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ECONOMIC COMMISSION FOR EUROPE

INLAND TRANSPORT COMMITTEE

<u>**Working Party on Rail Transport**</u>
(Fifty-seventh session, 21-23 October 2003,
agenda item 7)

PRODUCTIVITY IN RAIL TRANSPORT

<u>Transmitted by the Governments of Azerbaijan, Armenia, Croatia, Hungary, Republic of
Moldova, Slovakia, Sweden, Switzerland and United States of America</u>

<u>Note</u>: Following the decision of the Working Party at its fifty-sixth session (TRANS/SC.2/198,
para. 13), the secretariat had collected replies to a questionnaire containing a range of quality
indicators of railway productivity for passenger and freight transport as referred to in document
TRANS/SC.2/2002/15, section IV.

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AZERBAIJAN

Indicator	Unit		
Efficient service delivery	Price (USD per freight ton km)	0,032	USD/net ton km
Service quality	Average train speed – freight transport	33	km/h
	Percentage of arrivals delayed less than 15 minutes	93	per cent
Safety	Accidents in mill. train-km (freight + passenger)	22,7	accident/train-km
Accessibility	Network density (route km/km2)	0,0245	
	Net ton km FT/GDP (current prices)	2,28	USD/net ton km
	Net ton km FT/GDP (permanent prices)		USD/net ton km
	Rail share of person-km/(person-km + Net ton km)	7.9	%
Environment quality	Measurement units for the net ton km performed	0,033	
Financial sustainability	Costs/income (revenue)		%
	Asset profitability (profit/total assets)		%
Capital	Track operated under slow orders (maintenance, track locks)		
	km travelled per available locomotive/day (passenger transport)		locomotive km/day
	km travelled per available locomotive/day (freight transport)	0.49	locomotive km/day
Management	Ratio – freight transport (excluding subsidies)/price in freight transport	61.9	%
	Average locomotive availability %	44.8	%
	Average freight and passenger wagon availability %	16.3	%

ARMENIA

Indicator	Measure	Best practice*	Your reply
Efficient service delivery	Price (US$ per freight ton km)	< 2 ¢	$ 0,024
	Price (US$ per passenger km)		$ 0,005
Service quality	Average train speed (km/h) (urban, local, intercity, and for various types of freight trains)		24,8 km/h
	% of arrivals less than 15 min. late	95 %	30%
Safety	Train accidents (per million train km)		28 accidents
Accessibility	Network density (route km/km^2)		0.04 km
	Freight ton km /US$ GDP (PPP)		-
	Rail share of rail + truck ton km		3.2%
	Rail passenger km as % of passenger km + ton km		3.2%
Environment quality	Kj of energy per converted ton km		524 (10^4 ton/km/br)
Financial sustainability	% of costs covered from internal cash generation Real return on total gross assets (%)	> 100 USA	0.14
Capital	Track operated under slow orders on track and structures - route km - % total km		112km 13.5%
	km travelled per available locomotive/day		167 km
Management	Ratio of average passenger tariff to average freight tariff (based on US$ per km) (%)	> 2.0 Europe	$ 0.005 p/km $ 0.024 ton/km
	Average locomotive availability (%)	90 USA	19.3%
	Average freight and passenger wagon availability (%)	>90USA/Europe	58.5% freight 20.4% pass.

CROATIA

Freight transport

Indicator	Measure	Best practice*	Your reply
Efficient service delivery	Price (US$ per freight ton km)	< 2 ¢	3,3 US c/tkm
	Price (US$ per passenger km)		
Service quality	Average train speed (km/h) (urban, local, intercity, etc.)		30 km/h
	% of arrivals less than 15 min. late	95 %	26 min/100 km
Safety	Train accidents (per million train km)		
Accessibility	Network density (route km/km^2)		0,05
	Freight ton km /US$ GDP (P. P. Parity)		0,1
	Rail share of rail + truck ton km		
	Rail passenger km as % of passenger km + ton km (%)		40 %
Financial sustainability	% of costs covered from internal cash generation Real return on total gross assets (%)	> 100 USA	62,5 % ratio of revenues/costs in freight transport
Management	Ratio of average passenger tariff to average freight tariff (based on US$ per km) (%)	> 2.0 Europe	
	Locomotive availability (%)	90 USA	63 %
	Freight and passenger wagon availability (%)	>90USA/Europe	93,4 %

Passenger transport

Indicator	Measure	Best practice*	Your reply
Efficient service delivery	Price (US$ per freight ton km)	< 2 ¢	
	Price (US$ per passenger km)		0,03366
Service quality	Average train speed (km/h) (urban, local, intercity,etc.)		- fast (F), express (E) and accelerated (A) trains - 60 km/h; - border (B) and suburban (S) trains – 41 km/h; - passenger (P) and local (L) trains – 45 km/h
	% of arrivals less than 15 min. late	95 %	- F, E, and A – 71,5 % - B and S – 95,4 % - P and L – 93,2 %
Accessibility	Network density (route km/km^2)		0,05
	Freight ton km /US$ GDP (P. P. Parity)		0,1
	Rail passenger km as % of passenger km + ton km (%)		40 %
Management	Ratio of average passenger tariff to average freight tariff (based on US$ per km) (%)	> 2.0 Europe	
	Locomotive availability (%)	90 USA	63 %
	Freight and passenger wagon availability (%)	>90 USA/ Europe	87,3 %

HUNGARY

Freight transport, 2001

Indicator	Measure	Best practice*	Your reply
Efficient service delivery	Price (US$ per freight ton km)	< 2 ¢	2 ,8¢
	Price (US$ per passenger km)		1,2 ¢
Service quality	Average train speed (km/h) (urban, local, intercity, and for various types of freight trains)		32,1mainline 16,2 shunting
	% of arrivals less than 15 min. late	95 %	
Safety	Train accidents (per million train km)(passenger and freight)		0,28
Accessibility	Network density (route km/km^2)		
	Freight ton km /US$ GDP (Purchasing Power. Parity – PPP)		0,09
	Rail share of rail + truck ton km		17,6
	Rail passenger km as % of passenger km + ton km (%)		22,3
Environment quality	Kj of energy per converted ton km (=pass. tonkm + tonkm)		319,8
Financial sustainability	% of costs covered from internal cash generation Revenue / cost ratio (pass. and freight)	> 100 USA	64,8
Capital	Track operated under slow orders on track and structures - route km - % total km		2990 40
	km travelled per available locomotive/day (passenger and freight)		224
Management	Ratio of average passenger tariff to average freight tariff (based on US$ per km) (%)	> 2.0 Europe	0,4
	Average locomotive availability (%)(passenger and freight)	90 USA	82,6
	Average freight and passenger wagon availability (%)	>90USA/Europe	74

HUNGARY

Passenger transport 2001

Indicator	Measure	Best practice*	Your reply
Efficient service delivery	Price (US$ per freight ton km)	< 2 ¢	2 ,8¢
	Price (US$ per passenger km)		1,2 ¢
Service quality	Average train speed (km/h) (urban, local, intercity, and for various types of freight trains)		66,1 express 43,9 local
	% of arrivals less than 15 min. late	95 %	95,7
Safety	Train accidents (per million train km)(passenger and freight)		0,28
Accessibility	Network density (route km/km^2)		0,09
	Freight ton km /US$ GDP (Purchasing Power. Parity - PPP)		
	Rail share of rail + truck ton km		
	Rail passenger km as % of passenger km + ton km (%)		57,2
Environment quality	Kj of energy per converted ton km (=pass.tonkm + tonkm)		319,8
Financial sustainability	% of costs covered from internal cash generation Revenue / cost ratio (pass. and freight)	> 100 USA	64,8
Capital	Track operated under slow orders on track and structures - route km - % total km		2990 40
	km travelled per available locomotive/day (passenger and freight)		224
Management	Ratio of average passenger tariff to average freight tariff (based on US$ per km) (%)	> 2.0 Europe	0,4
	Average locomotive availability (%)(passenger and freight)	90 USA	82,6
	Average freight and passenger wagon availability (%)	>90USA/Europe	69

REPUBLIC OF MOLDOVA

Indicator	Measure	Best practice	Moldova[1]
Efficient service delivery	Price (US$ per freight ton km)	< 2 ¢	0.0137
	Price (US$ per passenger km)		0.0278
Service quality	Average train speed (km/h) Passenger trains: 　　　　Suburban 　　　　Local 　　　　International Freight trains		 25.2 31.5 34.5 30.4
	% of arrivals less than 15 min. late	95 %	99.7
Safety	Train accidents (per million train km)		None
Accessibility	Network density (route km/km^2)		0.033
	Freight ton km /US$ GDP (Purchasing Power Parity - PPP)		1.67
	Rail share of rail + truck ton km		77.0
	Rail passenger km as % of passenger km + ton km (%)		11.6
Environment quality	Kj of energy per converted ton km		not applied
Financial sustainability	% of costs covered from internal cash generation Real return on total gross assets (%)	> 100 USA	37.8
Capital	Track operated under slow orders on track and structures: 　　　　route km 　　　　% total km		 31.2 2.5
	km travelled per available locomotive/day		425.3
Management	Ratio of average passenger tariff to average freight tariff (based on US$ per km) (%)	> 2.0 Europe	2.03
	Average locomotive availability (%)	90 USA	not applied
	Average freight and passenger wagon availability (%)	>90 USA/ Europe	not applied

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[1] Source: calculations made by CFM (the Railway of Moldova).

SLOVAKIA

Indicator			
Efficient service delivery	Price (USD per freight ton km)	0,032	USD/net ton km
	Price (USD per passenger km)	0,017	USD/net ton km
	Price in passenger transport (including subsidies)	0,059	USD/net ton km
Service quality	Average train speed – freight transport	28,02	km/h
	Average train speed – passenger transport	34,39	km/h
	Technical speed – freight transport	47,05	km/h
	Technical speed – passenger transport	55,49	km/h
	Percentage of arrivals delayed less than 15 minutes	not monitored	
Safety	Accidents in mill. train-km (freight + passenger)	8,78	accident/train-km
Accessibility	Network density (route km/km2)	0,075	
	Net ton km FT/GDP (current prices)	2,28	USD/net ton km
	Net ton km FT/GDP (permanent prices)	1,57	USD/net ton km
	Rail share of person-km/(person-km + Net ton km)	20,53	%
Environment quality	Measurement units for the net ton km performed	0,336	
Financial sustainability	Costs/income (revenue)	101,12	%
	Asset profitability (profit/total assets)	-0,61	%
Capital	Track operated under slow orders (maintenance, track locks)	40 – 190 km 0,58 – 2,76 %	
	km travelled per available locomotive/day (passenger transport)	1 159 002	locomotive km/day
	km travelled per available locomotive/day (freight transport)	1 071 056	locomotive km/day
Management	Ratio – freight transport (excluding subsidies)/price in freight transport	53,5	%
	Average locomotive availability %	not monitored	
	Average freight and passenger wagon availability %	not monitored	

Proposals for qualitative indicators (criteria) to improve the productivity in passenger transport
1. Productivity - services
2. Productivity – revenue
3. Overall liquidity
4. Interest coverage
5. Work ratio (operational costs without deprecations / income excluding subsidies)

Natural indicators:
1. Passenger transport (pers. km) – differentiated by domestic and international transport
2. Freight transport (net ton km) - differentiated by domestic and international transport
3. Average transport distance in freight and passenger transport
4. Ratio of the transport and operational performance in freight transport (net ton km/gross ton km)
5. Loading/unloading in freight transport – total (tons)

SWEDEN

Indicator	Measure	Best practice*	Your reply Year 2001
Efficient service delivery	Price (US$ per freight ton km) *(Note: figures calculated with exchange rate 1 US$ = 8.27 SEK mean selling rates during 1999)*	< 2 ¢	Year 1999 approx: 0.20 SEK or 2.4 ¢ Or calculated with the same exchange rate as in 2001 1,9 ¢
	Price (US$ per passenger km) *(Note: figures calculated with exchange rate 1 US$ = 10.33 SEK mean selling rates during 2001)*		Year 2001 approx: 0.79 SEK or 7.6 ¢
	Note: We have calculated these prices with accessible figures from public sources. This means that we have used reported operating income as basis and not the specific passengers and freight traffic receipts. These receipts are unknown except for the railway undertakings themselves. You should note that this might result in slightly higher prices then if we had accessed figures of the actual receipts. In particular, this is the case with the freight tonnes kilometres price.		
Service quality	Average train speed (km/h) (urban, local, intercity, and for various types of freight trains)		Passenger traffic Urban: 60 km/h Local: 75 km/h InterCity: 105 km/h Freight tr.: 65 km
	% of arrivals less than 15 min. late. *(Note: % of arrivals equal or less then 5 minutes, year 2002)*	95 %	Passenger: 92% Freight: 75%
Safety	Train accidents (per million train km)		0,48
Accessibility	Network density (route km/km^2) *(Note: Inland lakes etc is excluded from km^2 figure)*		0,027
	Freight ton km /US$ GDP (Purchasing Power. Parity - PPP)		0,084
	Rail share of rail + truck ton km		34%
	Rail passenger km as % of passenger km + ton km (%)		32%
Environment quality	Kj of energy per converted ton km *(Note: Electric energy including losses in sub stations supplying the line plus diesel energy divided with gross hauled tonne-kilometres)*		Passenger: 236 kJ Freight: 107 kJ
Capital	km travelled per available locomotive/day *(Note: figure for passenger traffic calculated with available number of tractive unites due to the great number of railcars)*		Passenger: 349 km Freight: 230 km
Management	Ratio of average passenger tariff to average freight tariff (based on US$ per km) (%) *(Note: Ratio is based on figures reported in 'Efficient service delivery')*	> 2.0 Europe	3.95
	Average locomotive availability (%) *(Note: Figures are not accessible. Railway undertakings have not reported this figure for, at least, the last ten years)*	90 USA	No statistics available
	Average freight and passenger wagon availability (%) *(Note: 'Up to date' figures are not accessible. The latest reported figures are from 1991)*	>90USA/Eu rope	Year: 1991 Freight: 87% Passenger: 91%

SWITZERLAND

Indicator	Measure	Passenger traffic	Freight traffic
Efficient service delivery	Price in CHF (per passenger/freight ton km)	0.162	0.109
Service quality	Average train speed • Total freight • Wagon load traffic • Rolling road Gotthard • Oil Switzerland	--- 	49.46 46.38 53.00 53.03
	% of arrivals less than 15 min. late	99.12	72.43
Safety	Train accidents (per mio train km)	0.0517	0.2857
Accessibility (for the whole Swiss rail network in the year 2000)	Network density (route km/ km2)	0.000122	0.000122
	Freight ton km/GDP at market prices (in CHF)	---	0.0256
	Rail ton km / truck ton km	---	47.4 %
	Rail passenger km as % of passenger km and ton km (road + rail) (year 1999)	11.2 %	---
Environment quality	Kj of energy per converted ton km	0.3096	0.2232
Financial sustainability (year 2002)	% of costs covered from internal cash generation (2002): Real return on total gross assets (%)	2.1	---
Capital	Km travelled per available locomotive/day (365 days)	---	339
Management	Operating expenses per train km (2002)	25.1	---
	Average locomotive availability (%)	115.5	94.4
	Average passenger/ freight wagon availability (%)	106.8	96

UNITED STATES OF AMERICA

Indicator	Measure	Best practice*	Your reply
Efficient service delivery	Price (US$ per freight ton km)	< 2 ¢	$ .16
	Price (US$ per passenger km)		*
Service quality	Average train speed (km/h) (urban, local, intercity, and for various types of freight trains)		38.5 km/h
	% of arrivals less than 15 min. late	95 %	87%
Safety	Train accidents (per million train km)		2.3
Accessibility	Network density (route km/km^2)		230,150km
	Freight ton km /US$ GDP (Purchasing Power. Parity - PPP)		$ .23
	Rail share of rail + truck ton km		60%
	Rail passenger km as % of passenger km + ton km (%)		3.5%
Environment quality	Kj of energy per converted ton km		Unknown
Financial sustainability	% of costs covered from internal cash generation Real return on total gross assets (%)	> 100 USA	14.6%**
Capital	Track operated under slow orders on track and structures - route km - % total km		4,600 km <2%
	km travelled per available locomotive/day		***
Management	Ratio of average passenger tariff to average freight tariff (based on US$ per km) (%)	> 2.0 Europe	****
	Average locomotive availability (%)	90 USA	>90%
	Average freight and passenger wagon availability (%)	>90USA/Europe	>90%

* **Government subsidy to Amtrak (only) totals $750 million in 2002**
** **Total pre-tax freight railroad cost of capital (6.9% debt, 20.1% equity = 14.6%)**
*** **Unknown: Multiple diesel units per train set, loco numbers vary from day to day, dependent upon type of load, distance, geography, etc.**
**** **The privately owned and operated U.S. freight railroads receive no Government subsidies of any kind and each of those railroads negotiates individual tariffs with each individual customer. They do not share this data with one another, nor with the U.S. Government.**

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