



EcoDriving at ÖBB-trains

presentation WKO

activities in the train driving sector



long distance trains
with up to 230 km/h



freight trains with up to 3.000
tons



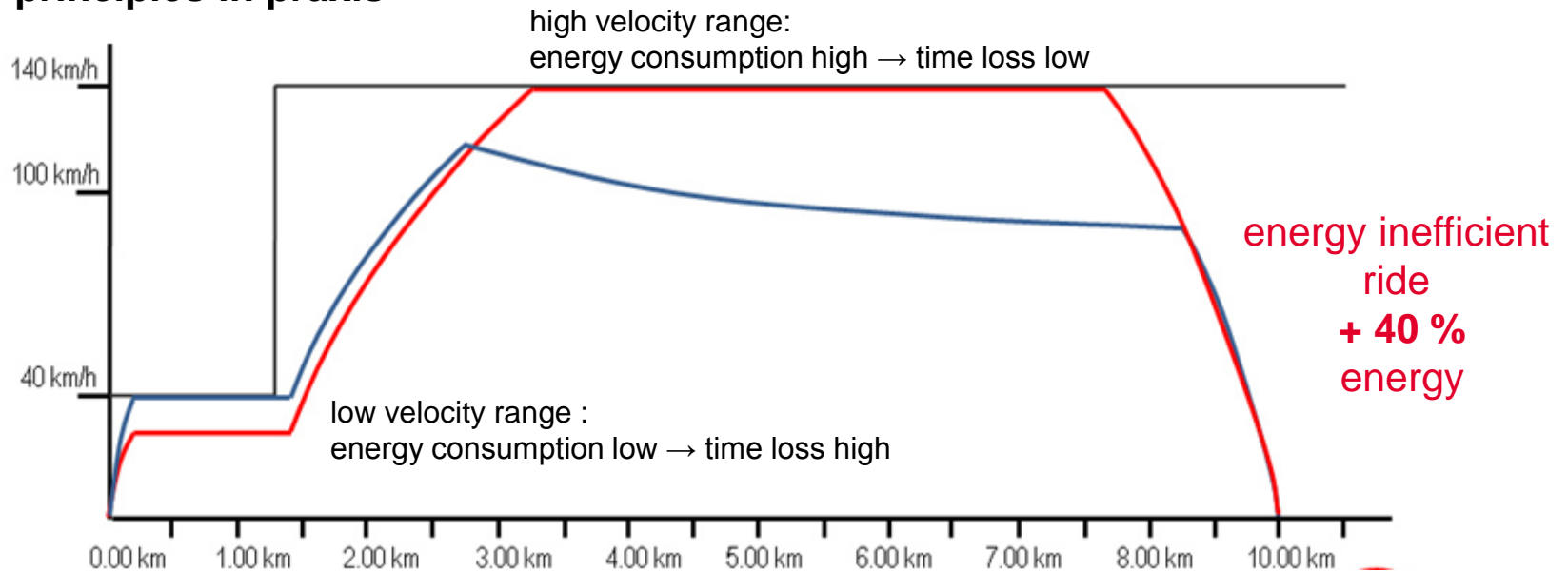
regional traffic

tracks with a slope up to 30 ‰
mainly electric locomotives with recuperation brake

EcoDriving = Energy optimized driving with strict observance

- safety
- punctuality
- comfort

principles in praxis



- rapid acceleration – time table reserves for succeeding ride
- utilize time table reserves and prevent high velocity
- prevent unnecessary braking by foreseeing driving (communication to Infrastructure-Dispatcher)
- use electric recuperation brake

basics:

- **time table** from infrastructure with sufficient reserve
- **systematic support**
 - offline assistance systems had been tested
 - second energy optimized velocity in the time table was implemented in 2014
 - driving advice to the driver via text-SMS on the cab radio from the infrastructure dispatcher (in realization process)
 - adaptive train steering (planned)

energy optimized velocity (2. column) for the train driver in the time table „TIM“

2.= energy optimized velocity

RJ 553		-> W.Meidling 07:03:30 -> Graz Hbf 09:33:30		Freitag 13.09.2013	11:09:07
ab km 46,90: 140 km/h		N.Halt: Wr.Neustadt Hbf!;(in Nb) *Nb* 07:28		✓ 02.08.2013 09:41:17	
ab km 48,10: 100 km/h					
	€ 8,60		Liesing-Fbf! (in Lg);*Lgf*		07:08
	€ 9,60		Liesing! (in Lg) *Lg*		07:08
	10,20	120			
160	11,00		Perchtoldsdorf		
160	12,00	120	Br.-Maria Enz.Nord!;(in Bu) *Bun*		07:09
	12,90		Brunn-Maria Enz.!(in Bu) *Bu*		07:10
	€ 15,20		Mödling		07:11
160 (120)	POS: 12,00		105	-GSM-R-A-	

that speed at which an operationally-scheduled ride, reaches the operation points and the scheduled stops on time.

main steps:

- **information and training for the loco drivers**
 - EcoDriving was integrated in the basic education
 - current EcoDriving topics during the periodically drivers education
 - guideline, check lists
 - energy saving – simulator training



experience several qualities of driving on the simulator

main steps:

- **information, education and motivation**
 - professional accompaniment in the drivers cabin from a specialist*



*in each region one experienced energy saving specialist, accompanies the loco drivers during selected rides.

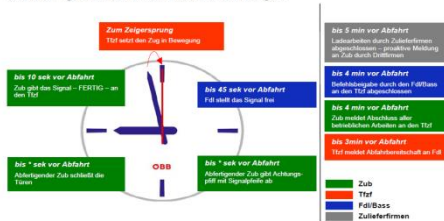
- competitions (simulator), rewards, trials with new standards in live operation

EcoDriving

the five most important rules:

punctual departure

Visualisierung der Zeitschiene beim Abfahren von P-Zügen:



*) Der konkrete Zeitpunkt richtet sich nach der jeweiligen technischen Ausstattung des Zuges und der Art der Abfertigung in der Betriebsstelle und ist so zu wählen, dass sichergestellt werden kann, dass mit dem Sekundenzeigersprung auf die verlaufenden Abfahrtschalt der Zug in Bewegung gesetzt werden kann.

rapid acceleration

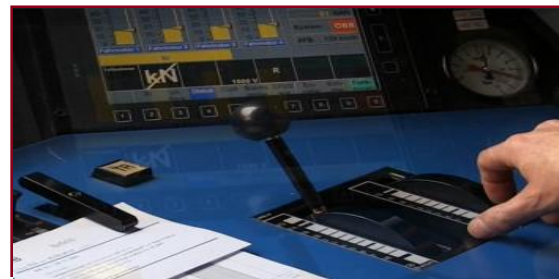


if not delayed, drive the velocity in the second column (enough to be punctual)

RJ 553		
ab km 46,90: 140 km/h		
ab km 48,10: 100 km/h		
£ 8,60		
£ 9,60		
160	10,20	120
	11,00	
160	12,00	120
	12,90	
£ 15,20		
160 (120)	POS: 12,00	
Zug wählen	Zugstatus	folgende LAs



turn off, roll out



recuperate, especially at the high velocity range

additional steps

- **organizational measures in the stabling zones**
 - clear guidelines in the case of heating or cooling from train in stabling zones.
 - „app“ on the loco drivers smartphone, with a step by step description on how to „shut down“ a loco correctly.



additional steps

- **system engineering**

- minimize idle running consumption (park settings, automatic stop for diesel engines)
- raise the locomotive efficiency (system updates)
- hybrid locomotives
- minimize board energy in passenger train carriage

