

# **EUROPEAN UNION - TACIS**

Technical Assistance to the Southern Republics of the CIS  
and Georgia - TRACECA

## **TRADE AND TRANSPORT SECTORS**

Terms of Reference

for

**Rolling Stock Maintenance**

-

**Railways**

Final Recipients:  
TRACECA Region Ministries of Transport

**Rolling Stock Maintenance - Railways**  
(TRACECA Project No. 15)

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## 1. Introduction and Background

1.1 During May 1993 a conference was held in Brussels organised by the Commission and attended by authorities of the eight Republics of the south of the former USSR:

- Armenia,
- Azerbaijan,
- Georgia,
- Kazakstan,
- Kyrgyzstan,
- Tadjikistan,
- Turkmenistan,
- Uzbekistan.

They are the Beneficiary States of this programme.

The objectives of the conference were :

- to stimulate cooperation among the participating Republics in all matters pertaining to the development and improvement of trade within the Region
- to promote the Central Asian - Trans Caucasian - Europe Transport Corridor
- to identify problems and deficiencies in the Region's trade and transport systems
- to define, in terms of contents and timing a Technical Assistance Programme to be financed by the European Union (EU).

TRACECA (Transport Corridor Europe Caucasus Asia) was thence created as a component of the TACIS interstate programme.

1.2 The "Brussels Declaration" issued at the conclusion of this conference recommended the European Union to address in the TACIS programme variously expressed needs for feasibility studies and technical assistance projects.

Regional sectoral Working Groups (trade, rail, road, maritime), composed of experts and officials from each TRACECA state and the EU, have been established as part of the TRACECA programme. They meet periodically in the Region. They have inaugurated specific projects including this present one, and will monitor results.

A strategic study for Central Asia has recently been completed by the EBRD under TACIS financing (see 3.10).

1.3 National and Regional Technical Assistance projects carried out, approved or prioritised to date, are mostly aimed at halting a deterioration of the existing transport system due to maintenance difficulties, and obsolescence. Few consider reinforcing capacity. In fact transport demand has declined since the break up of the FSU.

Radical Institutional transformations are taking place in the region. The transport system has been particularly affected by these, especially the rail sector which has been fragmented into national entities.

Tariff structures under the old regime were detached from economic considerations. It is by no means easy for regional authorities to inaugurate a market-based system.

1.4 This project is aimed to provide Technical Assistance to the rail organisations in the region in order to contribute to solving :

- acute rolling stock maintenance and repair problems
- rolling stock replacement and construction problems
- shortage of spare parts problems

1.5 The splitting up of the FSU and the creation of new independent railways profoundly distorted the execution of rolling stock maintenance in the TRACECA states.

The current problem has several aspects, technical, financial and economical :

1.5.1 Technically, TRACECA countries had very few major rolling stock maintenance and overhaul workshop infrastructure established compared e.g. to Russia and Ukraine. In the past, the majority of heavy maintenance work was carried out in huge facilities located outside the region.

Some of the Republics are now left without adequate overhaul and repair centres for their own rolling stock. In other cases, existing facilities are overdimensioned for the current needs; because before, they had many Republics as their clients. Some facilities are used well beneath capacity or currently stand idle.

Meanwhile, relationships with workshops situated in other Republics or in Central and Eastern Europe have profoundly changed, as some of these facilities are also affected by a restructuring process or have been closed.

1.5.2 Regarding the facilities established for production of new rolling stock, the situation is similar to above.

1.5.3 Regarding spare parts, the Republics in this region previously were supplied most of their spare parts from Russia and Eastern European countries.

The present supply of spare parts has become very difficult. Local production of spare parts is non-existent, or, where it exists, is often adversely affected, because basic raw or half-finished materials or components are lacking, or because workshop machinery and tools are no longer adequately serviced or supplied.

1.5.4 Financially, operation of the workshops and carrying out of maintenance and repair work, or procurement of sufficient quantities of spare parts, or purchase of new rolling stock are all compromised by the precarious financial situation of the railways in the TRACECA region in general. This has been caused by traffic downturn, and by the economic and organisational changes in the region. Purchase from abroad is generally difficult because of the lack of foreign currency to pay suppliers in either Russia, Ukraine or in Central and Eastern Europe.

1.5.5 Economically, many of the newly independent states are currently interested in developing national systems. The aim to become self reliant is often a priority of national industrial and economic policy. This carries in itself a very real risk of restrictive national measures to the detriment of overall efficiency, and of economically unjustified developments. Some of the railways do not have sufficient size to justify a development of all required facilities.

1.6 Despite the many problems, restructuring is under way in various states, and the way forward seems to include :

1.6.1 The conversion, restructuring and/or improving the equipment of existing rolling stock maintenance facilities and manufacturing complexes to the new requirements. This process may benefit from technical assistance, technology transfer and investment, possibly under joint-venture agreements.

1.6.2 Coordination and cooperation between the networks on a regional and wider basis.

## **2. Objectives and Main outputs**

The objectives and main outputs of this project are the following :

2.1 Survey the rolling stock maintenance and manufacturing sector of the TRACECA region and provide recommendations to solve existing problems.

2.2 Provide recommendations for local manufacturing and adequate supply of spare parts and components.

2.3 Provide guidance to rail organisations in the region for the establishment of commercially viable rolling stock maintenance and manufacturing, within the framework of a market-oriented railway system.

2.4 Set up a railway rolling stock group, covering all TRACECA countries, and carry out with this group a study visit to EU.

2.5 Select a rolling stock maintenance (or manufacturing) case study project, and make specific recommendations that are judged appropriate to be implemented in the selected area.

2.6 Design a detailed reorganisation plan in the selected area in cooperation with the national authorities, and train the staff involved in appropriate management techniques.

A major result of this project should be to emphasise the need to foster co-operation between the different railways in the region and bring about a greater sharing of facilities between themselves for the maintenance, repair and manufacturing of rolling stock. Duplication of facilities need to be avoided by adopting a regional approach to maintenance of rolling stock and the local manufacture of items regularly used.

### **3. Scope of Work**

To meet the aims stated above, the scope of work will include :

#### **3.1 Gather detailed data regarding the existing fleet**

Provide a detailed rolling stock inventory per state (wagons, coaches, diesel and electric main line and shunting locomotives, diesel and electric multiple units). This will include breakdowns per category, main technical and usage characteristics, age profiles, ownership and maintenance responsibility.

#### **3.2 Estimate the required fleet**

Rolling stock inventory requirements will be derived and re-assessed from traffic volumes and usage. Future rolling stock inventory requirements will be derived from traffic forecast evolution and from commercial requirements. The expected variations in rolling stock maintenance parameters (see 3.3 hereafter) and operational utilisation parameters will have to be assessed.

It is evident that future rolling stock requirements will be impacted by the share of international trade that is expected to be realised, and what type of rolling stock will be needed to meet these requirements. Also new emerging requirements (e.g. multimodal transport and other less standardised traffic types) will have to be included.

A detailed estimate of the future fleet size and composition for the next ten years, broken down in yearly intervals and will be produced by state.

Where appropriate, a range of possible scenarios will be proposed.

Data is to be exchanged with a parallel project, the Regional Traffic Forecast Model study (see 3.10 Other Related Projects), which will carry out a comprehensive review of traffic on all modes throughout the Region and include a synoptic of long term forecasts of traffic

The existing or planned programmes to scrap rolling stock, to convert existing, or purchase new rolling stock will be inventorised or recommended.

The option to chose between continued maintenance of rolling stock, compared to conversion of existing rolling stock or purchase of new rolling stock is an important economic issue, and the consultant shall address this in detail as part of the case study with the local parties involved (see 3.7 Case study).

### 3.3 Maintenance strategy § organisation - Gather data § prepare recommendations

(a) This will require assessment of the existing regulations on inspection and periodic service of rolling stock, maintenance levels, the definition of the maintenance services to be carried out, and the implementation of maintenance strategy.

(b) The scope of work in the technical area will be comprise :

- Providing a description of the existing maintenance strategy § organisation.  
It can be expected that a thorough investigation will only be necessary initially in one state, given the previous homogeneity of the system. The study will then verify the conformity of the other states to initial findings.
- Draw up a concise description of maintenance services
- Highlight specific difficulties that the states currently experience in implementing their maintenance strategy
- Strengths and weaknesses of the currently implemented strategy will be evaluated and compared to Western practise  
This should include gathering data about the key ratios, periodicity's and resources (human and material) that are allocated
- Recommendations for changes, where appropriate, will be drawn up
- An appreciation of the overall organisation of maintenance, research § development, supporting information systems, supply of spare parts, equipment and tools used, staff development, etc. is to be included

There is however little doubt that, technically, the maintenance strategy and organisation, as herited from the FSU, was well developed.

(c) Maintenance management - Economic and commercial aspects

These aspects were not highly developed in the FSU system and constitute a major difference between former and market-based management practises.

A transfer of knowledge of Western practises in economic and commercial aspects of maintenance management is to be carried out, and this aspect will be addressed in detail in the case study to be set up in close cooperation with local staff (see 3.7 Case study)

3.4 Determine the future overall rolling stock maintenance & replacement requirements

The future fleet size to be maintained, as well as requirements for new types of rolling stock that will have to be built, purchased or converted from existing stock will be determined.

In a first stage, forecasts of fleet maintenance & replacement requirements will be calculated per state.

In a second stage, the consultant will take into account the impact of the existing or potential shared use of rolling stock by more than one state (pool) :

- The currently existing pool arrangements between several or all TRACECA states, or with other FSU states, will be documented, including their composition and management structure
- The future planned evolution regarding technical uniformity and pool usage will be investigated or as such recommended.
- The impact and the possible reduction on the total required fleet size of poolage will have to be estimated.

Revised fleet forecasts for the TRACECA region will then be produced.

Two key outputs are expected :

- Future detailed maintenance workload estimates for all rolling stock, based upon the fleet forecasts (3.2 above) and the knowledge of current and future maintenance practises (3.3 above)
- Future requirements for new rolling stock

The forecasts will be detailed in physical (units/year) and in financial terms and the impact, also financially, of cooperation on a regional and wider basis shall be amply documented.

3.5 Spare parts supply and manufacturing requirements

The existing problems and requirements regarding the supply and manufacturing of spare parts and components in the TRACECA region shall be surveyed and analysed.

This analysis shall include technical, economical and financial aspects.

- rolling stock maintenance and overhaul
- rolling stock manufacturing
- spare parts and component manufacturing

(a) The scope of work will include :

- an inventory and detailed survey of the major facilities existing in the region, including localisation, technical equipment, organisational status, actual tasks, capacity, actual output and utilisation, workforce, main customers and suppliers
- an assessment of the state of the existing facilities, covering analysis of management, technological, financial and operations topics
- strengths and weaknesses of the existing situation
- a summary of the current problems, present experience in the new economic environment, modernisation planned or under way

(b) The current infrastructure, technology and facilities will be assessed mainly through discussions with the staff of the regions' organisations and through field visits.

(c) The strengths and weaknesses of the existing situation will be highlighted in perspective of the local environment and aspirations.

### 3.7 Prepare recommendations regarding the future structure and size of the sector

(a) In order to meet the short- and medium-term requirements of the individual railways, and of the region as a whole, three plans will be prepared :

- a plan comprising the most justifiable distribution of number, site, tasks and capacity of the major workshops.  
This plan will indicate the major shifts from the existing situation that are proposed. A work allocation plan for the existing facilities will be prepared. Modernisation of equipment that is deemed necessary will be indicated.
- a plan covering the enterprises for the construction of new rolling stock
- a plan covering the spare parts supply and manufacturing

The restructuring and rationalisation plans will include organisational, financial and economical evaluations of the proposed options, including restructuring, capacity balancing and task distribution at national and regional level.

The future outputs for the different facilities and enterprises will be estimated. The necessary technical and financial measures to be taken will be detailed.

(b) The specifications for improvement should emphasise, among others, promoting the use of a single technology in an international perspective.

(c) Organisation proposals may differ from state to state, and should be tested against local feasibility.

Organisational scenarios that can be envisaged will include, where appropriate :

- Changes that can be introduced without major alterations to the existing management system
- Reform of the present departmental structure, including the introduction of production incentives
- Creation of “autonomous” facilities, with or without private equity
- Leasing or Joint-Venture agreements

The study will inventorise current or planned reconversion and privatisation projects.

### 3.8 Case study

(a) One of the major objectives of the TRACECA programme is to foster cooperation in the region. To this end, a maximum of local participation in the consultant's work is to be foreseen, to achieve effective technical cooperation and lasting results. A case study, involving more than one state railway, will be an integral part of the work.

(b) The aims of the case study are :

- to work closely together with the local organisations to carry out the review and prepare recommendations
- to provide short-term solutions to the stated problems in the area selected
- to gather information regarding medium term solutions to the stated problems
- to identify a number of specific recommendations that are judged appropriate to be stimulated in the selected area.
- to design a detailed reorganisation plan in the selected area in cooperation with the national authorities
- to train the staff involved in appropriate management techniques

The case study shall provide assistance to rail organisations in the region to execute rolling stock maintenance and manufacturing services on a commercial and market-oriented basis.

(c) The case study will parallel the consultants' main activities (item 3.1 to 3.7 above), but need be carried out in only two states (or more, if considered appropriate by the consultant). It will also be restricted to a limited technical area, e.g. workshops for locomotive maintenance, to be chosen by the consultant.

(d) Execution of case study :

During its implementation, the case study will concentrate on :

- solving, at least partially, specific problems
- training
- proposing recommendations for future development

The case study execution will include a “work” part, carried out by the consultants in close cooperation with the selected counterparts, and a “training” part that will include training on one or several sites in the region. These two parts may be run in parallel.

(e) The consultant will include in his proposal the technical and geographical area of the case study. He will establish a detailed proposal for the topics he intends to address and for the work he intends to carry out.

(f) The consultant will clearly specify in his proposal the training aids and equipment, hardware and software, he deems necessary to implement the case study.

### 3.9 Study visit in EU countries

(a) A rolling stock transport group will be set up. The study visit participants will be drawn from all TRACECA countries and will be selected by the Consultant in consultation with the TRACECA and National authorities.

The study tour will cover several railroads and rolling stock manufacturers in EU-countries.

The proposal will indicate the proposed study visit programme, which should cover at least two countries and last about 2 weeks for 16 participants maximum.

(b) The purpose of the study visit is:

- to examine the organisation and execution of rolling stock maintenance and manufacturing in Western countries
- to familiarise the participants with technologies currently used and under development in the West

(c) The timing of the study visit is left at the discretion of the consultant.

### 3.10 Other Related Projects

3.10.1 Several related reports prepared by Western consultants precede this project.

They include:

Rail Management Restructuring Studies	Armenia, Turkmenistan, Azerbaijan	TACIS
Rail Sector Survey	Russia, Ukraine, Kazakstan & Bielorussia	EBRD
Roads & Road Transport Study	Russia, Ukraine, Kazakstan & Bielorussia	EBRD
Central Asia Outline Transport Strategy	Kazakstan, Kyrgyzstan, Turkmenistan, Uzbekistan	EBRD/TACIS
Caspian and Black sea Port Studies	Georgia, Azerbaijan, Turkmenistan, Kazakstan	EBRD/TACIS/OTHERS
ESCAP studies	Asia	UN

3.10.2 At the time of writing, the following projects, sharing certain domains of interest with this one, are expected to commence shortly:

Regional Traffic Forecasting Model, Review of Int'l Route Capacity, and a TRACECA Corridor Feasibility Study Europe - Asia	TRACECA
Forwarding - Multi-modal Transport Systems	TRACECA
Infrastructure Maintenance - Railways	TRACECA
Inland Terminals - Railways	TRACECA
Trade Facilitation, Customs Procedures, Freight Forwarding	TRACECA
Transport Legal Reform	TRACECA

Other related projects are or may be expected to commence within the timeframe of this present one.

3.10.3 The Consultants appointed to carry out this project are to coordinate their work closely with all other related activities within the TRACECA region. A full collaboration with such projects will be required.

The preceding listing of related projects must not be considered limitative.

### 3.11 Local Participation

3.11.1 National consultants should be deeply involved in all aspects of the project. All TRACECA countries have Institutions specialising in various aspects of transport planning and engineering.

It is a firm requirement that Organisation and Methodologies include local experts and Institutions to:

- make full use of local experience, antecedent projects and data bases
- promote the emergence of a financially viable local consulting sector
- ensure the effective transfer of know-how to the Beneficiary states
- ensure the enduring effect of project output

3.11.2 Consultants should base their activities largely in the TRACECA region, carrying out the project in collaboration with a local technical organisation(s), and employing both senior and junior professional staff, from several TRACECA states.

The Consultants Methodology should fully explain his training and transfer of know-how programme within the project.

Consultants must make amply clear in their proposal the arrangements they have made to work with local entities.

### **3.12 Foreign Expertise**

The Consultant is free to compose his expatriate team for this project as he sees fit, but the following domains of expertise should be clearly visible in his proposed staff list:

- rolling stock management
- rail operations
- rolling stock engineering
- workshop management
- workshop engineering and equipment
- rolling stock and spare part manufacturing
- rail transport planning
- rail transport economics

### **3.13 Logistics**

The Consultant shall be responsible for arranging necessary living accommodation, transportation, telecommunications, equipment, surveys, investigations, document reproduction, printing, secretarial services, office space and all other input required for the purposes of the work.

## **4. Time Table and Reporting**

4.1 The project is to be completed within a period of twelve months.

4.2 All reports are to be delivered in the numbers, languages and locations as follows:

	Bound		Loose-leaf		Diskette (Eng.+Rus)
	English	Russian	English	Russian	
TACIS Brussels	5	1	1	1	1
TRACECA CU (per state)	1	5	1	1	0

The word processing programme to be used will be agreed with TACIS.

4.3 Reporting is to be in accordance with standard TACIS Guidelines. These foresee:

*Project inception report*

An Inception Report shall be issued within 2 months of the start of the project. It shall summarise initial findings and propose any modifications to the methodology and work plan. In particular it will adapt the work plan to the needs of each individual TRACECA state taking into account the parallel activities of other Technical Assistance programmes, avoiding duplication of effort, and addressing unfilled needs.

It will also confirm or modify institutes/organisations/consulting bodies to be directly involved in the implementation.

It will firm up or alter, if required, the arrangements planned for the case study part of the work (see 3.8 above)

*Project progress report*

This report will be submitted at the end of month 6. It will cover technical progress to date, and will include, in particular, the results of parts 3.1 to 3.5

One month will be allowed for TACIS to consider the contents and to orient the further phase of this project.

*Final Report*

The Draft Final Report will be submitted at the end of month 12. It will, in particular, include the results of the case study and of parts 3.6 and 3.7 of the scope of work

Any comments on the Draft Final Report will be issued by TACIS Brussels within six weeks of its receipt. The Final Report incorporating any modifications will be issued one month thereafter (2,5 months after issue of the Draft Final)

All Reports must include an Executive Summary.