



INTERNATIONAL UNION
OF RAILWAYS

unity, solidarity, universality

Assets Managemnt

Railway Days
Wider Black Sea Area Railway Summit

5-6 th October 2010



Why are we introducing Asset management ?

The world is changing!

- New expectations and restrictions appear for infra providers.
- Our business will change.

The changing world is asking new questions

What will be the costs of a better performance?

Reduce the delays on the line A to B

Why is maintenance so expensive?

Can you improve the performance of line A and G?

What do we have to pay for 1% more availability?



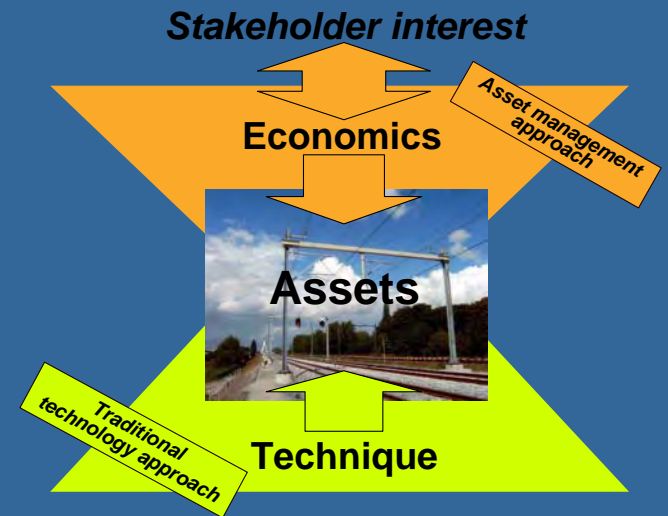
Asset manager

What are the best actions to be taken to improve performance?

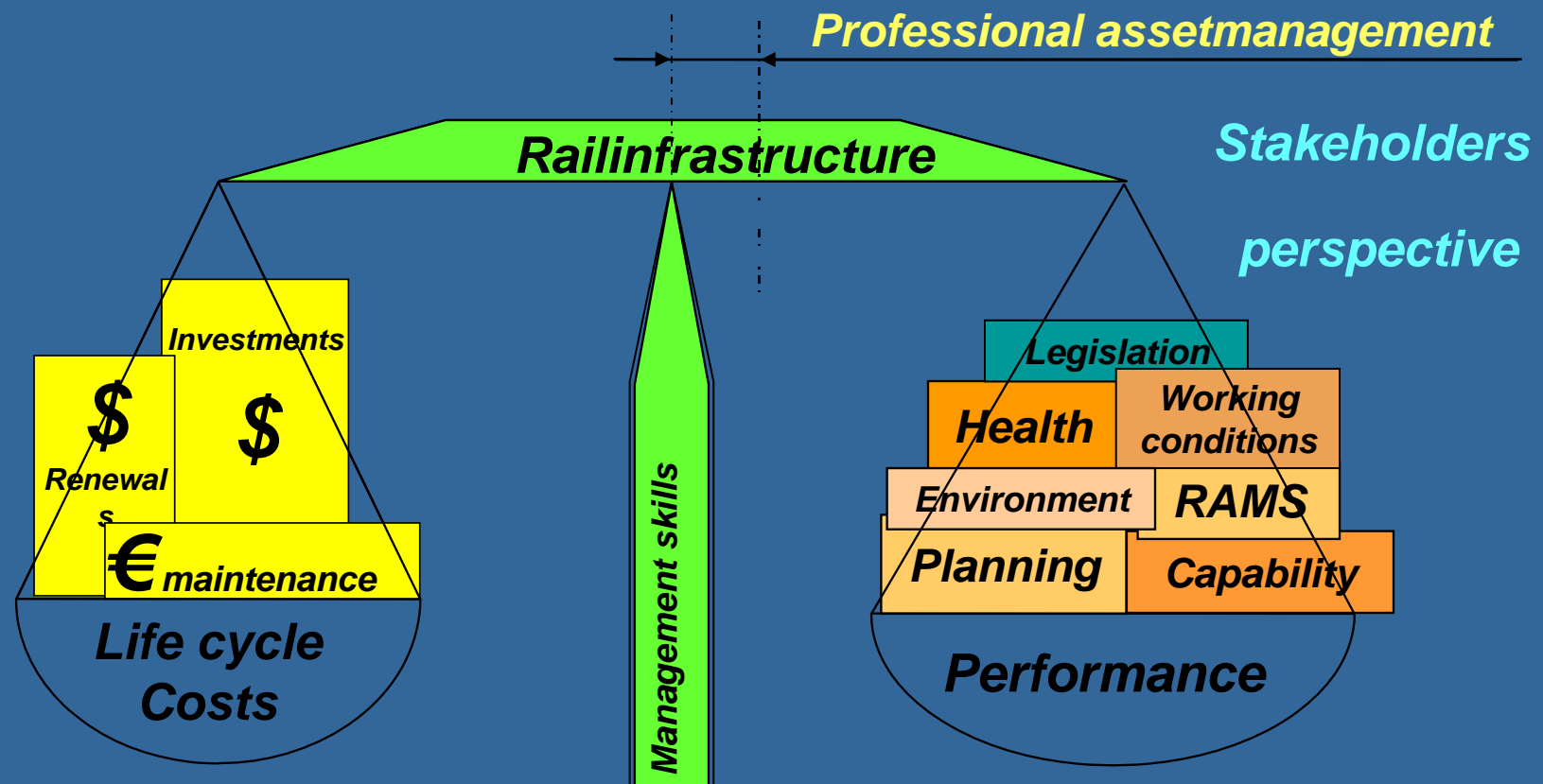
Asset management working group

Original assignment (10th October 2007)

- **first task:** to identify all areas of interest where the UIC can contribute to the development of professional Asset Management, applied to Rail infrastructure management.



Managing the balance...



Definition :

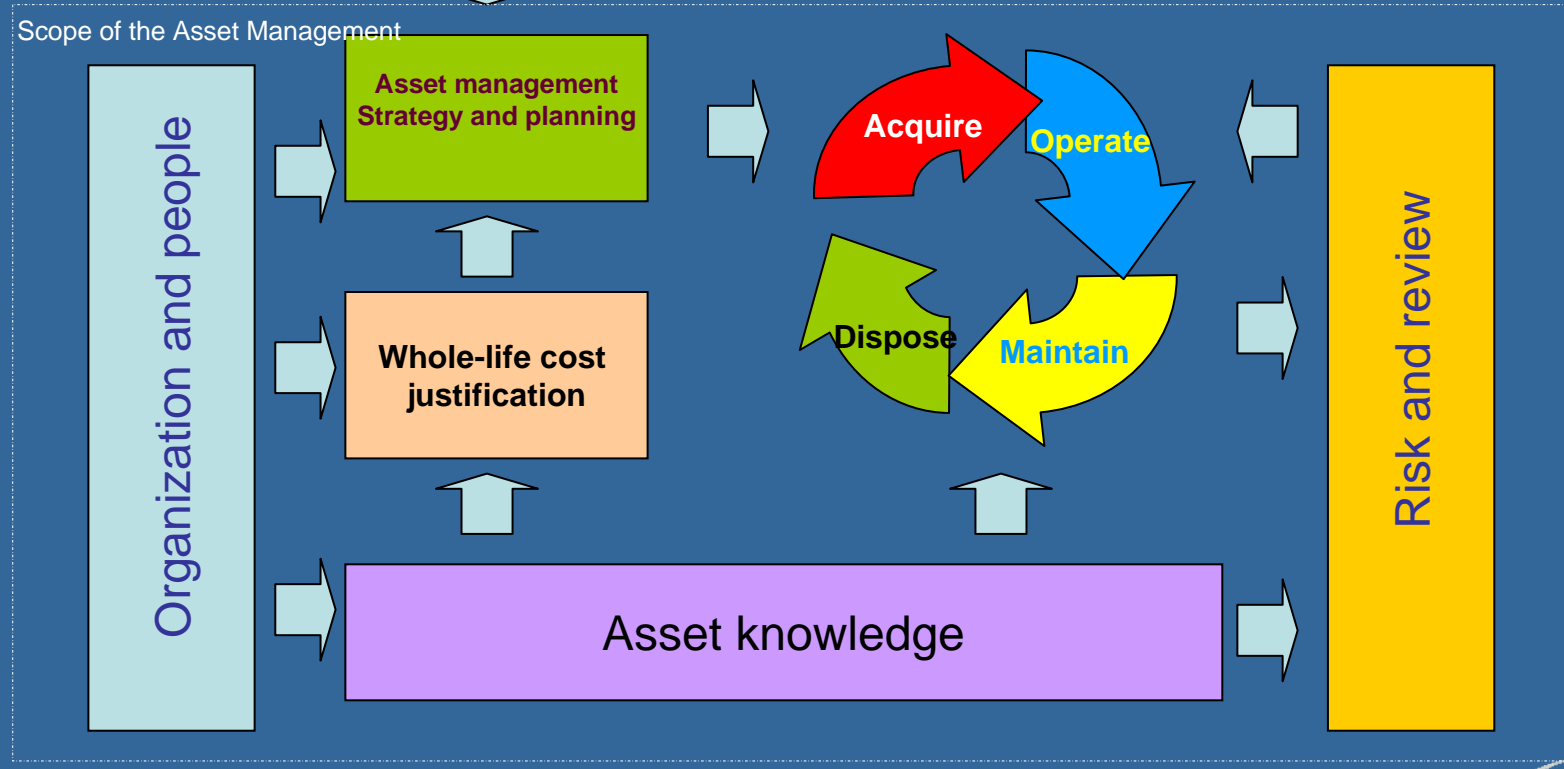
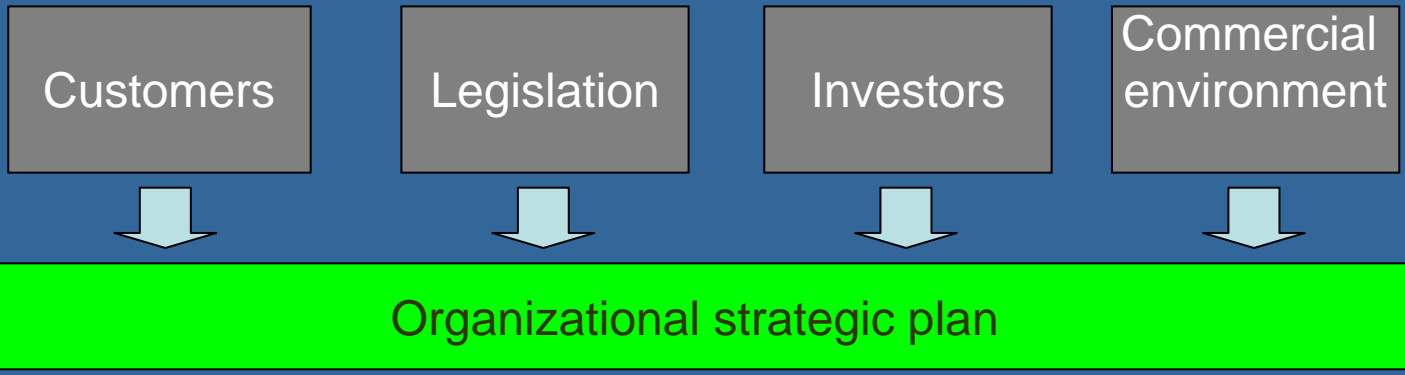
“Asset management comprises all systems, methods, procedures and tools to optimize costs, performance and risks for the complete rail infrastructure life cycle. The aim is to realize the best ‘value for money’. “

Asset management is defined in BSI (British Standard Institution) PAS 55as :

“The systematic and coordinated activities and practices through which an organisation optimally and sustainably manages its assets and asset systems, their associated performance, risks and expenditure over their life cycles for the purpose of achieving its organisational strategic plan”

An other definition is give by the European Federation for National Maintenance Societies :

“the optimal lifecycle management of physical assets to sustainably achieve the stated business objectives”



Main aspects of Asset Management

- Meet stakeholder)* interests, by exploring them explicitly and translating them into companies objectives
- Finding a balance between the requirements and the overall (lifecycle) cost by applying risk management and consequently linking activities to the companies objectives.
- Managing the company in a *fully transparent*)** way by means of an *explicitly traceable* analysis.
- By taking all relevant aspects and activities into account (holistic approach).

)* Main stakeholders are; Government, Operators, Local Authorities and Public/Customer.

)** Because of a lack of competition in the monopolistic rail world, transparency is essential to convince the stakeholders of our quality.

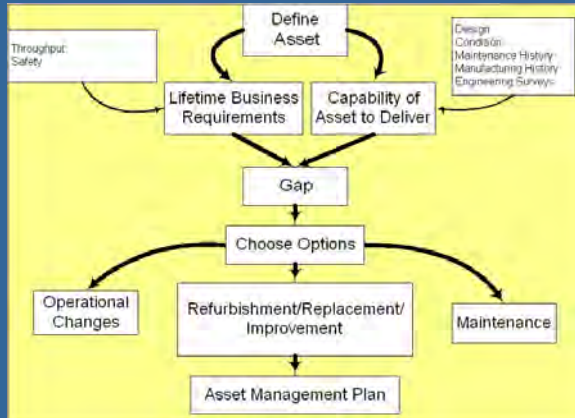
The UIC AM working group has worked on:

1. ... creating a common idea, definition and interpretation of asset management
2. ... exchanging best practices
3. ... strategic issues but also on quick wins.
4. ... defining the ultimate goals and KPI's for an asset manager.
5. ... supplying the equipment for the toolbox of the asset manager.

Learning from other sectors

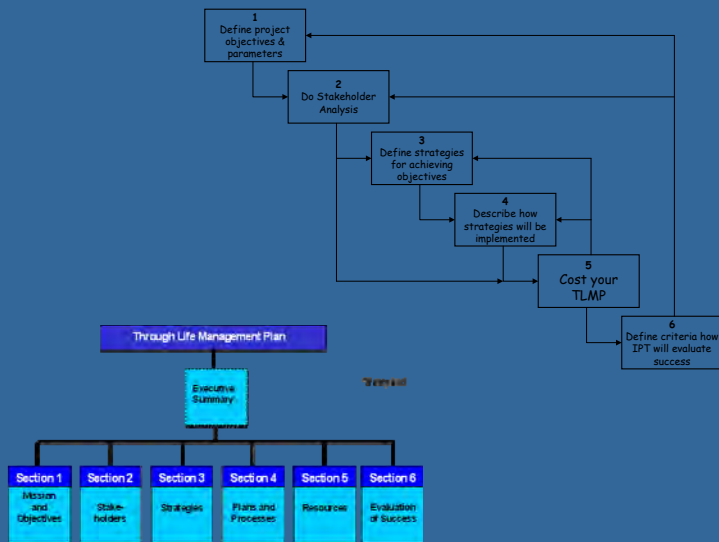
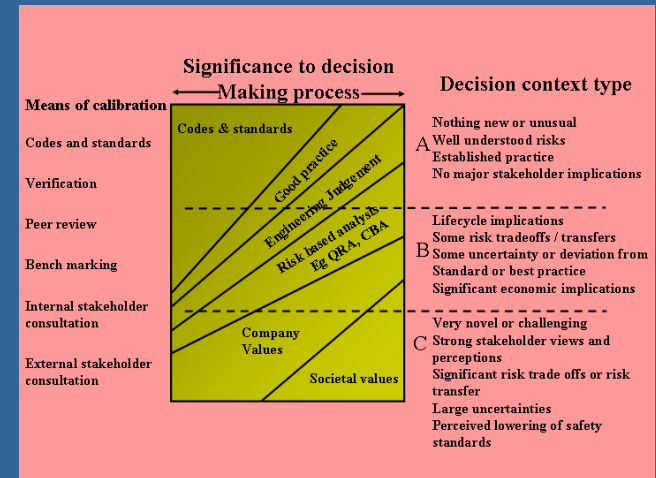


Existing frameworks

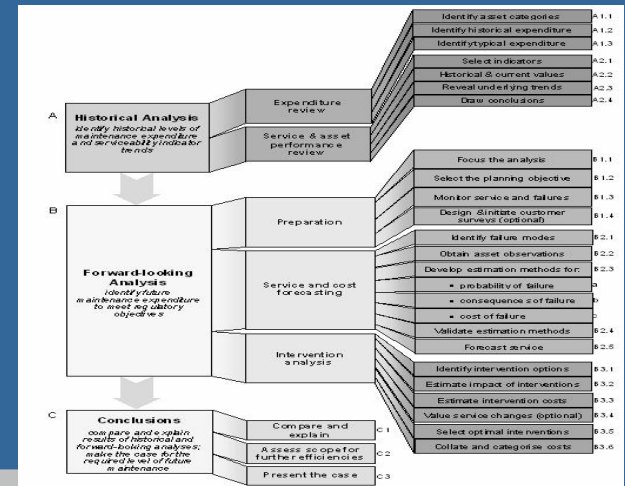


Nuclear Generation

Oil and Gas



Water Utilities



Defence

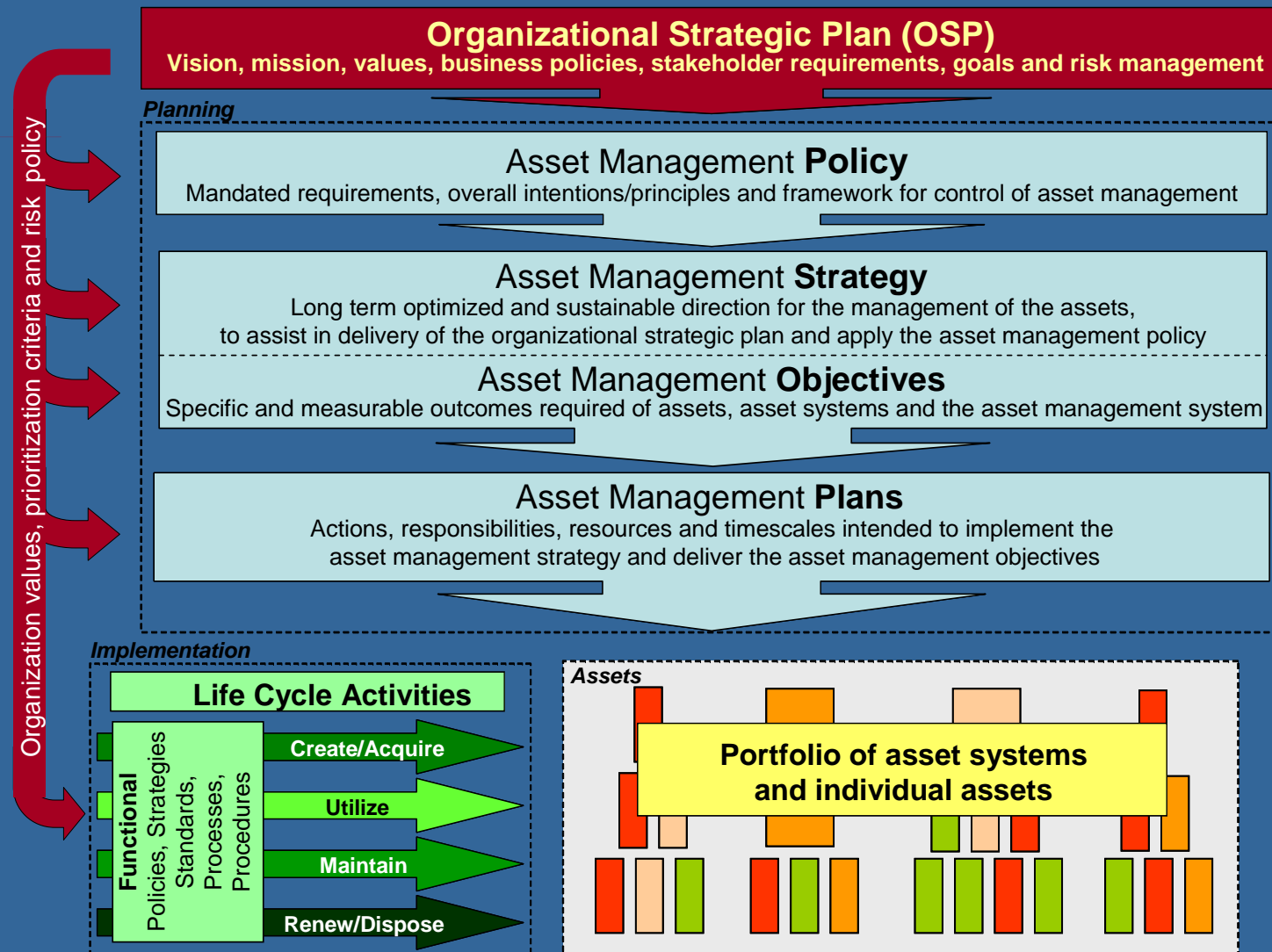
PAS 55

Specification for the optimized management of physical assets

- Definition of what good asset management looks like
- 28 point checklist specifying requirements of an asset management system
- First issue released in 2004, update in 2008
- Developed by more than 50 public and private companies
- Update involved participants from 10 countries and 15 sectors

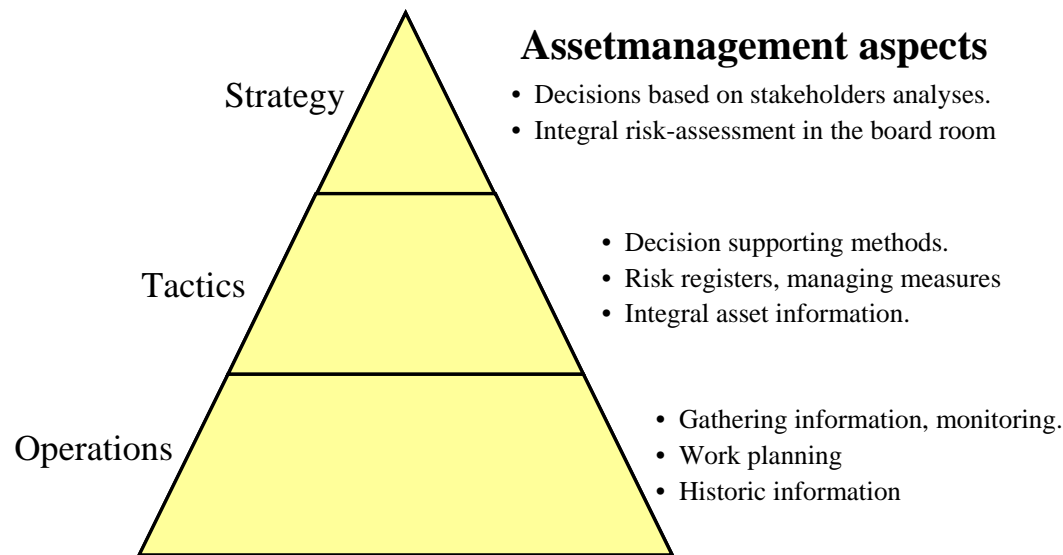


PAS 55 structure



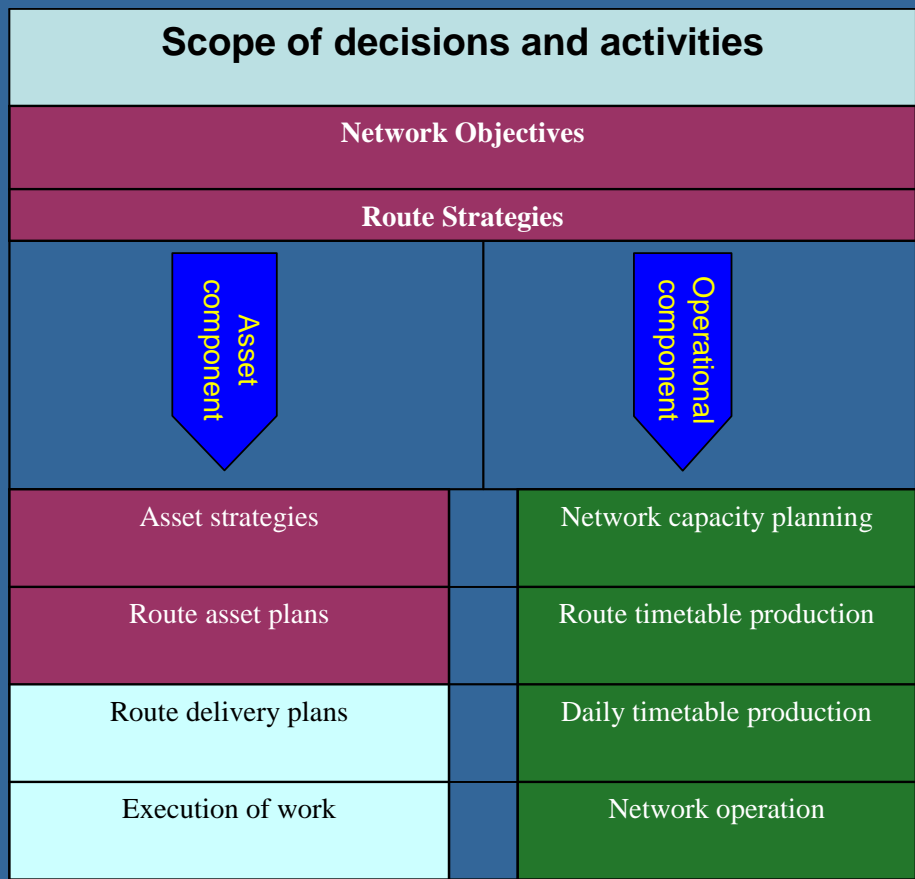
Working process

- **Inventory of criteria to order the subjects**
- Time to produce: short, medium, long
- Nature: learning, definition, process or instrument
- Level: strategic (“What”), tactical (“How”) or operational (“Do it”)

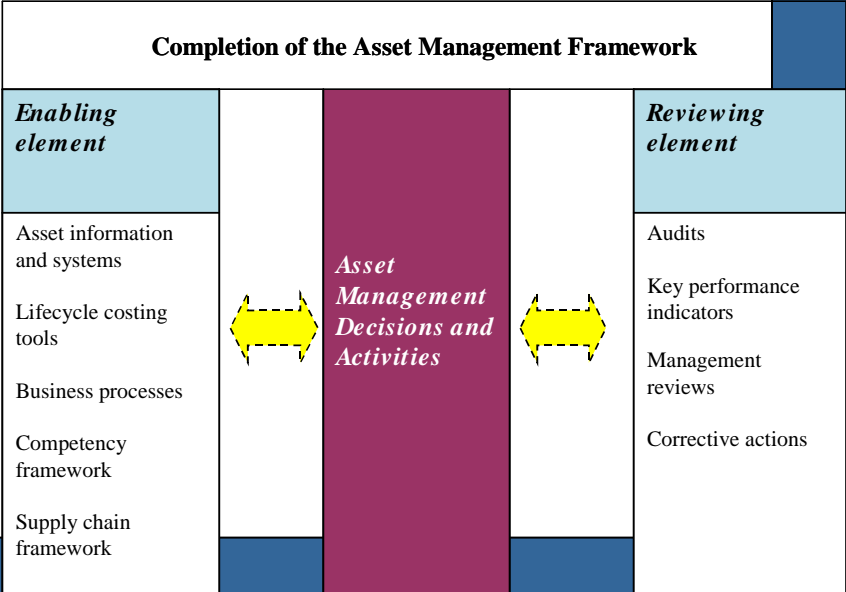


... creating a common idea, definition and interpretation of asset management

AM framework for railways



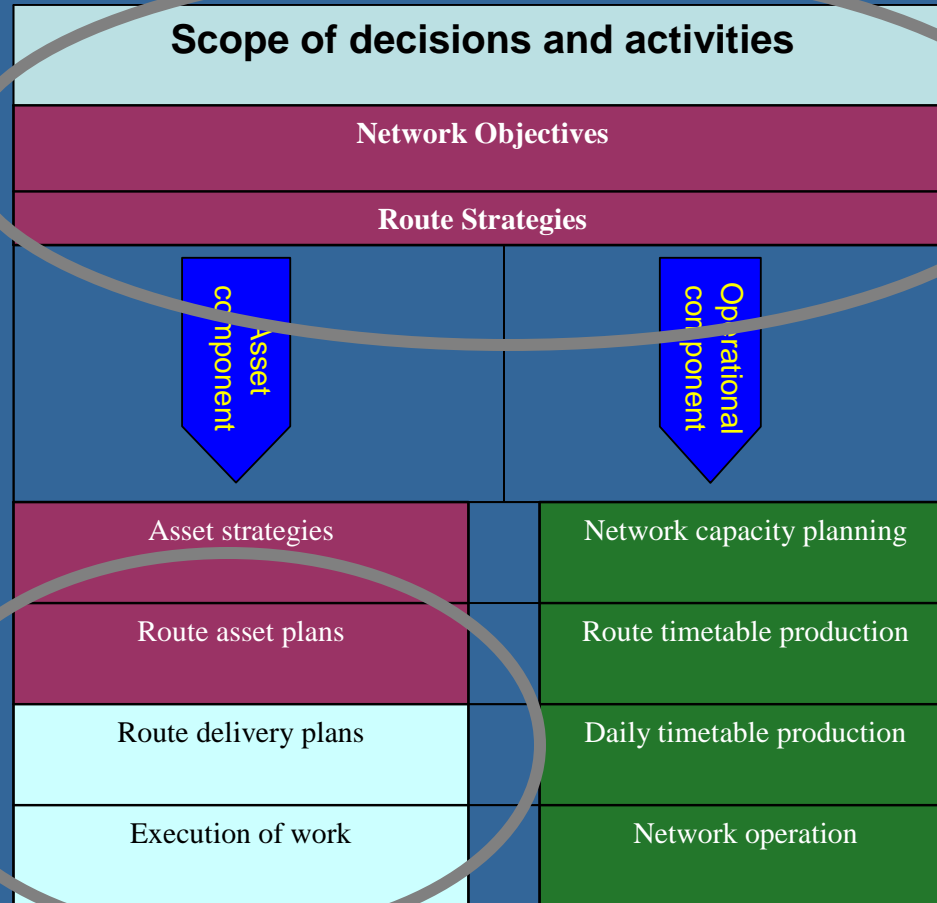
- A framework was defined.



Overall view

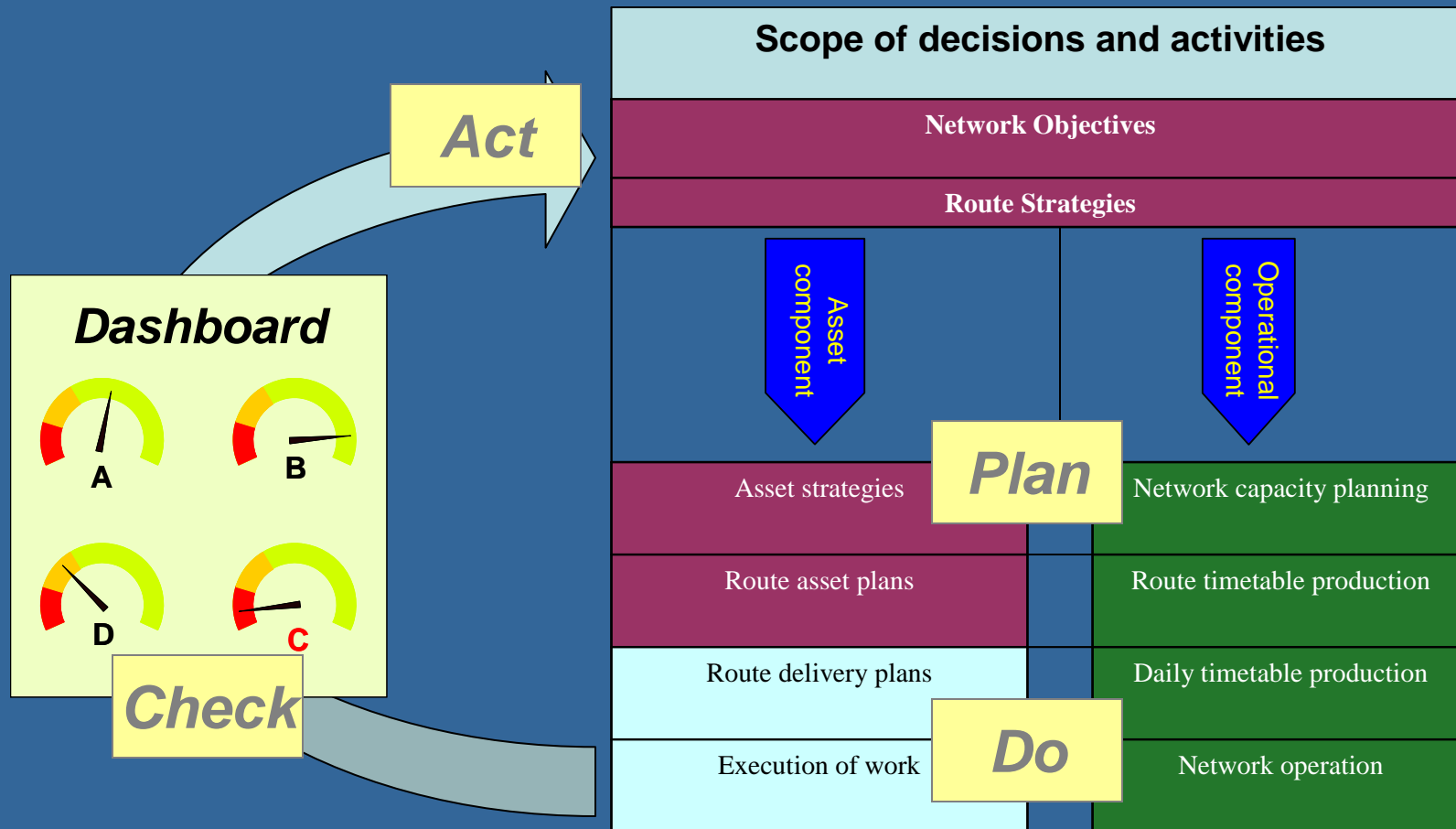
Creating processes in this area will keep you attached to the relations with your stakeholders and helps you balancing performance and costs.

Staying in this area will keep your focus on technical solutions and will eventually provide over-performing assets, that are too expensive.



It's all about connecting your activities to the companies objectives.

Overall view

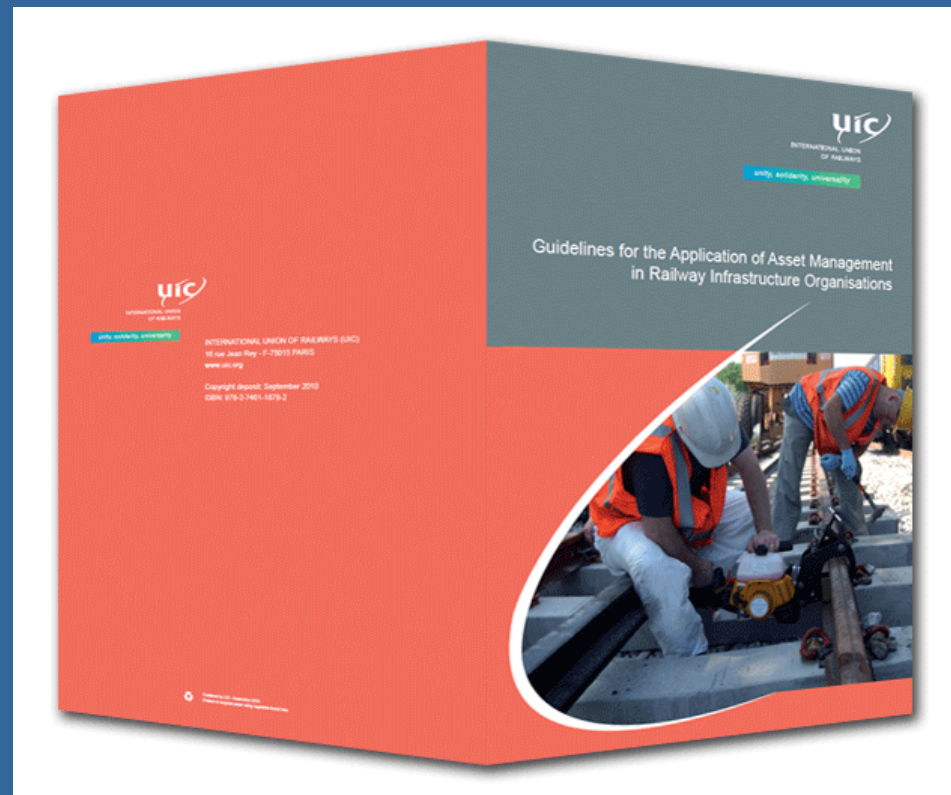


UIC role in AM

UIC is be the platform to facilitate the development and exchange of knowledge with respect to Asset management

- a common, shared understanding of asset management for rail
- exchange of best practice when applying AM
- support and facilitate the execution of benchmarks
- use of common key performance indices (KPI) referred to asset management
- development of a standardized AM-process based on the life cycle of assets
- shared views on organization, knowledge and education

Early September ,the brochure is issued as a result of the UIC team , work.
Will be sent to all UIC members.



The railways system standardization need for metadata

Assets register

Needs and benefits

- To achieve an efficient management of assets it is necessary to have the exact description of the assets as geographical positioning ,asset description ,the original value, and it's evolution in time ,Life Cycle etc.

→ **Asset register**

- Standardisation of properties description of railways assets

Benefits :

- rail track construction and maintenance with important benefits and impact on the track quality, automation, shortage of duration of work, interoperability.
- Exactitude in the following of each asset during it life
- Help to compare the costs over Europe
- Possible unification of method for assets management

GI-Standards

The CNTD – Coordinate based continuous Numerical Track Description – establishes the coordinate description of the track (Y, X, Z, elevation and kilometre axis reference), in the reference network and the data structures associated to the track-side objects of the railway within the European standard geodetic system ERTF89) .

- 1. ISO 19107 GI – Spatial scheme / ISO 19137 GI – Profiles of spatial scheme**
- 2. ISO19109 GI – Rules for application schema**
- 3. ISO19111 GI – Spatial referencing by co-ordinates**
- 4. ISO19115 GI – Metadata**
- 5. ISO19118 GI – Encoding / ISO19136 GI – GML**

Existing experience

- DB,SBB and SNCF for TGV line
- OBB,NS start
- UIC – projects Georail and TMG
- UIC leaflet 728R - recommendation for application of the absolute coordinates CNTD to the track work system.

Cost information: Benefiting from the existing experience and tools

LICB

Lasting Infrastructure Costing Benchmark



INFRACOST



- project of the UIC (International Union of Railways) start 1996
- analysis of total infrastructure cost
 - investment
 - maintenance
 - renewal
- aims
 - help for infrastructure managers
 - improve the performance of infrastructure
 - enable them to define their individual cost-position
 - develop methods for cost comparison
 - identify cost drivers
 - "toolboxes" for strategies towards cost reduction



The results of INFRACOST are the input for LICB

- In June 2002 INFRACOST has delivered the final report
- The study has provided considerable insight in cost relations and has given useful advice to infrastructure managers
- In order to preserve this value, a "lasting benchmarking function" has been established to guarantee a platform for a continuous comparison of cost and for tracking of trends

Background and Objectives



LICB Key Performance Indicators

**MOBILITY &
ACCESSIBILITY**



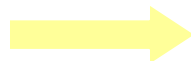
Passenger journeys
Offer in passenger rail traffic
Freight output
Offer in freight rail traffic
Commercial train utilisation

**ASSET
UTILISATION**



- Train frequency
[train km / main track km]
Development for passenger and freight traffic
since 1996
- Network utilisation
[transport units / main track km]
[gross ton km / main track km]

**FINANCIAL
EFFECTIVENESS**

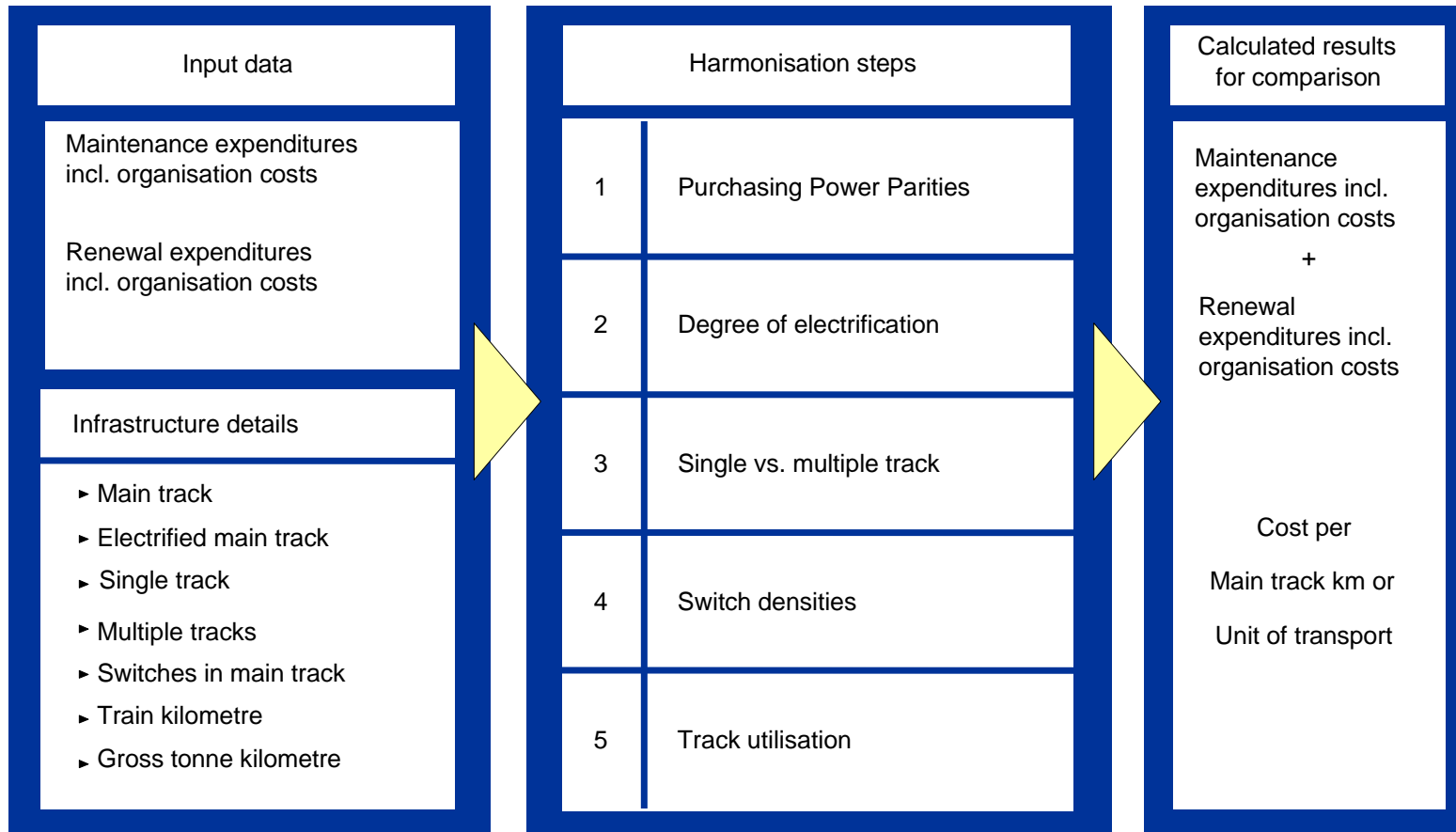


Life-cycle costs
Maintenance and renewal expenditures
[1.000 € / main track km]
[€ / train km]
[€ / 1.000 TU]
[€ / gross tone km]
Cost development over time

Key Performance Indicators - detailed

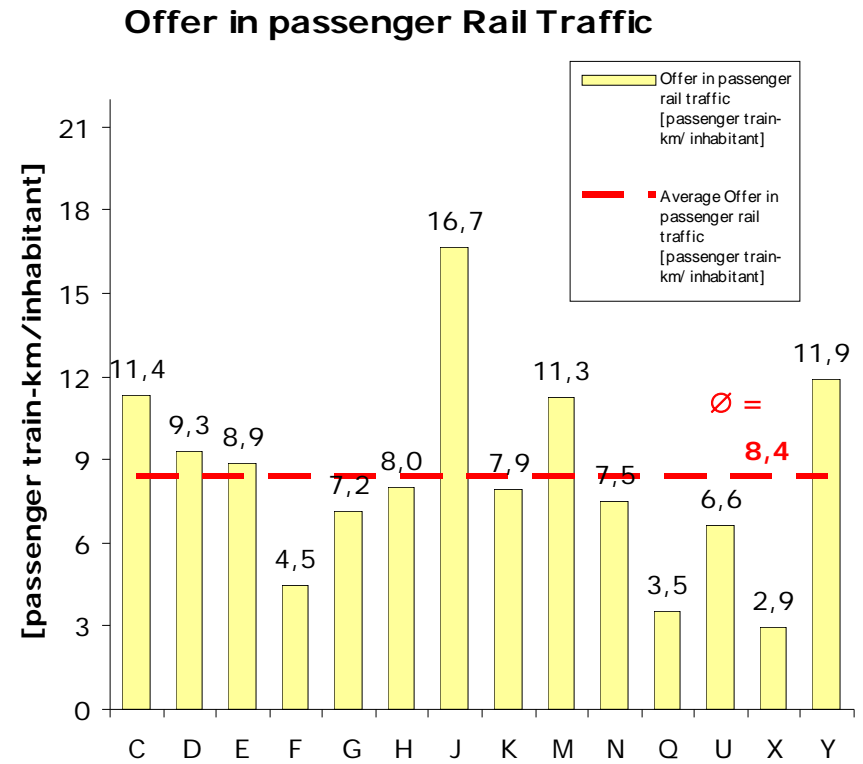
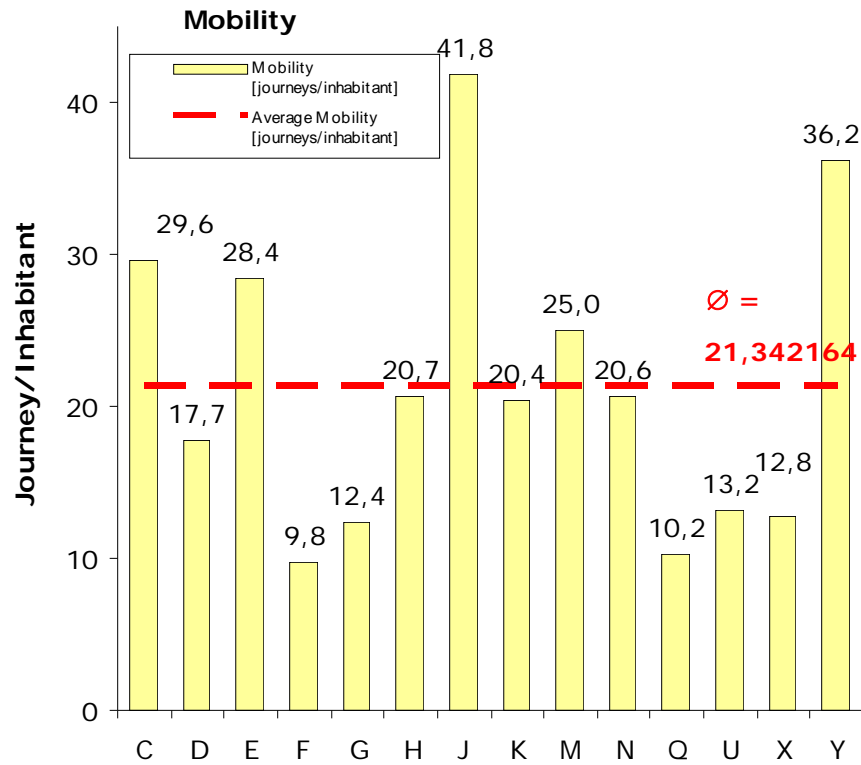
Parameter
Inhabitants (mio inhabitants)
Length of lines, total [linekm]
Length of lines, passenger [linekm]
Length of lines in single track [linekm]
Length of main track [main trackkm]
Length of electrified main track [main trackkm]
Number of passenger stations [passenger stations]
Number of switches in main track [switches]
Passenger transport output [mio passkm]
Passenger transport volume [mio journeys]
Passenger trainkilometers [mio trainkm]
Passenger gross tonkilometers [mio gtkm]
Freight transport output [mio net tonkm]
Freight transport volume [mio net tons]
Freight trainkilometers [mio trainkm]
Freight gross tonkilometers [mio gtkm]

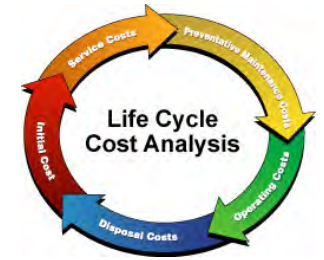
In order to make cost figures comparable a harmonization is necessary



Mobility & Accessibility

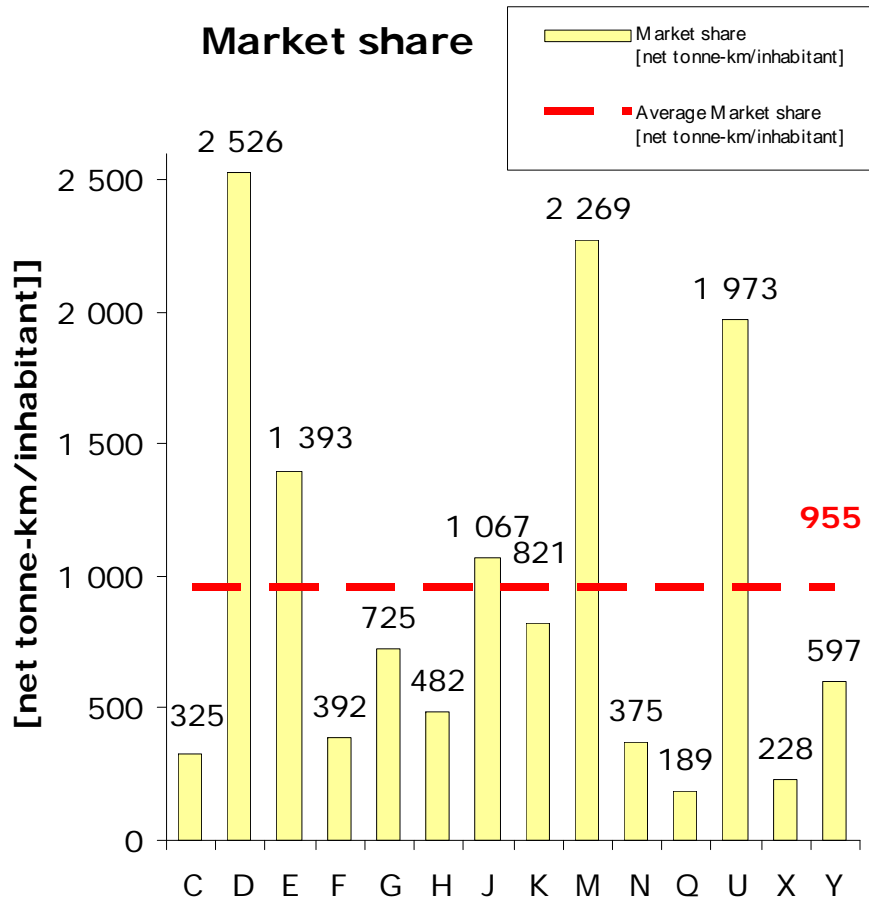
- Passenger journeys
- Offer in passenger rail traffic
- Freight output
- Offer in freight rail traffic
- Commercial train utilisation





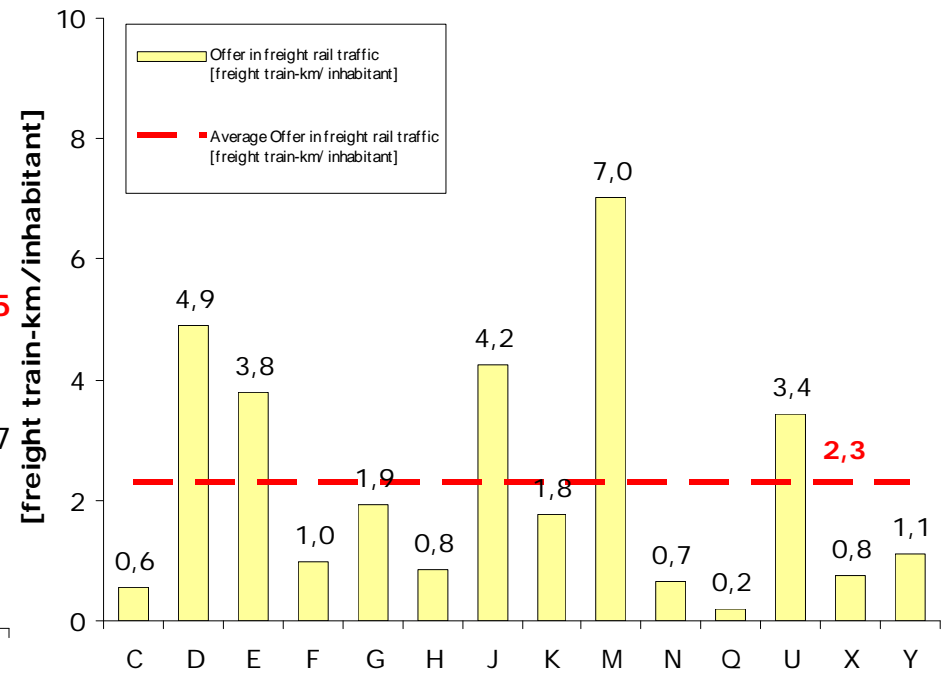
$\frac{\text{net tonne km}}{\text{inhabitant} \cdot \text{year}}$

Market share

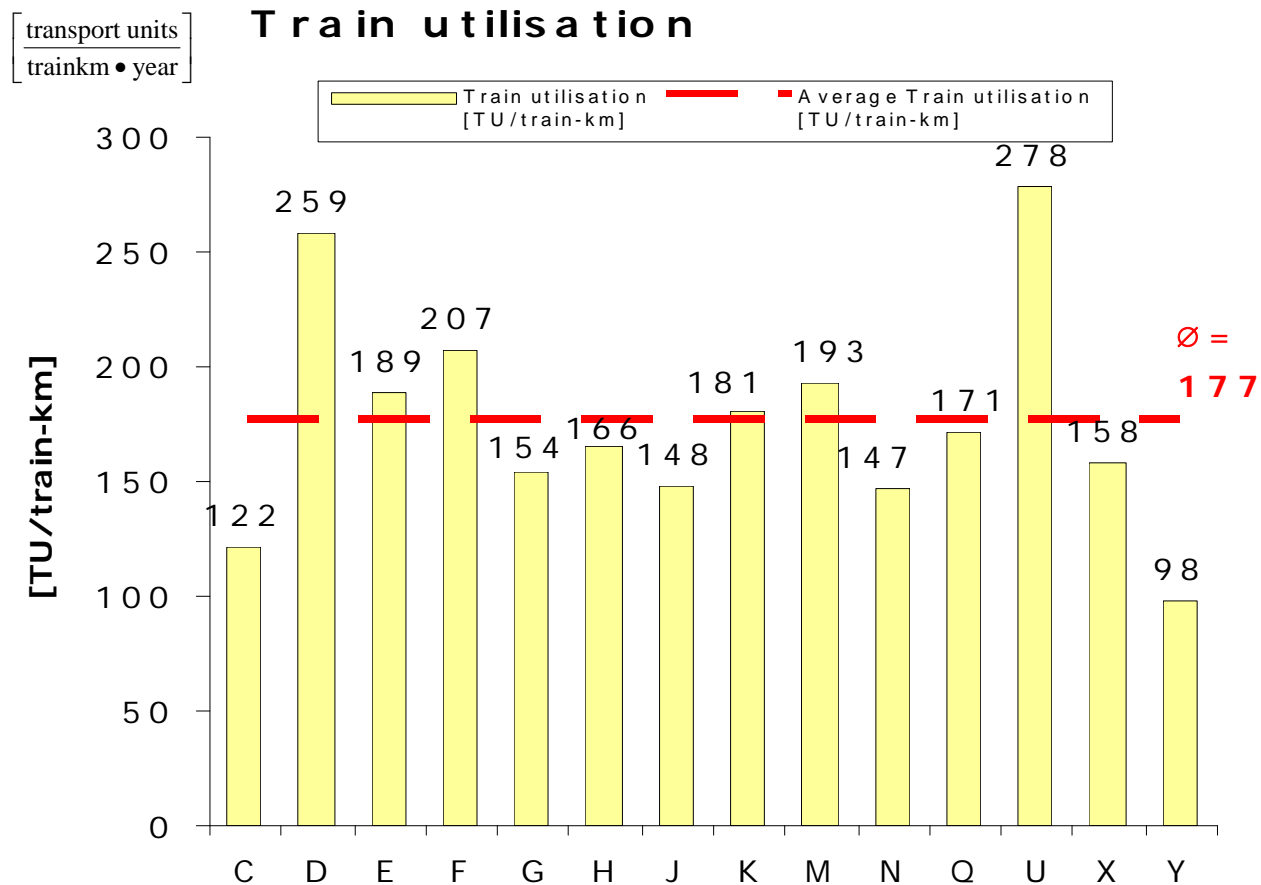


$\frac{\text{freight train km}}{\text{inhabitant} \cdot \text{year}}$

Offer in freight rail traffic



Commercial train utilisation in terms of passengers and tones of freight



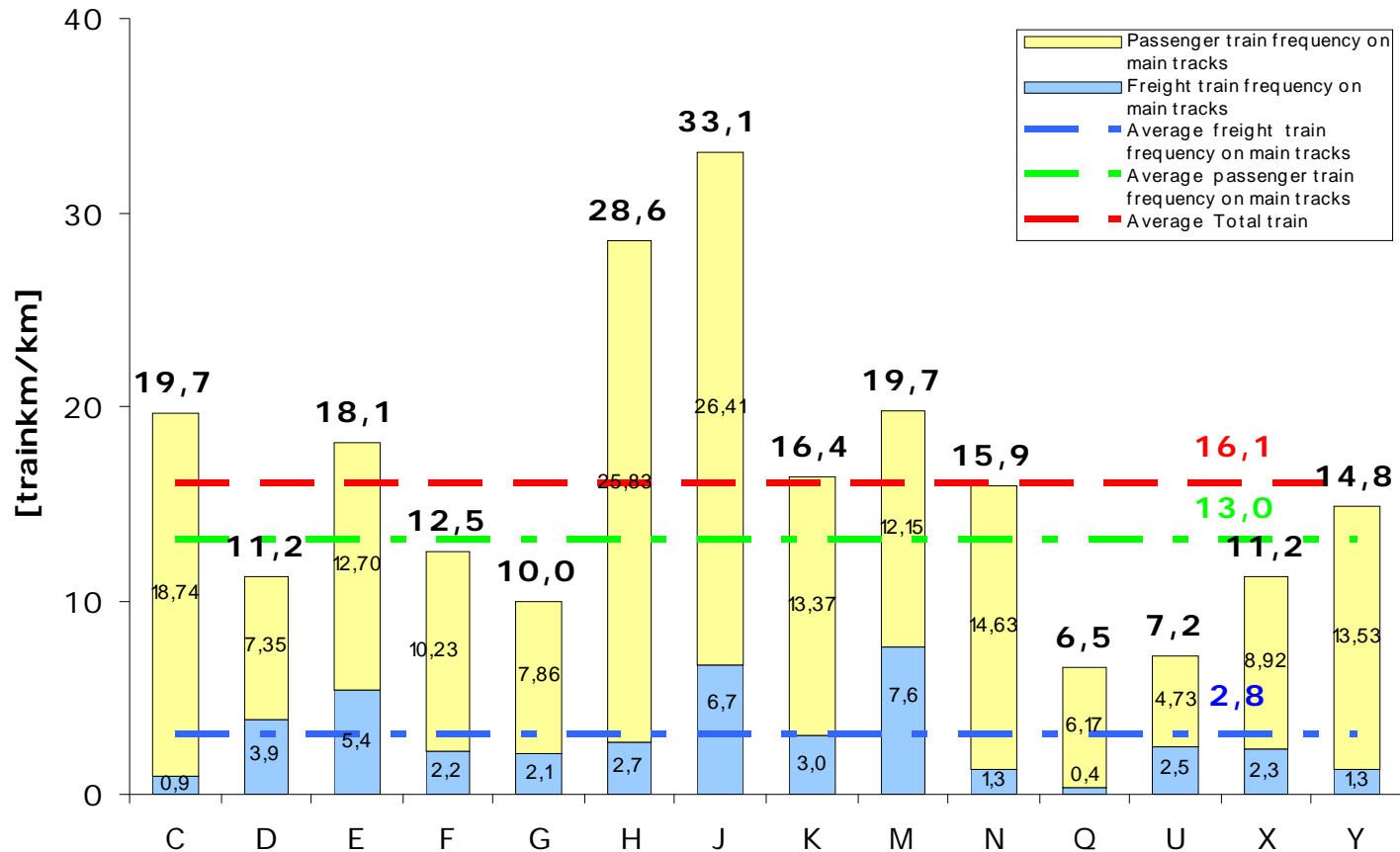


Asset utilisation

- Train frequency
[train km / main track km]
Development for passenger and freight traffic since 1996
- Network utilisation
[transport units / main track km]
[gross tone km / main track km]

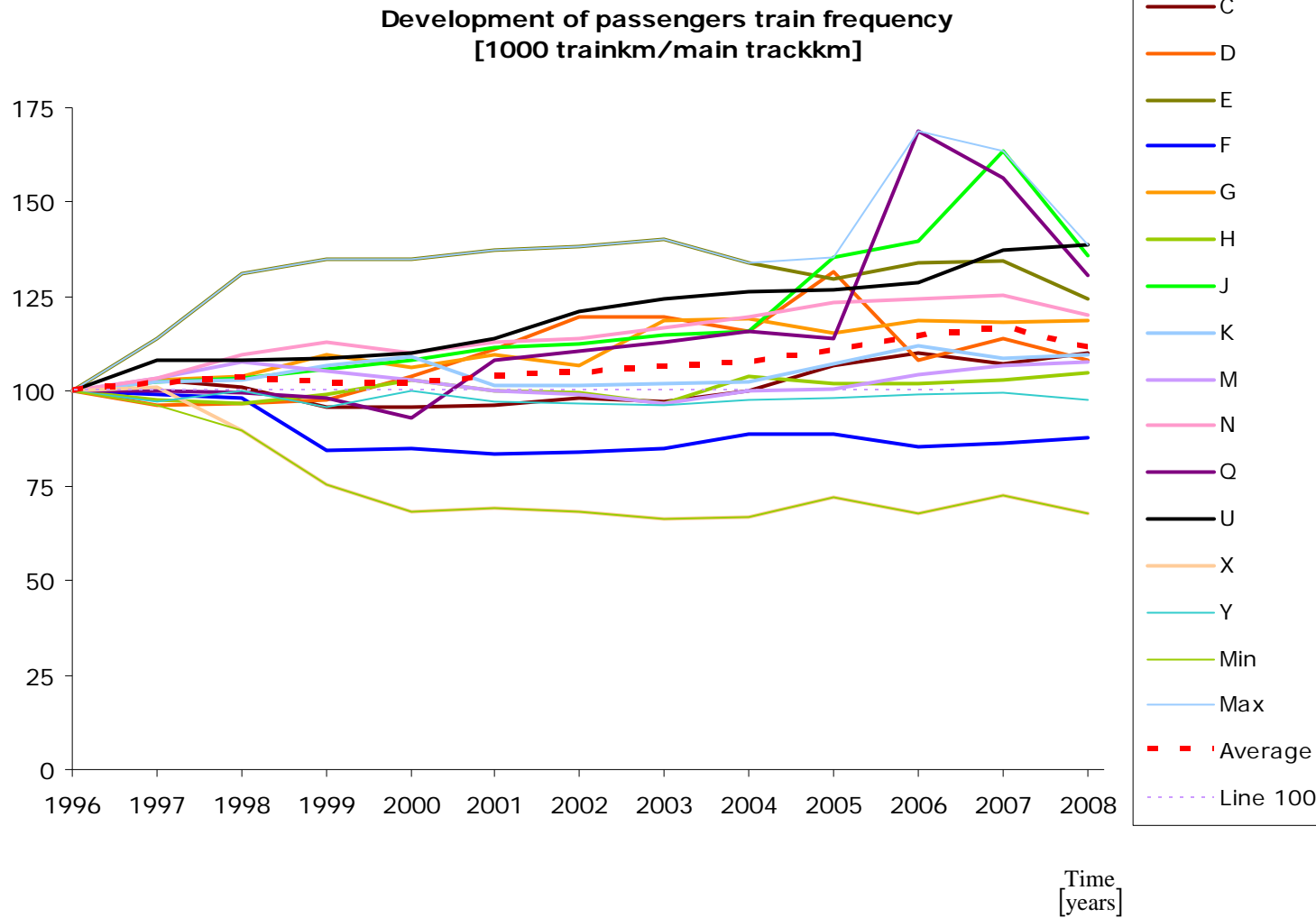
Train frequency for passenger traffic differs much more between the networks than train frequency for freight traffic

Total train frequency on main track



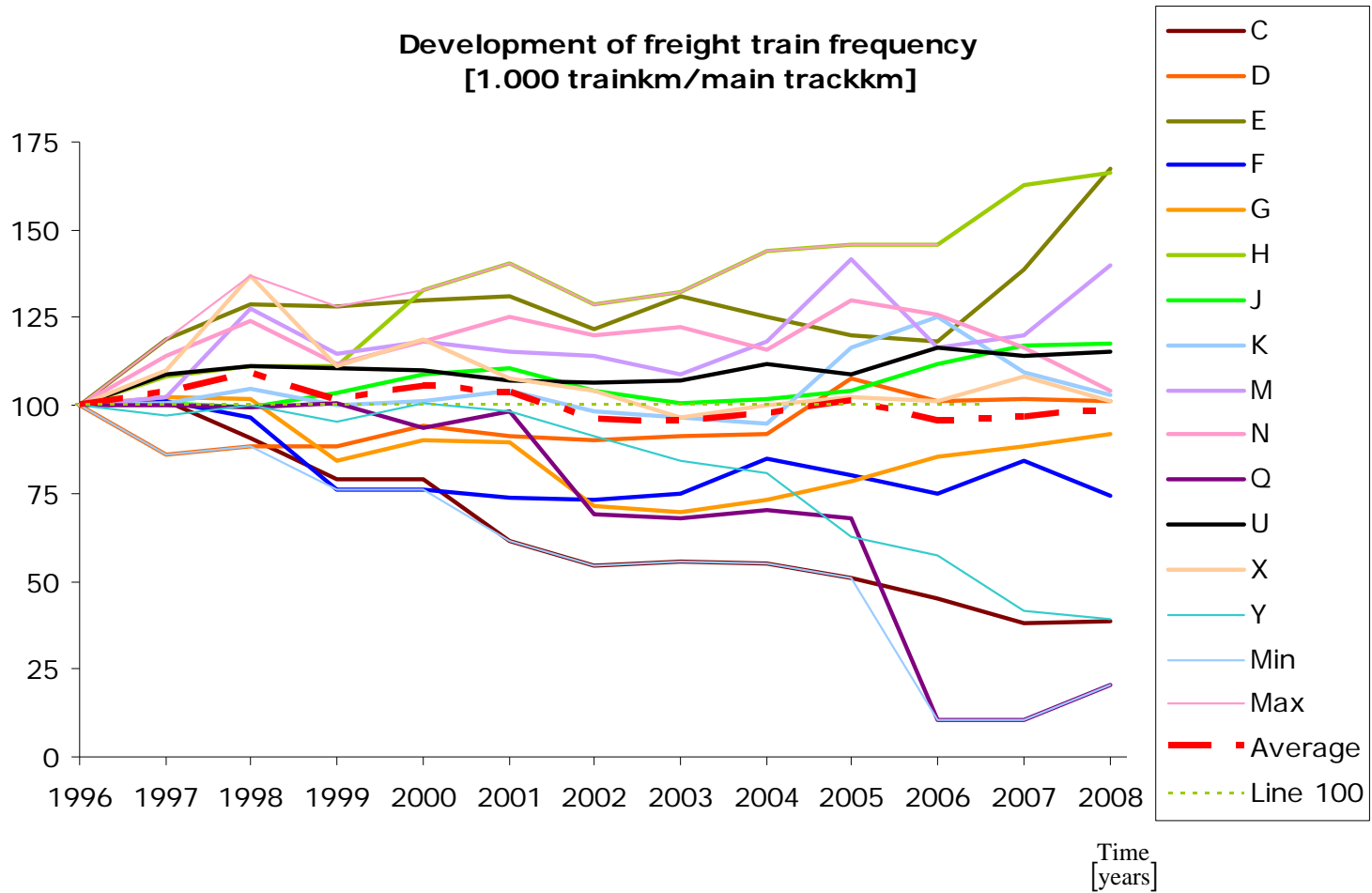
The passenger train frequency increased only slightly by 10 % on average over the last 13 years

Index
[1996 = 100]

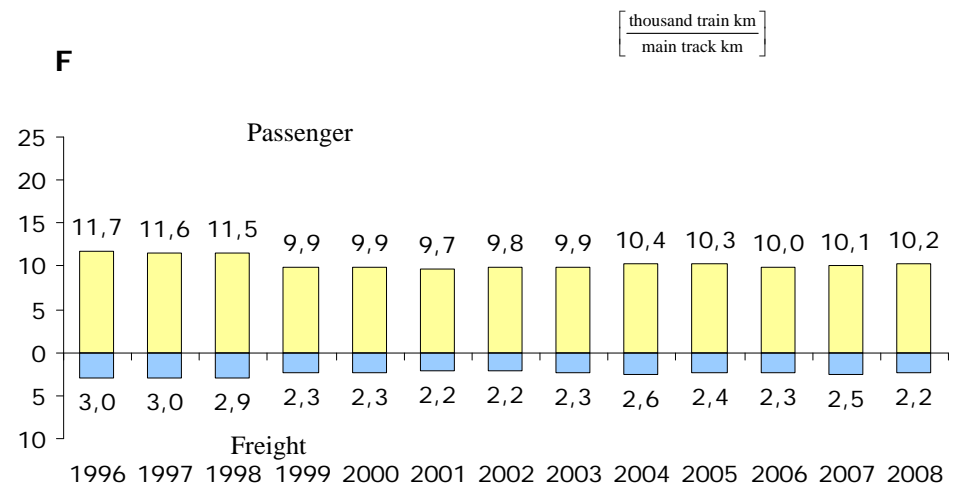
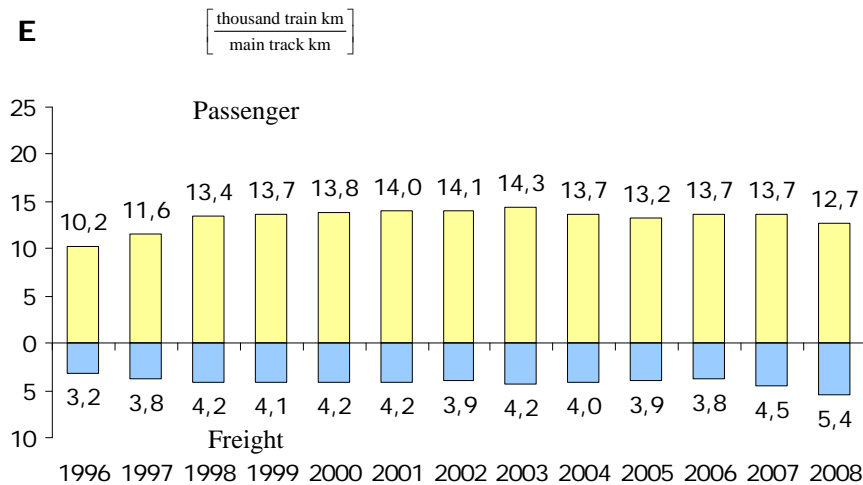
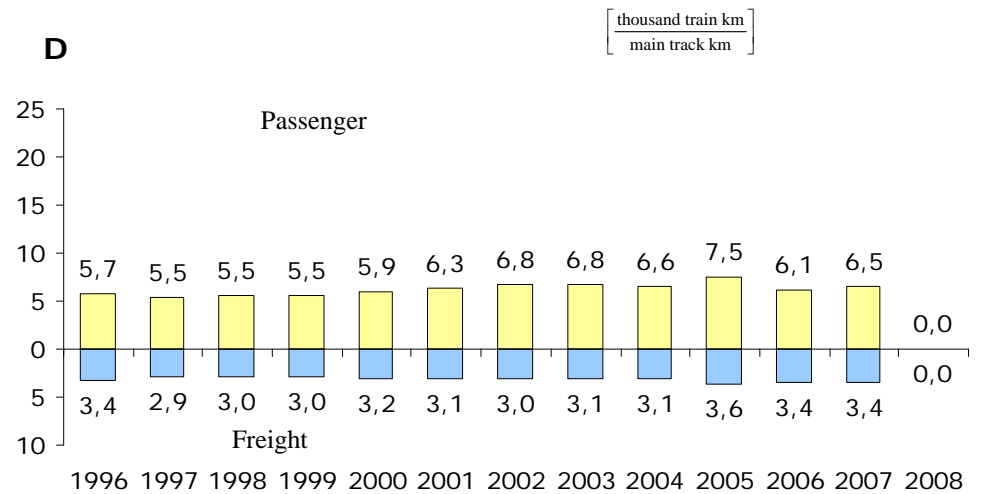
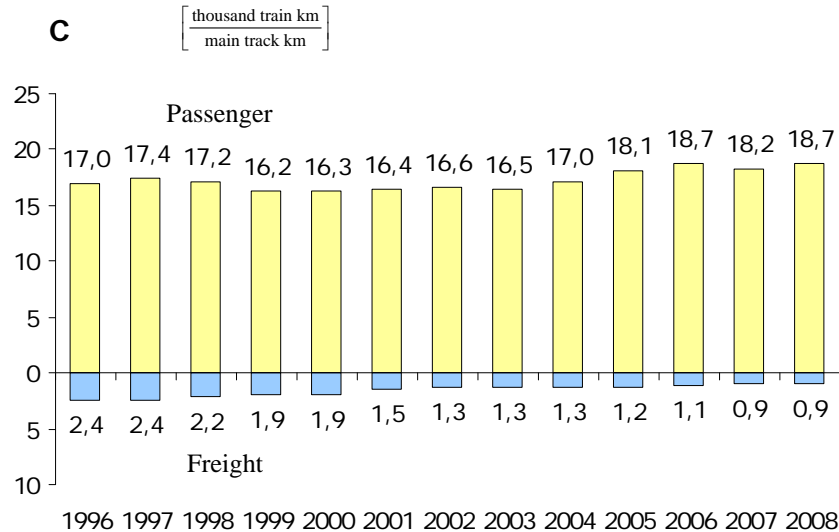


The average freight train frequency remained about the same since 1996

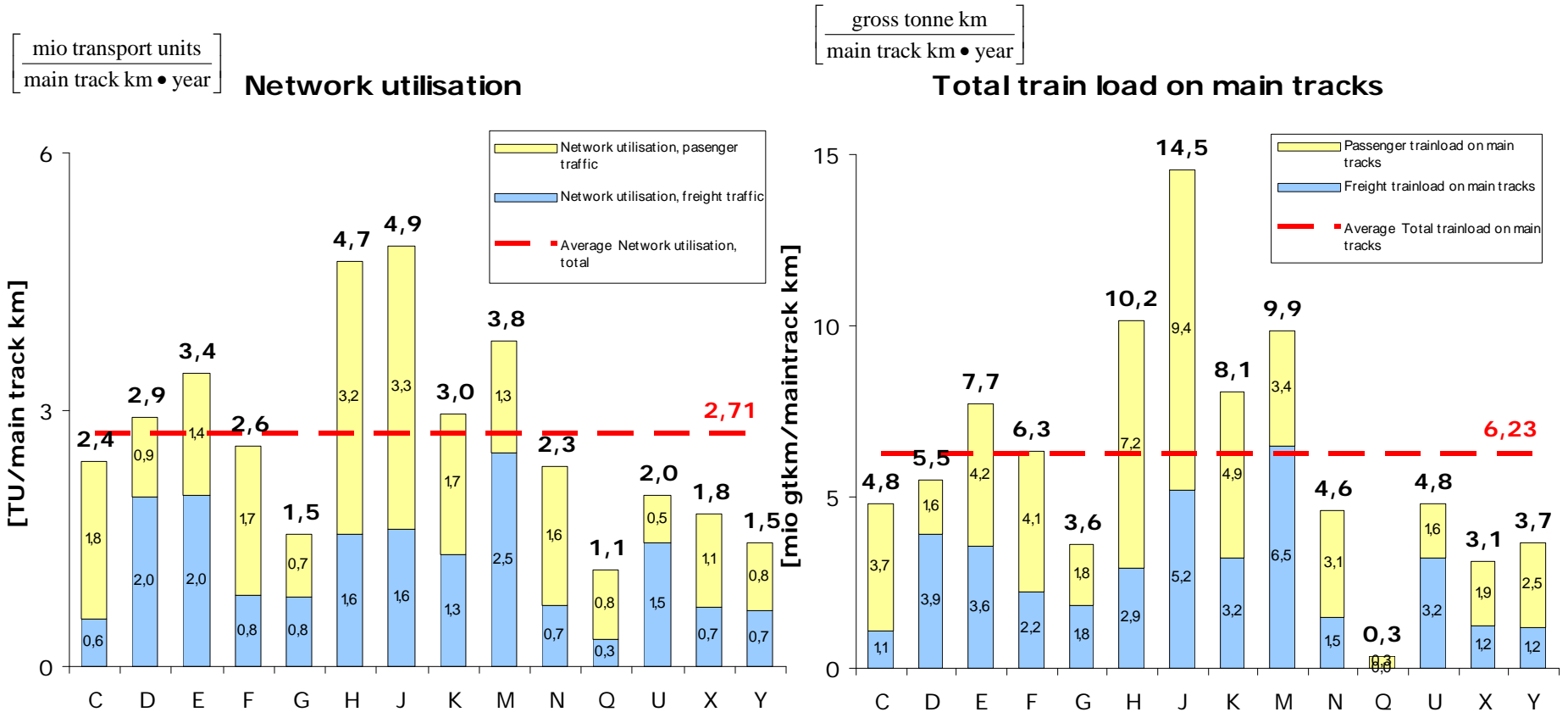
Index
[1996 = 100]



The development of train frequencies for passenger and freight traffic is documented separately for the railways



Freight oriented railways tend to have a higher network utilisation in terms of gross hauled tonne km

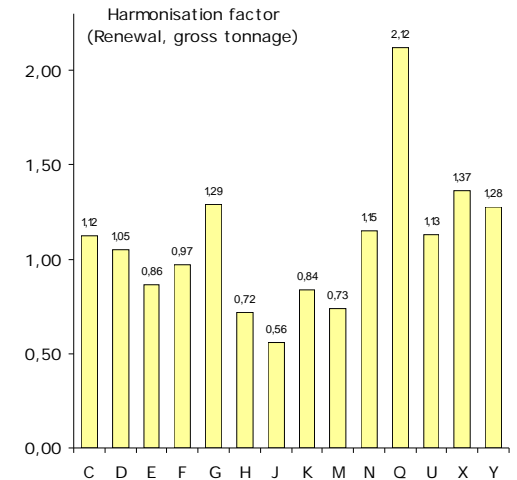
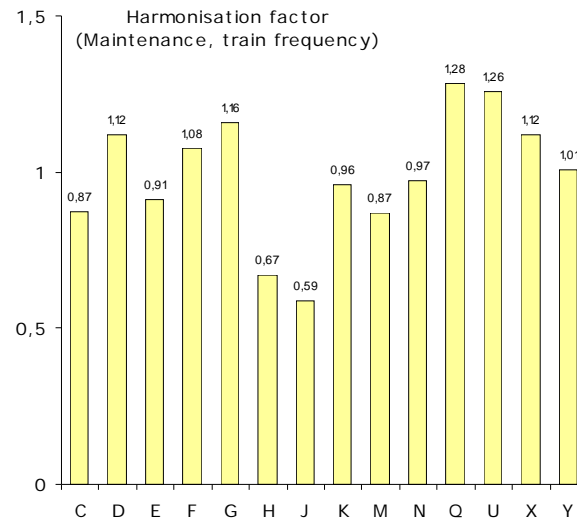
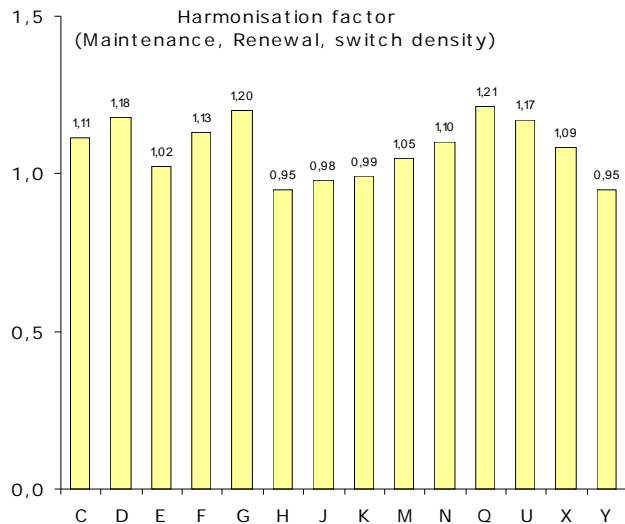
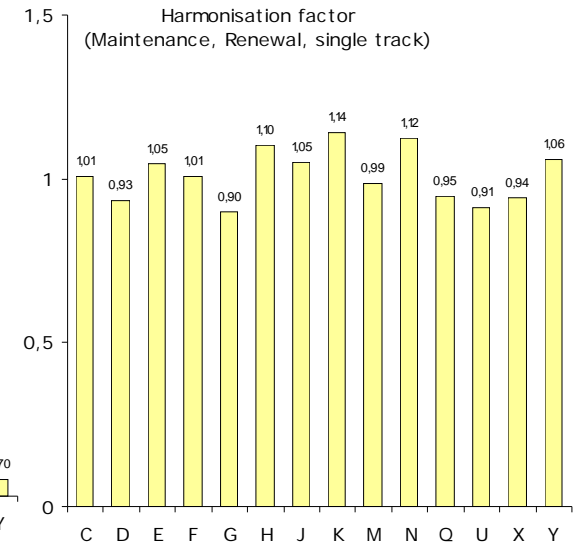
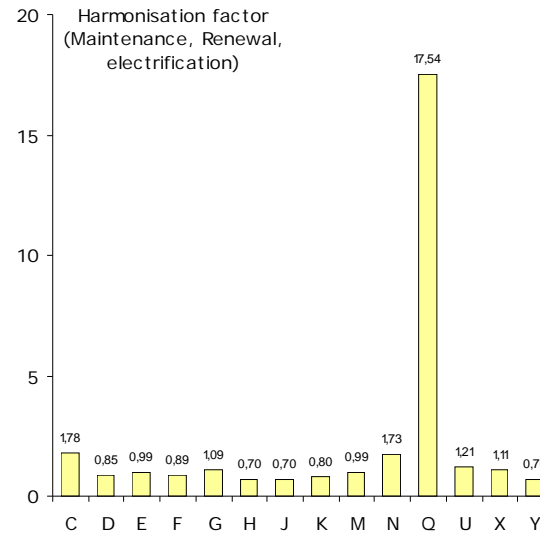
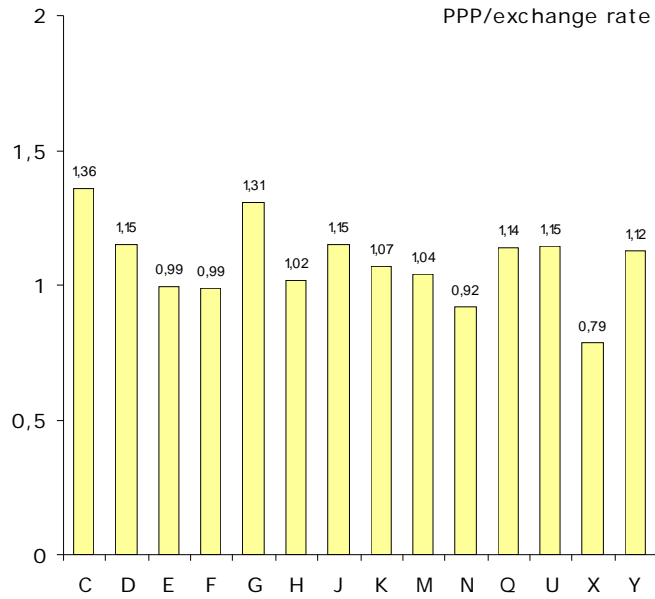




Financial Effectiveness

- Maintenance and renewal expenditures
 - [1.000 €/ main track km]
 - [€/ train km]
 - [€/ 1.000 TU]
 - [€/ gross tonne km]
 - Cost development over time

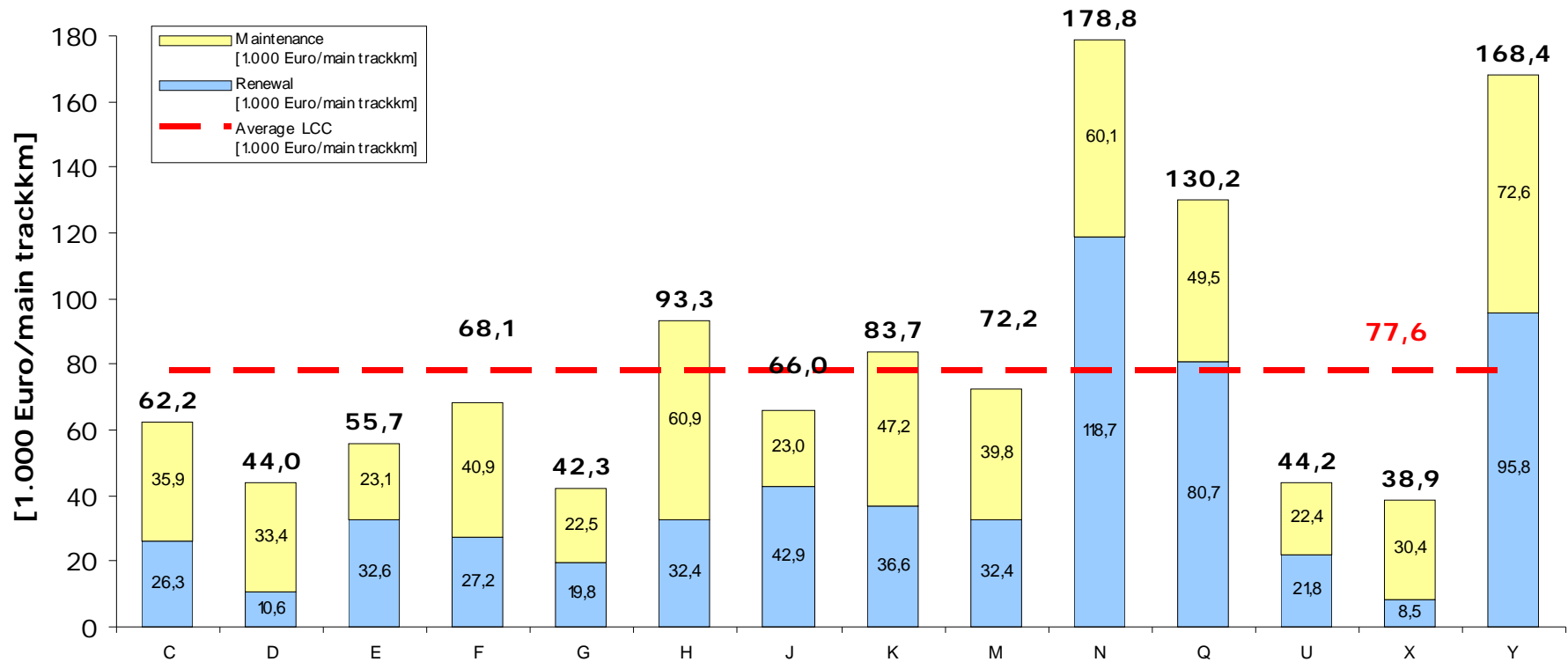
Different harmonization factors have been used to make the costs of the railways comparable



Annual maintenance plus renewal cost are about 77,4 K€ per kilometer of main track

Annual expenditures 2008
(full harmonized)

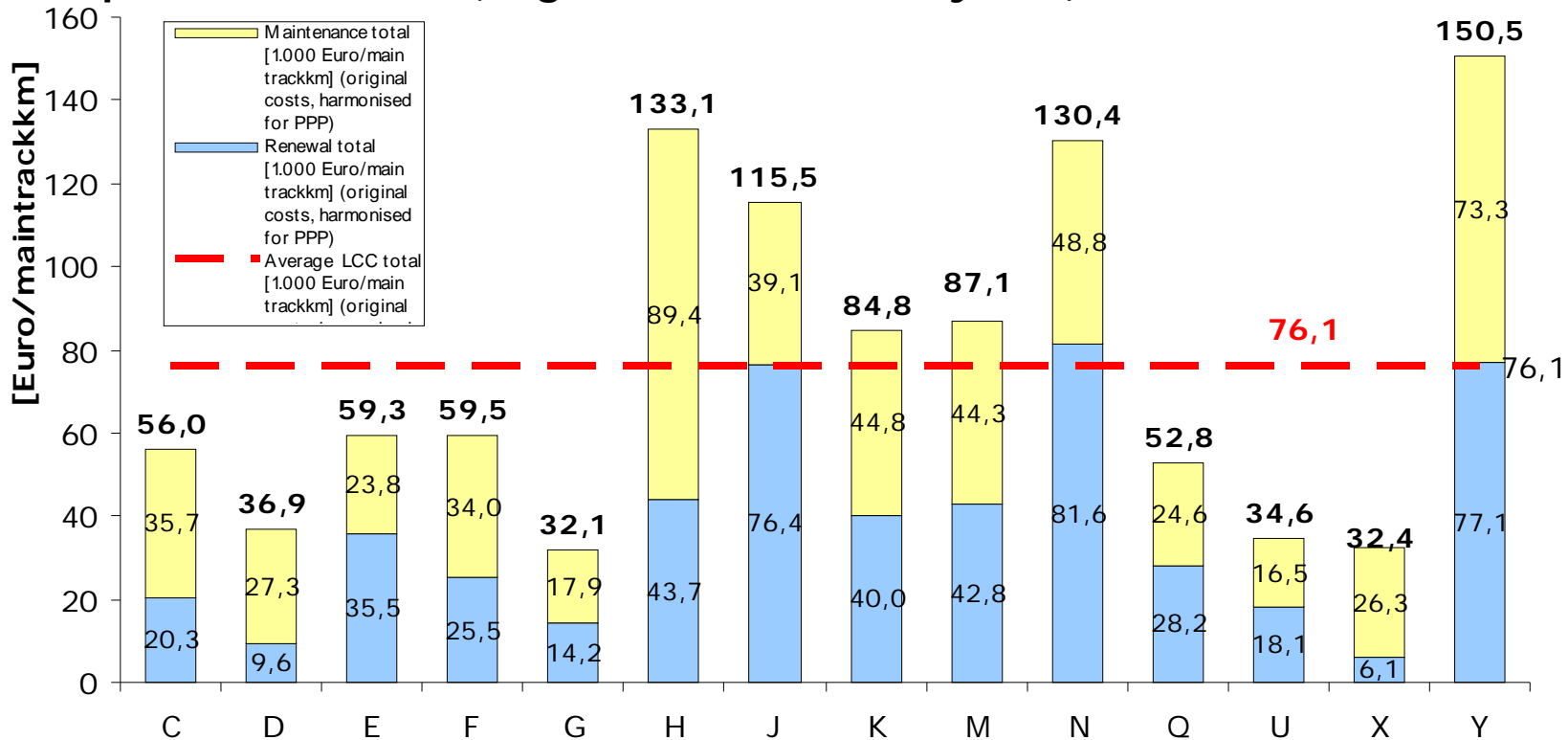
LCC per main trackkm (full Harmonised)



Harmonized life cycle costs are about 76,1 € per kilometer of main track and year

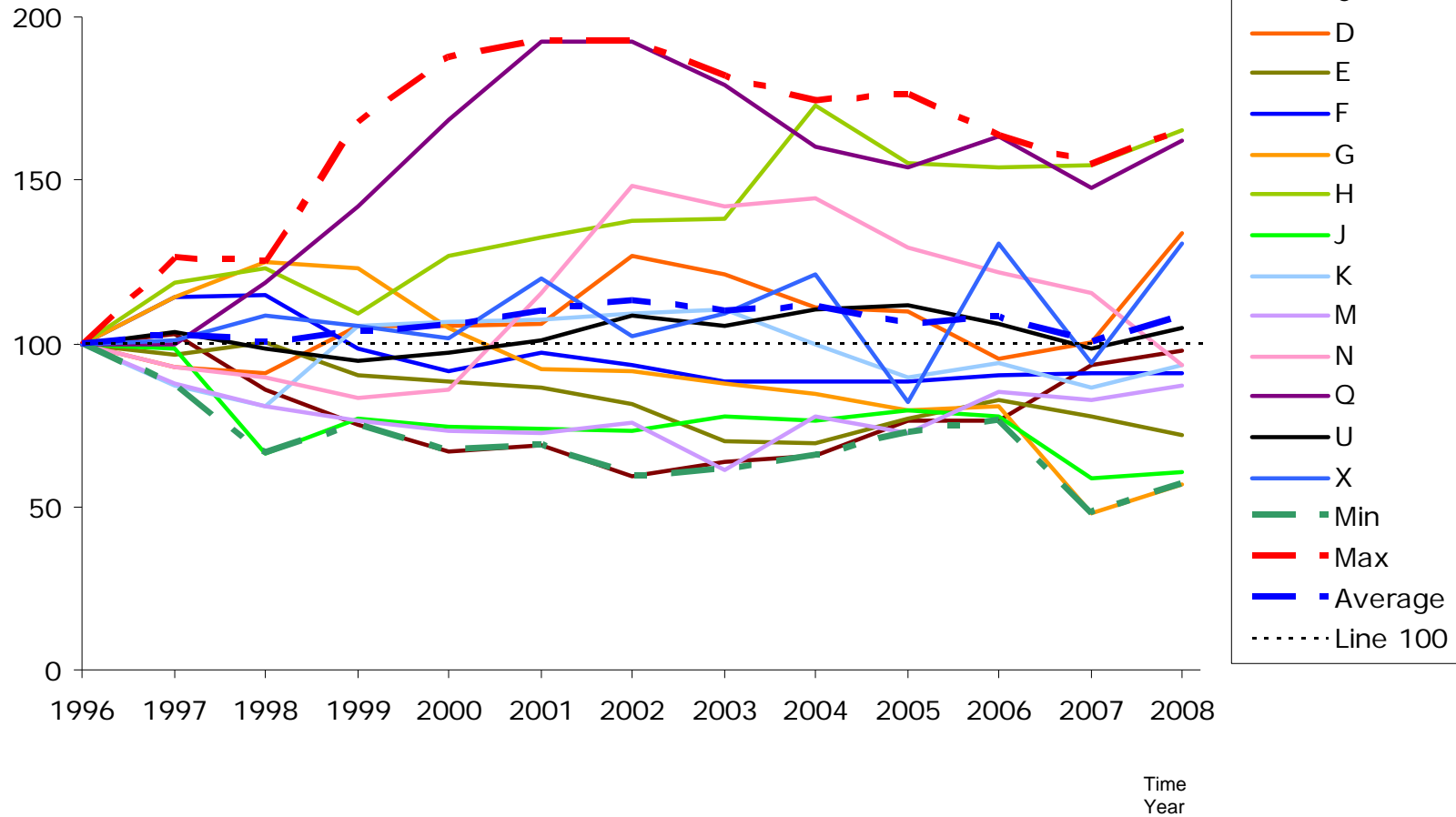
Annual expenditures 2008
(original,harmonized only PPP)

LCC per maintrackkm (original,harmonised only PPP)



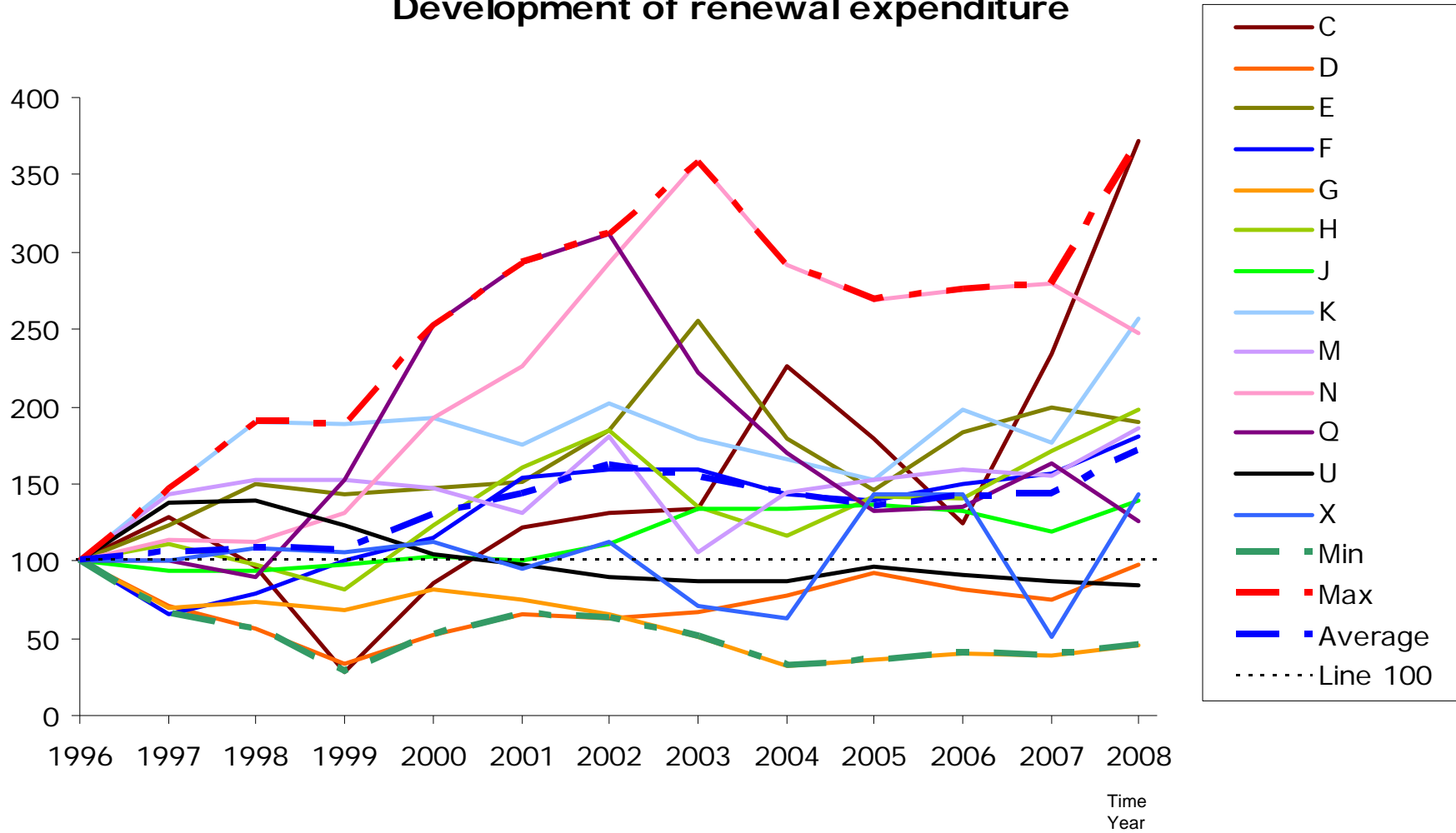
Index 1996=100%

Development of maintenance cost

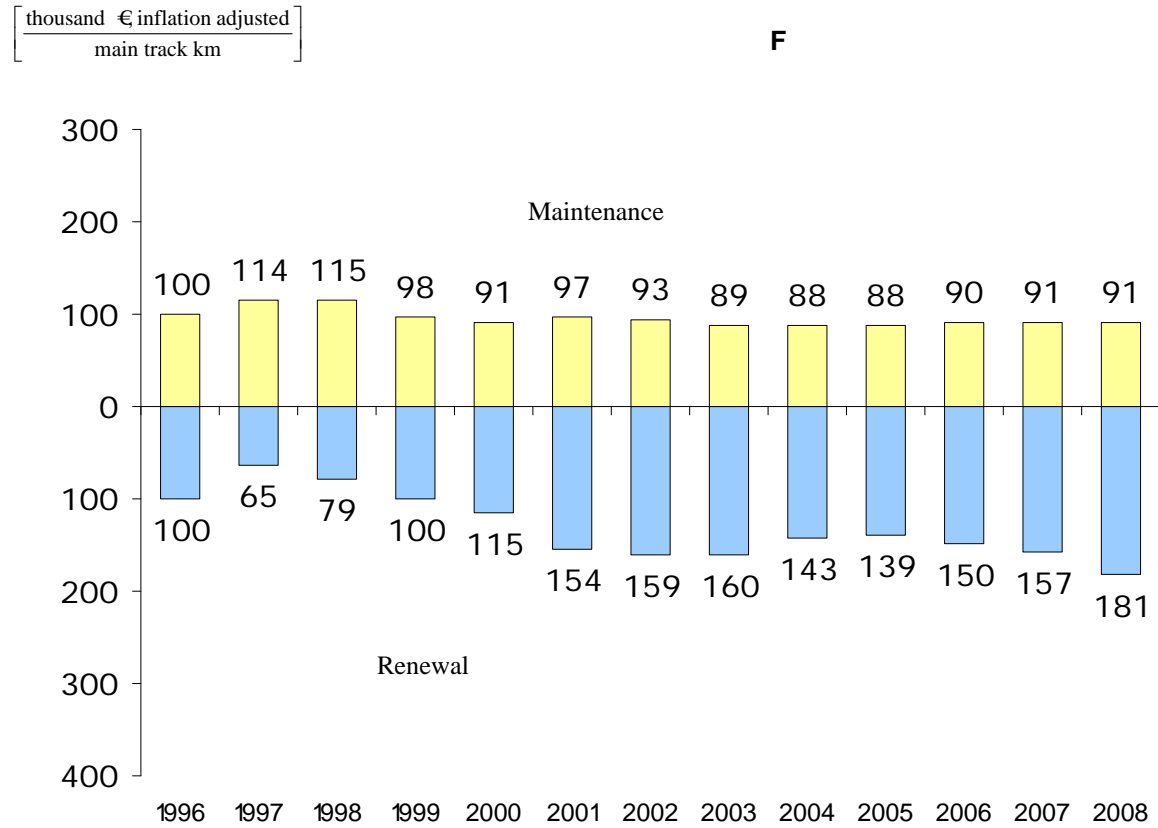


Index 1996=100%

Development of renewal expenditure



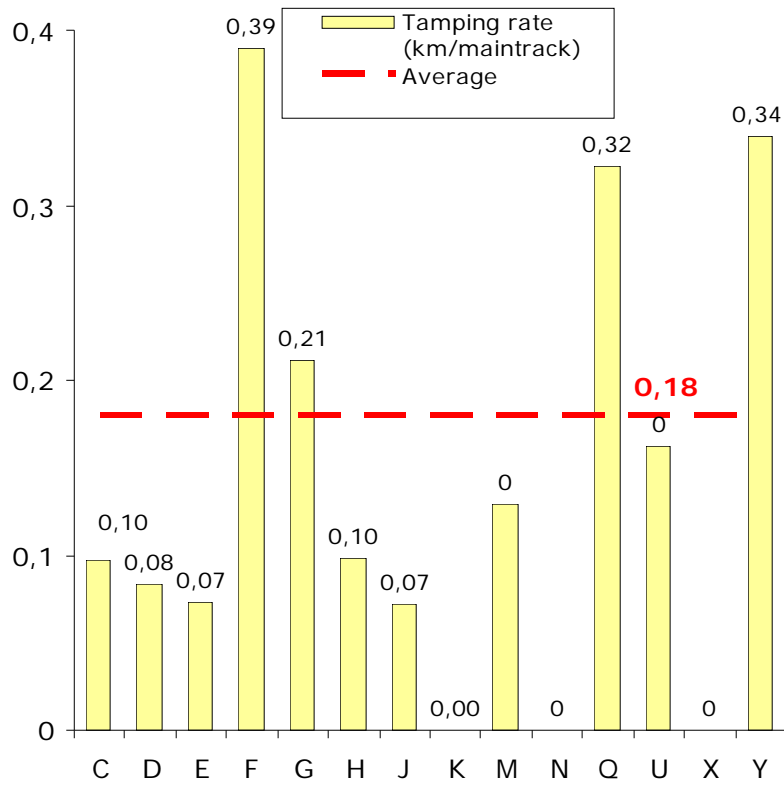
Maintenance and renewal expenditures over time for each railway



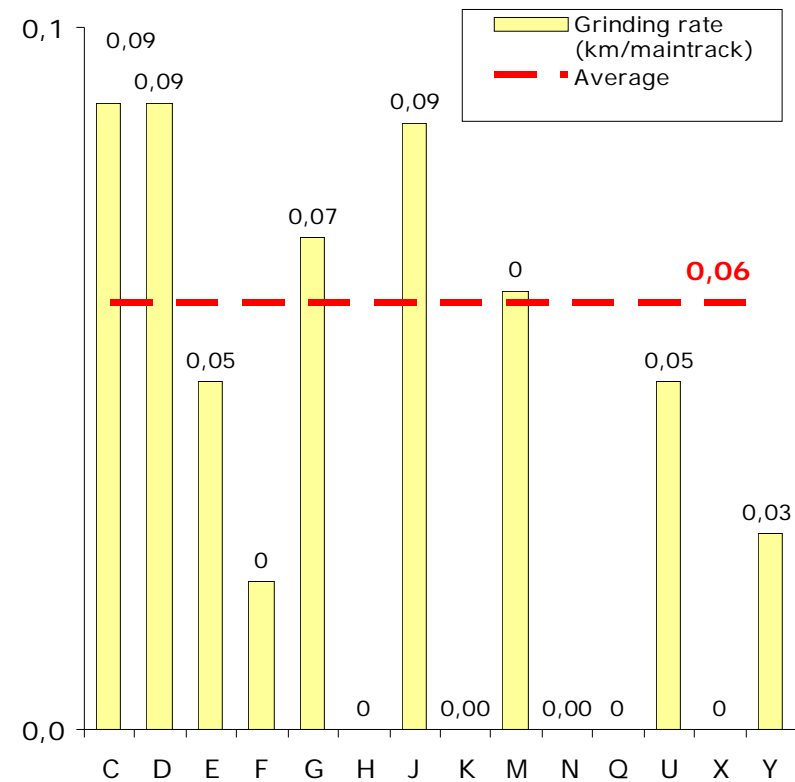
Maintenance & Renewal Rates

- **Tamping rate**
- **Grinding rate**
- **Ballast cleaning rate**
- **Renewal rate of rails**

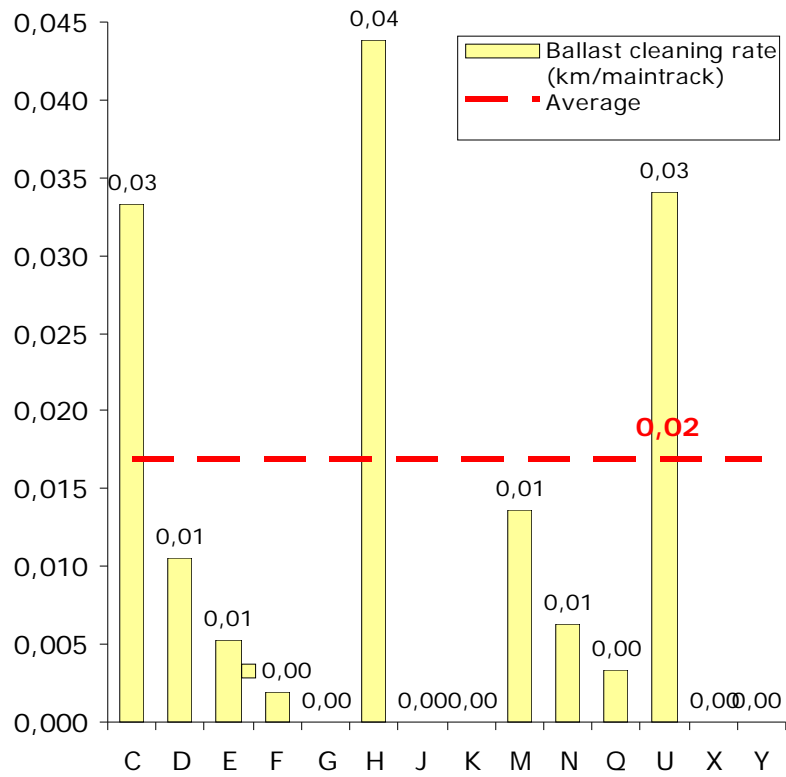
Tamping Rate



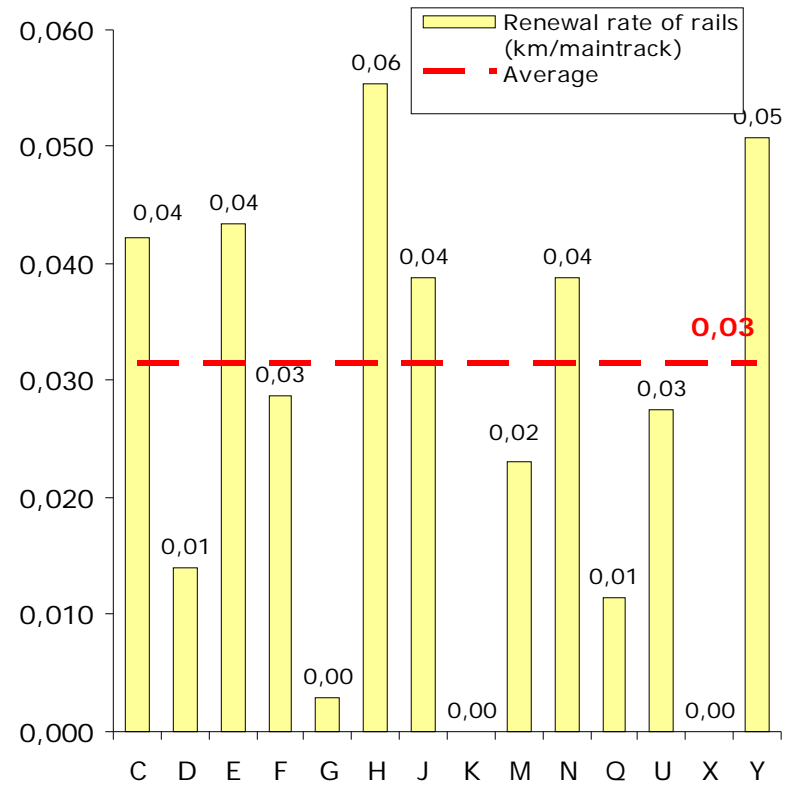
Grinding rate



Ballast cleaning rate



Renewal rate of rails





Background indicators

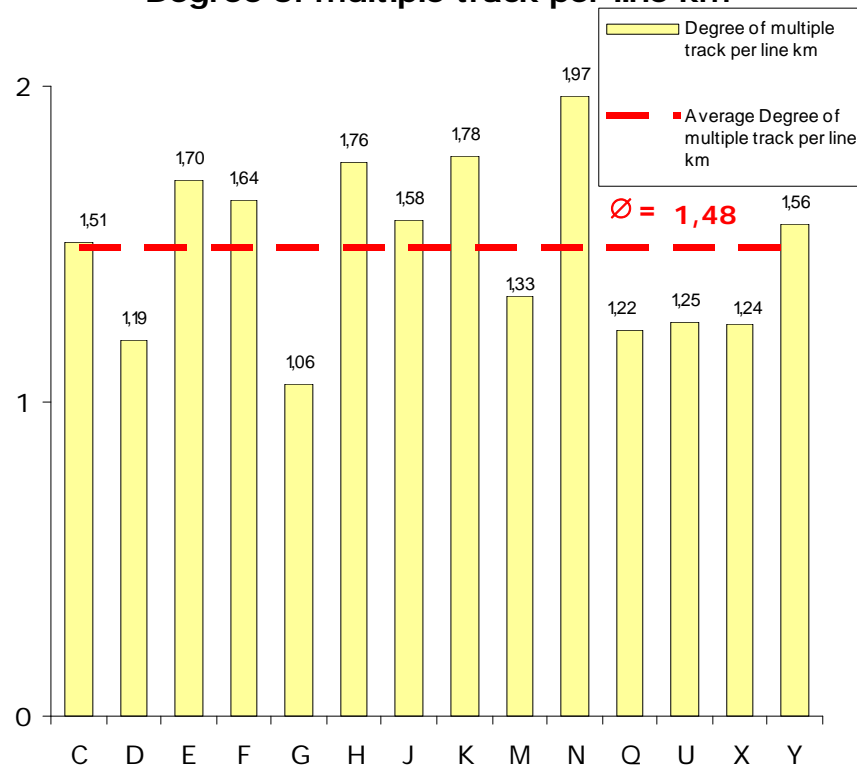
- Degree of multiple track per line km
- Degree of electrification
- Passenger station density
- Density of switch units

A number of parameters are essential for understanding the variability in performance between different railways

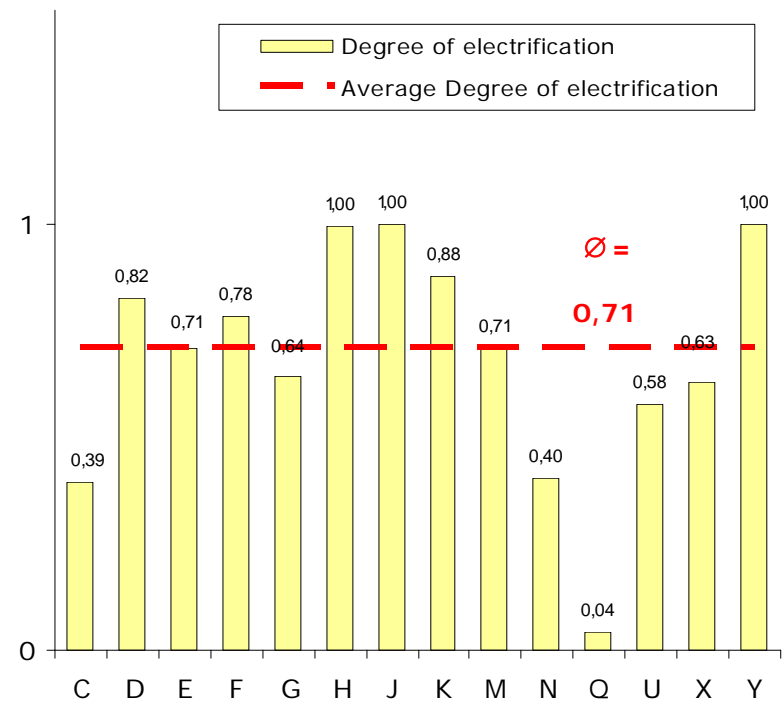
$$\left[\frac{\text{main track km}}{\text{line km}} \right]$$

$$\left[\frac{\text{electrified main track km}}{\text{main track km}} \right]$$

Degree of multiple track per line km

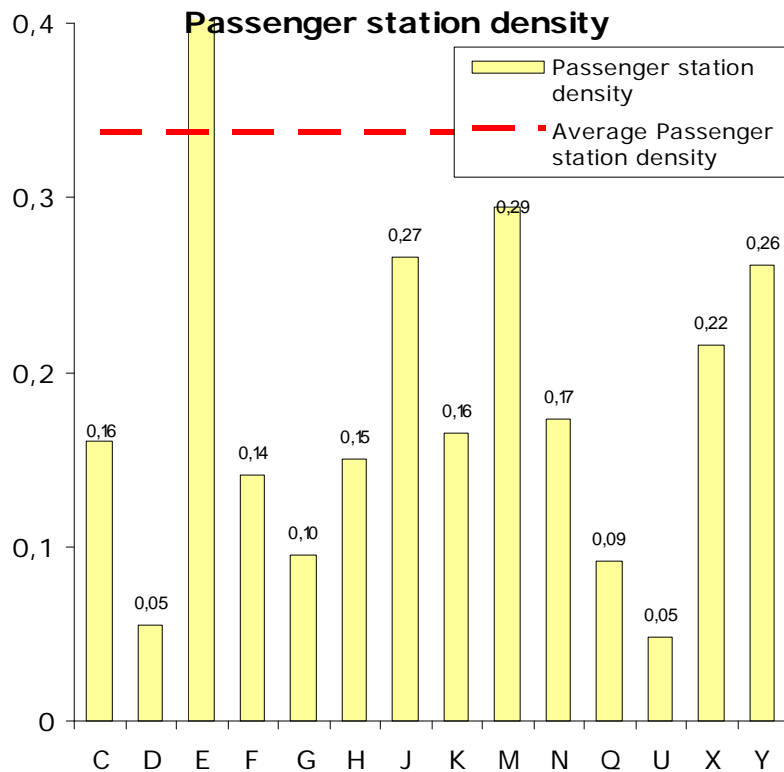


Degree of electrification

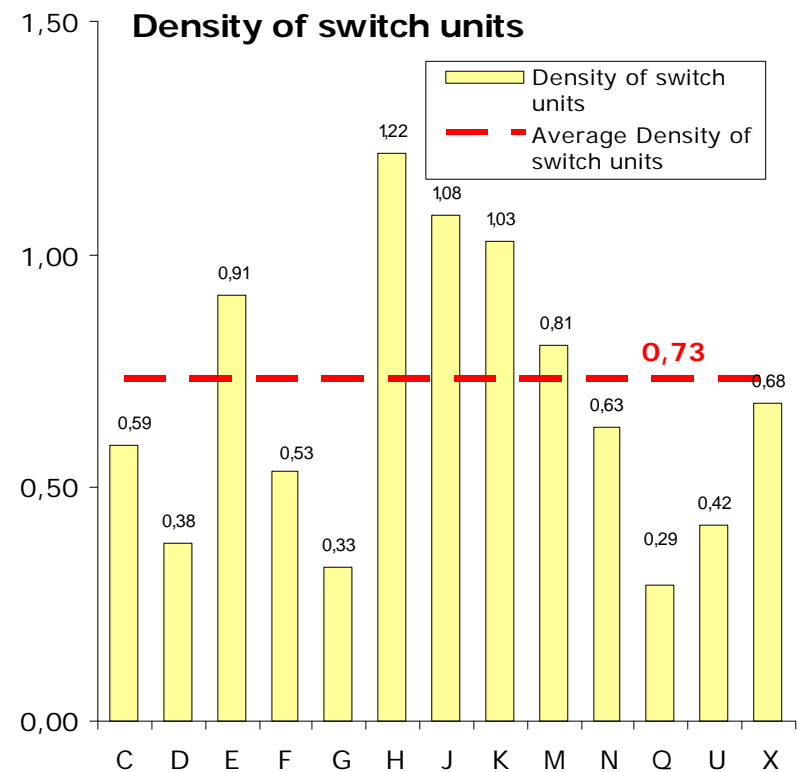


Mobility and market share for passengers and freight are widely spread in European countries

$\left[\frac{\text{passenger station}}{\text{passenger line km}} \right]$



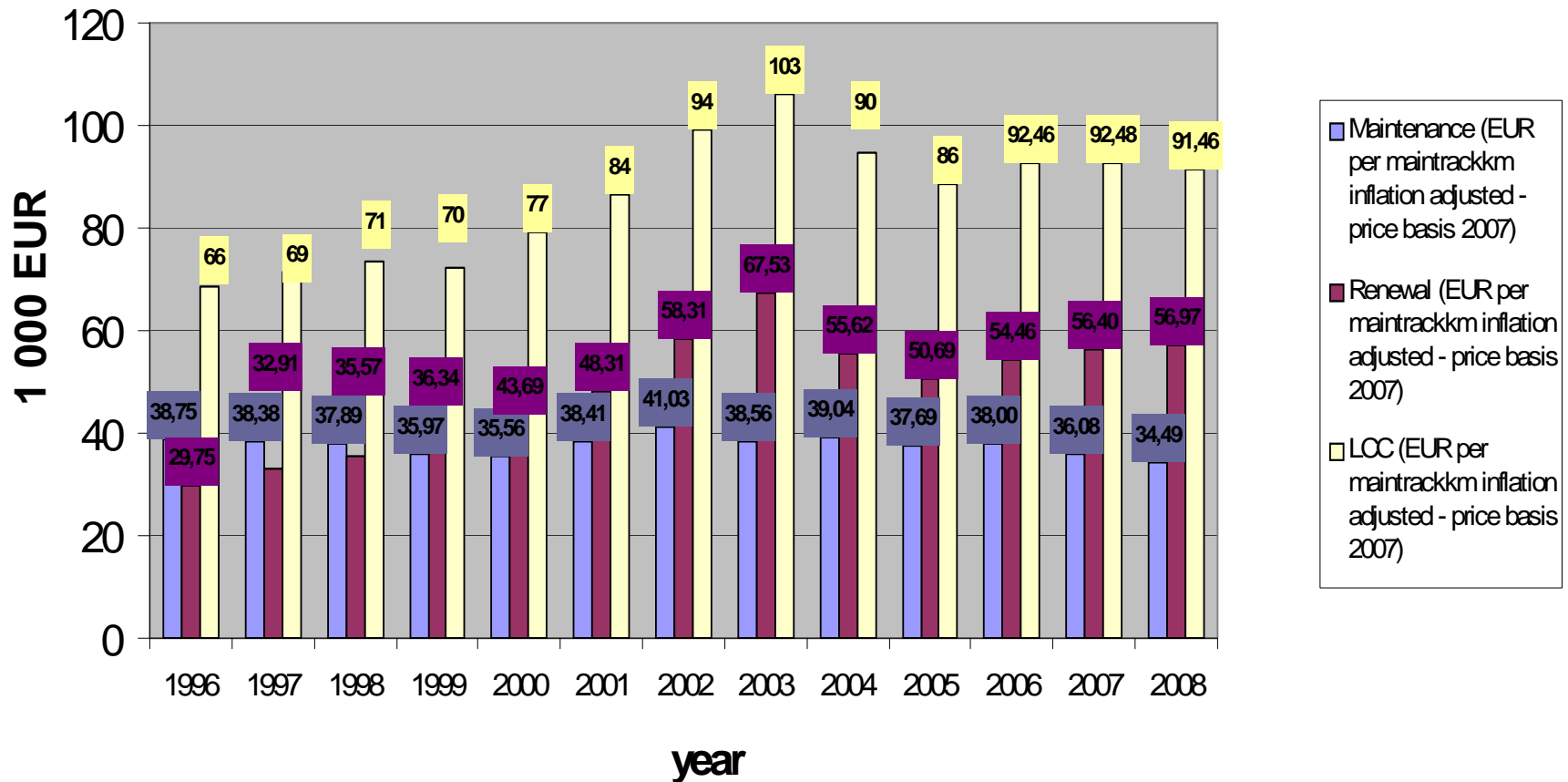
$\left[\frac{\text{switch units}}{\text{main track km}} \right]$



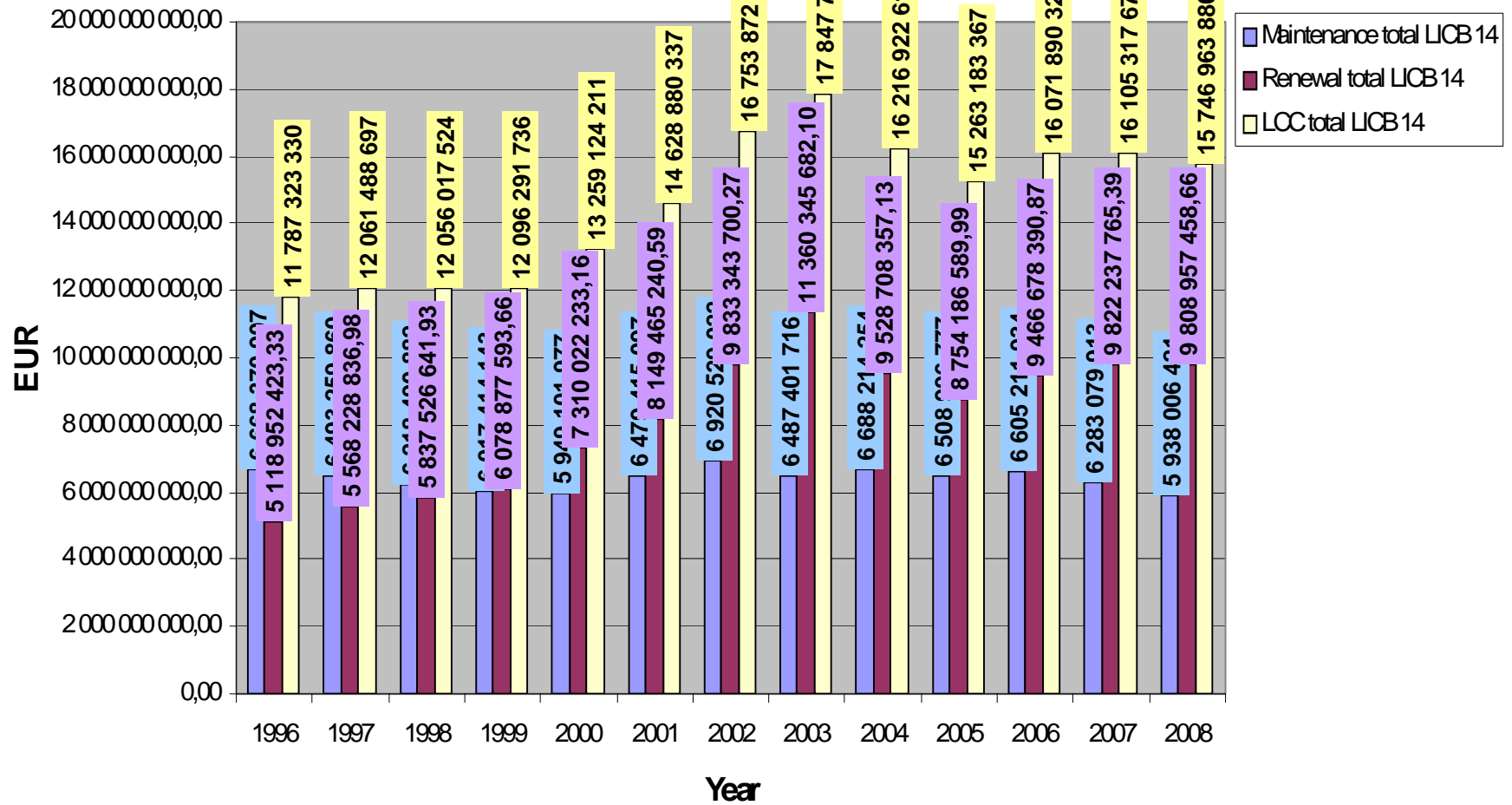


Global expenditures figures

14 LICB Members Average Expenditures Maintenance and Renewal Development (1000 EUR/main trackkm)



Total expenditures LICB 14



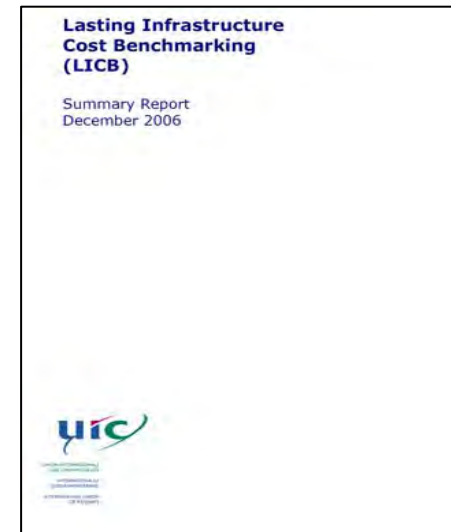


The Benefits of Benchmarking

- improving performance by learning from best practices and understanding the processes by which they are achieved
- better understanding and forecasting of costs and revenues
- setting target cost levels
- There is increasing pressure on railways to demonstrate their costs and performance, in relation to other railway networks achievements and other modes.
- Internally, budgetary constraints demand a business case to support requests for higher levels of investment , to secure long-term benefits.
- Externally, important political issues are feeding a debate on infrastructure provision:
 - Transparency of access charging and accounting
 - State Aid and Multi-Annual Contracts
 - Recognition of external costs
- It is preferable for IMs to prepare the basis for such assessment rather than allow other stakeholders to draw their own conclusions, from perhaps uncorrelated sources.

Deliverables :

- Each year a full report – for the LICB Members
- Each year a summary report for – all UIC Members



In 2007 – 10 years report



LICB new project phase 2009-2010, consists of two work packages

Deliverables



Key deliverables

- Documentation and presentation of the revised methodology including the overall approach to normalisation, cost-functions applied and long term steady state renewal levels
- Documented analyses of status quo, IT concept, development of the new software and launching and testing it
- Survey with potential candidates, workshop to discuss the approach and the benefits, planning of the next project phase to assess and evaluate information



- *Only first step to find out their interests*

Line comparaison benchmark

Goal of the line comparison

- To get a **better understanding** on :
- how different **asset management strategies and methods**
- **Influence of costs and performance** of comparable infrastructures
- **Scope of the study:**
 - Costs and performance on lines of a similar nature.
 - Two types of lines:
 - High Density Lines:
 - Lines serving and converging to capital cities
 - Regional lines:
 - Regular passenger railway services in areas bigger than a city,
 - with low density of population

Conclusions

■ ■ ■ Thank you for your kind attention

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