

*Rail Investments in
Central and Eastern Europe:
Towards a Competitive
Railway System*

Editors: Jérémie Pélerin and Tudor Mircea



Note From the Editors:

UNIFE has been working for several years for an acceleration of the modernisation of rail systems in Central and Eastern Europe. In addition to its lobbying activities in Brussels and in the capitals of Central and Eastern Europe, UNIFE organised two workshops in order to exchange best practices between operators, infrastructure managers, transport authorities and the rail industry. The first one was organised in July 2007 in Warsaw and the second one in January 2009 in Bucharest. These workshops contributed to raising awareness on problems shared by the countries of the region: there is a stringent need for a higher absorption capacity of EU funds, but also for well-designed projects and integrated investment strategies at the national level. The task is immense, but most of the Central and Eastern European countries are now on the right track. The stakeholders involved understand the need to render more ambitious national planning, to better coordinate cross-border sections, to quickly develop more projects of good quality, to improve tendering procedures, to optimise the use of EU funds and to accelerate project execution.

This booklet is based on contributions from the speakers who participated in the second workshop, which was jointly organised in Bucharest by: UNIFE - the Association of the European Rail Industry, AIF – the Romanian Railway Industry Association and TAIEX – Technical Assistance and Information Exchange.

The booklet intends to provide information and advice to infrastructure managers, operators and transport authorities in the countries of Central and Eastern Europe.

It is structured according to the different steps of a project: from the inception of the project to its actual implementation. Firstly, it presents the phase of planning, both at the national and the European level. Secondly, it gives advice regarding project development and how the best technological choices can be made. Thirdly, it analyses the project financing phase. And finally, it develops options for project implementation.

We would like to warmly thank all contributors for the work they put into the preparation of this publication as well as Urszula Chomicka and Jessica Buckley for their help in editing.

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Introduction

Market trends for the rail supply industry: The potential for rail transport in Central and Eastern Europe

By **Michael Clausecker**, Director-General, UNIFE



In 2006, UNIFE, the Association of the European Rail Industry, commissioned Roland Berger Strategy Consultants to conduct a global, comprehensive analysis of the railway market. A sound knowledge and understanding of the international railway market is essential for companies to stay on track for continued success. Moreover, it provides all interested parties with a consistent overview of the global railway sector and of the general tendencies for the next years. For these reasons, and due to the high success of the first study with its members, UNIFE decided to update the study in 2008, two years after the first edition.

This second world market survey of the rail supply industry shows that the industry has grown tremendously over the past two years. New railway projects around the world plus upgrading/expanding existing railway lines caused orders in virtually all market segments to surge. According to the study, the total annual world market for the rail supply industry in 2007 is estimated at more than €120 billion, out of which €85 billion is accessible. As for the annual growth rate, it is considered to be between 2.0% and 2.5% over the next nine years.

The findings show that Western Europe remains the dominant market, accounting for almost 35%, followed by NAFTA (24%) and Asia/Pacific (21%). Overall, these regions account for 80% of the accessible market. Rolling stock represents the largest market segment, followed by services and infrastructures. We expect long-term growth to exceed the worldwide average of the market in Asia/Pacific, CIS, Eastern Europe and the rest of America. At the same time, NAFTA, Western Europe and Africa/Middle East display growth rates of between 1.9% and 2.7%.

Central and Eastern Europe, with an accessible market of around €5 billion per year, represents about 6% of the global market. The region is predicted to register significantly higher growth rates (4.1%) than the Western part of the continent (2.1%). The most dynamic segments are rolling stock and rail control which grow clearly above average by 6.7% and 3.3%, respectively.

Rail operators and suppliers currently face numerous global and sector-specific trends, most of which have a beneficial impact on the industry. Climate change and ecological awareness, railway liberalisation, urbanisation and standardisation are the main drivers behind the positive development of the industry.

On the other hand, the current financial situation is increasingly affecting the rail industry. A number of rail infrastructure and rolling stock projects have already been cancelled or delayed. Public private partnerships are put on hold worldwide because of the lack of private financing. Rail freight operators have already been hit hard by the crisis, as demonstrated with the 29.3% drop in performance during the first quarter of 2009. The result was a dramatic slump in locomotive and freight wagon orders. Investments in passenger rolling stock are so far less affected because they are less dependent on the private sector. However, the current increase in budget deficits of the Member States will weigh on future investments when restrictive budgetary policies will have to be put in place in the coming years (the risk of empty pockets). Finally, the European recovery plan and national stimulus plans do not include a significant number of new rail infrastructure and rolling stock projects and no money from these plans has yet been injected into the rail sector. To a lesser extent, the shortage of engineering capacity can become a bottleneck for growth.

Nonetheless, megatrends (e.g. demographics, urbanisation etc.) and the need for green transport should drive growth in the long-term and outweigh negative short-run effects.

Enjoy the read!

Sincerely,

A handwritten signature in black ink, appearing to read 'Michael Clausecker', written in a cursive style.

Michael Clausecker

UNIFE Director-General

Key issues for railway development in Central and Eastern Europe

By **Stefan Roseanu**, Secretary-General, AIF

The European Union's process of expansion in the years 1990 - 2000 brought into the confederation a series of new Member States which are generically grouped under the term “the Central and Eastern Europe countries”. Ten of these countries (except the Czech Republic) form the border of the Union and have recently known the existence of totalitarian political regimes, as well as a centralized and nationalized economy.

The political changes at the end of the 1980s brought together the structures of the European Community and the reorganisation of national economies on different levels. On the one hand, the international economic agreements (see COMECON) have been annulled and on the other hand, the industry has experienced a decentralisation and privatisation process. This way, there was an evolution from an economic system based on the existence of industries which involved large transport volumes (the steel industry, intensive agriculture, energetic coal plants, etc.) on large distances – the regions of a country had different production specialities, and the COMECON member countries were encouraged to organise product exchanges according to the existing plans.

The break-up of the previous economic organisation and the split-up of COMECON in the beginning of the 1990s shocked the railway transport system. The disappearance (or in gentler words, the reduction) of goods to be transported, together with the liberalisation of the road transport system, led to a significant reduction of the freight volume shipped by trains, but also to a reduction of the passenger transport demand. The rigidity of the rolling stock fleet for both freight and passenger transport prevented the railway operators from countering the competitiveness of road operators. The experience of Western Europe during the period 1950-1960 was shared by the communist countries in the period 1990-2000.

To sum up the above-mentioned information we can say that:

1. For the economies of the countries in Central and Eastern Europe, the period 1990-2000 represented a period of setting new values (the disappearance/reduction of mass transport and the appearance of occasional transport).
2. The accession of the 10 countries to the European Union transformed them into border regions of the confederation and implicitly into access gates to the CIS and Asian areas;

3. The liberalisation of the road transport together with the stiff organisation of the railway system led to the loss of important market quotas both in freight and passenger transport;

This situation led, at least in Romania, to people forming a worse opinion about the railways and consequently to the reduction of political support and railway investments.

And yet...

At the same time, the railways remain a prosperous business environment. The financial support granted by the central budget of the European Union for the development of railway transport was transformed into projects aiming at recovering the infrastructure and renewing the rolling stock fleet. All countries in Central and Eastern Europe adopted the provisions of the 1st Railway Package, which stipulated the institutional separation of infrastructure managers and operators. In this context, the private initiative of freight and passenger transport undertakings became possible. The percentage of private operators in the Member States varied according to the protection and interest level of the state in granting funds for the railways – while we record a higher percentage of railway freight operators in Romania (around 30% of the market), we notice a low percentage in Hungary (around 5%), where fund allocation to the infrastructure modernisation was quicker.

The competition in the area of railway operators has two benefits in the CEE countries: the first is a lower rhythm of customer loss to the benefit of the road system, due to providing more flexible offers and adapting the rolling stock fleet to the demands of the customers (acquisition of new wagons, repairs and modernisation, but also leasing contracts with the wagon pools owners). The second benefit is the private undertakings' reactions which pressure the political class to speed up the railway infrastructure modernisation projects as well. In this context, the fact that the 10 Member States were allocated €175 billion from the Union budget is important because significant amount of funds can be directly or indirectly attracted by railway transport projects.

The recovery of railways

The financial gap between the countries in the region and those in the EU15 favours the development of large infrastructure projects connecting the East and the West of the continent by priority transport axis (the Pan-European Corridors, TRACECA). In all CEE countries, the modernisation work of Pan-European corridors is under development or tenders are being prepared. At the same time, the rehabilitation of local-interest sections is accomplished through national or local budget allocations in order to ensure social cohesion and mobility.

The adoption of public service obligation contracts opened the path to rolling stock investments for the improvement of passenger transport. More complex forms of these contracts, such as those adopted in the Czech Republic or Poland, led to the

acquisition of coaches for local and regional transport. Incipient forms of the contract were also adopted in Romania, but the lack of coherence of texts generated differing interpretations with respect to the proper implementation of public money and caused delays in granting the state aid to the national operator. However, the private operators succeeded in finding money for acquisition and modernisation work on the basis of the same contract.

Although there is a gap between two parts of the same region (the 10 countries which acceded to the European Union in 2004 are more advanced than Romania and Bulgaria), railway infrastructure investments are under development, due to the interest showed by national or European players. Thanks to these efforts, the railway managers accepted the implementation of urgent solutions - for ex. the automated infrastructure works or the implementation of ETCS/ERTMS level 2 for the new projects.

As for passenger transport services, operators introduced new offers in conformity with the latest mobility demands (airport connections, different suburban trains, etc.). All these generate acquisitions and the modernisation of DMU and EMU fleets.

The freight transport, in spite of being severely affected by the financial crisis, still remains a significant source of projects. The adaptation of the locomotive fleet to cross-border traffic, the acquisition of container wagons together with the development of intermodal terminals, as well as the encouragement of RO-LA transport system are just some of the areas where the railway industry manages to transform railways into a competitive player on the transport market.

Section 1

National and European Planning

National and Regional Development and the need for a long-term perspective in the development of the transport system

By **Anastassios Bougas**, Head of Unit, Unit I1 (Romania), DG REGIO, European Commission

If I would have had to elaborate in front of you on this subject some months ago, the “modern economists” would have told me that investing in transport infrastructures is an old-fashioned way of addressing the needs and pre-requisites of regional and economic development. Others consider the only relevant paradigm of regional and economic development to be that of exogenous development based on attracting Foreign Direct Investment.

Economic history and my experience in regional policy tell me that there cannot be sustainable regional and economic development without a policy mix that jointly addresses the needs of endogenous development (which means increasing the capabilities), capacities and the long-term potential for growth (thus securing a more sustainable basis for attracting FDI), competitiveness, job creation and a more balanced development.

The financial crisis came to remind us of some basic truths, for example, the importance of investing in basic infrastructures. You will have noticed that all the economic and recovery plans have as a key priority the development of basic infrastructures. It reminds us that the real economy has a non-materialist dimension to it. It reminds us that Europe should maintain a capacity of industrial, energy and agricultural production and, for this, transport infrastructure is quite important. And this capacity is not only a transition phase, especially for the new Member States.

I am sure you are aware that besides the economic crisis, we also have to address the energy and climate change crisis. They exist and, if we want to have an impact on them, we must observe more carefully the qualitative dimension of the investment and not only its quantitative aspect. And we have to implement investments in the most cost-effective manner because there is a high cost for the citizens and future generations.

Transport infrastructure is a key issue for the 2007-2013 programming period in Romania and also, without much risk, for the quasi-totality of the new Member States, as well as the other states which form the European Union.

- Transport infrastructure in Romania was identified as a key objective within the 2007-2013 framework negotiated between the Romanian government and the European Commission.
- 24% of EU Cohesion policy funds (financed by the European Regional and Development Fund (ERDF) and Cohesion Fund (CF)), representing almost EUR 4.6 billion, were provided for the Sectoral Operational Programme for Transport (SOPT). Additionally, an estimated €1.3 billion within the Regional Operational Programmes will be provided for the improvement of county roads and urban streets.
- On top of all this, there is about €500 million which will be spent from the pre-accession instrument.
- A reasonable leverage of national funds (co-financing), loans and private capital, could mobilise a total investment close to €10 billion, if not more, for the period 2009-2013.
- Given the many years of underinvestment in the transport sector, this amount of money is not sufficient to address all the priorities. This is despite the fact that Romania has never witnessed such investment in the transport sector.
- The challenge is manifold:
 - Quantitative: to absorb this money and have a leverage effect,
 - Qualitative: to absorb this money in a cost-effective way, based on clear priorities and having functional and operational projects at the end of this programming period,
 - Be on time: to absorb within the deadlines (foreseen by the regulations) and to manage to frontload the implementation and absorption of the funds in order to counterweigh the economic crisis.

Why is this a key issue?

Modern transport infrastructure and services are an essential element to achieving national and regional development goals:

- Increasing economic competitiveness (reducing transport costs, favouring mobility of the labour force);
- Economic integration with the EU and the development of the internal market (through the Trans-European Networks);
- Spatial cohesion (more balanced development by reducing negative externalities from congestion and excessive concentration of economic activity etc.);
- Promotion of sustainable transport through the facilitation of modal shift to more environmentally friendly transport means (rail and water transport), with an emphasis on public transport and safety.

In practical terms, we are aiming at increased accessibility to regions and locations through new or modernised infrastructure investments, reductions of traffic congestion and delays (which represent high negative externalities) improvement of transport services offered to customers, offering more developed and competitive logistic systems which pollute less, as compared to similar traffic levels.

Integration with other regional policy objectives

I would like to refer to one specific example of integration. The implementation of growth, a key objective for the Romanian regional policy, is dependent on the adequate transport infrastructure being made available to serve these areas.

Specific objectives for Romania transport sector

- Emphasis on the investments for the three Trans-European Transport Network (TEN-T) priority axis:
 - Road priority axis 7 Northern branch: Nadlac–Bucharest–Constanta
 - Rail priority axis 22 northern branch: Bucharest–Costanta
 - Inland Waterways priority axis 19–Danube, including the development of river ports, but also the Constanta port as the main Romanian freight access point in the Black Sea.
 - Launching of feasibility studies for the southern branch of axis 7 and 22 linking Romania to Bulgaria and Greece for which a major component (the combined rail and road 2nd Danube international bridge) is already under construction.
 - As a clear sign of how important this is within the context of the SOPT, more than EUR 1.5 billion is foreseen from the Structural and Cohesion Fund for **each** sector – rail and road – for TEN-T projects.
- Modernisation of the national transport infrastructure outside the Trans-European Networks (road, rail, river and maritime ports, air transport infrastructure, traffic safety and inter-modal transport).
- The investments cover new infrastructure (in particular in the case of the road sector) and rehabilitating and modernising existing infrastructure in order to bring it up to European standards and to ensure interoperability with the EU's transport system (notably for the railway sector) .

Challenges for the implementation of a long-term transport investment strategy

Transport is not only projects to be implemented or corridors to finalise. It represents a **system**. We need then a systematic and systemic approach for upgrading, sustainability, and competitiveness.

We have suggested a global agenda to the Romanian authorities, both systematic and systemic:

- *Systematic* - in order to define priorities which are well-ordered, timely and coherent with financial resources.

- *Systemic* - in order to reinforce the positive interaction between the different initiatives taken in the transport sector.

- Transport infrastructure capital investment (which must be based on a coherent plan that contributes actively to the national development strategy, is technically and financially sound and is endorsed politically through a broad consensus. This is why the Commission is very much looking forward to the conclusion of the Transport Master Plan and its subsequent political endorsement.
- The requirements mentioned above are directly linked with the many challenges Romania faces:
 - Within the transport sector itself, the different modes cannot be looked upon each in an isolated way. The rationalisation of the existing networks, in particular for the railways, needs also to be included within the sector's strategy. Critically, the sector's strategy needs to be coherent with an overall development strategy.
 - Political stability and constant agreement on the priorities for the potential investments are essential. This means that they need to be endorsed at government level, and a long-term approach needs to be accepted.
 - Adequate administrative capacity and efficiency of the sector's structures: preparation, implementation and monitoring of investment projects.
 - Adequate financial resources need to be mobilised in particular the completion of the TEN-T priority axis investments. This means matching, through global investment planning, physical objectives with the foreseeable financial resources. Planning should also take into account that not all financial resources are equally stable or readily available in the medium term:
 - For the EU Structural Funds, a stable financial framework for the 2007-2013 (in real terms 2015) period is ensured; these will be supplemented to some extent by the TEN-T budget;
 - The state budget will be under considerable pressure, given the following factors: the current financial crisis and instability with the exchange rate. Being subject to shorter political cycles, the state budget carries more risk of change in particular for the investments which are not being co-financed by the EU funds;

(There should be prudence with regard to changing objectives or trying to find short-term fixes for investment priorities in this sector. Given their very long life span, major transport infrastructure investments always need to be seen in the longer term perspective.)

- Loans from International Financial Institutions must be used to better implement agreed investment programme priorities;
- Public procurement, contract management, and selection of companies need to have the expertise and capacity to carry out such difficult projects.

We have suggested a detailed agenda of **15 key initiatives** structured in three pillars:

- Operational issues concerning project preparation
- Capacity and institutional building measures
- Financial and structural measures

Given the serious delays in the implementation of this agenda and the projects, we expect that the government and authorities will address with priority the implementation of transport sector projects.

It is not only an issue for the sector, but a key pillar for the economic and regional development of Romania, and as such, an answer to the economic crisis in Romania.

Key initiatives

A. Operational Issues Concerning Project Preparation

1. Preparation of major projects for 2008/2009/2010.
2. Railways standards (speed 160/120 and ERTMS technology are key ones).
3. Eligibility of Rolling stock conditioned by the guarantee of available financial resources to finish railways main corridor.
4. Awareness mechanism and specific monitoring for ex-ISPA projects being at risk (300 MEUR according our estimations).
5. Preparation of post-2013 projects.

B. Capacity and Institutional Building Measures

6. Modernisation of the administrative framework of the transport sector, in particular clarification of the relationship between the Ministry of Transport and the two key agencies (CFR and Road Agency) for better effectiveness and sound and efficient management.
7. Higher salaries, specialist and working conditions for the Managing Authority's staff and employees of the Structural Funds and IFI co-financed projects.
8. Addressing the "external hindrances" for the implementation of the projects of the transport sector.

9. Timetable for the adoption of the Master Plan (a strategic document, fixing clear priorities, endorsed by the Parliament and the government).
10. Compliance assessment of the management and implementation structures respecting the standards of the Community regulations for sound and efficient management.
11. Public procurement, contract management, capacity and expertise of companies selected to implement the projects.

C. Financial and Structural Measures

12. Co-financing capacity / financial resources for the sector.
13. Financial engineering options for the co-financing of the different projects.
14. Decisions on pricing policy and revenues of and for the rail sector need to be made.
15. Rationalisation of the railway network.



The challenges of rail infrastructure development in Romania

By **Claudiu Dumitrescu**, General Director, Railway Unit, Ministry of Transport Romania

Rail transport has been, since its beginnings in the 19th century, a mode of transport that has substantially contributed to the development of society. We are convinced that it will continue to be useful to people and that it will be a generator of progress for society, both in Romania and in others.

The creation of the railway network and the development of rail transport in Romania took place at the same time as progress on the European and global level began.

During this time, the year 1998 represented a decisive moment, with the adaptation and implementation of a legal framework separating exploitation and maintenance activities of rail infrastructure from railway operations.

The reorganisation of the Romanian railway system according to the European Directives represented the necessary development framework for reasonable and non-discriminatory access of transport operators to rail infrastructure. The liberalisation of tariffs in rail freight transport, the creation of conditions for the entrance of private capital, as well as the continuation of efforts of harmonisation of the rail transport system with the European market.

Romania was the first Central and Eastern European Country to institutionally separate in 1998 the management of rail infrastructure from rail transport (passenger and freight), and to bring about the institutional separation between passenger and freight services.

The achievement of the major objectives of the European integration of the rail transport system is linked to the modernisation of rail infrastructure and to ensuring interoperability with the European rail infrastructure. Romania has created the legal framework concerning the commitments to modernise the main railway lines located on the European Corridors that are crossing the country, countries stemming from the European Agreement on Main International Railway Lines (AGC), the European Agreement on Important International Combined Transport Lines and Related Installations (AGTC), and/or the Trans-European Railway (TER) project. The achievement of this commitment will draw an important amount of transit traffic through Romania ensuring important revenues.

Romania is crossed by two rail corridors out of the ten TER corridors:

- Corridor IV has two branches on Romanian territory, with a total length of 1.395km. The northern branch crosses Romania from the Hungarian border until Constanta, from NW to SE (880 km), and the Southern branch of these corridors goes from Arad to Calafat. The rehabilitation and modernisation of corridor IV represents the main priority for CFR.
- Corridor IX crosses Romanian territory from North to South, representing an important transport line, ensuring much of the traffic between Finland, Russia, Ukraine, Belarus, Lithuania, Moldavia, Romania and the countries of South-Eastern Europe – Bulgaria and Greece, while also connecting the transport areas in the proximity of the Baltic Sea, the Black Sea and the Mediterranean Sea. The rail section of Corridor IX on Romanian territory follows the route: Ungheni Prut–Iași–București–Giurgiu Nord.

The modernisation of rail infrastructure in Romania requires at least 10 to 15 years of important financial efforts from various sources: European funds, state budget and bank loans.

The Governing Programme for 2009-2012, approved through Parliament's Decision no. 31/2008, mentions in *Chapter 13 – Transport Infrastructure*, the main lines of action, namely the ones concerning rail infrastructure:

- The completion, by 2009, of the modernisation works of the Bucuresti-Constanta rail sector and, by 2011, of the Campina–Brasov sector, both of them being part of TER Corridor IV;
- A delay of one year, from 2012 to 2013, of the finalisation term for the modernisation of the Curtici–Brasov sector, part of Trans-european Corridor IV, by slicing it into short sectors;
- The completion of the project for modernising Corridor IX until 2009, and the beginning of modernisation works in 2010 (Giurgiu–București–Suceava – Vadu Siret);
- The electrification and the doubling of the main lines of Cluj–Oradea and Iasi–Tecuci;
- The reanalysis of the works undertaken on the Râmnicu Vâlcea–Vâlcele and Bucharest–Giurgiu lines, as well as of the bridge affected by floods;
- The reconstruction of Bucharest's Main Railway Station (Gara de Nord), by transforming the annexed areas into a shopping centre; there will be an international auction for a PPP;
- The rehabilitation of the stations: Cluj, Sibiu, Alba Iulia, Timișoara, Iași, Craiova, Constanța, Galați and the development of shopping centres in the areas; construction works will be undertaken by a PPP;
- The continuation of the modernising process of rail remote and signalling systems for the high-speed corridors IV and IX (160 kph).

Several projects are envisaged in order to increase the quality of rail services:

- Renewing and modernising rail transport rolling stock through: the purchase of 100 new EMUs (Electric Multiple Units), and of 500 new railcars, as well as the refurbishment of approx. 700 railcars and 300 locomotives;
- The purchase of 50 more “Săgeata Albastră”-type diesel DMUs (Diesel Multiple Units);
- Ensuring subventions for public transport at the necessary level and in conformity with European regulations.

Other projects concern intermodal transport:

- Ensuring railway piggy-back transport from harbours for long distances;
- The opening of a transfer Station RO-LA in the South of Bucharest to take over road freight traffic coming into the country through Giurgiu Customs.

Finally, metro transport projects will also be undertaken:

- The completion of the 1 Mai – Laromet (3,1 km – 2 stations) metro line by 2010;
- The beginning of works for metro line number 5: Ghencea–Drumul Taberei–Eroilor–Universitate–Pantelimon. The first section, Ghencea–Eroilor, will be finalised by 2012;
- The purchase of 26 metro trains (156 railcars) in order to modernise existing rolling stock;
- The modernisation of safety and ventilation systems.

We are convinced that rail transport, through its current performance and the envisaged development programmes, will lead to the complete integration of the national rail network with the European one. Thus, it will manage to satisfy the ever-increasing need for transport mobility and will substantially contribute to the complete integration of Romania into the European Union.



The development of the Trans-European Transport network (TEN-T)

By **Ioannis Gheivelis**, Principal Administrator, Unit B1 (International Transport Relations & Trans-European Transport Network Policy), DG TREN, European Commission

Transport infrastructure is key to the free movement of persons, goods and services; it strengthens economic and social cohesion in Europe, contributes to further development and improves the competitiveness of our economy.

The establishment of a truly **trans-European transport network** was enshrined in the Maastricht Treaty of 1993. The Trans-European Network (TEN) guidelines were first adopted in 1996. Despite their importance, the creation of the TENs has suffered from delays, mainly because of their huge costs. In order to give renewed impetus to the implementation of the TENs, in 2004 the European Parliament and the Council adopted an important modification of the guidelines for trans-European transport networks. Community funding concentrates on a limited number of major transnational axes and priority projects, which were declared to be of European interest. These 30 major axes cover the whole territory of the European Union, with a particular focus on the integration of the transport networks of the new Member States.

For the most part, these are rail projects, with the construction of high-speed train lines, in particular for passengers, and inland waterway and maritime projects. In parallel, the construction of motorways is continuing, particularly in the new Member States.

The full cost for the construction of the whole TEN-T network is estimated to be over €900 billion. €400 billion have been realised until end 2006. The remaining will be realised until 2020. The full cost of the 30 TEN-T priority projects is estimated at €397 billion. €127 billion have been realised until end of 2006. €270 billion will be realised until 2020. However, the public financing capacities of Member States remain under constraint. Therefore, Community funding offers significant advantages over national financing.

Important amounts of community financial assistance for transport infrastructure development are available from the Cohesion Fund, €30 billion, the Structural Funds, €20 billion and the loans from EIB, €75 billion for the period 2007-2013. Moreover, the Community TEN-T budget has recently been increased substantially to €8 billion, which allows the TEN supports to play a catalyst role, focusing on critical infrastructure sections.

Out of the 30 Priority Projects of European Interest, **four concern Romania**, namely:

- PP N°7: Motorway Athens–Sofia–Budapest with a branch to Bucharest and Constanta,
- PP N° 22: Railway Athens–Sofia–Budapest–Vienna–Prague–Dresden/Nurnberg with a branch from Curtici to Bucharest and Constanta,
- PP N° 18: Inland waterway Rhine–Main–Danube, where Romania has to remove the bottlenecks on the Danube,
- PP N° 21: Motorways of the Sea, which concern mainly the port of Constanta.

The implementation of the above projects in Romania will greatly improve the connection from the centre of Europe to the Black Sea and further to the East in the Caucasus area, as well as to South East Europe, to Greece and Turkey.

The Commission has adopted a Communication on *the extension of the major European transport axes to the neighbouring countries*. This Communication follows a report by the High Level Group II chaired by ex-Commissioner, the late Mrs de Palacio, which identified 5 major axes to the East and the South of the European Union. In parallel, a number of horizontal issues have been defined like security, safety and interoperability, where increased cooperation between the countries concerned has to be developed. Following bilateral talks in 2007, a progress report has been presented in March 2008. A Communication of the Commission on international transport relations is expected in autumn 2009.

A mid-term revision of the TEN-T policy is underway to develop a policy more appropriate for the decades 2010 and 2020. At the beginning of February 2009, a **Green Paper on the TEN-T** was approved by the Commission which contains a set of proposals for discussion and will prepare a possible revision of the TEN-T guidelines. In 2010 a report on the progress of the 30 Priority Projects will be drafted by the Commission. It may lead to possible modifications of the project list and of the funding instruments.

Focusing on “best practices” to develop national rail networks that are truly interoperable in the European TEN-T context

By **Gabriel María Fernández Mateos**, Project Manager and Senior Consultant, European Railway Consulting

TENT-T necessities and Twinning

Within the frame of the fundamental strategic diagnostics of TEN-T necessities, we have among others, institutional instruments to be used. One of them is the so-called “Twinning”. Twinning is an initiative of the European Commission that was launched in 1998 in the context of the preparation for enlargement of the European Union. More specifically, it is a joint implementation tool of cooperation between Public Administrations of an EU Member State and of a Beneficiary Country (BC), candidate to the EU or new EU member. The corresponding funds were to be found until 2007 under the PHARE programme and from that date on under IPA (Instrument of Pre-Accession). In this context, this article will focus on the convergence criteria of the EU Rail Infrastructure.

Before Tendering

Before tendering, which is the implementation phase of the National Master Plan, appropriate preliminary studies have to be achieved to ensure that on national and international level, the main objectives of TEN-T necessities are met. Beneficiary countries usually know the situation of their Rail Infrastructure and may detect the necessity of foreign help to know the best practices in response to any technical weakness. The key issues towards focused tendering are basically the steps starting with identifying key components to be improved during the twinning development. Afterwards, the results which are the base of the identification and calendarisation of the “After Twinning Actions” arrive. Twinning represents then the most appropriate approach to ensure high quality in the elaboration or in the fine-tuning of the Master Plan.

Case Study: Optimisation of Rail Infrastructure, Hungarian Railway MAV

ADIF, the Spanish Railway Administration, won this twinning and the Spanish project leader, Mr. Joaquin Jimenez and myself as resident twinning advisor had

the privilege to design the twinning contract based on the identified key components of the project fiche and to develop this project, successfully achieving the mandatory results. All twinning developments have the same intuitive and logical steps in their development: the Inception Report followed by the Assessment, which build the base for the proposals. In our case, specific improvement actions were additionally requested.

Inception Report

To approach the Inception Report, actual local or private studies have to be used. In the case of MAV, the Rail management was aware of the situation so that a good starting base was in existence. The Rail Industry and the private operators are also a good source of analysis of the situation and should be consulted.

Assessment Report

As a continuation of the inception phase, the technical topics on each key component will be analysed by the best corresponding Railway experts. The gap between best practices and reality is identified by influencing parameters. Every topic will be discussed with the local responsible (coaching) and in ad hoc working groups. Seminars and study visits emphasise the assessments to promote the understanding and the final agreement of the assessment studies. The advantage is that advisory and beneficiary experts speak the same language because they share the same type of work, past and present experience and participation in numerous international working groups. Transferring best practices is then possible by discussing own experience and also based on past mistakes or let's simply say: "worse practices". The experience in Budapest shows that speaking about mistakes is also very positive.

Proposal Report

In this twinning, the Proposals were addressed to the Rail Infrastructure Operations and Maintenance, including the necessities of the TEN-T Corridors as first priority, national main lines as second priority and finally the branch lines as third priority. Objectives to be worked out were identified, described in depth and listed with the corresponding local agreements. They covered all identified fields of the project fiche; managerial, technical and organisational. As far as the TEN-T Corridors and the best practices are concerned, the conclusion number 13 indicates that: *"It is necessary to optimise and then modernise the safety installations, starting by the International Corridors, with the following purposes: Reducing signalling failures, reducing the time devoted to maintenance activities, reducing the unavailability times of the installations, easing the resolution of events, easing the implementation of Centralized Traffic Control Systems and easing traffic interoperability"*. In the next study, these recommendations were included in the requested specific improvement actions.

Specific Improvement Actions

A total of 37 specific actions were identified, with necessary investments coming to a total of around € 2,550 million. All the necessary investment details were determined by taking into consideration other local / EU plans and implementation strategy (TEN-T) with the agreement of the beneficiaries. The actions already described in the proposals were summarised in a kind of “project fiche” or card containing: project title, short description, detailed needed investments (grants), project details, implementation calendar and finally a short evaluation of the situation if no action is undertaken.

After Twinning Actions

After twinning, actions are recommended by the Commission, to implement the good work already done. A schedule of these actions was fixed for a several years. By closing the twinning, the ministry, the rail infrastructure organisation, the top management and the advisory institution agree to follow the after-twinning actions, but they will be slowly and partially performed today. This is a criticism that can be made.

Recommendations

Until now, around 30 Twinning have been performed for Rail Infrastructure. Another 20 Twinning indirectly affect Rail Infrastructure and were also performed. The average cost of performing one twinning amounts to around €1 million. Statistic says that around only 55% of the Twinning are fully achieved. The statistic on the implementation of after-twinning actions is not known. To avoid forgetting the issues and recommendations of the after Twinning actions, a specific follow-up should be implemented for a certain period of time to ensure the consideration of the recommendations in the modernisation of the Rail Infrastructure with a special focus on the fundamental transport strategy and TEN-T Context.





National planning best practice: Master Plan for railway transport in Poland until 2030

By **Juliusz Engelhardt**, Undersecretary of State, Ministry of Infrastructure, Republic of Poland

The superior state document which defines the direction of development of Poland as a country is the *National Development Strategy for 2007–2015*. According to its objectives, one of the main duties of the State is to provide communicative accessibility for Poland, its regions and especially its main economic centres.

At the same time the *National Transport Policy for 2007–2020*, a document developed by the Ministry of Infrastructure, ruled that the expression of development of the transport sector will be the implementation of *four priorities*:

- increasing the communicative accessibility of the country and strengthening its interregional connections,
- improving the quality and accessibility of transport services for the citizens,
- reducing the negative impact of transport on the environment,
- improving the safety of transportation.

The necessity of developing a strategic business plan for the development of rail transportation in Poland was imposed on Polish authorities by the Decision of the European Commission on 8 July 2005, which modified the Financial Memorandum of the project for: *Modernising the Poznan Rail Node (railway E20) located in Poland*, as a special condition related to its implementation. The Commission, which finances the modernisation of rail transportation in Poland, wanted to be informed about the strategic objectives of our country in this respect, in order to efficiently plan the development funds for the following years.

Therefore, it was very important to prepare a realistic, stable and predictable programme of reviving rail transport in Poland.

Initially, the Commission set the date for submission of the document for mid-2006. In order to meet the obligations, at least in part, the administrator of public rail infrastructure PKP PLK S.A. set out to independently prepare the initial objectives of the railway modernisation plan. The document was entitled “*Main objectives of the modernisation and development of the rail network managed by PKP PLK S.A.*”.

However, as the document was limited to infrastructure issues, during the negotiations over the *Infrastructure and Environment Operational Programme* for 2007-2013, the Commission set March 2008 as the deadline for the adoption of a Master Plan by the Polish Government.

In order to meet the requirements, in 2006, the Ministry of Infrastructure developed the Terms of Reference for the *Master Plan for railway transport in Poland until 2030*, but the Commission took no position on the document.

Therefore, a public procurement procedure was launched, and on March 12th 2007 a contractor was chosen to supply the former Minister of Transportation with the *Master Plan for railway transport in Poland until 2030*. The tenders were evaluated based on the following criteria: price (weighting 60%) and delivery date (weighting 40%), so they gave priority to contractors who were able to deliver the complete document at a possibly low price as soon as possible. Due to the complexity and cross-sectional character of the document, the contractor worked closely with representatives from different Ministries (Ministry of Finance, Ministry of Regional Development, Ministry of Environment, Ministry of Economy), the Polish railway agency (Railway Transport Office – UTK), different departments and organisational units of the Ministry of Infrastructure and the infrastructure manager (PKP PLK S.A.) to develop this document. Moreover, the *Master Plan* was also drafted in close cooperation with representatives of the European Commission: DG TREN (Directorate General for Energy and Transport) and DG REGIO (Directorate General for Regional Policy).

The main objective of the draft *Master Plan* is to render rail transportation a competitive element of the transportation market, based on cooperation between central authorities, local authorities, carriers and incumbent operators therein, and infrastructure managers, who should provide quality services to passengers and clients. As the ministry responsible for infrastructure, we propose a coherent, stable and realistic programme of a profound reconstruction of rail transportation in order to meet the requirements of passengers. All investment activities will also have to meet requirements related to environmental protection. Despite the fact that railway has traditionally been perceived as the “greenest” type of transportation, due to many years of neglect, it is losing its environmentally-friendly character in Poland.

The *Master Plan* is a comprehensive, long-term state strategy, which in fact represents the national rail policy. It refers above all to the following issues:

- construction of new railways;
- modernisation of the existing railways;
- reconstruction investments, that is restitution of the initial design parameters of some railway sections;
- repairs and maintenance;

- investments in the railway signalling system on least burdened lines in order to develop a more efficient employment structure of the infrastructure manager;
- investments in “unconventional” infrastructure i.e. comprehensive info systems for passengers in trains, at stations, on the Internet and via mobile phones;
- investments in cargo, multi-modal and combined transportation;
- modernisation of railway stations and railway stops;
- modernising and purchasing (passenger and cargo) rolling stock.

Sections of the passenger transport market that will be in focus in the future are:

- transportation between metropolitan areas;
- transportation within metropolitan areas.

They will be an object of particular interest for railway carriers, mainly due to increasing passenger streams. This will facilitate efficient competition against other transportation branches.

Passenger transport segments characterised by a smaller profitability than the two previous ones, i.e. regional, inter-provincial and international transport, will obviously still exist. It must be provided as a public service on one hand, and under our international obligations on the other hand.

Most promising in terms of goods transportation are the inter-modal transport based on modern IT systems which support management of the entire transportation chain, as well as long-distance intercontinental transport (Europe – Asia).

The *Master Plan* set some very ambitious goals, especially when we consider the present condition of the Polish railway sector. The main goal of the state is to create the conditions for Polish railway transport to become the pride of Polish citizens, just like it used to be in the Second Republic of Poland. The present atmosphere is railway-friendly – from the activities of provincial authorities in terms of subsidising the purchase and modernisation of passenger railway stock, renovation of railway stations and railway stops, modernising certain sections of local railways, reactivation of suspended passenger transport connections, up to activities on the national level in the form of the *Infrastructure and Environment Operational Programme* and the debated construction of high-speed rail. In addition, I should mention the work of numerous companies and even individual enthusiasts who restore the splendour of forgotten and neglected narrow-gauged lines, transforming them into tourist highlights and additionally reviving their regions.

The most serious technological challenge for the Polish railways in the years to come will be the preparation and beginnings of the construction of high-speed railway. It expresses the conviction of the Council of Ministers that it is necessary to introduce new rail technologies tailored for the 21st century in Poland.

It should be emphasised that most of the problems that we encountered during the preparation of the *Master Plan* were the result of the exceptional character of the document, which, in the Polish context, was pioneering and precursory. In fact, never before has a multi-annual railway policy been developed in Poland.

Discrepancies between the position of Poland and the opinion of the European Commission concerning the *Master Plan* were related to different views of both parties concerning railways. The Ministry of Infrastructure focused mainly on issues related to the necessities of modernising infrastructure, railway stations and rolling stock, which can be described as an engineering approach. The European Commission on the other hand attached much more weight to the need of improving quality of services offered to passengers, increasing their volume, and the implementation of completely new services, which can be described as a service approach. With regard to this discrepancy, it was necessary to find a compromise which would satisfy national interest and at the same time take into account the need of introducing Polish railways into the 21st century. The expression therefore is the *Master Plan for railway transport in Poland until 2030* adopted by the Council of Ministers in December 2008.



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Network development best practice: The Spanish Railway development under the Strategic Plan for Infrastructure and Transport

By **Joaquín Jiménez Otero**, Director for International Affairs, ADIF

Since the launch of the new organisation of the Spanish railway sector on 1 January 2005, when ADIF (the railway infrastructure manager) and Renfe Operadora (the railway undertaking) were established, Spain has had a very stable scenario that promotes the major development of railways.

- The Strategic Plan for Infrastructure and Transport (PEIT), which is a guideline for the improvement of the Spanish transport system 2005-2020 applies sustainable criteria and assigns 48% of the total budget of €250,000 million to railways, showing a clear political decision of supporting and giving priority to the railway mode.
- Safety and interoperability are priority objectives both for PEIT and ADIF's Strategic Plan.
- The Multi-annual Contract 2007-2010 between the State and ADIF supports the development of the railway model in accordance with PEIT and has become a very useful means of accomplishing the foreseen objectives for the High Speed network, but most of all for the conventional network.

According to this model, the Ministry of Public Works and Transport is in charge of defining railway policy, as well as legislating and planning. And ADIF is entrusted with the management of railway infrastructure as well as construction tasks that the Ministry commissions. A particular characteristic of the Spanish system can be underlined: as of 2005, the State is the owner of the conventional network (Iberian gauge), while the operating of the conventional network is entrusted to ADIF (the necessary financial resources are provided through the Multi-annual Contract). The High Speed Network is included in ADIF's patrimony, together with passenger stations, freight terminals and the optical fibre network.

ADIF is Spain's major investor with €4,350 million invested in 2008. It is also the owner of the High Speed Network, 1,584 km long out of the total length of 13,330 km of the Spanish railway network. This network stresses the growing participation of HS traffic, which in 2008 represented in trains/km, 16.6% of total traffic, with a 44% increase on last year's figures (where the percentage was 11.9%).

Therefore, PEIT acts as a guideline and dedicates the considerable amount of €120,000 million to railways, during its validity period (out of which €83,450 million are assigned to High Speed). In Spain, this consolidates the investment tendency that situates railways as a priority; since 2003, they receive more investments than roads, with figures that in the last few years are around 0.75% of the GDP, amounting to €8,146 million in 2008.

This tendency is being reinforced in 2009, as the government regards investment in infrastructures (mainly railways) as a privileged instrument to take action against the financial crisis, and increases railway investment by 18%, giving ADIF €5,207 million, 10.6% more than the previous year. This comes to a total amount of €6,091 million, including investments and maintenance of both High Speed and Conventional networks.

Without a doubt, the construction of the new Madrid-Sevilla High Speed Line from 1986 to 1992, with a length of 471 km was key; today, there are 1,584 km of High Speed lines operating in Spain, once the lines to Valladolid and Malaga were opened to service in 2007, and the line to Barcelona was opened in 2008. Above all, it is worth highlighting that ADIF is currently constructing another 1,636 km that will cover most of the Spanish territory.

In all, ADIF has been entrusted by the State with the construction of 2,467 km of High Speed Lines. By 2011, with these lines in addition to the network that is already in service, Spain will have the longest High Speed Network in the world (taking into account the very tight cost of each unit in this network, including railway equipment, (but not stations) brings the price from €13 million to €15 million per kilometre. Spain's mountainous surface also makes work difficult in many cases).

We can currently highlight the ongoing works connecting France with Barcelona, as well as the High Speed Corridor between Madrid and Levante that are already very advanced (more than 80% of the superstructure has been built). There are also significant works, especially due to their complexity, such as the railway access to Asturias (with a 25-km long tunnel) and the connection with France through the Basque Border (the so-called Basque "Y" that links Bilbao, Vitoria and Irún).

In this way, by 2020, 90% of Spanish citizens will have a High Speed Station at less than 50 km distance from their homes, with two main High Speed Axes on lines only for passenger traffic (between Andalusia and Cataluña/France, and between the North/Northwest and the Mediterranean Levante), together with a significant number of new lines equipped for mixed traffic, mainly on international links and with access to ports. In addition to these, interoperability and integration of the great international corridors are fixed priorities (with special attention paid to freight). To this end, the conventional network oriented to freight will provide significant capacity, in accordance with the most recent European orientation.

Apart from High Speed, in passenger traffic, suburban railways in big cities receive special attention. Taking into account that it is through this means that rail offers daily services; railways are an irreplaceable element in urban mobility.

Interoperability has been pointed out as one of the key objectives of railway planning in Spain. This can be underlined as a fact: 7 different types of High Speed trains, with technologies from major global manufacturers run on ADIF's tracks, providing long and medium distance services at speeds between 250 and 300 kph; with a fleet of approximately 120 trains in service (231 trains in the immediate future, with the next two years) that will allow ADIF to offer 90,000 seats/day on 286 different timetables and routes. This is without doubt an aspect worth highlighting - trains can run on ADIF's tracks in a totally interoperable way, achieving through daily practice a major goal of European transport policy.

Also worth emphasising is the solution adopted for the problem of the coexistence of two networks with different gauges (High Speed network with standard European gauge and the Conventional network, with Iberian gauge). 32 out of 118 High Speed trains in service currently have double gauge, using two different technologies (CAF and TALGO) that allow switching from one network to the other without stopping the train, but only slowing down the speed to approximately 20 kph. Trains use the gauge exchanger system owned by ADIF (and with ADIF technology to integrate both solutions on just one installation). This way, this type of trains can run, for instance, from Alicante to Madrid on the conventional line (with sectors at a speed of 200 kph), cross Madrid on the suburban connections, change gauges as they leave the Madrid-Chamartin station, and set off on the new High Speed Line at 250 kph for Valladolid, where another change of gauge will enable them to continue the journey northwards to Santander on the conventional network.

Alongside the abovementioned technology, we consider that ADIF is a pioneer in the development and implementation of ERTMS (European Traffic Management System). Up until now 1,049 km of lines are operating with ERTMS level 1, with trains running at 300 kph; testing is very much advanced on level 2. This accomplishment is a major indicator of real interoperability: on these High Speed Lines owned by ADIF, four different track equipment technologies and five onboard equipment technologies, fully interoperable, have been installed, including the STM module that enables trains that are equipped onboard with ERTMS to run on lines equipped with the former LZB.

As a result of the command of this technology, ADIF can offer very high punctuality indexes (which are the basis of the existing commitment made in 1995 of refunding passengers the total amount of train tickets if the train is delayed by more than five minutes). For example, during the first month of operation of the new Madrid-Barcelona line, the punctuality index of 98,3% was offered, which increased to 99,6% on the already classic Madrid-Sevilla line (for delays of less than 3 minutes).

A different issue, but not less important, is related to the environment. Passengers have shifted from other modes of transport which have great impact on the environment. For the group of links that benefit from the Madrid-Barcelona High Speed line, it is expected that railway modal share will rise from 20.2% before opening the service to 46.7% in the immediate future, with almost 16 million users. 4.5 million of these users will be the result of induced demand because of the new, convenient mobility system. Savings in terms of externalities will be substantial: almost 80 million equivalent litres of petrol, 170.000 tonnes of CO₂ and 18 million

hours of travelling time will be saved every year. This, in addition to the benefits obtained from external costs, such as accidents, will result in annual savings of almost €325million.

Equally, socio-economic analysis shows that every unit invested in infrastructures is multiplied by a factor of 1.6 throughout the duration of work. This is the result of the effect of goods and service demand on all economic sectors (direct and indirect demand) which rises to a factor 2.5 when incorporating the benefits of the opening of the new line into the country's productivity. Considering that approximately for every €35,000 invested one new job is created, we can assume the very important effect of the investments on the creation of employment. This provides evidence that investing in infrastructures is an excellent anti-crisis tool.

Financial sources in a given year show the State's effort in the construction of new High Speed Lines by ADIF (that is to say, with our own assets), covering 31.7% of the annual budget; and the importance of European funds that cover another 21.7%, together with EIB credits and tax returns.

Finally, we can mention the following examples. Two of the recently inaugurated lines already reveal a substantial increase in railway modal share in comparison with aviation.

- On the new Madrid–Barcelona line (the fastest non-stop trip allows a travelling time of 2 hours 38 minutes, at a maximum speed of 300 kph and at a commercial speed of 236 kph along the 621km journey), the railway market share has grown from 12% to 43% in just 5 months after the complete line was opened for service; and it is now nearly 50%, with a considerable influence of induced demand.
- On the new Madrid–Malaga line, high speed trains cover 500 km in two and a half hours, after opening service of the Cordoba–Malaga sector; increasing railway transport passengers to 63% and decreasing airline passengers to 37%. The number of passengers travelling by train has tripled, once again, with the important influence of induced demand (which, therefore, appears as a very important component of each new High Speed project).

We cannot forget to mention some examples of great achievements on High Speed lines, such as the Guadarrama or the Pajares tunnels, the 5th and 6th longest in the world; both carried out in record time and on tight budgets, showing the capacity that Spain has developed High Speed in each and every one of its aspects (superstructure, track, equipment, operation and trains, amongst others), with a highly qualified private industry and with a public sector which is very efficient with work and resource management.

In conclusion, all these accomplishments are definitely taking transport in Spain to a new level, with a prominent role of railways, based on the development of High Speed. Since 2006, a continuous increase of passengers-km on these lines has taken place (without a substantial decrease in passengers-km on the conventional network which in many cases acts as a feeder/distributor of the former). So by 2010/2011,

especially after the opening into service of the Madrid-Levante line towards Valencia and Alicante, practically half of railway clients in Spain will be High Speed passengers (also including suburban services in big cities, which have 30% of passengers/km).

Without doubt, the Spanish example can show the revolution of the past times, when railways were in a very precarious condition coinciding with the entrance of Spain in the European Union in 1986, up to the present time, in which High Speed, together with high-quality suburban services in big cities, are the driving forces of a highly competitive “new railway” that provides services to the country and its citizens.





Network modernisation best practice: Completed projects and investment priorities in the Czech Rail Infrastructure

By **Zdenek Zak**, Deputy Minister, Ministry of Transport of the Czech Republic

The basic aim of constructing a new railway infrastructure in the Czech Republic is to ensure quality connections to the European transport network, and to include it in the European TEN-T network in the parameters corresponding to our international obligations.

The Czech Republic's location in the middle of Europe increases the importance that transport corridors have for us. We are, to some extent, bound to fulfil the role of transit country for both freight and passenger transport. Our territory is at the crossroads of routes leading from Western Europe and the North Sea to Eastern Europe and Russia and to the Balkans, and the routes leading from the North to the South, from the Baltic to Adriatic seas. It is also important to us that, when implementing our infrastructure development plans, we take into consideration the environmental impact of these projects and try to minimise their effects.

In this endeavour we are closely cooperating with the EU bodies, and with both neighbouring and more distant countries.

The modernisation of Czech rail transit corridors began in 1993. The modernisation of the main branches of the trans-European rail network, which met European Union requirements, has been finished already. It comprises the modernisation of the pan-European corridor IV (state border Germany/Czech Republic–Děčín–Přerov–Česká Třebová–Brno–Břeclav–state border Czech Republic/Austria; it is labelled as the transit corridor I in the Czech Republic), including the last section Břeclav–state borders with the Slovak Republic. Furthermore, the modernisation of the pan-European corridor VI (state border Poland/Czech Republic–Petrovice u Karviné–Ostrava–Přerov–Břeclav–state border Czech Republic/Austria; it is labelled as the transit corridor II in the Czech Republic). Both of these projects are priorities of the pan-European TEN-T network development. They were followed by the modernisation of the rail line Česká Třebová–Přerov, which connects both pan-European corridors in our territory. It was finished at the end of last year.

Another task to be accomplished in modernising the infrastructure of the Czech Republic involved in the EU priority projects is to finish the modernisation of the Czech corridors III and IV by 2016.

The modernisation of the transit corridor III: The rail line Praha–Plzeň–Cheb (the transit corridor III in the Czech Republic) is part of the European priority project no. 22/D. Work has already begun and should be finished in 2016. The modernisation of two sections Cheb–Planá and Plzeň–Stříbro was completed in 2008, and the section Plzeň–Rokycany–Zbiroh–Beroun is to be completed by the end of 2010.

The modernisation of the transit corridor IV: The rail line Praha - České Budějovice - Horní Dvořiště (the transit corridor IV in the Czech Republic) is part of the European priority project no. 22/E. The sections Praha, Hostivař–Strančice and Doubí – Tábor were completed in 2008, and the sections Benešov and České Budějovice–Nové Dvořiště should be completed by the end of 2009.

Further priorities also include the programme of rail line electrification, which should alleviate some of the negative effects of transport on the environment. Currently under way is the electrification of the rail line České Budějovice–České velenice and Letohrad-Lichkov.

Our attention is also concentrated on the modernisation of railway nodes situated on railway corridors. Namely, these are nodes in the cities of Prague and Brno, and further Břeclav, Ústí nad Labem, Ostrava, Olomouc, Přerov and Plzeň.

The modernisation of the node in Ústí nad Labem, tied to the revitalisation of the large space in front of the railway station, has already been completed. The complex project of redeveloping the Brno node has begun, as well as other ones, including the modernisation of the railway node in Kolín to be completed in 2009, and the modernisation of the node in Břeclav to be completed in 2010. The modernisation of the nodes in Přerov and Plzeň is being prepared.

The *AirCon* project will modernise the rail line Praha-Kladno and the construction of a branch leading to the Airport Praha Ruzyně is also being prepared for implementation.

An example of a very important rail node modernisation, which was finished at the end of the previous year, is the construction of the so-called *New Connection Prague*. Part of it was the modernisation of the west section of the Prague Main railway station. The new connection links Prague's main railway station and Masarykovo railway station situated in the centre of Prague, with more peripheral rail stations like Libeň, Vysočany and Holešovice. This complex now better serves the needs of both long and short distance rail transport, as well as commuter trains.

Apart from modernising the railway infrastructure as such, it is also necessary to improve the competitiveness of rail transport on a broader scale. That is why the EU is so committed to rail interoperability. Equipping rail infrastructure with the modern Control – Command and Signalling system and its component, the

European Rail Traffic Management System (ERTMS), will reduce infrastructure costs and thus, help to render rail transport more competitive with other transport modes.

ERTMS has two basic components: the communication system called GSM-R and the European Train Control System – ETCS.

The communication system GSM-R has already been implemented in the Czech Republic on the rail line section Děčín–Prague–Kolín as a pilot project. We plan to gradually equip 2,500 km of the TEN–T network by 2016, including 1,387 driving vehicles.

The pilot project of ERTMS is currently being implemented on the rail section Poříčany–Kolín. Depending on the continuation of the modernisation process, we also plan to implement this system on the lines of corridor I and II by 2014 and on the lines of corridor III and IV by 2016. Equipping 317 driving vehicles with this new technology is also planned.

Corridor E connects Dresden with Prague, Vienna, Bratislava and Budapest. A couple of months ago, a cooperation agreement was signed by participating countries for the implementation of ERTMS by 2015. The only exception is the section Dresden–Děčín, which will be finished by the year 2020. This project has become the basis for an intensive joint effort, currently aimed at preparing quality documentation for the EU to co-finance the project.

Implementing ERTMS on this important international corridor will help railway transport in many respects. For example, the travel time on the Děčín–Budapest line will decrease by four hours for freight. Furthermore, it will make possible a more effective use of propelling engines, and so on. All these improvements will lower operational costs, making railway transport more competitive with other transport modes. Corridor E was further extended to Constanta in Romania in 2008.

In the European context, the Czech Republic is also planning to build a fast railway network to improve rail transport's competitiveness. The construction of the complex network should begin after 2015, but nevertheless some sections might be implemented sooner (for example on the corridor III, a tunnel at the Ejpvovice locality next to Plzeň and a tunnel on the line Praha–Beroun). Our fast railway network should partly consist of new fast rail lines built in parameters for speeds from 300 to 350 kph, and partly of existing, modernised sections, which will allow speeds from 160 to 200 kph. Currently, there are steps being made to adapt land use plans for these tracks and discussions are held with neighbouring countries regarding conjunction points.

It is envisaged that the modernisation of the Prague–Plzeň line on corridor III would become part of the project of the fast rail connection of Prague–Bavaria. However, this is a project for the more distant future. The possibility of upgrading the rail line Prague–Domažlice–Regensburg (the so-called Donau-Moldau bahn) to the speed of 160 – 200 km is currently being considered. This project has yet to be thoroughly discussed with our German counterparts. Originally, the plan was to

build a completely new high speed rail line Praha–Norimberk, but upgrading the track Plzeň–Domažlice–Regensburg will be both easier to negotiate with Germany and much cheaper to complete. Besides, the speed parameters of this solution offer a fast connection between the Czech Republic and Bavaria, which will be fully competitive with other transport modes.

The long distance railway network in Germany could then be used in the direction from Regensburg further to Nuremberg or Munich. Implementing this proposal would decrease the travel time between Prague and Nuremberg by 30%, and between Prague and Munich by 42%. It would also improve the connection of the Czech Republic with Western and Southwestern Europe and connect Bavaria with Poland by rail through the Czech Republic.

The fast rail connection Praha–Linz is linked to the modernization of corridor IV. A project with the new double track with high speed parameters is also being considered. This track could become a part of the high speed line Praha–Brno. On the České Budějovice–Horní Dvořiště line, there should also be a new double track built with high speed parameters allowing trains to reach 200 kph. The implementation of both projects will increase the capacity of the corridor and decrease travel times on the whole branch Praha–Linz. The route planning has been finished already, but nevertheless it is necessary to proceed further in discussions with Austria.



Trans-national project best practice: The East European High Speed Line as part of a European Priority Project

By **Jean Faussurier**, Director European and International Affairs, RFF

The East European High-Speed Line (EE HSL) is a 400-kilometer newly-built line between Paris and Strasbourg that will improve accessibility to the Eastern part of France by offering new opportunities for mobility and economic development in the regions concerned. The EE HSL also aims at improving international connections with France's neighbours – Germany, Luxembourg and Switzerland and at anchoring Paris to the Blue Banana axis, the socio-economic centre of Europe.

The first phase of the project (300km from Paris to Baudrecourt) was finished in June 2007 and can serve 11 million passengers by operating approximately one hundred high-speed trains running each day at 320 kph. The second phase will reduce travel times even further: Strasbourg will be 1 hr 50 min away from Paris and 1 hr 25 min from Luxembourg. This second phase will also advance the implementation of the “*Magistral Railway for Europe*”, a 1382-kilometer line that cuts through Europe, connecting Paris to Bratislava (Slovakia), via Strasbourg, Stuttgart, Munich and Vienna.



The Magistral Railway line coincides with the Priority Axis No. 17 of the TEN-T network. The estimated cost (in 2006) of this project was €23 billion and is due to be finalised in 2015.

However, implementing transnational projects is not an easy task as it is time-consuming and complex. International coordination is also sometimes difficult.

The main reasons for starting these projects were the following:

1. The need to improve international connections
 - The key success factor: an international agreement on funding and planning
2. The increasing demand to improve direct connections between Paris and Eastern France
 - The key success factor: connections of new high-speed lines with the existing network
3. The opportunity to improve inter-regional connections between the East of France and the North and South-West and West without changing in Paris.

The cost of the first phase of the project was €3.125 billion (in 1997 prices) without rolling stock. The financing implied gathering several partners with various objectives: the French State, the European Union, SNCF, RFF, Luxembourg and 17 local authorities. The multitude of players involved in this project makes the cooperation even more complex.

The biggest parts of the funds were allocated to civil engineering activities (49%) and to the acquisition of railway equipment (23%).

It is important to note that rail infrastructure development represents long cycles of maturation and public decision at each crucial step. The period from the initial studies to the public debate to the opening of the line, including works, can last from 14 to 16 years and it is unlikely that it will decrease in the near future.

The first phase of the EE HSL followed the same pattern. The preliminary studies were finalised in the early 1990s. In 1992, the project was included in the national high-speed master plan and a Treaty with Germany and Luxembourg was signed. After the creation of RFF (1997) and the signing of the first-phase financing convention (2000), civil engineering works started in 2002. Finally, in the spring of 2007, the line was inaugurated and in June of the same year it was put into service.

The technical complexity of the project can be described as follows:

- Excavation works: 64M m³
- Embankments: 40M m³
- Deposit: 25M m³
- 335 Structures:
 - Bridges: 241
 - Flyovers: 9
 - Passages (wildlife and rivers): 85

Signalling: Two overlapping systems: TVM 430-SEI & ETCS level 2

- 4 000 km of cables
- 17 Signal boxes
- 1 000 signals

Innovations and testing also ensured the success of the project:

- Test of track beds technology
- Fast-clip and concrete sleepers
- CCTV monitoring un-oiled switches
- Track tests without ballast on concrete slab
- Ecological plantations.

Integrating the life cycle from the early stages is one of the main priorities. RFF's activities concentrate on the maintenance and construction of tunnels, noise-reduction walls, level passageways, electric and electronic equipment, hydraulic openings, cables and railway lines.

On the other side, environment is a factor of growing concern. Environmental NGOs may oppose a project if the stakeholder dialogue, including public hearing and public debates, is not carefully managed. This was taken into consideration during the planning and implementation of the HSL. More recent studies in the case of the Rhine-Rhone HSL show that civil works (excavation and structures) contribute significantly to the carbon footprint and that there is a strong need to deal with the environmental aspects from the very beginning of the project. The planning takes into account these environmental concerns: passageways and flyovers to protect forests and villages, noise-reduction walls, rearranging fauna, restoration of public roads and protecting archaeological sites.

To conclude, the winning card concerning planning, financing, and environmental concerns is to continuously manage the stakeholder dialogue. Only by taking up this task will we be able to reach the overall objective of optimising the use of the network and not just building projects.

Section 2

Project Development and Technological Choice

Signalling: why choose ERTMS?

By **Karel Vinck**, ERTMS Co-ordinator

ERTMS (European Rail Traffic Management System) is a key issue to ensure the existence of a fully interoperable and competitive rail freight network in Europe.

ERTMS consists in both a radio, GSM-R, and a train control system, ETCS. GSM-R is a radio system similar to GSM but using specific frequencies for voice and data exchange between the driver and the central control.

ETCS ensures the adequate safety margin between trains – thus increasing line capacity – by transmitting speed limits from track to train according to traffic and by stopping the train through an on-board computer when that speed limit is exceeded.

Currently, there are over twenty different speed control systems throughout Europe and seventeen different radio systems.

In that context, the added value of ERTMS is based upon at least two aspects: a decrease of costs and a guarantee of interoperability. In order to cross borders, locomotives need to be equipped with multiple systems, which introduce complexity and increase costs. Furthermore, system multiplicity often imposes a change of locomotives at borders, incurring delays. The deployment of ERTMS helps reduce equipment and operational costs – provided manufacturers, infrastructure managers and railway undertakings proceed at a pace that is coordinated enough to generate economies of scale.

Concerning interoperability, ERTMS is based on a single European standard, known as 2.3.0d, which was legalised through a Decision of the Commission of 23 April 2008. A new baseline, referred to as Baseline 3, is currently being tested by the European Railway Agency and should enter into force at the end of 2012.

In 2007, around 2,000 km of tracks are equipped with ETCS. A range of interventions at the financial, political and legal level will contribute to its further development.

European financial support is based upon the TEN-T budget and the Cohesion Fund. In the framework of TEN-T budget, €240 million was allocated in 2007 and €260 million will be further granted in 2009. Unlike common infrastructure works, ERTMS investments benefit from a maximum co-funding rate of 50%. In the

framework of the Cohesion Fund, ERTMS represent the compulsory counterpart of EU support for transport infrastructures, based upon the fact that in that case, co-funding rates reach 85%.

On the basis of the Directive 2008/57/CE of 17 June 2008 on the interoperability of the European rail network and the subsequent Decision of the Commission of 28 March 2006 on interoperability of signalling and control-command for conventional rail, the EU Member States adopted in March 2009 a European Deployment Plan for ERTMS (EDP) through which they commit to equip major rail freight axes and to link in major terminals by 2015 or 2020 according to the sections. In addition, the EDP makes it compulsory to equip locomotives ordered after 2012 or put into service after 2015 with ETCS.

Another tool is that of the Memorandum of Understanding (MoU) signed on 4 July 2008 in Rome between the European Commission and the main rail freight organisations to speed up the deployment of ERTMS along major rail freight corridors. The primary purpose of that MoU is to settle the frame of cooperation of rail actors, including the industry, so as to ensure by the end of 2012 the legalisation of Baseline 3 as a unique and stable interoperable standard.

The specific approach of rail freight corridors in the frame of ERTMS deployment is justified by a priority catch-up need in terms of competitiveness, especially against road transport, and in terms of equipment investment compared to rail passenger transport. However, it should be noticed that ERTMS is only one aspect of rail freight competitiveness and that the development of major corridors is also related to other types of action such as the removal of bottlenecks and the harmonisation of operational rules.

Indeed, certain issues call for further attention; one of the most important is the issue of mutual acceptance of safety homologation procedures and for operational rules.

Improvements need to fulfil a certain amount of pre-conditions such as achieving a better cooperation and procedural coordination among national safety authorities and notified bodies, standardising trackside and on-board equipment, harmonising testing specifications, references and procedures as well as operational rules (Ex.: driver licenses, cross operations, single train standards...).

Generally speaking, the main challenges to come are both technical and financial. From a technical point of view, equipment compatibility with version 2.3.0d, be it trackside or on-board, and the availability of a tested and validated Baseline 3 by 2012 must be set as a high priority. For that purpose, it is important that the European Railway Agency (ERA), together with the European Commission and the relevant actors of the railway sector, take joint action to improve test procedures and tools. In addition, the ERA will soon publish accreditation criteria to label reference testing laboratories at a European level.

From a financial point of view, one should seek financing tools that are alternative to public subsidising (such as PPPs), which could be implemented for rail freight

corridors in all their aspects. This implies an appropriate estimation of investment costs, cost savings and direct benefits, which still needs to be properly undertaken.

As a conclusion, the deployment of ERTMS is a necessary step towards an integrated and competitive rail network. However, it must be integrated into a broader approach including infrastructure and operational issues. Central and Eastern European EU Member States have a leading role to play in these matters, because their rail market share has been for years higher than that of western EU member States and because they are engaged in a broad renovation effort of their rail network.



Project development at the local level: the example of Ploiești

By **Radu Popescu**, General Manager, RATPh Ploiesti

Ploiești is one of the main Romanian transport knots connecting to Bucharest, the Romanian capital (60 km South) and two other important regions in the country, Transylvania and Moldavia. The city has 280,000 inhabitants and considering the establishment of the metropolitan area, the number of inhabitants is estimated to reach almost 400,000 people in the metropolitan area and 550,000 in the greater metropolitan area.

At the same time, Ploiești is one of the most industrialised cities in Romania, with the unemployment rate lower than 2% in 2008. It is also the seat of Prahova district which is the most densely populated district of Romania.

In the 1980s, Ploiești, as well as many other Romanian cities, underwent a major transformation process from the view point of systematisation which could not be carried on after the fall of the communist regime in December 1989. Therefore, the City is facing an impossible situation because, although there are two or three-lane entrance arteries in a proportion of 70%, only a single lane can be used. This situation results in bottlenecks and significant time wasted in traffic.

To that effect, several projects for the take-over of transit traffic are currently under development, more specifically: the extension of the Western beltway from one lane to two lanes, which should be finalised in 2012, and the construction of Bucharest-Brașov, which includes Ploiești, with an estimated finalisation in 2015.

The North-Western suburban area of the city is expected to experience a boost of the commercial area and residence districts, with a surface of around 800 hectares, approximately 7,000 locative units and 27,000 inhabitants for the residence districts, the construction of two hypermarkets, three DIY shops, three malls and five supermarkets. This commercial area will have an estimated customer flow of around 50,000 customers per day.

We believe the development of the city's North-Western area is just the first step to the development of the metropolitan area, while the centre of the city will remain the landmark of the city for the following 15-20 years.

To serve this area, in addition to the already existing plans, we believe it is imperative to create a new public transport plan that will ensure friendly public transport and an alternative to personal vehicles.

By creating this new transport plan we aim at improving service quality through the modernisation and alignment to the accessibility standards of all stations on the public transport network, intermodality between routes, intermodality with other transport means (district, national auto and railway transport), the loading vehicle level, passenger information, safety and security and most importantly, the increase of commercial speed from a 13 kph average to around 22-23 kph/fleet.

Central area crossing – at the basis of a new transport plan

In order to reach the proposed 22-23 kph/fleet commercial speed an alternative to cross the central area should be established. As already mentioned above, except for the boulevard that crosses Ploiești on the North-South axis including a double lane and an overcrowded traffic, all the other streets have only one lane. Crossing the central area, both North-South and East-West, without considering the development of the North-Western area of the city, takes around 20-25 minutes/km both in the case of motor vehicles and public transport.

Bearing in mind everything presented so far, we believe that the only solution for solving the mobility issue in Ploiești would be to develop a crossing passageway of the central area, on the axis of the existing tram line. This crossing will have to include one lane for the tram line and two double lanes. The crossing will have five public transport stations and, based on the technical project, two or three car entrances/exits, on 2.5 km of transit length on the North-South axis of Ploiești.

This public transport passageway will be the basis for a new transport plan that will be developed together with a new ticketing system. This in turn will not be based on the transport line, but on a time schedule established after several evaluations.

Basically, the North-South transport line will be connected to all other transport lines, creating two major interchange points in the central area of the city. The model that we propose here will help avoid the current situation of common sections on the transport lines that are located mainly in the central area (e.g. Independenței Boulevard, where within 1.2 km we can find six parallel transport lines).

The advantages of a crossing passageway:

- Over 85% traffic decongestion on Independenței Boulevard and Democratiei-Stefan cel Mare;
- Creating a single public transport line on Independenței Boulevard, from six lines;
- A 60% reduction in the crossing time, irrespective of means of transport used;
- Mobility increase in the central area;
- Reducing the number of vehicles by eliminating common segments, as well as the waiting time for passengers;

- Reducing the maintenance costs, thanks to a 50% more efficient functioning system, in terms of costs for direction and braking elements, suspensions for buses and trolleys and daily maintenance elements for trams;
- Increasing the commercial speed in the central area by over 100%;
- Extending the area for pedestrians.

Our objective in terms of mobility development in Ploiești is to elaborate a modular development package, and the crossing passageway project is the first piece of the puzzle. Basically, the modular package implies the construction of the crossing passageway, together with:

- Closing the railway ring, 90% of which represents the adjacent perimeter of Ploiești. This means that the tram infrastructure will have to be modernised on a segment of 1.8 km as light-rail. This section will be used by both tram and light-rail, with the same gauge;
- Extending the electric tram transport network in the urban and commercial development area in the North West of the city, serving almost entirely all the areas that are currently being developed. This means that the electric tram transport network will be extended by 16 km. This way, we will create the first metropolitan line between Ploiești–Blejoi and Păulești;
- Achieving intermodality with the railway system on the Câmpina–Ploiești–Mizil, Ploiești–Măneciu and Ploiești–Slănic axis, in the North area. It has been estimated that the development area will be extended beyond these lines.

We believe that the only basic solution for the urban and metropolitan development of Ploiești is represented by a crossing passageway of the central area. This could also be seen as a pilot project, the solution for mobility development in congested urban areas such as Ploiești, both in Romania as well as in most countries in Eastern Europe which have been facing the same urban systematisation problems.



New trains vs. Refurbishment

By **Robert Zappa**, Director Sales, Bombardier Transportation

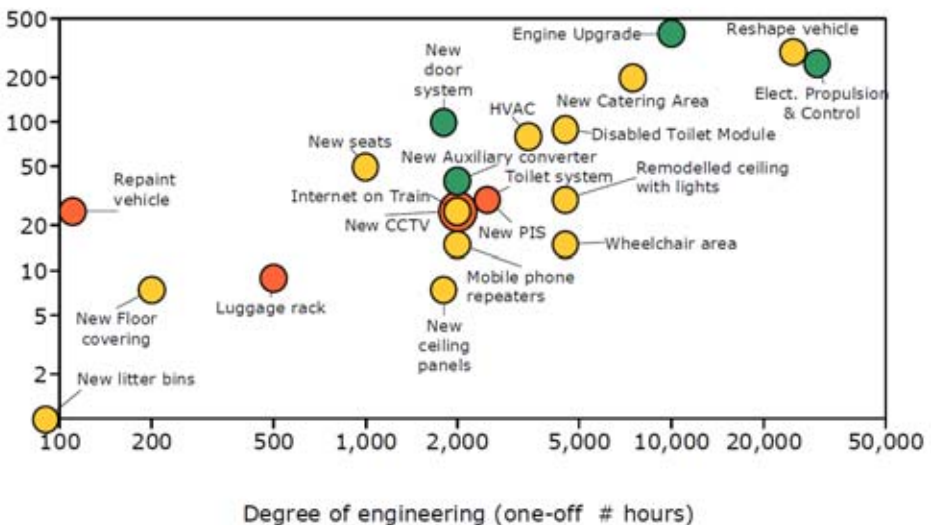
Seen from Bombardier Transportation's (BT) perspective, the general trend in rolling stock goes towards buying new products and not refurbishing older products. A look at BT's order intake shows a clear trend in favour of new acquisition: in 2007, BT received orders for the refurbishment of 69 trains and for 437 new trains; in 2008, the company received orders for the refurbishment of 70 trains and for 304 new trains.

The decision to choose between new and refurbishment solutions must be made by first identifying objectives to be achieved by modernisation, such as:

- Reducing Cost (Operations and Maintenance);
- Increasing Capacity/Performance;
- Increased Reliability/Availability;
- Aesthetics, Passenger Environment and Safety.

Some performance and cost savings solutions can only be obtained from new equipment (lower energy cost, longer maintenance intervals, and safety).

Average price per vehicle (EUR K)



As demonstrated by this graph, major refurbishment may drive cost close to the price of newly-built, sometimes without the newest technology.

There is sufficient reliable information today to evaluate the expected results from any identified solution:

- A detailed Life Cycle Cost (LCC) to compare possible range of solutions;
- LCC model to include all costs of ownership and operation as well as the capital expenditures;
- Risk and Sensitivity Analysis to consider the impact of key variables on the total cost (such as energy cost, maintenance cost, etc).

However, generally, much lower risks can be expected with the acquisition of new trains to achieve the desired performance and safety targets.

The advantages of investing in new rolling stock

The advantages of new-built trains are threefold:

- they have modern design that brings immediate benefits to passengers;
- they allow for much more flexibility than old trains;
- they are much more environmentally-friendly.

Design

The design of new trains allows for greater comfort, more space, security and visibility, and easier access for passengers. For instance, thanks to its articulated architecture, BT's AGC has wide-car bodies, inter-circulation gangways, as well as a continuous low floor.

Flexibility

New trains are much more flexible than old trains. Although they are often based on standard platforms, new trains can adapt to operators' requirements in terms of length, interior lining, number of doors and traction mode, etc. Once trains are built, modern trains can offer flexible solutions in terms of length and traction. In this regard, hybrid trains allow for seamless travel, whatever the energy source is. Originally designed for the French market, BT's hybrid AGC combines certain operating features for the first time ever in a train. Dual-mode (electrical and diesel) and dual-voltage (1500 and 25000 V) technology enables the train to glide seamlessly across the entire railway network and to access electricity from any available source. This results in energy savings and reduced CO2 emissions, as well as overcoming infrastructure constraints and the need for passengers to change trains.

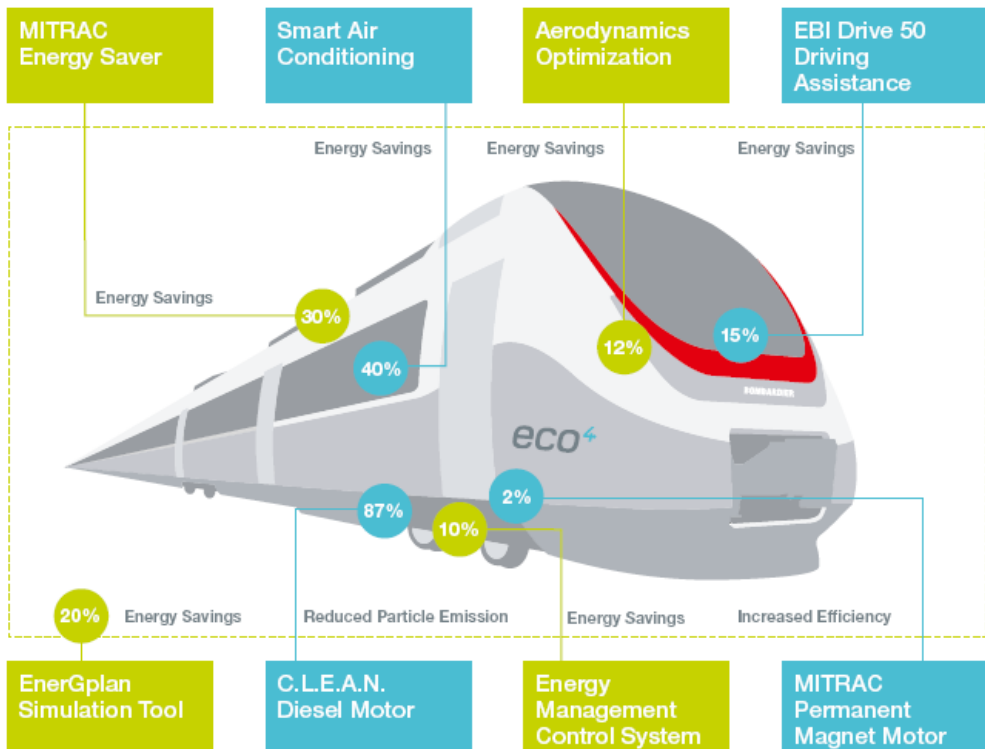
Environmental benefits

Energy is a key sustainability issue for both the transportation industry and our planet. As a global leader in rail technology, Bombardier introduced a package of energy-saving technologies called *ECO4* in 2008. Easily customised to any fleet, these innovative technologies advance sustainable mobility by:

- Optimising energy use
- Decreasing energy waste
- Minimising CO₂ emissions
- Increasing economic value
- Improving total train performance.

ECO4 technologies are built on four cornerstones: energy, efficiency, ecology and economy. By implementing these solutions, operators can generate an overall energy saving of up to 50 per cent.

The following figure shows the different *ECO4* technologies and their impact in terms of energy savings, reduction of particle emissions and efficiency:



Best fitting railroad products under financial consideration

By **Jens Kleeberg**, General Manager for R&D, RAIL.ONE Group

Infrastructure projects are commonly affected by high financial risks. On the one hand, financial risks are particularly associated with railway activities organised in the classic way, with only one entity responsible for running and maintaining both infrastructure and trains. Hence, alternative models, similar to the ones applied in the aviation sector, split responsibilities and risks, (at least between infrastructure providers and train-operating companies). On the other hand, those models show that rail infrastructure is affected by high technical risks which often require considerable expansions of installation as well as maintenance budgets. Potential solutions of this problem are procedures that force engineers to make not only technically, but also economically reliable railway products. Rail.One, as a leading supplier of concrete sleepers and tracks systems, successfully uses such tools to develop high-quality and competitive rail track systems and components.

The major idea behind determining the reliability of a component is to predict its behaviour in service. Therefore, at first, data of existing lines needs to be collected. Secondly, that data needs to be analysed in such a way as to have reliable predictions that can be made concerning a new product or project on the basis of past experience. Basically, RAM-procedures (Reliability, Availability and Maintainability) are meant to give engineers guidelines on how to prioritise aspects in their design in order to achieve maximum reliability.

The procedure is based on 3 major steps:

1. Definition of System Structure: breaking down the entire component into the smallest, singular elements;
2. Risk analysis and failure mode and effect (and criticality) analysis (FMECA): identifying and prioritising failure modes;
3. Mitigating measures: defining design improvements to mitigate failures.

With this procedure, risks can not only be identified, but also weighted with respect to their consequences and mitigated at the source. Furthermore, with failures related to their initiating component, one can also make a maintenance strategy on how and when to inspect, to repair or to exchange each single component of a system. Therefore Life-Cycle-Cost calculations can be put on a solid basis. With such profound knowledge also entire operational simulations like Performance

Simulation Models (PSM) can be derived, giving an insight on the financial success of a railway line for ten years or more.

The following railroad products by Rail.One have run through the above- mentioned process: standard concrete sleepers for main line and light rail traffic, turnout sleepers, wide sleepers to reduce ballast and soil pressure, heavy haul sleepers for axle loads of > 40 tons and annual tonnage > 200 MGT, heavy haul sleepers with low abrasive rail seats, ballastless track systems Rheda 2000 for high speed and standard traffic, ballastless track system Rheda City for light rail, and the ballastless track system GETRAC A3 for upgrading existing lines.

The Advantages of High Speed

By **Emmanuel Fargues**, Product Line Strategy Director, Alstom Transport

We generally use maps to measure the distance between cities or to evaluate the trip time to a certain destination. High Speed Lines are modifying the way we measure our travelling time. In fact, they are bringing cities closer. For example, Lyon, France is now viewed as 2 hours from Paris and not 430 km; it is in fact the same travel time as for Caen (230 km). By narrowing the distance, high-speed lines are also narrowing the economic and cultural links. Lille, now one hour from Paris (220 km), could be considered now as a big suburb of Paris.

On these two lines, high-speed rail overtook the other transportation modes, namely road and air, at least for passenger transportation. Generally speaking, high-speed rail overtakes air transportation for trips with travel times below 3 hours: 65% of travellers are now taking the TGV for going to Paris from Marseilles and 53% the AVE for going from Sevilla to Madrid.

High-speed rail provides other types of advantages:

- Ecological: less CO2 emissions: 2,2g per passenger per km to be compared with car (115g) and air (153g),
- Safety: 17 time less people killed per billion passenger kilometre
- Land requirement: the width of high-speed lines' tracks is half the width of a high speed road, which could provide the same traffic capacity.

Now the programmes to come for new High Speed Lines are really promising. New countries are considering developing new lines beyond 250 kph by 2025: in Europe, these are Portugal, Sweden, Poland, and Russia. And we should add the projects under discussion in Turkey, Brazil, Saudi Arabia, Morocco and California.

Section 3

Project Financing



 DSB

 PKP

 ÖBB
Bahn wirkt
 CFL

 Slovenske železnice

 Renfe

 DB

 ED

 SNCF



TRENITALIA



la voie éternelle



N

Completing the financial architecture of CEE railways: Redesign rail infrastructure investment strategies

By **Paul Guitink**, Central and Eastern European Countries Adviser, CER

The deficiencies of the railways' financial architecture – that still prevail in Central and Eastern Europe and even worsen in some countries – put a real risk to the goal of creating a reliable basis for a common, open European rail freight market in this part of Europe.

In contravention of Directives 91/440 and 2001/14, many infrastructure companies, especially in Central and Eastern Europe, are chronically underfinanced. Public sector contributions to expenditure in rail infrastructure have been insufficient in allowing infrastructure managers to meet maintenance and renewal costs. Because of State under-compensation of rail operators that have to meet public service obligations, full payment of track access charges to the infrastructure manager is frequently impossible. As a consequence, maintenance was deferred resulting in speed restrictions and weight limitations on a large part of the network in an effort not to compromise safety. This in turn affected the willingness to pay high track access charges of freight and passenger operators, creating a downward spiral of indebtedness.

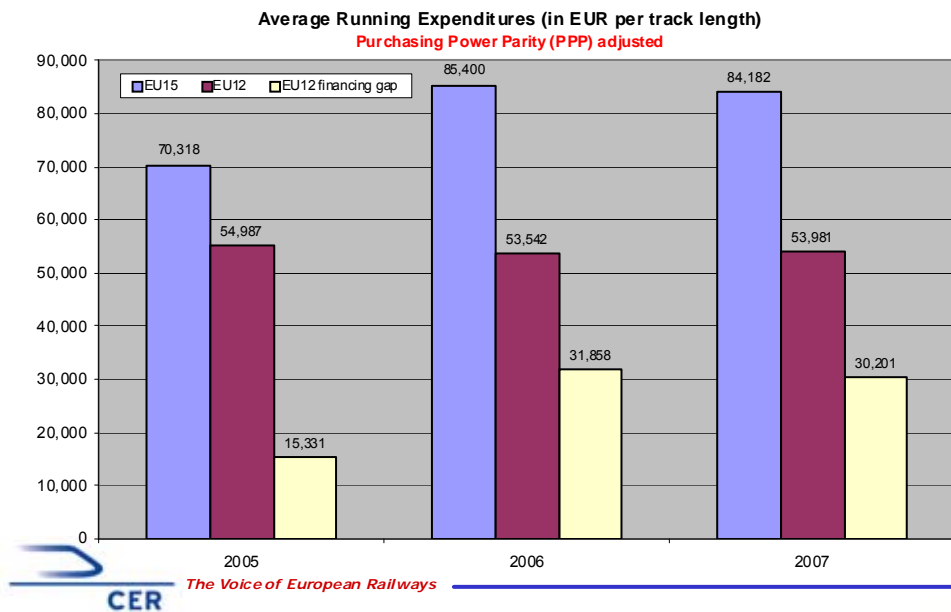
The EU perspective

EU regulations stipulate that Member States must ensure that the income and expenditures of infrastructure managers are balanced. Whereas this may be to some extent the case for CEE infrastructure managers, the poor condition of large parts of the network indicates inadequate financing of maintenance. To overcome a shortfall in revenues and inadequate State budget support, infrastructure managers sometimes turn to capital markets to finance their needs, accumulating an even larger debt burden than already inherited from a difficult transition period.

Illustrating the problem, the European Commission's Multi-Annual Contracts (MAC) Communication revealed large variations in rail infrastructure investment between EU countries, and in particular between the EU15 and EU12 member states. The main conclusion to be derived from comparing rail infrastructure expenditures between EU15 and EU12 is that extremely large discrepancies persist:

- Average running expenditures, i.e. maintenance, per km track length almost 60% higher in the old members states (EU15) than in the new member states (EU12);
- Average investment in existing rail infrastructure (rehabilitation) almost 80% higher in EU15 than in EU12;
- Average investments in new infrastructure is about 53 times larger in EU 15 than in EU 12.

EU12 Infrastructure Financing Gap: MAINTENANCE



The European Commission observes that the maintenance of infrastructure does not always get the attention and financing required for railway operators to compete with other modes of transport. The Commission argues that Multi-Annual Contracts (MACs) will facilitate a shift from compensation for expenditures to performance related payments.

So far, MACs are not being applied in the new member States. Some countries have framework contracts (e.g. Poland, Romania) and in Hungary, the Ministry of Transport is elaborating a MAC for Rail Infrastructure Quality. EU 15 countries also have only limited experience with MACs: only France and Germany have MACs. In the UK, as well as in the Netherlands, a regulatory framework contracts exists. Switzerland (a non-EU State) also has a MAC in place.

Redesigning rail infrastructure investment strategies

The legacy of chronic underinvestment has led to the unenviable position most CEE rail infrastructure managers find themselves in today, that of being confronted with a very low capital base on the one hand and massive investment needs on the other. Significant productivity improvements cannot happen without investments in new business processes, technology and infrastructure, in parallel to right-sizing staff and assets.

The practice of year-to-year funding is inconsistent with the objective of efficient, customer-oriented infrastructure management, particularly as rail infrastructure projects i.e. construction, upgrading or major renewal are capital-intensive and their planning and implementation extends over many years. The infrastructure manager needs long-term financial commitments for its business planning, whereas the State requires robust inputs for multi-year budget projections. Therefore, the Government must formulate realistic but challenging goals for railway infrastructure and allocate adequate financial resources to achieve these goals.

Infrastructure management must focus on protecting rail infrastructure investments by boosting efficiency and productivity instead of promoting system expansion. Multi-annual maintenance strategies determine the costs and the quality of the infrastructure, and are directly related to the level of track access charges and the competitive position of railways. Such maintenance strategies should be anchored in a capital planning process that aims at achieving efficient allocation of investments and demonstrated cost effectiveness, while fully satisfying safety requirements. Crucial sub-sector investments include track machines to enhance productivity of track maintenance crews and modern signalling systems to replace existing obsolete equipment.

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. Apart from the state, the regulatory body and railway 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 financing and the sector's market opportunities. Thus, through costs, performance indicators and track access charges this link is established, so 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 resulted in valuable best practices and lessons learned, including inter alia:

- Shift from a regular to condition/output based maintenance;
- Implement IT systems for cost control, traffic management, maintenance planning, and other major activities;
- Identify key performance indicators that are measurable;
- Establish measurement programs to regularly assess infrastructure condition;

- Move away from re-establishing past design parameters across the network;
- Focus resources on parts of the network where (future) demand is forecasted, as normally there will not be enough resources to reset the entire network to design conditions (rationalize assets to market needs);
- Aim at showing results to strengthen political commitment;
- The infrastructure manager's business strategy should be consistent with the national transport strategy and the resources available under it;
- Eliminate inefficiencies of in-house maintenance activities, for example through the outsourcing of certain maintenance tasks;
- Explore opportunities for outsourcing of tasks (renewal, maintenance), not as a goal but as a way to improve and based on review of institutional and market maturity.

Conclusion

Productive investments in infrastructure to support economic growth are typically a priority in EU15 countries, resulting in a relatively mature railway infrastructure. EU12 rail infrastructure generally requires more investment to recover from the past decades of underinvestment. Track access charges and other revenues (e.g. real estate development) can cover part of rail infrastructure costs. However, mindful of inter-modal competitiveness concerns and alignment with EU levels, track access charges must be complemented with State budget contributions. Investments in increasing the efficiency of infrastructure managers in maintenance and repair of rail infrastructure should lead to lower operating costs and create conditions, in the medium term, to reduce State support, while maintaining or increasing the cost recovery ratio of track access charge.





EU Structural and Cohesion Funds: The means to finance infrastructure projects in Romania

By **Eduardo Barreto**, Programme Manager, Romania Unit, DG Regio, European Commission

This article will focus on two main aspects:

- EU Cohesion policy objectives and budget 2007-2013
- Cohesion policy support for transport projects in Romania

The European Union's Cohesion policy 2007-2013

The Cohesion policy, enshrined in the EU Treaties, is a powerful force for European cohesion and economic integration. It brings tangible benefits to citizens and regions, by fostering economic growth, creating jobs and, in general, reducing regional disparities across the Union.

For the period 2007-2013, the Cohesion policy budget will account for 36% of the EU budget, representing a total of €347.4 billion.

This major financial effort focuses on three distinct Cohesion Policy objectives: convergence, regional competitiveness and employment and European territorial cooperation.

The financial resources and the objectives of the EU's Cohesion policy

- **Convergence objective:** €284.5 billion (representing 81.9% of the total budget) – financed through *the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund*. It benefits regions with GDP below 75% of the EU average as well as other regions under transitional support mechanisms. These regions are home to 35% of the total EU population. For the Cohesion Fund, countries that are eligible have a gross national income of less than 90% of the European average.
- **Regional competitiveness and employment objective:** nearly €55 billion (15.7%) – *ERDF and ESF*. It covers all the regions not covered by the Convergence objective including regions under a special transitional support mechanism ('phasing-in').

- **European territorial cooperation objective:** €8.7 billion, funded through *ERDF*, which aims at facilitating and promoting cross-border, trans-national and inter-regional cooperation, centred on research, development, the knowledge-based society, risk prevention and integrated water management.

The EU's Cohesion Policy support for Romania (2007-2013)

The Cohesion policy support follows a national development strategy (“National Strategic Reference Framework” – NSRF), and is structured into operational programmes (OPs), generally covering areas of activity or integrated regional development initiatives. In Romania, we have a group of national programmes under the Convergence objective and additional territorial cooperation programmes where other countries are also involved.

As foreseen in the Romanian NSRF, the EU and corresponding national funds aim at reducing the economic and social development disparities between Romania and the other EU Member States, by generating 15-20% additional GDP growth by 2015. Precisely, this would mean increasing from 31.1% of the EU average in 2004 to 41% by 2013.

In addition to this, other specific objectives are targeted:

- increasing the long term competitiveness of the Romanian economy;
- infrastructure development at European standards (with the lion share – 60% – of EU Cohesion policy funding for Romania);
- making a more efficient use of Romania's human capital.

Romanian Operational Programmes

1. National programmes under the Convergence objectives

- Environment Operational Programme
- Transport Operational Programme
- Regional Operational Programme
- Economic Competitiveness Operational Programme
- Technical Assistance Operational Programme

2. European territorial cooperation

- Operational Programme ‘Romania-Bulgaria’
- Operational Programme ‘South East Europe’ (SEE)

Each **Operational Programme** is organised by priorities with associated targets, matching through their indicated initiatives and corresponding financial resources, the Romanian development strategy for its specific intervention area(s).

Convergence regions in Romania

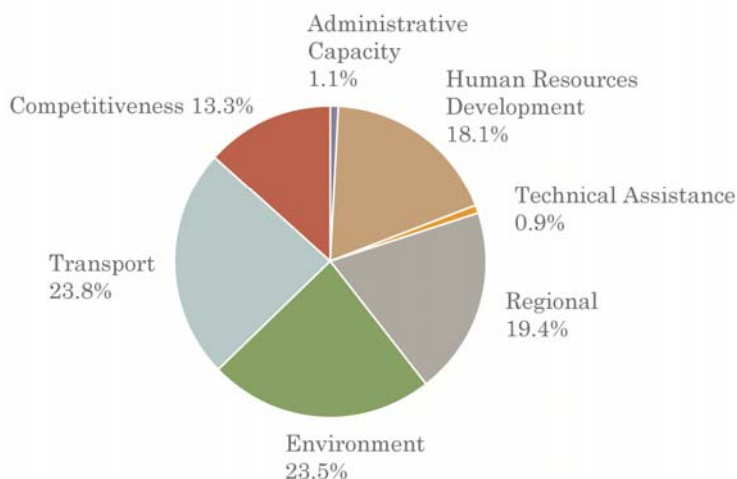


In order to reach these ambitious national objectives, €19.2 billion of EU structural and Cohesion funds were allocated under the Convergence objective and an additional €455 million under the European Territorial Cooperation objective. Romania's own contribution (including private sources) to complement the EU funds will amount to at least €5.5 billion, bringing the total investments in structural and cohesion policy to approximately €25.2 billion over the next seven years.

The Transport Operational Programme (SOPT)

In Romania, like in many other EU countries (see figure), transport infrastructure investment support by EU Cohesion policy represent a significant share of the total foreseen EU financing. In terms of EU funds, the SOPT by itself (i.e. excluding additional support from the Regional OP) has a share of 24% (€4.45 billion) of the allocated EU funds under the Convergence objective.

NSRF Allocation by Operational Programme



By far the biggest effort will be carried out under the **first priority of the SOPT**, and significant investments are planned for the three main European TEN-T Priority Axes (PA) in Romanian territory: the road PA 7 which, for its northern branch, will go from the Hungarian border to the port of Constanta on the Black Sea, the rail PA 22 where further major modernisation investments will be carried out, and finally the inland navigation PA 18, where planned investments will significantly increase the potential of the Danube river as a major European transport fairway.

Allocation of EU and national funds by OP Transport priority:

- Priority 1: Modernisation and development of TEN-T priority axes (EU contribution: 67.7%).
- Priority 2: Modernisation and development of national transport infrastructure outside the TEN-T priority axes: 23.7%.
- Priority 3: Modernisation aiming at a higher degree of environmental protection and safety: 6.4%.
- The remainder being allocated to the technical assistance priority.

The four priorities will receive ~ €4.56 billion from the Cohesion Fund and ERDF, with the national contribution accounting for €1.13 billion.

The balance between rail and road TEN-T investments is closely matched, with each one accounting for a 1/3 of the total EU funding available.

A further €1.3 billion will be invested in the transport sector under the Regional Operational Programme. These investments will support urban transport services and the improvement of regional and local transport infrastructure.



Best Practices in Rail Infrastructure Public Private Partnerships

By **Michael Robson**, Secretary General, EIM

The goal of the Lisbon Agenda is to make Europe “the most competitive and dynamic knowledge-driven economy by 2010.” This requires the creation of an efficient, sustainable and competitive transport system connecting all parts of the European Single Market. To support the development of a Trans-European Transport Network, the European Union has made significant resources available for investment in transport infrastructure (€90 billion for the period 2007-2013).

EU funds come from a variety of sources, such as the Trans-European Networks programme, the European Investment Bank and EU structural and cohesion funds and are often supplemented by private investors or national governments.

Robust investments and the rational use of EU funds play a vital role in the context of the current financial crisis affecting the European economy and threatening long-term private investments. Major financial uncertainties could have two contrary effects on infrastructure investments:

- **An increase in investment** if infrastructure projects are considered safer and more attractive by investors than financial products subject to fluctuation, or
- **A decrease in investment** if less public money is available for infrastructure projects.

However, investment in infrastructure would definitely bring a number of benefits to the economy as a whole, such as:

- Creating and sustaining employment;
- Improving productivity and competitiveness by lowering producer costs;
- Providing consumers with higher quality services.

The European Commission wants Public Private Partnerships (PPPs) to play a major role in the development of Trans-European Transport Networks, and in innovation and R&D. EIM also strongly believes in the potential of PPPs as a means of financing large infrastructure projects, and shares its members’ experience as part of a regular dialogue on that topic with the European Commission. This should result in a number of initiatives at EU level in 2009:

- The Commission is preparing a new regulatory framework for PPPs in the area of public procurement law;

- The Green Paper to prepare for the future TEN-T revision will test PPP and financing questions:
 - options for new PPP-specific financial instruments under the TEN-T budget;
 - options for facilitating the use of PPP in the railway sector;
 - addressing the problem of high set-up and bidding costs of PPP schemes;
 - seeking to strengthen competition in tendering for transport projects.
- Guidelines for PPPs in Transport will be released in order to:
 - provide orientation on best practice to implement PPP schemes;
 - enable a better integration of all EU financial aids;
 - pave the way to the removal of some of the financial barriers to the implementation of TEN-T projects.
- The new TEN-T *Financial Regulation* includes instruments for promoting PPPs.

The members of the European Rail Infrastructure Managers offer many examples of good practices in implementing rail infrastructure PPP projects. These include the Diabolo Project, the Liefkenshoek Rail Link, and the Nîmes – Montpellier Rail Bypass.

Diabolo PPP Project

This PPP project is a 40-year concession to design, finance, build and maintain an underground rail link running northwest from the present sub-surface station at Brussels airport. The goal is to help address growing road congestion and to double rail's share of the airport market to 30% by 2030.

Northern Diabolo NV will be responsible for maintaining the airport line for the next 35 years, until the assets are transferred to State ownership in June 2047.

The company's investment will be reimbursed through three revenue streams:

- an indexed annual payment from Infrabel of €9 million a year,
- a contribution from the train operators equivalent to 0.5% of all fare receipts for domestic passenger traffic,
- a fixed charge of €3.80 on all tickets to and from Brussels Airport (apart from staff journeys to and from work).

Liefkenshoek Rail Link

The objective of the new Liefkenshoek Rail Link is to absorb traffic for the port of Antwerp, which is expected to double between 2000 and 2020, mainly through

growth of container traffic. Rail's share of traffic to Antwerp is to increase from 8% to 15% by 2020. The project consists in the design and construction of a 16 km double-track rail link between terminals on either side of the Scheldt River within the Port of Antwerp. Work has begun in the first half of 2008 and is scheduled for completion in 2012. The total investment is over €700 million, of which €635 million will be provided by the PPP.



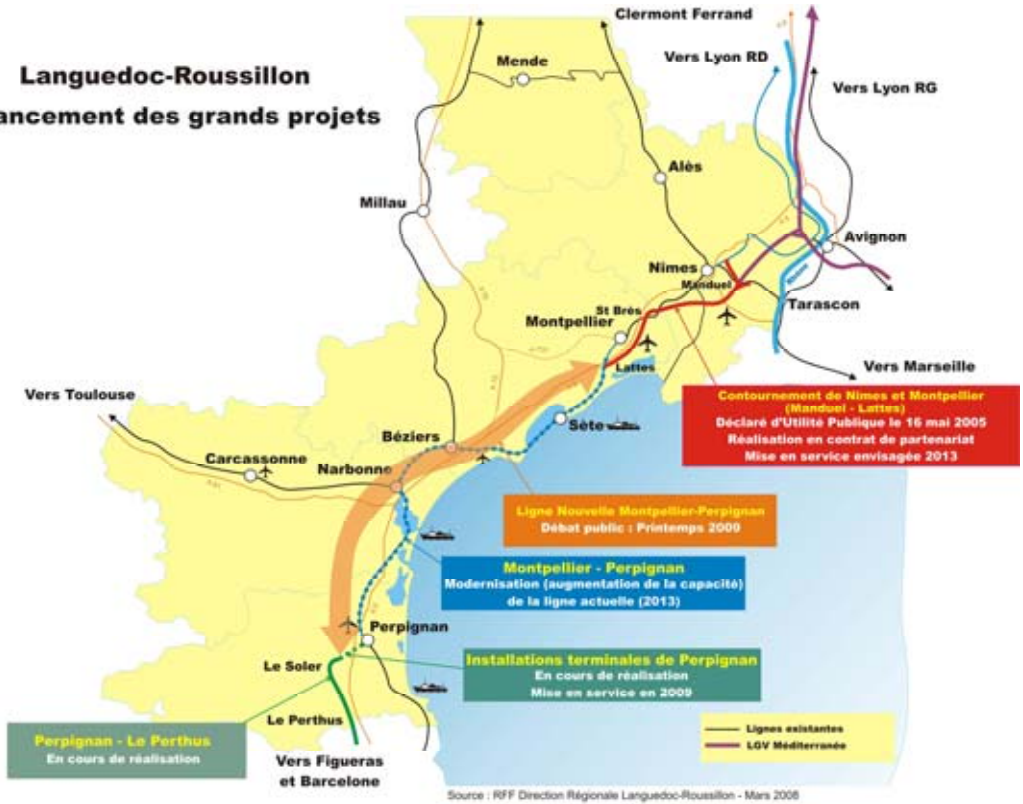
The new connection under the Scheldt will create a direct link between the port installations of the left bank (Deurganckdo) and the Antwerp-North marshalling yard and existing rail network on the right bank, with the result of unblocking the current tunnel and the Antwerp-Berchem – Antwerp-Schijnpoort section, a real bottleneck of traffic on the Antwerp network.

Nîmes-Montpellier bypass

The Nîmes-Montpellier line constitutes an essential link to the wider European transport network. The three main purposes for the new infrastructure include developing rail freight transport, relieving congestion, and bringing Barcelona to within just one and a half hours of Montpellier. Construction will cost €1.2 billion, with the following timetable:

- 2006: Call for tenders and consultation
- 2008: Formalisation by contract
- 2013: Opening to traffic

Languedoc-Roussillon Avancement des grands projets



Finding the Funds

These examples, along with many others, are also detailed in “Finding the Funds”, an EIM publication which aims to explain in a clear and practical way how Infrastructure Managers and Member States can benefit from available EU funding, as well as explore alternative sources of financing such as PPPs or loans from the European Investment Bank.

EIB JASPERS - Assistance on preparing projects for EU funding

By **Nicos Yiambides**, Head of JASPERS Bucharest Regional Office

What is JASPERS

JASPERS the Joint Assistance to Support Projects in European Regions, is a joint technical assistance facility of the *European Commission (Regional Policy Directorate-General – DG Regio)*, the *European Investment Bank (EIB)* and the *European Bank for Reconstruction and Development (EBRD)*. JASPERS was set up in 2005. In July 2008, *KfW Bankengruppe* became the fourth partner in this joint enterprise.

Jaspers is managed by the EIB (but separated from its lending activities) and is headquartered in Luxemburg.

Objectives

JASPERS was created in order to increase the ‘new’ Member States’ capacity to make the best use of EU Structural Grant funding. Experience has shown that the absorption of EU funds is a challenge; therefore, JASPERS assists in developing the necessary administrative capacities. The programme is run by a team of experts from the European Commission, the EIB and EBRD and draws from the experience of the various institutions.

JASPERS supports the Cohesion Policy by increasing the resources available for project preparation and improving the quality of technical advice available to project promoters. Thus, it enhances transition, environment, economic growth and job creation in those countries.

Priorities

The beneficiary countries are the EU Member States eligible to Convergence Objectives with priority to new Member States.

The main priorities for assistance are the following:

- Large projects in transport and environment sectors eligible for Cohesion Fund and ERDF;

- Transport and other sectors' projects with a capital cost higher than €50 million;
- Environment projects with a capital cost higher than €25 million.

The Structural Funds in the 12 new Member States increased significantly during this Programming Period to €178 billion. It is therefore of high importance for these countries to take advantage of this opportunity to improve their absorption capacity.

Key areas

Areas which JASPERS covers include:

- Trans-European networks (TENs);
- The transport sector outside of TENs, including rail, river and sea transport;
- Inter-modal transport systems and their interoperability;
- Management of road and air traffic;
- Clean urban and public transport;
- The environment, including energy efficiency and renewable energy;
- Public-private partnerships.

Main types of input

JASPERS assistance concerns project preparation and work on horizontal issues relevant to more than one project or more than one country and on exception, other project-related matters such as implementation support.

The assistance starts from the early stages of the project and ends with the decision of grant assistance (by the Commission or the Member State, depending on the size of project). In order to deliver a mature project, the facility's preparatory work includes:

- Advice on conceptual development and project structuring;
- Advice on project preparation (e.g. cost-benefit analysis, financial analysis, environmental issues, procurement planning);
- Review of documentation: feasibility studies, technical design, tender documents;
- Advice on compliance with EU law (environmental, competition and others) and conformity with EU policies.

Features

The main benefits, conditions and provisions of the technical facility are:

- JASPERS assistance is provided free of charge to the beneficiary;
- There is no obligation for the Member States to use JASPERS;
- No obligation from the Member State which benefits from JASPERS to borrow from EIB or EBRD;
- Member States, not JASPERS, continue to “own” the project; they submit the standard applications as required by the EU Regulations;
- Preparation of a project by JASPERS does not guarantee grant application approval by the Commission.

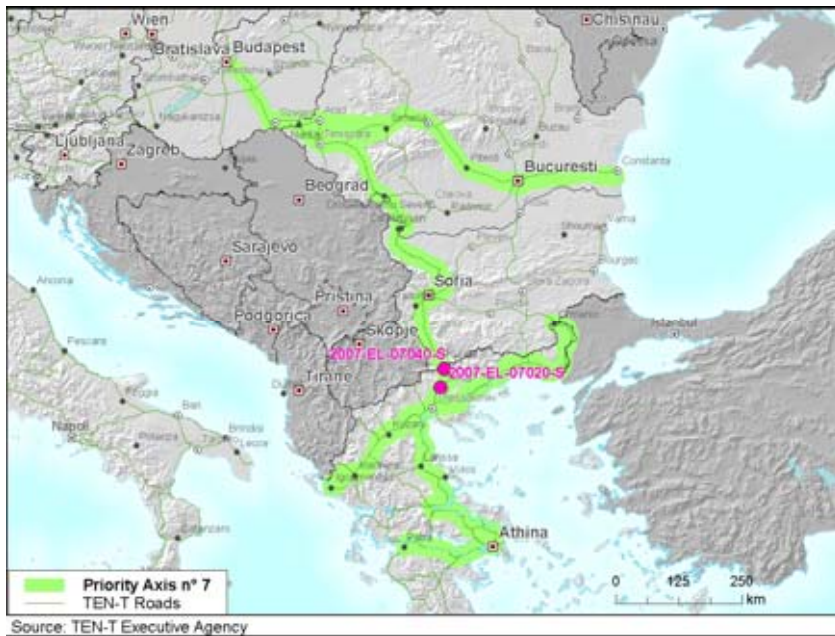
Transport Projects in Romania

In July 2007, the EIB opened its regional office in Bucharest, which currently also hosts 13 JASPERS staff. Romania is entitled to receive €19.7 billion in the period 2007 – 2013 for the implementation of projects that are in line with the priorities of the European Union’s regional policy; these projects cover the transport sector as well. Almost all projects from the Romanian Sectoral Operational Programme for Transport (approx. €5.5 billion) are included under JASPERS Action Plan.

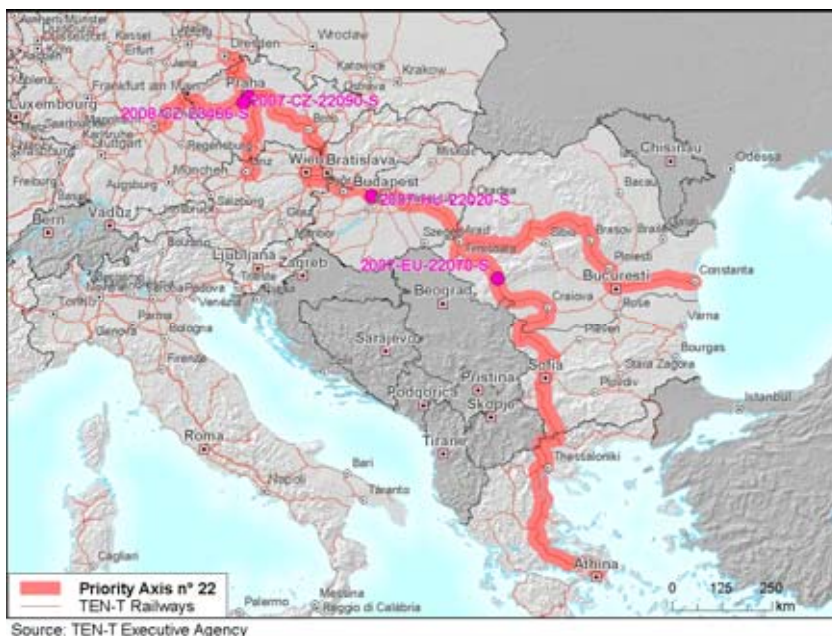
Type of Project	No. of projects
Roads	17 projects
Railway	12 projects
Inland water (Danube)	2 projects
Ports	>4 projects
Airports	1 project
Inter-modal	1 project
Horizontal	2 assignments

JASPERS actions cover in particular the modernisation and development of TEN-T priority axes 7, 18 and 22 aimed at a sustainable transport system integrated with EU transport networks.

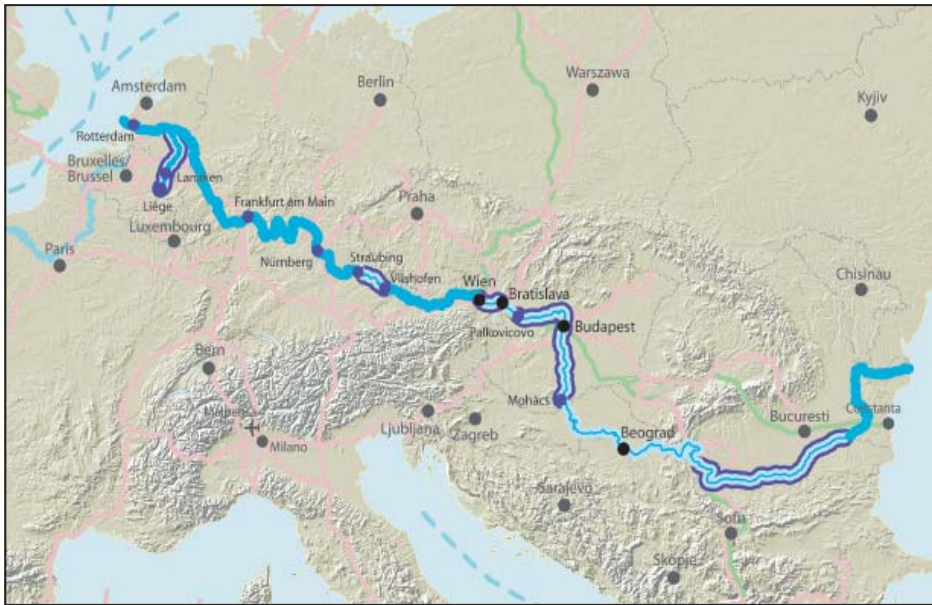
Motorways (TEN-T priority axis no. 7)



Railways (TEN-T priority axis no. 22)



Inland Waters – the Danube (TEN-T priority axis no. 18)



Source: TEN-T Executive Agency

Inland Waterways	Priority Section	Other Priority Axis	Motorway of the Sea
	In preparation		Road
	Under construction		Rail
	Completed		Inland waterway
			Airport

In the rail sector, JASPERS is currently involved in the following projects in Romania:

- Line Brasov-Simeria – rehabilitation & modernization;
- Line Simeria-Curtici – rehabilitation & modernization;
- Rehabilitation of Bridges and Tunnels;
- Rehabilitation of Railway Stations;
- Improving of Railway Safety;
- Pilot ERTMS Level II;
- Investment in new Rolling stock.

Conclusion

JASPERS is a valuable tool for helping new Member States to prepare their infrastructure projects until financing is granted. It has proved to be successful with various projects. Therefore, this assistance opportunity should not be missed, as absorption of European funds remains a key challenge in Central and Eastern Europe.



The Bombardier

tram is in Olympic

shape for

How to finance rolling stock according to State aid rules

By **Frédéric Versini**, Case Handler, Internal Market and Competition Unit, DG TREN, European Commission

On 30 April 2008, the Commission adopted guidelines on State aid to railway undertakings. The objective of these guidelines is to provide guidance on the compatibility with the EC Treaty of State aid to railway undertakings and to improve the transparency of public financing and legal certainty at the moment of the opening-up of the markets.

In this context, investments in moving assets were in a special situation. Traditionally, State aid for the purchase or the renewal of moving assets could only be approved by the Commission under very limited circumstances. In particular, moving assets financing could not be approved on the basis of regional aid guidelines.

However, the fleet of locomotives and carriages used for passenger transport is ageing and in some cases worn out, especially in the new Member States. The Commission considers that investment in rolling stock can contribute to several objectives. Investment in rolling stock is essential for keeping rail transport competitive with other modes of transport which cause more pollution or entail higher external costs. Such investment can also limit the impact of rail transport on the environment, particularly by reducing the noise pollution it causes, and improve its safety. Finally, improving interoperability between the national networks means it is necessary to adapt the existing rolling stock in order to be able to maintain a coherent system.

Therefore, State aid rules regarding investments in rolling stock needed to be clarified and completed in order to provide the necessary legal certainty and the legal instruments for tackling the challenge of fleet replacement. For that reason, a chapter of the railway guidelines is dedicated to rolling stock financing.

What is State aid?

Article 87(1) of the EC Treaty provides that in principle “*any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the common market.*”

In most cases, public supports for investments in rolling stock fall within the scope of State aid. In examining the presence of State aid, the following considerations need to be taken into account:

- transfer of State resources: resources of the structural funds are often transferred to the national budgets and are at the disposal of the Member States before being paid to beneficiaries. As a consequence, investments co-financed by structural funds involve a transfer of State resources;
- selective economic advantage: public support for the purchase or the renewal of rolling stock reduces the costs that railways would normally have to bear, which constitutes a selective economic advantage. As regards public service compensations, the Court defined in the Altmark judgment specific criteria for which they are not considered as State aid;
- effect on competition and trade: the interpretation of these conditions is quite broad. It is usually met when the measure strengthens the position of an undertaking compared with other undertakings competing in intra-Community trade. It is not necessary that the beneficiary undertaking itself be involved in intra-Community trade. It is indeed sufficient that the recipient of the aid compete with other undertakings on different markets open to competition or that the competitors have less chance of penetrating the market concerned. The fact that an economic sector has been liberalised at Community level is an element which may serve to determine that the aid has a real or potential effect on competition and on trade between Member States.

Pursuant to Article 88 of the EC treaty, State aid to financing rolling stock must be notified to the Commission which will examine its compatibility with the common market.

How can the compatibility be assessed?

The compatibility assessment has to be made according to the common-interest objective to which the aid is contributing. The Commission applies the general State aid rules (Article 87 (2) and (3) and various guidelines and frameworks adopted by the Commission) or, where the aid is intended for transport coordination, Article 73 of the EC Treaty.

The main criteria applied by the Commission for each aid category are summarised below.

Public service compensation

Public service compensation can be foreseen to offset costs relating to the purchase or the renewal of rolling stock in the context of a public service obligation or a public service contract. When the criteria set out in the Altmark judgement are not met and in particular, when there is no tendering procedure, these compensations give rise to State aid.

The Commission examines the compatibility of the aid with regard to Regulation (EEC) n°1191/69 which is in force until 3 December 2009. This examination consists mainly in ensuring the absence of overcompensation. Indeed, the compensation should not go beyond the costs relating to the purchase or the renewal of rolling stock concerned by the public service obligation or contract. As from 3 December 2009, Regulation (EC) n°1370/07 will replace the existing legislation. This regulation exempts from notification the public service compensations calculated according to its annex I guaranteeing the absence of overcompensation.

Restructuring aid

Fleet replacement or investment in rolling stock can also be financed in the context of the restructuring of a railway company. The Commission applies the reasoning and criteria defined in the rescue and restructuring guidelines.

The following conditions must then be fulfilled. First, the beneficiary must be a firm in difficulty, according to the definition of the guidelines. Second, the restructuring measures must allow the long-term return to viability of the company, as supported by a restructuring plan. Third, the aid must be limited to the minimum and include an own contribution of the restructured undertaking. Fourth, the measures should provide for compensatory measures if they lead to excessive distortion of competition. Finally, the firms should not have received State aid in the previous ten years and can not receive any additional aid for ten years in application of the so-called *one time last time principle*.

Environmental aid

Investment in rolling stock can also pursue an environmental objective. The Commission examines such projects in light of the environmental aid guidelines, which apply to both the acquisition of new vehicles and the retrofitting of vehicles.

The concerned measures should result either in the early implementation of environmental standards already adopted at the European level, but not yet in force, or in the application of standards which go beyond the existing European standards. The eligible costs only cover the extra costs compared to a reference investment on the basis of the applicable standards. The aid intensity for environmental investment in rolling stock is up to 50% of eligible costs. This intensity is brought to 60% for medium sized enterprises and to 70% for small sized enterprises.

It should also be noted that the general block exemption regulation exempts from notification to the Commission and considers compatible with the common market similar environmental aid, the intensity of which is limited to 35% of eligible costs (+10% to 20% for small and medium-sized enterprises).

Aid for small and medium-sized enterprises

Similarly to environmental aid described above, aid measures concerning rolling stock for small and medium-sized enterprises can be deemed compatible with the

common market according to the general block exemption regulation. This applies to financial support covering up to 20% of the investment for small enterprises and 10% of the investment for medium enterprises.

Aid for coordination of transport

Public support for rolling stock can also fall within the scope of aid for coordination of transport, in particular when it relates to the installation of safety systems, noise reduction and interoperability such as for example the European Rail Traffic Management System (ERTMS).

Chapter 6 of the railway guidelines provides for an extensive description of the conditions to be fulfilled for the approval of such aid. Investment in rolling stock for coordination of transport can be financed up to 50% of the eligible costs.

Regional aid

This is the main innovation in the railway guidelines as far as rolling stock financing is concerned.

Rolling stock was not eligible for aid for initial investment according to the regional aid guidelines. The Commission partially removed this ban by introducing derogation from this rule in the railway guidelines only with regard to rail passenger transport. Subject to certain conditions, the costs of acquisition of rolling stock in the rail passenger transport sector (or for other modes such as light rail, underground or tram) are deemed to be admissible expenditure.

In order to avoid distortions of competition, four conditions have to be met cumulatively in order to declare the aid compatible with the common market. First, the rolling stock concerned must be exclusively assigned to urban, suburban or regional passenger transport services in a specific region or for a specific line serving several different regions. Second, the rolling stock must remain exclusively assigned to the specific region or the specific line passing through several different regions for which it has received aid for at least ten years. Third, the replacement rolling stock must meet the latest interoperability, safety and environmental standards applicable to the network concerned. Fourth, the Member State must prove that the project contributes to a coherent regional development strategy.

Certain specific provisions also apply in the case of large investment projects, if the recipient undertaking is entrusted with providing services of general economic interest or when the replaced rolling stock is sold on the market. The other conditions provided for in the regional aid guidelines, notably as regards the intensity ceilings and the regional aid maps apply.

As a consequence, the chapter dedicated to rolling stock financing in the railway guidelines constitutes a tool box for Member States in order to elaborate measures encouraging fleet replacement in accordance with State aid rules and with the lowest possible distortive effect on competition.

Section 4

Project Tendering, Contracting and Implementation

Contracting strategies – types of contract, experience and way forward

By **Jeremy Candfield**, EFRTC Board Member and Chairman of EFRTC Policy and Research Committee, Director General, Railway Industry Association, London, with **Imrich Korpanec**, EFRTC Secretary General

EFRTC as a Federation of Railway Trackworks Contractors has vital interests in seeing a sound contractual relationship between its members and their clients, mainly Railway Infrastructure Managers. It represents about 130 specialist track contracting companies, from medium-sized to very large, with turnover in billions of Euros. Railway Trackworks Contractors are major employers of companies, performing track construction, renewal and maintenance for many infrastructure managers.

Infrastructure accounts for about 50% to 70 % of the total costs of railway systems. It therefore goes without saying that any potential savings in infrastructure are likely to have a significant impact on the total costs of railway operation and on the charges to the end users of the railways – passengers and freight forwarders.

Recent investigations carried out by the EFRTC within the EU-funded INNOTRACK project suggested that the adoption of appropriate strategies based on closer and more open relationships between infrastructure managers and contractors could be expected to lead to percentage cost reductions in railway infrastructure going into two digit figures. Having addressed key issues of processes, people and culture infrastructure managers and contractors jointly identified seven key areas as critical to success, namely:

- Market Strategies;
- Long Term Funding and Strategic Planning;
- Work programming;
- Project Management and Logistics;
- Contracting Strategies;
- Rules and Regulations;
- Plant.

Contracting strategy is one of the above areas critical for success which require further joint attention from infrastructure managers and contractors.

There is obviously an interaction with the other areas, so contracting strategies are rarely set independently. They are a function of at least the following:

- market strategies;
- funding mechanisms;
- how work is programmed and managed;
- inherited structures, systems and cultures, etc.

With regard to the market, infrastructure managers are responsible for making decisions i.e. for taking clear decisions on what is to be done by in-house resources or contracting. There is no point in infrastructure managers and contractors competing for positions. EFRTC instead proposes a relationship where tasks are done by those who add the most value. However, that can only happen with a true understanding of long-term costs and openness of dialogue. It also requires rational, defensible and open analysis, which is clearly communicated and understood.

Concerning funding, infrastructure managers need long-term funding commitments from governments to allow long term planning as acknowledged by the statement of contractors that “planning stability is at the heart of efficient processes”. Long-term planning is fundamental to allow contractors and infrastructure managers to measure their capacity with the anticipated market needs. Vitally important is that plans are credible – they need to be well-based, and to be delivered.

Secure funding, longer term planning, and contracting would enable infrastructure managers:

- to develop long term strategies for infrastructure funding, with business plans meeting the customer needs;
- to set up long-term maintenance and renewal plans supported by secured funding;
- to improve operational planning, contracting and procurement and thus optimise project pipelines for the works to be performed by contractors in open and competitive markets.

Longer term planning, funding and contracting would enable contractors:

- to size their capacity and resources on the basis of long term, output-oriented contracts with clearly formulated targets (KPIs – Key Performance Indicators), definition of responsibilities, identification and fair attribution of risks and provision of incentives for innovation;
- to avoid over-resourcing the fleet of heavy and costly machinery due to peak demands and significant variation in track possessions;
- to optimise planning and work processes (track possessions, worksite logistics, supply of materials, utilisation of machinery and skilled workforce, etc.) through improvements in the interfaces with infrastructure managers.

The current contractual practice is very often based on annual budgeting with typically short notice bids and incomplete criteria for awarding contracts such as the following:

- price;
- technology/machinery to be used;
- logistics, duration and resources;
- past experience.

This leads often to shorter term “cost plus” contracts with less incentive for innovation and thus cost reduction.

The recent experience in countries where contractors closely cooperate with infrastructure managers in establishing long-term planning based on longer term commitments from governments showed that there are other more efficient contracting options.

“Output-oriented” contracts where infrastructure managers jointly with contractors define a set of the performance criteria as a part of contract are now in place in a number of countries. In this case, contractors are generally able to respond most effectively to longer-term contracts with sets of measurable performance criteria such as integrated “LCC Performance contracts” with incentives to deliver best products for best LCC, both for infrastructure managers and contractors, and with clear allocation of risks.

The duration of the contracts is usually from 3 to 6 years depending on the level of details specified by contracts. Currently the planning, budgeting and subsequent contracting is negotiated at three levels:

- strategic 10+ as e.g. is the practice in the Netherlands and Switzerland;
- framework 3-7 years as in the UK and some other countries;
- operational annual planning agreed in year Y-1 (budget with detailed planning of all maintenance and renewal works agreed and contracted one year before starting work, as in Switzerland).

Along with cooperation it is evident that competitive tension in the process is essential to maintain pressure on value and innovation.

Current experience in contracting in various countries can be briefly summarised as follows:

- contractors in the Netherlands, UK and Switzerland have experienced to some extent the positive impact of long-term and stable funding through multi-annual contracting which results in significant benefits in the efficiency of track maintenance and renewal;
- contractors in other countries as e.g. in particular in Spain, Belgium, France, Portugal, Poland and some others would welcome the opportunity to enter into longer term output-oriented contracts;

- contractors' early involvement in the negotiations between infrastructure managers and the state on funding and contracting is essential for the improvement of planning at all levels.

To conclude, it can be stated that the most efficient contracts for infrastructure managers and their contractors will tend to:

- be longer term;
- be output-oriented;
- be incentivised to drive efficiency;
- share risk and reward allocation equitably;
- share the benefits of innovation equitably;
- be based on open and honest communications;
- be based on fair tender procedures that include sensible timescales and documentation of adequate quality;
- reflect, to some extent, the demands of individual markets.

In other words, they will be fair to both sides.





Success Factors for Infrastructure Project Implementation: An attempt to take a more philosophical approach

By **Manfred Rosenauer**, Head of the Road and Rail Infrastructure, Strabag

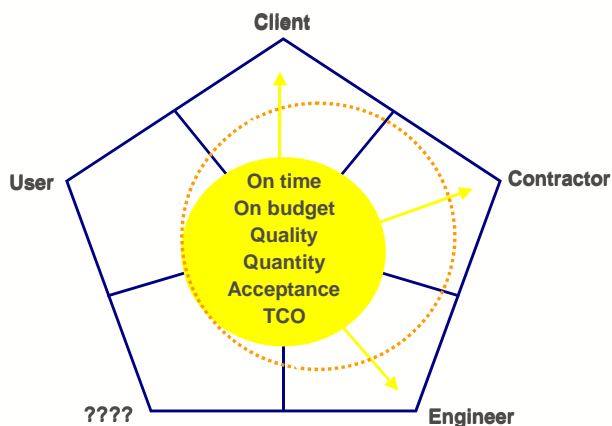
Every project and project implementation is in the centre of a complex network of interests, goals and – not necessarily good – intentions. Everybody involved in project management from time to time experiences cooperation with stakeholders of projects who don't act to the highest standards or even in good faith. This happens not always due to negligence, but sometimes in the hope of gaining advantages over other partners in the project.

Key questions to ask

Let's come back to the title "Success Factors for Infrastructure Project Implementation"

Central key questions are:

- **When is a project successful?**
- **How to measure that success** (using the same parameters – in abstract terms everybody would define success more or less with the same parameters...)?
- **And – hasn't every stakeholder a different definition and scale...?**



Definition of success and the stakeholders

And – under the special circumstances of implementing an infrastructure project – shouldn't ONE stakeholder be in the centre of all contemplations...?

Undoubtedly it is a complex interaction between the client, the contractor, the engineer and of course the user of the infrastructure project. The latter is the one who finally defines the success of such a project.

Cooperative approach

In a more philosophical approach – as a vision – everything in balance secures the optimum of the total of benefits. If you destroy this very balance – everybody loses. If risks and chances are allocated correctly, (the risk should be dealt with by the party best able to handle it) and when this allocation is transparent and clear, you would regularly encounter a 'win-win-situation'. But unfortunately, in daily business, each party tries to pull the circle of success towards his/her own corner to gain the assumed advantages, thus distorting the circle and therefore creating an imbalance.

Such behaviour is covered in the 'Game Theory', which focuses on how people or groups of people interact and how decisions are made by assuming what the other party will do in an effort to achieve their own goals.

Just to mention two examples from daily practice:

Clients increasingly misuse contractors of banks to reduce financial burdens and push financial risks onto the shoulders of the contractors, thus overstepping the contractual conditions or by vague definition, the payment regulations.

Or in another example, the client makes the contractor responsible for land expropriation, a risk the contractor is not able to handle at all.

In summary the contractor can hardly calculate which kind of cost he might face. The client pushes risk towards the contractor in the assumption that the former gains benefits such as reduced costs or even delay penalties in the second case. The contractor on the other hand can either calculate these costs to his best assumptions and risks (this can result in too high an offer) or neglect this risk to maintain his chances of getting the contract. A prudent contractor will choose not to hand in a tender if the risks are not calculable. That means the client loses out on one qualified offer. Regardless whether he has calculated this risk or not the contractor who is awarded the contract will attempt to recover additional costs. In reality the client and/or the constructor lose(s) out again.

If risks are allocated to where they can be dealt with best, then clear and precise tender documents can be produced and fair offers be submitted.

A framework to face the challenge

Preliminary – a cooperative approach/focus should start in the earliest stages of a project depending on information flow and transparency (even under mediation). It is important to create a fair environment for all stakeholders with a transparent presentation of the risks and chances for each party in an integrated organisation (until the legal end of a project with the handing over of the certificate). Therefore, the quality of the tendering process is of enormous importance.

A project team should deal with common goals instead of differences. Common problem solving may also be supported by an incentive scheme; the fair diversification of risks and the attributing of risks to the party which can best handle it is a must. Continuous improvement and permanent feedback help to achieve the goal of a win-win-situation for the customer, the contractor and therefore the user, meaning satisfied customers, high-capacity companies, a technical and commercial optimisation which equals the success of the project.

It is simply important to minimise the incalculable risk. Areas of conflict between customer, engineer and contractor may always arise because of the market need/demand. These may include:

- maximum reward for a fixed price
- prime quality despite other tender regulations
- adherence to delivery dates although deadlines are missed by the customer
- staying within budget even if more/other work was asked for or
- wrong allocation of risks

Furthermore – and to change to a more pragmatic approach – in project management in general an important standpoint in the project execution is planning. **Time spent planning is time well spent!** It is important to take milestones and deliverables into consideration, as well as different kinds of qualifications/organisations depending on the contract size, flexible work plans, accurate cost estimates and detailed resource requirements. Applying a valid and realistic time-scale and an early warning system to keep the team focused and aware of project progress is essential.

Despite the tendering procedures in general, all the financing issues (state financing, a model of infrastructure financing, bodies managing the funds, application procedures – wider use of private funds) and all (local) rules for investment projects implementation have to be taken into consideration.

This leads to a need for controlling and reporting procedures – and a problem-solving team involving all parties.

It may also be helpful to define critical success factors and make them measurable (bonus system) – e.g. reduction in the cost of raw materials by the end of the year – all influenced by limitations in transport, the production of building materials, the use of local and waste products if possible, CO₂, the development of prices and tariffs and the procurement market in general.

To deliver value and excellent results generated on time, with the budget, and in scope is the goal which has to be communicated during a project closure process. And the feedback may support continuous improvement in executing such a project. It is essential not to invest assets – either manpower or capital – in conflicts, but in solving problems as they arise.

Furthermore, international and therefore intercultural projects are on the rise. Hence being aware of the cultural diversity is a (if not the) main issue in success. Use of an experienced team of experts, who are highly motivated, avoid unrealistic promises and be aware of changes in contract terms (a standardised comprehensive body of regulation – e.g. FIDIC).

And – in any case: Putting everything into writing is a MUST.

We may approach the question for success factors in infrastructure project implementation from different angles, perspectives – but we should bear in mind some key questions and conclusions:

- **Who are the stakeholders of a project?**
- **If success is a goal, how do you measure/define it?**
- **Aren't there competing goals connected with a project, hence different definitions of success?**
- **What are the key factors which push a particular project off track?**
- **What is the correlation between cost-development and price-development?**
- **And – the user's satisfaction is the success of the project!**

Concerns from the industry in tendering and contracting

By **Riccardo Zampieri**, Director Business Development, COLAS RAIL

The current worldwide financial crisis has drastically reduced cash availability and has pushed corporations to concentrate on their core business, with banks and financial institutions focusing on financing whilst infrastructure contractors remain on design, build and maintain activities. Contractors have become cash-conscious and will have difficulties to accept and to carry out work with a negative cash flow.

Indirect project financing by tough payment conditions on contracts is unhealthy not only because it is more expensive than a structured financing with financial institutions, but more importantly because negative cash flow can put an unwary contractor in major difficulties. This in turn leads to project delay and conflicts between the infrastructure owner and the contractor.

Let me present an example of this to illustrate the consequences on a €40+ million project with 2-year duration with typical payment conditions that are now difficult to accept:

- 15% advance of first year anticipated billing reimbursed during the first year payments;
- 75% of cost of materials on site paid 56 days after approval of invoice;
- Progress payments for work paid 56 days after approval of invoice.



These conditions raise some comments:

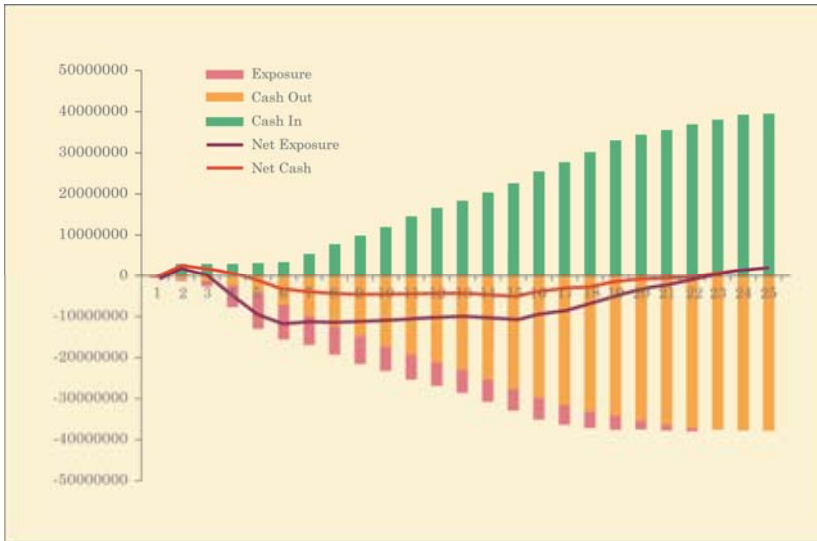
- The 15% advance on the first year's anticipated billings is equivalent to a 7% down payment to be reimbursed on the first year's payments. This does not cover mobilisation costs, design costs and transportation costs incurred before the materials arrive on site;
- The 75% payment of cost of materials should be understood as 75% of the cost of the contractor's mobilisation and management expenses, plus design costs and the cost of materials including transport. The cash flow curves are based on this larger definition of material costs, otherwise the cash flow would be even worse;
- Payment 56 days after approval of invoice means that payment can be longer than 56 days after receipt of the invoice, because an undefined time is required between the contractor issuing the invoice and its approval;
- Obviously only 75% payment instead of 100% payment does not go in the direction of improving cash flow. Also 56 days for paying approved invoices is long and severely impacts the cash flow as can be seen on the charts, where the values of cash out for month M are equivalent to those of cash in of month M+2. Clearly if the 56 days were reduced to 25 days the negative cash position would be reduced by half.

The chart plotting cash in and cash out shows that a credit facility of up to €5 million is required by the contractor. The contractor is put at risk because of the lack of available cash throughout the duration of the contract. If the contract is stopped at any given moment, the contractor finds himself in a position where a payment of up to €5 million is due.

The contractor's financial exposure is even greater than that of the negative cash generated by the payment conditions. In fact, in case of stoppage of the contract, the contractor's total exposure is equal to the negative cash due to payment conditions. To this should be added the value of the amount of work in progress not yet invoiced plus expenses committed yet to be paid. Amounts committed yet to be paid means the amount that the contractor is obliged to pay after the stoppage of the works, for example, rent for project office lease up to the termination of the lease or payment of equipment/materials ordered and not yet delivered.

The €5 million negative cash for a stoppage on month 7 of the contract is only a part of the total exposure which on the 7th month is more than €11 million. Even if it is rare that a contract be stopped by an infrastructure manager, the amount of exposure faced by the contractor is very high and infrastructure managers should bear in mind that the contractors will seek to immediately recover such outstanding amounts.

The contractor's financial exposure could be worse if, in addition to the above, there are untimely settlements of variations for extra work. Typically, variation orders are agreed and signed well after the unforeseen works are completed and often after the end of the contract works. Such practices mean that the contractor finances the extra work for a long period of time without a guarantee of covering the costs.



Another source of concern for the contractors is the lack of visibility on inflation and material prices especially in the case of fixed price contracts with durations longer than one year. The fact that contracts were on a fixed-price basis seems to be a matter of little importance before 2007.

In 2007, the massive jump in material and labour costs made the climate far more difficult on long-duration, fixed-price contracts with huge cost overruns impacting the profitability. Contractors that were exposed to a level of inflationary risk not experienced before are now extremely cautious even if the price of materials tends to come down.

Many clients, aware of the limitations of the traditional fixed-price contracts, have been bringing in different models in response to the unforeseeable market conditions. These models share more equitably the risk of escalating prices between the clients and contractors.



Project Implementation: “From Drawing to Reality”

By **Richard Chamberlain**, Consultant

Eastern Europe and Romania are presently enjoying the refurbishment and expansion of their rail and road infrastructure with the object being to link this infrastructure with that of the surrounding countries.

In order to realise this expansion plan, projects are being implemented without due consideration of the tender documentation. A mistake made in the tender documentation can be fatal and lead to early project enthusiasm being dented by post-contract claims, increased budget and late project completion.

In Romania, I have found that the preparation of the tender documentation for an infrastructure project is usually procured by means of competitive tendering, i.e. the selection of the project designer is determined by lowest price tender. This selection process is not proving to be cost-effective because the designer is more concerned with meeting the tender price rather than with the responsibility to investigate, verify and validate his/her design.

Unfortunately, if inaccurate and imprecise design is included in tender documents and used in competition to select a construction contractor, it is inevitable that claims will arise. The inaccuracy of the documents combined with unrealistic construction periods, expropriation problems and unforeseen artificial and physical conditions force the winning construction contractor to recover his/her construction cost by pursuing claims.

If construction is to be paramount and claims a supplementary matter, then the question to be addressed is how can the parties manage the risks, meet the planned budget and deliver an infrastructure project on time and to the required quality?

For any infrastructure project to be successful, but especially in Romania, I feel it is necessary for the parties to jointly manage risk from project inception to completion. By this statement I mean that they must select appropriate contract conditions and if necessary, modify these conditions to allow them to jointly deal with risk events.

In the narrative to follow I discuss and give an overview on what I consider to be the most suitable standard form of contract conditions to successfully manage the risks and meet the budget for the construction of an infrastructure project in Romania.

As previously stated I feel that the major areas of risk for any infrastructure project in Romania are normally found in the risks associated with design, time to construct, unforeseen artificial and physical conditions and land acquisition.

In dealing with risks of this nature, the international construction market provides prospective employers with two generic forms of contracts to procure and appoint a construction contractor; namely, design and build, and construct only.

In selecting either of these forms, the employer also has available the choice of negotiating and selecting a contractor by means of lowest price tender or most economically advantageous price.

On comparing these forms it can be seen that a design and build form of contract allocates the management of design risk to a construction contractor. This is a useful allocation of risk if a contractor has sufficient finances to meet the contractual obligations and to satisfy the employer's requirements in respect of design quality. Further, if considered and applied fairly by the parties, this allocation then limits the contractor's opportunities to claim additional cost. When this allocation is compared to the construct only form of contract (where extensive claims are made for either late or incorrect employer's design) it can be seen that this is a major advantage and credit in the use of the design and build form.

A further benefit of allocating design risk to a construction contractor is that the investigation at the time of tender is his/her risk and thus there is more interest in seeing the conceptual design investigated, the detail design finalised and the project constructed. These are positive contractual obligations which are more likely to reduce claims for additional cost.

In Romania there is a unique infrastructure construction risk and this is the risk associated with land acquisition. I feel that that this risk must be managed by the employer because it is a consequence of the process of changing from a socialist to democratic society and a legal issue related to Romanian land law.

At this point of my overview, it can be seen that I consider the design and build form of the contract to be a more favourable process for the implementation of an infrastructure project. This is because it allocates construction risk to the party best suited to manage it and is a positive form of contract that stimulates construction progress rather than claims.

Aside from the allocation of risk, the other important factor in respect of the completion of a successful infrastructure project in Romania is meeting the anticipated budget. As previously stated there are two mechanisms available, namely, lowest price in a competitive tender or negotiated and most economically advantageous.

Having confirmed that I consider the design and build contract is the best form for the management of risk because it allocates risk to the best suited party, it must in my opinion follow that in order to manage this risk successfully a contractor must be provided with sufficient funds.

On the basis of sufficiency of price to meet construction risks, it is clear that the selection of a contractor by means of lowest price in a competitive tender is not conducive to financing the risks of a design and build form of contract.

Therefore, it can be seen that it is both sensible and advantageous in respect of the management of risk in a design and build form that the parties negotiate a most economically advantageous price. Initially, this price may appear high to a prospective employer but it needs to be recognised that the lowest price tender is an illusion and usually a catalyst for claims and disputes.

In summary, I feel that to implement and realise a successful infrastructure project in Romania, the most effective form of contract is design and build. Furthermore, the procurement of a construction contractor by mutually advantageous price may initially appear to be more expensive but selection by lowest price tender is a false economy.





Contracting best practices: The advantages of Turnkey Projects

By **Urban Sundberg**, Strategy Manager, Balfour Beatty Rail

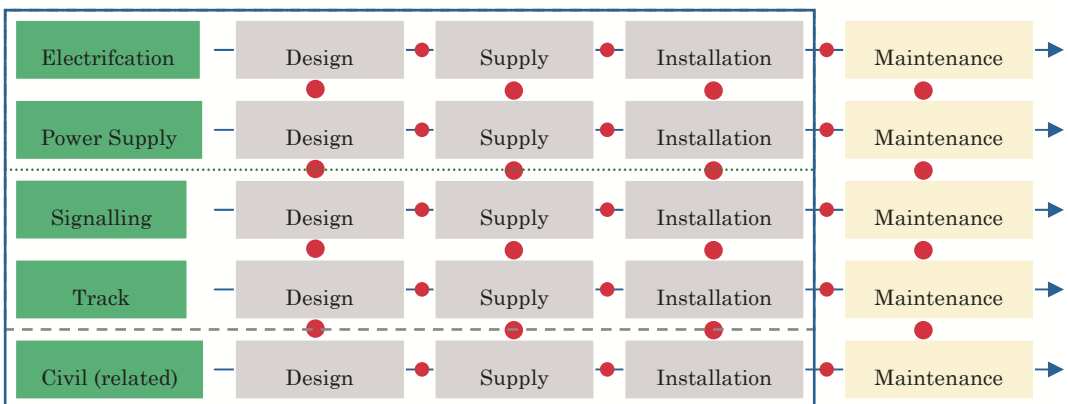
A railway client can tender new construction and renewals projects in different ways. The client can either bundle several rail infrastructure disciplines, like signalling, track, power supply & electrification in the same package or tender each discipline separately. In some cases, an infrastructure manager may choose to include rolling stock in the tender, although this is not common.

There are some distinct advantages with turnkey and multi-discipline tenders compared with single-discipline. This short article gives a few examples of these advantages from rail infrastructure perspective.

Interfaces

Construction of a new railway line or the renewal of an existing line normally involves work on all rail infrastructure disciplines. Regardless of how the client packages a tender – single-discipline or multi-discipline, design & build or installation only – the key factor for successful completion of the line will be related to interfaces. The interfaces between disciplines are more critical for the overall project and demand more management skills than the interfaces between the phases (i.e. design, supply, installation and maintenance) in a discipline [see illustration 1]. Maintenance is often not part of new construction or renewals tender but there are of course exceptions.

Interfaces [red dots] by different scope of works (number of disciplines) [illustrated by coloured and dotted lines]



Clear allocation and understanding of responsibility related to the interfaces is essential in order to take proper management control. This is especially important for a good client-contractor working relationship. A contractor can only take full responsibility for the interfaces within its scope of work, which means the client has to manage the interfaces not allocated to contractor(s). Consequently, if a larger scope of the work is allocated to one contractor this will reduce the client's responsibility for interfaces and simplify the project structure. Turnkey and multi-discipline structures put more responsibility on the contractor but also provide a larger incentive for the contractor to improve processes and methods and seek synergies within project scope.

Integrated approach

The benefit of turnkey and multi-disciplinary projects is the integrated approach – “one project and one project team”. This leads to several advantages for example in:

- Design process, as several disciplines are coordinated and integrated from the beginning, allowing more flexibility and efficient use of time and resources (e.g. parallel work, simplified cross-check between disciplines, quicker adjustment to changes in design requirements etc.);
- Overview, control and management of programme and overall project performance (e.g. client and contractor have same focus and similar priorities);
- Optimisation of logistics and utilisation of synergy effects (e.g. material delivery and storage, office facilities, project team structure – particularly in administrative functions etc.);
- Efficient utilisation of possessions, for example by parallel installation work, decision on sequence and methods of work etc., which potentially reduce traffic interruptions.

Safety aspects

Safety is an extremely important issue for the rail sector and the companies involved in rail infrastructure works.

A multi-discipline approach gives all parties – authorities, client, contractor, subcontractor etc. – clear advantages from a safety perspective, as the same safety policy and procedure can be applied to the whole project team. An integrated project team increases transparency and overview of other activities which, for example, reduces risks during installation works. The overall project perspective will also help client and contractor to identify potential safety hazards and consequently reduce or eliminate these by selecting the appropriate technical solution, method and material.

Maintenance considerations

Multi-discipline and turnkey projects give the client and the contractor a very good opportunity to reflect on maintenance aspects – independent of who undertakes the maintenance.

Maintainability should be considered in the design phase and in the selection of technical solutions and material with a view on life-cycle cost and RAMS (Reliability, Availability, Maintainability and Safety), as well as in the layout and planning of the route and associate facilities. A multi-discipline approach in the construction phase for example will ensure that “maintenance tolerances” (e.g. track and overhead contact line alignment) are intact, because one contractor has the responsibility.

Alternative contracting methods and models

For large and complex projects, where the risks are more difficult to assess, a close interaction between contractor and client is vital. This is better achieved if a collaborative approach is applied in the contractual arrangements between the parties.

Multi-discipline and turnkey projects allow alternative contracting models and structures more easily. There are different models of these, for example partnering and alliance where certain incentives can be incorporated, such as target pricing, the sharing of potential gain and pain etc. The main objective with all models is to facilitate a relationship where the parties work towards a common goal: successful performance of the project through transparency of costs and risks in an attitude of “no blame”.

It is clear that some of the models are more applicable within the existing framework of EU-funded projects than others.

Normal contract models for complex projects often lead to variations and claims, which can cause problems for both the client and the contractor, jeopardising the overall performance of the project.

Increase efficiency and utilisation of EU funding

In addition to the examples already mentioned, there are a number of other factors in favour of multi-discipline/turnkey projects.

Several of the infrastructure managers in Central and Eastern Europe have ambitious plans to upgrade and extend their rail infrastructure network including the introduction of high-speed lines. However, at the same time the clients have a number of constraints to overcome, for example limited internal capacity, time pressure to realise projects (from feasibility to completion) etc. There is also the required demonstration that the EU funding provided for rail investments is used wisely.

Movement towards turnkey and multi-discipline tenders can help the client to meet these requirements and implement ambitious investment plans without overstressing their own organisation whilst ensuring the efficient utilisation of EU funding. Larger turnkey and multi-discipline projects reduce the number of interfaces and number of contracts for the client to supervise, allowing the client to focus own resources on key priorities, while at the same time utilising capabilities of infrastructure companies in an efficient manner.

There is a larger selection of rail infrastructure contractors that are capable of handling multi-discipline/turnkey projects compared to 5-10 years ago, thus ensuring the clients' value for money and strong local competition. Several of these companies are present in a number of European countries, which means that they have the ability to transfer their knowledge and experience throughout Europe to the benefit of the clients.



Best practices for turnkey projects – signalling suppliers view

By **Hannes Boyer**, Head of International Business, Thales Rail Signalling Solutions

This summary analyses the benefits and shortfalls of the turnkey, general contractor approach on large multidisciplinary railway infrastructure investment projects.

In any such major project, there are some key objectives that the Infrastructure Manager aims to achieve:

- Reasonable and transparent tendering process;
- Reliable performance of the contractual works;
- High technical quality;
- Optimisation of the integration of the overall system;
- Optimisation of Life Cycle costs of the investment.

In practice, we see that the approach for such projects varies from one infrastructure manager to another, from one project to another and from year to year, sweeping the full spectrum of options from dividing the project into lots to full turnkey project awarded to a single general contractor (integrated projects).

We can make a strengths/weaknesses analysis from the perspective of 3 major aspects: Operational (how the project is executed and managed), Technical (what is put inside and how it is supported/managed), and Administrative (how the contract administration is impacted).

Integrated projects – Strengths

Operational Aspects:

- Employer retains overall project outcome and strategic goals;
- Single point of contact;
- More simple high-level schedule monitoring for the Employer;
- Less “daily” management and co-ordination effort from the Employer.

Technical aspects:

- Single and clear integration responsibility;
- Single warranty responsibility and aggregated Service Level agreement.

Administrative aspects:

- Single contract, easier to administrate and manage, including changes.

Integrated projects – Weaknesses

Operational Aspects:

- Over-dependency on one single major contractor – lower employer leverage;
- With less real visibility on the Turnkey Process (as opposed to the Lots Progress) a problem can arise during one part of the process leading to sudden surprises and negative outcomes.

Technical aspects:

- Risk of inappropriate solutions for technologies that financially represent a small volume, but have high operational (cost/revenue) impact;
- Larger spectrum of technical solutions from one contract to another;
- Higher risk of incompatibilities between successive contracts;
- Risk of extreme positions in lower value sub-contractor/supplies, thus increasing operating costs;
- Risk of increased global LCC (Training, Operation, Maintenance efforts, etc.).

Administrative aspects:

- Higher stakes for any contractual issues;
- Slower / less flexibility to specialty changes and cascading amendments.

General Recommendations

Thales has a wide experience both in Europe and worldwide in all types of approaches. Drawn from this experience we have compiled a list of best practices and general recommendations:

- Apply International standard contract terms & conditions e.g. FIDIC Yellow Book;
- Define clearly an entity as Integrator;
- Enforce interoperability requirements (National and European);
- Define upfront an objective formula for contractual price adjustment;

- Adopt a fair Limited Liability clauses;
- Allow and encourage consortiums of ‘best-in-class’ horizontal specialists to compete with ‘all-shop-stop’ vertical generalists (best-in-class usually are better value);
- Define and implement a sustainable strategy for cross-project technologies with strong technical interfaces (e.g. safety, operational expenses, life cycle costs, etc.);
- Keep employer authority to verify and validate all critical subcontractors and suppliers (retain influence on specifications), and to control all technical solutions with operational impact;
- Consider separation of purely civil works and railway specific works.

Conclusion

Both by “Lots” and “General Contractor Turnkey” approaches have pros and cons. There is no *silver bullet*!

If the employer chooses Turnkey, then the employer/infrastructure manager should launch an integrated tender, but it should retain the influence within specification of signalling system to optimise according to the needs & specific requirements in view of the overall signalling operation of the whole Railway network.

Under the Turnkey approach, we believe that the best solution is “Specialty Turnkey”. This means to divide the major project into very few but technologically coherent projects, such as Infrastructure Turnkey (civil, tracks, power) and Automation Turnkey (Control, Signalling, Interlocking, Telecom, Security). This reduces the capital / operational complexity and risk for the Employer, as well as for the Contractor, and thus increases the reliability of a project implementation (cost, schedule and performance) and subsequent system exploitation.



Tendering best practice: the case of ADIF

By **Cristobal Perez Monjardin**, Director of Financial Planning and Budget, ADIF

ADIF is what in Spain is called an entity governed by Public Law. It is an entity depending on the Spanish government but halfway between public administration and private company. That's why ADIF is ruled by principles of the public administration (publicity, competition, objectivity and transparency) and pursues the public interest.

ADIF is going to invest approximately €60 billion until 2020 and has invested more than €5 billion in the railway network in 2008. We estimate the same amount for 2009.

Focusing on public procurement procedures in ADIF, first of all, I would like to say that all projects related to High speed with the exception of the management and the supervising is outsourced. That is why our figures of bidding are so important. In 2007, for example, we managed almost 10,000 files with a total amount of close to €6 billion.

Our procurement procedure is basically the procedure that European directives establish. ADIF complies with the directive for public works and the directive on the special sectors:

- The directive for public works in platform works, railway trucks, stations and freight terminals.
- The special sectors in maintenance, signalling, telecommunications and energy.

For both, Spain has developed two laws and for both, ADIF has developed internal procedures

Bidding procedure

First of all, to carry out a contract in ADIF, the project needs to be entrusted by the Government (if the project is for a High Speed Line) or to be officially sanctioned by the Ministry of Public Works for the conventional network.

The next step is to open what we call an Investment Proposal (IP) for the estimated cost of the project. The Investment Proposal identifies the task and estimates all costs of the project attributed to it, for example the external contracts or the internal costs such as the staff, etc.

In all cases, the Investment Proposal or its modifications after its analysis is sent to ADIF Direction Committee (the chairman and the general directors) for approval.

To prepare the procedure it is necessary to have some documentation:

- A **report** describing the goal of the project, with the history of the corridor, the needs to be met and the justification of the elected solution, and the rest of circumstances.
- The **plans** that outline the project, delimit the land to be bought and other legal rights affected by its execution.
- The **technical specifications** with the description of the project, the way they have to be carried out, the technical obligations the contractor must follow...
- A **budget** with a detailed list of unitary prices and the market price analysis of material, labour, etc.
- A **working plan** with the estimated timetable and the cost.
- Other compulsory **documentation** in accordance with different rules: for example, the declaration of environmental impact on our nature reserves.

If it is a work contract, the project is **supervised by** the people in charge of it. Finally the project must be approved according to internal rules by an ADIF manager. The responsible manager is determined by the cost of the project. For example, the chairman is responsible only if it is more than €6 million; if the estimate budget is under €70,000 a workshop manager is designated.

Once the project is approved, the next step is to verify if the project can be carried out, taking into account the shape and size of the land.

- **A Draft of the Authorisation of the counsel of ministers** is necessary when the contract is over €12 million.
- **Statement of urgency** with the justification, if necessary.

Once the file is approved, the next step is to make a **statement about the beginning of the procurement procedure** by the appropriate manager. It contains the contractual needs and the justification of the procedural bidding choice, as well as that there is financial support to carry it out. At this point, it is necessary to incorporate more documentation into the file:

- The Administrative specifications that contain the terms of the deal. ADIF has approved a tender model that is compulsory to use (with some exceptions).
- The official authorisation of the counsel of ministers is enclosed.
- The Overall contract that ADIF has the intention of carrying out during the year a prior contract notice is made.

This phase finishes with the Resolution approving the Procurement Procedure and the expenses made by the appropriate ADIF manager determined by the budget.

The resolution is published. ADIF follows the rules on publication and transparency established in the European directives; according to the thresholds, the contract is published in the official journals.

A pre-requisite to contract according to Spanish law for contracts over €350,000 (VAT not included) is to be classified, that is, authorised to contract with the administration and included in the official register. With this classification, the law tries to check the suitability of contractors on the basis of criteria related to their economic and financial capacity, as well as their technical and professional knowledge. ADIF also has its own register.

The proposals of the interested tenders have to fit into the administrative and technical specifications. The presentation of the proposal supposes the unconditional acceptance of the totality of the terms and conditions, without exceptions. The proposals are secret and are managed in a way that confidentiality is maintained until the moment of the public opening. To maintain objectivity, it is compulsory that the technical proposals be opened prior to the price proposals.

The contractual bidding is usually done using the open procedure or the restricted procedure. As a rule, we normally use the open procedure with various criteria. In 2007, 73% of the total amount was bidding in an open tender procedure.

Only when the internal handbook allows us to use the negotiated procedure that is, in the cases established by law or to use the competitive dialogue, ADIF does the bidding in this way.

Negotiated procedures in 2007 represented 12% of total procedures. To avoid excesses when a negotiated procedure is proposed, it is compulsory to write a report about the reasons of using it.

Conclusion

The success of ADIF as a public investor is based on the following points:

- Political commitment
- The Spanish law establishes the general procurement procedure as a development of European directives. ADIF's internal rules are only an adaptation; therefore without this adequate general legal framework, it would be impossible for ADIF to achieve its objectives.

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