

## Rail infrastructure asset management -

### Best practice in Europe and the way forward in South East Europe

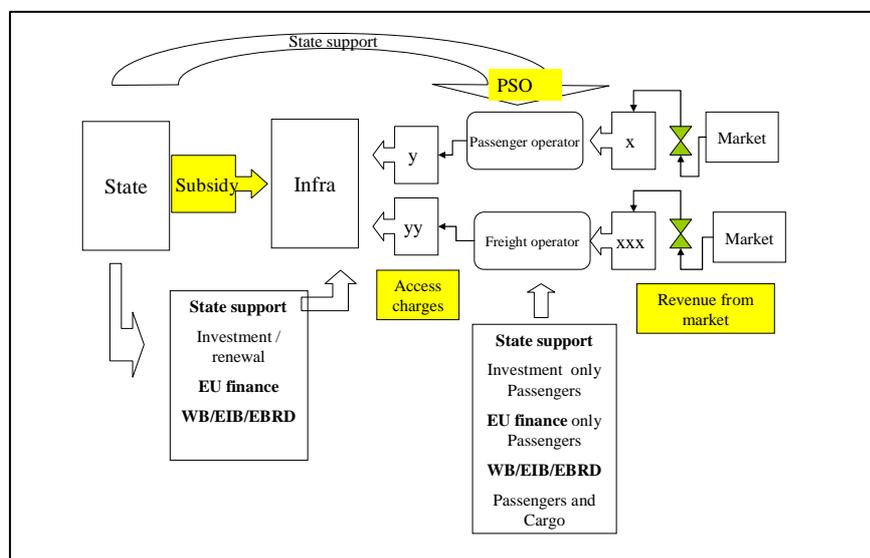
This paper summarises a presentation and discussions at the railway working group meeting held in Zagreb (HR) in September 2008. It is the outcome of several years of work for railways and transport ministries on asset management in South East Europe.

To achieve competitive rail transport in Europe, it is necessary that the infrastructure manager's (IM) financial situation is balanced and stable. Europe promotes the idea of multi annual contracts between infrastructure manager and State as an instrument to achieve this. Such contracts require that the IM is able to adapt his maintenance strategy. The maintenance strategy should be based on current condition of infrastructure, future utilization of the network and available budget.

In practice we see in many countries a situation where there are not enough resources to keep the infrastructure at an appropriate quality level. This is most important for the track system. If problems with sleepers, ballast or rail occur and there is no money to repair properly lower speed restrictions are imposed. On many networks the list of speed restrictions has grown to impressive length.

In Eastern Europe often the solution is to propose a list of track renewal projects to restore the tracks in normal working condition. This requires huge amounts of money that never come available and the result is that most of the renewal work is postponed from year to year.

In general, the financial situation of the IMs is not balanced. In the balance scheme below, income of the infrastructure manager from subsidy and access charges is not sufficient to perform proper maintenance.



If the IM needs more money either access charges or State subsidy or both should be increased. But access charges are already too high and the State is in general cash strapped.

In Western Europe railways developed new maintenance strategies in the last 30-40 years as a reaction on budget cuts. In times of economic crisis (about every 7 years) governments did cut budget for renewal maintenance. Track renewal is very expensive and postponing has significant effect on the State budget. Railways learned how day to day maintenance and medium maintenance should be adapted to allow postponing renewal without imposing speed restrictions. Gradually in several countries maintenance strategies were developed that are based on:

- condition measurement
- analysis of future utilization (which lines are used by how many trains etc)
- life cycle optimization; renewal is not based on a regulation (like in the past in Eastern Europe) but on condition development and preventive maintenance
- priority setting: not all lines are the same important, less important lines could do with a less demanding maintenance regime.
- Preventive maintenance and fast repair of local deficiencies is utmost important to reduce costs and extension of renewal periods

During contract discussions between IM and State in the last 15 years many discussions were held how much should cost rail infrastructure; infrastructure is very expensive and one can not allow access charges to be too high because this will result in loss of market. This has triggered following developments:

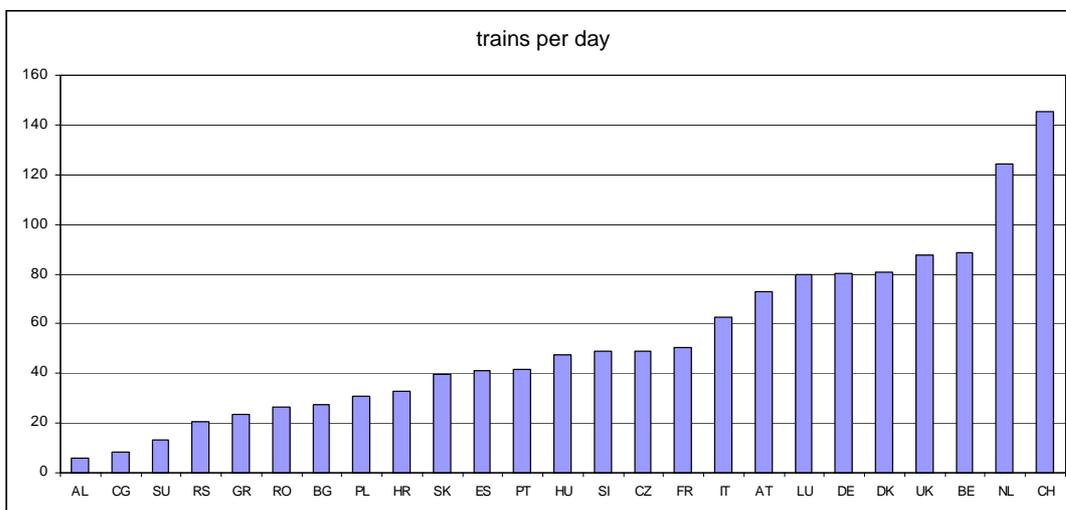
- Pressure on IM to reduce maintenance costs, this was achieved by condition and utilization based maintenance strategies
- Search for other sources of income: for example to allow the IM to use railway assets that are no longer used for operations for real estate development.
- Benchmarking between IM's from different countries. Most countries have only one IM, governments can not assess if their IM performs well. Benchmarking tools have been developed to compare IM performance in different countries.

This development resulted in what is called “Infrastructure asset management Plan” (IAMP). The IM should have an asset management plan (IAMP) which shows:

- how utilisation will develop,
- what are most economic maintenance strategies compliant with this utilization,
- what could be done with non operational assets,
- what should be priorities for various parts of the network,
- What are financing requirements and what are options to schedule work within available budget.

CER promotes introduction of IAMP in Eastern Europe and supported a Dutch funded project to introduce this practice in Bulgaria. Prorail (Dutch IM) experts performed a benchmark study, Dutch maintenance contractor experts explained to Bulgarian colleagues how modern maintenance practice looks like, how it should be organized, how to plan preventive and repair maintenance, what equipment is needed etc. And Dutch experts from Ministries of Transport and Finance explained to Bulgarian colleagues how they deal with the IM and his finance.

If you try to apply principles from West European Railways in Eastern Europe the first problem is the difference in utilization. In the diagram below is presented the average number of trains per day per line km.

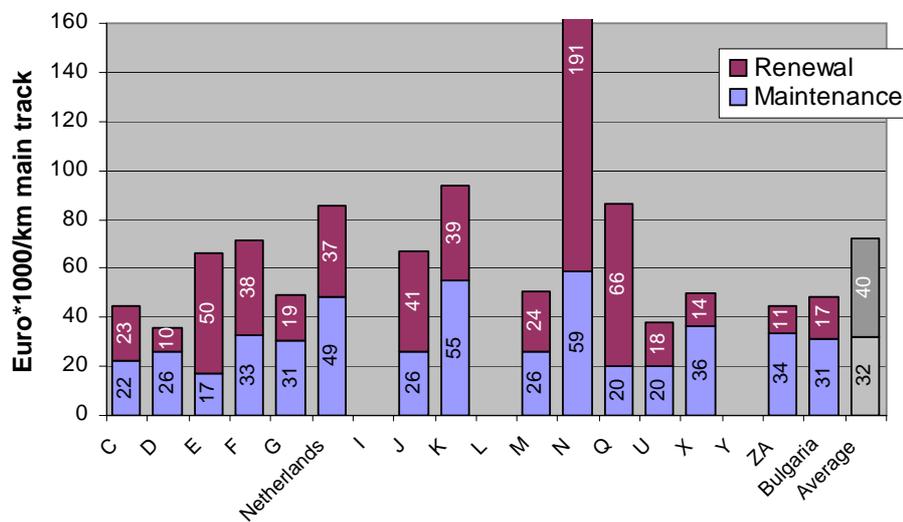


Most Eastern European networks show a much lower train density as in North West Europe. This means however that variable, marginal and fixed cost has a different dimension. On the left side of the diagram track elements will have a much longer life cycle as on the right side. It also means that investment for renewal should be considered against this low utilization, maybe high tech, high quality track that is used in Western Europe is not the most economic solution for the next 45 years. It means also that access charges per train km will be more high if full cost coverage is applied.

The experience in Bulgaria showed that a benchmark tool can be used to assess what should be a reasonable budget. The benchmark assesses:

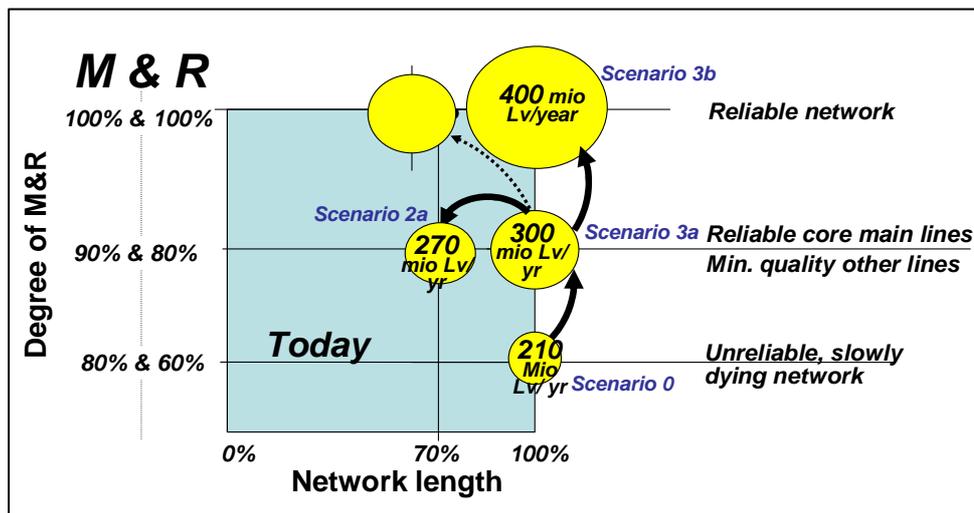
- Utilization of tracks (in million tons per year) today and in future
- Cost of maintenance corrected for purchasing power, single / double track, electrification level etc. (see the example below)

Cost benchmark:  
**LC-costs/km main track (fully harmonised)**



From the benchmark a strategy can be developed that answers the question what should be a reasonable budget for maintenance.

In the diagram below is presented how much money per year should be available dependent on government policy, utilization, priorities and targets.



The diagram shows several options:

- Degree of maintenance and repair on the left vertical axle;
- 3 scenario's on the right side:
  - Today's situation
  - A middle scenario where a few main lines (core network) that carry the majority of traffic receives 100% maintenance and the other lines have a more cheap regime
  - What would cost a full quality solution?

Each scenario has of course different effects for passenger service, cargo transport, access charges en government policy.

For each scenario different schedules for maintenance and renewal can be developed.

The benchmarking enables government to consider its rail policy en budget plan and to agree with the IM which scenario will be basis for a multi annual contract.

The conclusion is that also for low utilization networks in Eastern Europe modern maintenance practice from Western Europe can be applied. It requires a shift of budget from renewal projects to current maintenance. It requires in general restructuring of maintenance organization to allow fast repair, condition measuring, detailed planning of maintenance actions, mobile maintenance team with sufficient vehicles and equipment. And of course it requires integration of maintenance and renewal planning both based on future utilization and priorities.

In Western Europe IAMP and benchmarking are used to achieve that:

- Maintenance and Renewal works can be scheduled in 5 or 10 year plans within available budget (State budget + access charges + real estate income)

## Conclusions

Maintenance strategies determine the costs and the quality of the infrastructure, and thus also the level of track access charges and the competitive position of railways. Moreover, maintenance strategies are the instrument for the state to define and agree cost and performance targets with its infrastructure manager, as required under EU legislation. Consequently, the state, the regulatory body and railways' customers should take an interest in the infrastructure managers' maintenance strategies, as it is an important factor for their financial and market position, i.e. the need for state finance and the sector's market opportunities. It thus is through costs, performance indicators and track access charges that this link is established, that performance can be benchmarked and compared and targets can be agreed.

An analysis of infrastructure managers' maintenance strategies in South East Europe, but also in other parts of the world, has led to the following recommendations:

- Shift from a regular to condition based maintenance

- Establish measurement programmes to regularly assess infrastructure condition.
- Move away from re establishing past design parameters across the network , future utilization should decide what parameters are sufficient and appropriate based on government policy and not on engineering history

Focus resources first of all on parts of the network where most demand is forecasted. Like in every industry mostly 80 % of effect (improvement) can be achieved with 20% of resources. In Bulgaria this means that improving 20% of lines has effect on 80% of trains. In general there will never in any country be enough budgets to have all lines on top quality.

The infrastructure manager's business strategy should be consistent with the national transport strategy and the resources available under it.

The current budget constraints for most Governments in the Balkan have as effect that access charges are high (they cover IM operations cost minus available subsidy). Per train km they are even higher because of the low utilization (low number of trains).

For the European goals this has adverse effects, it makes international long distance rail transport -for example from Germany to Istanbul – expensive and uncompetitive. To compete with highways by the sea (most important competitor) and road transport it is advised to have a basis access charging level comparable with the German one. If this tariff is competitive in West Europe, it will also be competitive on the whole route via the Balkan. Competitive means also more trains and higher utilization and lower costs per train km.

Again this makes it important that governments discuss with the IM options to reduce costs with modern maintenance practice and priority setting that enables rescheduling of works and reduction of costs.

Experience learns that IM's can learn from colleagues in West Europe, and governments can learn from colleague governments in West Europe.

Zagreb, September 2008