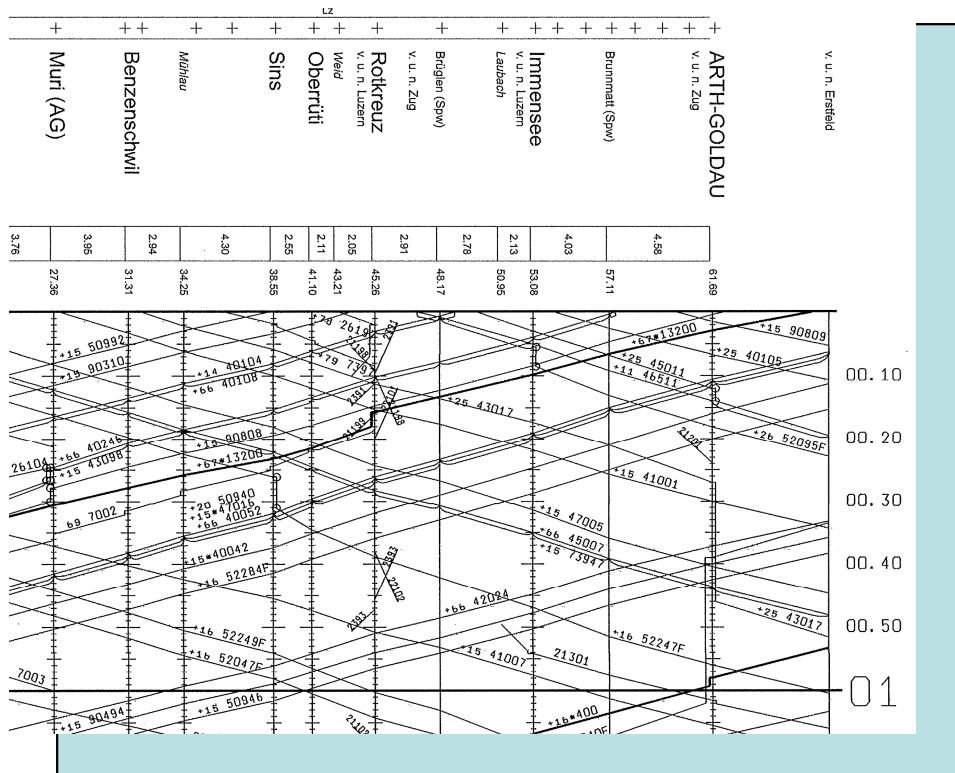
Real infrastructure data;

- Power supply system
- Height profile
- Speed limits
- ... etc.

Responsible:

- **Infrastructure owner**
(via train operator)

6 Operational requirements



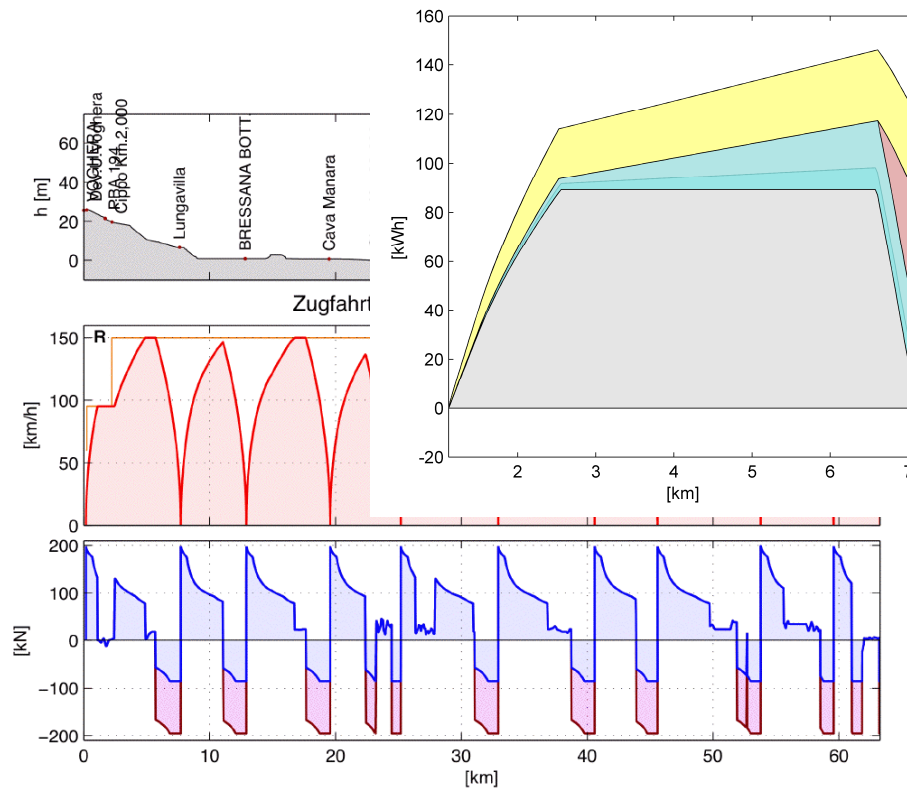
Operational data:

- Timetable
- Payload
- Driving style
- Regenerative brake
- Comfort functions
- Parked trains

Responsible:

- ***Train operator***

7 Simulation



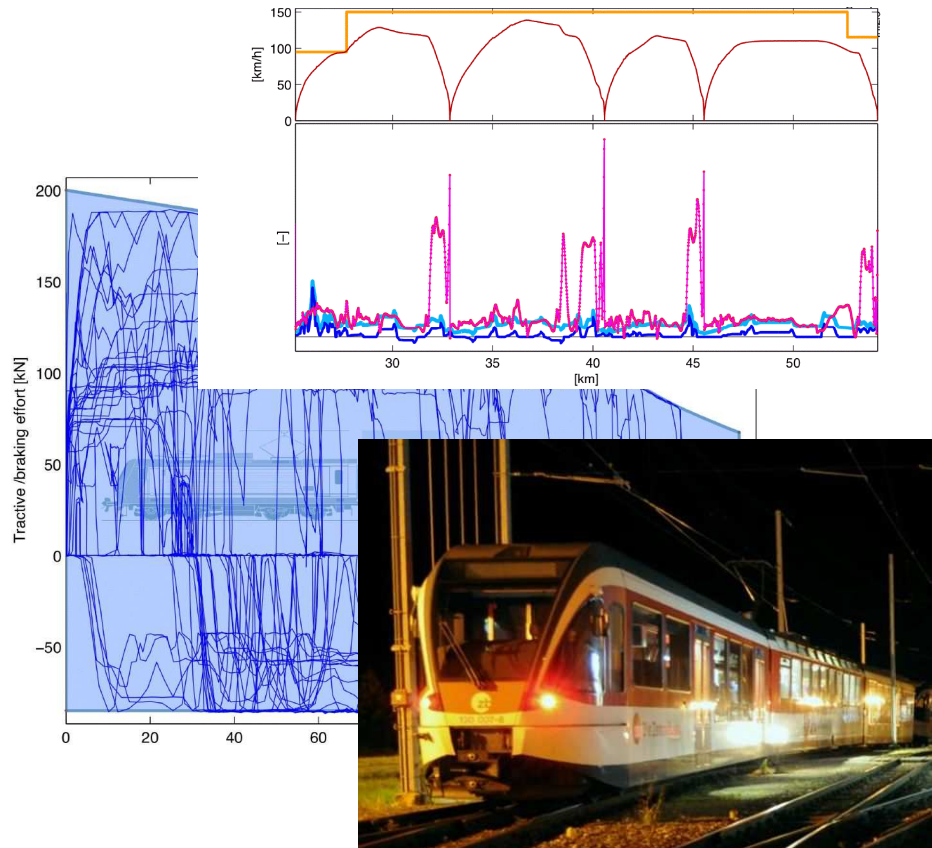
Simulation:

- Speed profiles
- Running time
- Energy consumption for train runs
- Energy consumption of parked trains

Responsible:

- ***Rolling stock manufacturer***

8 Verification



Test runs for:

- Comparison between simulation and reality
- Measurement of parked trains

Responsible:

- ***Rolling stock manufacturer***

Confirmation:

- ***Train operator***

„Part A“ and „Part B“

- TecRec 100_001 can be used in two different ways:

- **A**

Real railway lines and timetables

➡ fully ready today

- **B**

Standard profiles (similar to automotive industry)

➡ annex includes profiles; future fine tuning may be necessary

Conclusions

- TecRec 100_001 is (in our view) the future de-facto standard for handling energy consumption in rolling stock procurement processes
- It takes into account all relevant aspects of railway operation (also parked trains)
- We encourage you to apply TecRec 100_001 !
- Give feedback about your experiences to UIC and UNIFE
- A „user workshop“ may be planned in 2011