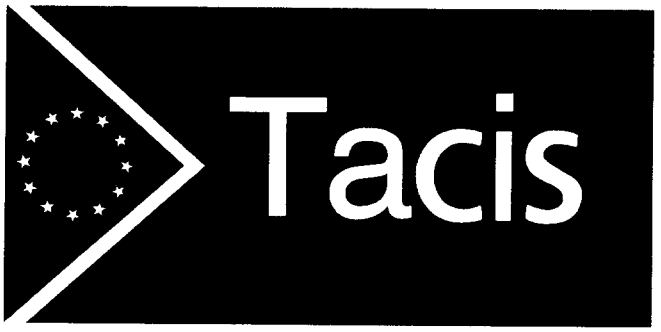

Traceca: Central Asian Railways Restructuring
Module D Tadjikistan
Final Report
December 1998.

TRACECA
Central Asian Railways Restructuring – Kyrgyzstan and Tadjikistan

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	Local operator	EU Consultant
Name :	C I E CONSULT/SYSTRA	C I E CONSULT/SYSTRA
Address :	Signal & Communications Centre, Railway Headquarters, Bishkek.	Grattan Bridge House, 3 Upper Ormond Quay Dublin 7, Ireland.
Tel. number :		+ 353- 1 703 4701
Fax number :		+ 353-1-703 4725
Telex number :		
Contact person :	David Waters	Michael Barry
Signatures :		

Date of report : December 1998.

Reporting period : April/May 1998

Author of report : David Waters

EU M & E team	_____	_____	_____
	(name)	(signature)	(date)
EU Delegation	_____	_____	_____
	(name)	(signature)	(date)
TACIS Bureau	_____	_____	_____
(task manager)	(name)	(signature)	(date)

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1. Executive Summary

1.1 Introduction

This report is the Final Report of Module D (Kyrgyhstan and Tadjikistan Railways) of the Central Asian Railways Restructuring Study which is funded by the TRACECA programme of EU TACIS. Modules A, B and C covered Kazakhstan, Uzbekistan and Turkmenistan Railways, respectively. This study was carried out by CIE Consult of Ireland in association with SYSTRA of France. Module E is a study of telecommunications in the TRACECA railways which is being carried out by the UIC.

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1.1.1 Objectives

The objectives of this study are as follows:

- Review the developments proposed for the railway restructuring.
- Encourage both government and railway to develop plans for comprehensive restructuring in the light of current and expected market opportunities
- Advise on the future relationship between government and the railway.
- Support the restructuring process by encouraging and assisting the railway to develop restructuring implementation plans.
- To describe the organisation of a project implementation unit and the legislative, regulatory and planning instruments required, such as a new railway law, contract plan between government and railways agreed restructuring targets, action plan
- Assist the railway in getting loans for investment from the EBRD and other international finance institutions.

1.2 Legal

1.2.1 USSR railway system

In the former USSR, railways were divided into 27 separate administrations, which reported to Moscow. One of these administrations covering the region of Uzbekistan, called the Central Asian Railway, included the railway in Tadjikistan. These railways reported to the USSR Ministry of Railways and were, in effect, subdivisions of that Ministry. Thus the present railway administration in Tadjikistan is a recent creation.

1.2.2 Tadjikistan railways

After Tadjikistan became an independent republic, the State enterprise known as "Tadjikistan Railways" was established by the "Decree on the establishment of Tadjik Railway" in 1994, and is a legal person. It is not a Joint Stock Company.

1.2.3 Railway law

Tadjikistan Railways operated using the procedures which were in place during the USSR period (the railway charter of the Soviet Union of 06.04.1964, No. 270, updated 01.01.1983 and the rules of transportation of the Soviet Union, authorised 01.01.1983) until the present Law on Transport was adopted.
The railway infrastructure is owned by the state in the person of the State Property Committee.
Agreements have been entered into with the administrations of neighbouring railways. A Council of Railways in C.I.S. countries meets and regulates these arrangements.
The existence of a Draft Decree "On State Support and Development of the Railway" is a positive indication of recognition by the Government of the need to provide an effective legal environment for railway transportation in Tadjikistan.

The pending enactment of a Decree "On State Support and Development of the Railway" offers a unique opportunity to establish a legal environment within which railway transport will prosper and better serve the interests of the state and the interests of its customers.

1.3 Institutional and management re-organisation

1.3.1 State/Railway Relationship

Tadjikistan Railways need entrepreneurial autonomy in order to survive and perform well in the arising national and international transport market. This can only be achieved if the relationship between the state and TZD is completely reshaped.

It would be premature to push TZD into a too rapid privatisation process without having similar development in most of the other branches of the economy. Although much has been done in this respect in Tadjikistan as compared to other countries in Central Asia, Tadjikistan seems far from having a large scale market economy, particularly as far as production of bulk commodities is concerned. Large parts of the economy are still government driven and controlled. This is the reason why out of the two options:

- privatise the railway and then make it efficient, or
- make the railway efficient and privatise it perhaps at a far later stage,

the Consultants recommend the second solution and propose the corporatisation of TZD within the framework described in this report.

The policy issues are identified, the problems of a state managed enterprise, and the incompatibility of the state's and the railway's interests are discussed. The principles for a new framework in the relationship between the state and the railway are established and the role of the state in relation to infrastructure, and the problems of overstaffing are defined. A Performance Agreement between the government and TZD will be proposed in which the rights and obligations of both partners will be laid down and which will contribute to a constructive partnership between the two parties.

1.3.2 Management Reorganisation

The present organisational structure is based on separate functions. A functional-type organisation structure has certain disadvantages. Many businesses overcome the disadvantages of the functional approach by re-organising on the basis of product or service. This involves the setting up of **Separate Business Units (SBUs)** within the organisation.

Our proposed structure is based on the principle of separate businesses for passenger and freight services, which are the main commercial activities of Tadjikistan Railways. It also provides for separate accounting of the infrastructure which seems desirable at present and which will facilitate third party operator access in the future.

Thus we propose three main Strategic Business Units, one for Passenger Services, one for Freight Services and the third one for Infrastructure. Each will have its own marketing and sales, the operation of its services, management of its own staff and its own management accounting.

The Director General will be responsible for overall direction of Tadjikistan Railways. He will act in accordance with the corporate mission, strategy, policy and budget as agreed with the Transport Minister. He will coordinate the activities of the Business Units, monitor their performance and take corrective action where necessary.

The Director General and the Executive Board will be assisted by a Corporate Services Unit. There are still a number of key services that should be retained at headquarters because the services can be provided most economically and effectively centrally, or because they are essential to enable TZD to operate as a single corporation.

The proposed services to be grouped in the Corporate Services Unit are mainly Corporate Planning, Finance & Accounting, Information Technology, Economics, Central Purchasing and Property Development, Legal Services, Human Resources, International Relations, and Internal Audit.
A Secretariat and a small Safety and Arbitration Unit dealing with disputes as to the use of infrastructure will assist the Director General.

We propose that each of the Business Units and the Corporate Services Unit be led by a Director. These four Directors, under the chairmanship of the Director General, will constitute the Executive Board. The Executive Board should meet regularly in order to co-ordinate the activities of TZD.

1.4 Financial situation

1.4.1 Adequate financial data

Tadjikistan Railways is in the process of reviewing and reorganising its operations and management to recognise its changed status as an autonomous enterprise in a free market system. To enable TZD operate in this changing environment it must have available adequate financial data and management information to make strategic decisions and to inform management and providers of capital and credit of the financial consequences of the decisions taken and of performance.

1.4.2 Generally accepted accounting principles

Ultimately, TZD should produce annual accounts for its shareholders and stakeholders, such as its employees and providers of capital and credit, in accordance with Generally Accepted Accounting Principals (GAAP), and in accordance with International Accounting Standards.

The present reporting system concentrates on gross revenues and detailed cost analysis on an accruals accounting basis. This system is that used under the Soviet regime.

1.4.3 TZD financial performance

The Railway Company reports a profit annually, which in 1997 was 510 million Tajikistan Roubles, roughly equivalent to US$500,000. However a review of the balance sheets shows a sharp deterioration in the cash and current asset position of the enterprise. There is a major build up of accounts payable. This suggests that the result for the year is more likely break-even or even a loss, rather than a profit.
The Company does not provide for bad debts and there are a number of debts outstanding, which under GAAP, would be provided for. Depreciation is provided for at between 10% and 15% of cost, and is insufficient to provide for replacement. This is especially so as routine maintenance is being postponed due to lack of funds and available specialist equipment.
It must be concluded therefore that the real situation is a loss for the year, with little prospect for any real improvement in results in the near future.

1.5 Costing and financial analysis

There is an urgent need to introduce a cost anaysis system which would allow the railway authority to identify profitable and unprofitable traffics. This is achieved by the setting up of profit centres thus allowing staff to take responsibility for the profitable operation of the railways in certain areas.

1.6 Management information system

1.6.1 General

Tadjikstan is an independent state which was formerly part of the Soviet Union. The Tadjikstan Railway (TZD) with its 423 km of lines is a relatively small railway, which employs 7,333 staff, carries 0.9 million passengers and 0.6 million tonnes of freight each year.
The railways in the independent states which were formerly part of the Soviet Union continue to use Russian as the "railway" language with a standard set of operating rules and regulations throughout the C.I.S. and Baltic States.
The Management of TZD is being restructured in line with Government policies and trends in other Central Asian Railways.

The continuing central role of the Ministry of Railways (MPS) in Moscow is demonstrated by the fact that the MPS continues to oversee the inter-railway settlement of payments for freight traffic on railways in the C.I.S. and the Baltic States.

The railway management information systems in the Soviet Union were highly integrated and controlled by the MPS. Included in these arrangements was a Soviet Union wide computer network based on a central computer centre (MCC) in the MPS in Moscow and a large number of regional computer centres (RCC's) strategically located throughout the Soviet Union.

1.6.2 Freight and passenger systems

Two major computer applications systems, ASOUP (a wagon information system) and EXPRESS (a passenger ticketing and revenue accounting system) were the primary users of this Soviet-wide network.
TZD freight traffic data is processed by the ASOUP system at the Uzbek RCC under a two year agreement.

1.6.3 TZD developments

Data supplied indicates that TZD commenced the development of PC based systems during 1997 with systems being developed for wagon fleet management (ASU), dispatcher information and information inquiry at the TZD central administration.
This policy has been continued during 1998 with additional work on ASU, the development of a TZD container control system and the development of a local alternative to ASOUP which it is stated will not have the full functionality of ASOUP.
While no information has been supplied regarding the disposition of computers or communications links, it has been stated that the ability of TDZ to implement these systems is inhibited by a lack of communications links.
No information has been provided regarding how passenger tickets are issued or processed. Neither has any information been supplied regarding how basic tasks such as wages calculation, inventory control, revenue accounting, financial accounting, management accounting, asset records etc., are undertaken. The absence of information would appear to indicate that these functions are manual and labour intensive.

It is recommended that TZD should:

- in parallel with its management restructuring, establish an MIS Steering Committee / Business Unit Working Party structure to approve and monitor MIS projects with the objective of ensuring that investment in MIS is business focused;
- work towards a situation in which data is entered once and held on a database which is accessible to all users;
- give priority to a review of the methods employed when analysing income and expenditure with a particular emphasis on the coding systems which are in use and develop proposals for coding structures appropriate to the needs of the new management organisation;

- seek to meet its software needs through software package acquisition before embarking on a programme of in-house development;
- take steps to ensure that any substitute local freight computer system has compatibility with ASOUP and total acceptance from the ASOUP community of railways;
- adopt a policy of progressively extending the computer networking to all PC's within as short a timeframe as funding availability permits;
- ensure that payroll and human resources functions are supported by closely coupled computer systems which meet the information needs of a restructured commercially focussed TZD.

Subject to verification that accounting procedures are not already supported by a modern computer based accounting system, it is proposed that a provision in the region of US$140,000 should be made for the acquisition and customisation of an accounting software package and associated personnel training.

Communications and Information Technologies are becoming increasingly integrated. The quality of available communications links can be the determining factor as to whether, or not, a MIS project is viable. Accordingly, the recommendations of the Module E study of communications will be central to the successful extension of information and communications technology in TZD.

These observations were based on the limited data provided by TZD and are accordingly open to modification should additional data on the status of MIS in TZD come to hand.

1.7 Railway Operations

The railway operation has been reviewed and proposals for cost reductions in railway operations have been made.

Once a part of the former Soviet Union railway, the present TZD railway infrastructure was designed to handle large quantities of goods and large numbers of passengers.

1.7.1 The Railway Network

TDZ operates a small railway of 423 km.

The gauge on all lines is 1,520 millimetre. All lines are single track lines and they are not electrified.

1.7.2 Mode of Operation

All standards and rules for railway operations, for train configuration, marshalling, operation control and timetable planning methods etc. are based on the rules and procedures valid prior to independence.

1.7.3 Operation Key Parameters

- **Maximum Speed**

- 90 kph for passenger trains
- 80 kph for goods trains

There are many speed restrictions

- **Axle Load, Train Lengths and Train Loads**

The maximum train load is 3600 tons. The maximum number of wagons is 60 wagons for goods trains and 23 coaches for passenger trains. Maximum train length is 850 metres.

1.7.4 Telecommunication Equipment

- Station operators along the line with each other (dispatching)
- Central dispatcher to locomotive drivers (radio communication with trains)
- Station inspectors to locomotive drivers (radio communication with trains)

- Locomotive drivers to each other (radio communication with trains)
- Shunting personnel to locomotive drivers and station operator (station radio)
- Party lines for permanent way maintenance staff
- Party lines for telecommunication and signalling maintenance staff
- Data transmission links with the main railway stations and other railway networks
- Public address systems at larger stations

1.8 Infrastructure

1.8.1 Characteristics of tracks

As in the former Soviet Union width of railway track in Tadjikistan is 1.520m.
The main features of the Tadjikistan railway network are given below:
All lines are single track.

The structure of the standard track:
- rails 50 kg/m
- rail lengths normally 12,5 or 25 m
- timber sleepers (most often pine) laid at distance 54 cm (1840 sleepers/km)
- ballast 30 cm

- **General state of tracks**

The main disadvantage is poor quality of sleepers. Geometry of the visited tracks is rather good.
Rails pads are not lasting, and rails joints are showing traces of damage.
Quality and volume of ballast is mainly within the norm and at many sections ballast has been recently replaced.

- **Analysis of speed limitation**

There are three main reasons for speed limitation:
- poor quality of sleepers
- risk of rockfalls
- problems of bridges

Poor quality of sleepers is the most important problem.

This problem requires urgent investment.

1.9 Rolling stock

A five year investment plan relating to potential investments in improving workshop facilities is required. No recommendations are made for investments in new rolling stock, except for the potential investment in re-conditioned engines for locomotives.

1.9.1 Locomotives

A programme of investment in factory exchange of the existing main line locomotive engines should be started now to help increase reliability and prevent a future shortage of locomotives.
Costs are US$ 0.2m per locomotive
No investment in new main line or shunting locomotives is required within the next five years.

1.9.2 Passenger coaches

There is a need to upgrade the passenger coaches

1.9.3 Freight wagons

There are sufficient wagons to meet the current needs of TZD.

1.9.4 Locomotive depots and workshops

Major repairs to locomotives should continue to be undertaken abroad.
An investment in upgrading facilities and new equipment of $ 0.5m will be required to maximise the amount of depot repair work which can be carried out in Tadjikistan on main line and shunting locomotives.
An adequate stock of spare parts is essential. US$ 0.5 m is recommended for this purpose.

1.9.5 Passenger coach depots

Major repairs to carriages, which were undertaken abroad, can in future be carried out in Tadjikistan.
An adequate spare parts stock of around US$ 0.5 m should be held.

1.9.6 Freight wagon depots

Consideration should be given to concentrating all depot repairs, as well as major overhauls, at the new depot at Makhram
Separate specialised units should be set up as part of the above depot for component repairs for the whole of Tadjikistan.
An adequate spare parts stock of around US$ 0.5 m should be held.

1.10 Human resources

The number of employees on the railway is far in excess of what is required for a railway of its size and the railway authorities should take decisive action in downsizing. It is nesessary to introduce training schemes in order that the railway will be competitive in the future.This is particularly important in the areas of accounting,MIS and modern management techniques.

1.11 Investment proposals

The three major areas of investment are

- Infrastructure new sleepers,mechanised maintenance equipment, and small tools.
- Rolling stock maintenance facilities, and spare parts.
- MIS where new hardware and software is required

1.12 Regional co-operation

There is good co-operation between the Railways of the Central Asian Republics and there is no reason to believe that this will change. The railways all use the same rolling stock, the same track standards, and rule books. There is even a common operating language, i.e. Russian.

1.12.1 Possible areas for development of co-operation

- **Intermodal traffic**

The TRACECA Study on Tariffs and Timetabling, carried out by SISIE-Calberson, identified a number of problems in the intermodal area. Rail costs are good generally by comparison with road. There are however bottlenecks on the TRACECA route, notably at Poti where the intermodal facilities are overloaded and the rates are high.

- **Rolling stock purchasing, leasing and maintenance**

The consultants are of the view that there is a limited potential for increasing co-operation in the maintenance area between the different railways. Generally the distances involved are very long so that moving rolling stock around to other systems workshops would give rise to decreased availability and would reduce the potential for dealing with breakdowns and emergencies. There are, however, some areas in which maintenance is shared on an advantageous basis, notably, Tadjikistan and Uzbekistan.

- **Development of regional track access**

The principle of access to the infrastructure of the railway companies should be expanded and encouraged. It should be possible for trains, including locomotives, to be operated outside their own particular system on an agreed basis. This will reduce time lost at border crossings and make for more efficient use of staff and equipment. It will also encourage competition, which should lead to better fares and quality of service in the passenger area.
Open access to freight operators, both private and public, would also result in improvements in efficiency, service and rates for customers. There are particular opportunities for block train operation here, whether within a national system or operated cross-border.

- **Infrastructure charging**

Implementation of the recommendations for the establishment of infrastructure departments and the introduction of a track charging system will provide a more realistic basis for traffic costing. Opportunity should be taken to review the charges for track usage between the different countries. Efforts will have to be made to arrive at a more flexible approach in this area so that new lines will not be proposed to obviate using the track in an adjacent system.

- **Interoperability**

While all the countries at the moment are using rolling stock and equipment in accordance with former Soviet standards, this position may change in the future. Some of the railways may purchase equipment from outside the CIS. It is essential that specifications for these procurements, while meeting international standards, should also be compliant with the present Central Asian (CIS) railway standards. Otherwise the danger is that new equipment and standards may hinder the present smooth interoperability.

- **Information Technology**

The installation of a modern IT system, supported by a new communications system is proposed for the Central Asian railways. Experts from the UIC are preparing proposals for the telecommunications system under Module E of this project. New hardware and software is envisaged to provide a platform for the necessary MIS systems.

- **Marketing**

The railway product must be presented and marketed as a single unit, both internally and internationally. The railways cannot be competitive without having a joint approach. An image must be created which will become recognisable to the public at large. A common approach to this must be established.

- **Training Programmes**

The railway sector in each of the Central Asian countries is generally well served with technical training institutes. However, in the move to the commercial restructured railway there is a need for training in disciplines new to the traditional railway, such as marketing, information technology, business management and organisation principles. It is suggested that this training should be organised on a regional basis to minimise costs and improve regional interaction.

1.12.2 Technical assistance for support of regional co-operation

Implementation of the proposals outlined above to further collaboration between the railways requires high level commitment and the dedication of the relevant Ministries and higher railway managements. Appropriate railway experts will have to be assigned to various tasks. They will have to adapt to new technology and ideas. This process should be assisted by technical co-operation using external experts.

1.13 Main recommendations

It is recommended that the Charter of Tadjikistan Railways should accommodate the organisational structure, accounting and reporting procedures contained in the management re-organisation proposals listed in the re-structuring study. It should be amended to transform Tadjikistan Railways into a state owned joint stock company (or a corporation which resembles a

joint stock company) with the Chairman and Board appointed by the appropriate state authority; the Board should in turn appoint the Chief Executive and the senior management who should report directly to the Chief Executive. The Chief Executive and the senior management, as appropriate to meet each particular situation, should appoint other Tadjikistan Railways staff. The focus of Tadjikistan Railways should be that of a commercial enterprise, consistent with the strategy, policy and objectives of the state relating to railway transport.

The present accounting system needs to be changed to bring it into line with modern reporting systems. The management information system needs to reflect the proposed changes in the management structure.

TZD should review its depreciation policy in order to reflect more accurately the financial situation.

Company wide involvement will be necessary to ensure the changes proposed meet the needs of management.

Training will be necessary to ensure a speedy and accurate transfer to the new systems.

Investment is required in the infrastructure, rolling stock maintenance facilities and MIS .

2 Introduction

2.1 The project

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This report contains the following sections:

- Executive Summary
- Introduction
- Legal Situation
- Institutional and Organisational Matters
- Financial Situation including Costing
- Management Information Systems
- Operations
- Rolling Stock
- Infrastructure
- Human Resources
- The Future
- Regional Collaboration

The project started in October 1997. Experts visited the Kyrgyz Republic and Tadjikistan in the inception phase. Unfortunately, due to subsequent events in Tadjikistan, members of TACIS projects were prohibited from further visiting the country. This caused a delay on the project. The project restarted in April 1998 with the Expert Team travelling to and working in the Kyrgyz Republic
The railways of Tadjikistan provided one member of staff to assist the experts for a period of approx two weeks.

The team liaised with Tadjikistan Railways from Bishkek. The team prepared questionnaires, which were completed by counterparts in Tadjikistan Railways. Local experts were engaged who, in view of the constraints in carrying out this part of the project, were invaluable in information gathering, liaison and local knowledge. Close contact was maintained with the Tadjikistan railways senior management during the exercise.

All this input, coupled with the early visits by some members of the consultant team,and the experience gained by the members of the team in other Central Asian countries has resulted in the execution of a good project, despite the difficult circumstances relating to access to Tadjikistan.

2.2 Tadjikistan

Tadjikistan is an independent nation in Central Asia, bordered on the north by Uzbekistan and Kyrgyzstan, on the east by China, on the south by Afghanistan, and on the west by Uzbekistan. Tadjikistan is extremely mountainous and settlement is concentrated in the lowlands. It has an area of 143,100 sq. km.

Mountains occupy 93% of Tadjikistan's territory and almost half of the country lies at an elevation of 3000 m or greater. The Pamirs lie in eastern Tadjikistan and contain the highest mountain of the CIS, Communism Peak. About 7% of the land is arable due to the mountainous terrain. Large glaciers feed numerous rivers, giving the country substantial hydroelectric potential. Lowland areas are confined to the Fergana valley in the extreme north, and to the lower reaches of tributaries of the Amu Darya in the southeast. The major rivers are the Syrdariya, which flows through the Fergana Valley; the Zeravshan, located in the northeast; and Kofarnihon, Vakash, and Panj, tributaries of the Amu Darya that together drain more than three-fourths of the republic's territory.

The population of Tadjikistan is around 5.3 m. Tadjikistan is the least urbanised country of the CIS, with more than two-thirds of its population living in rural areas. Dushanbe, the capital has a population of around 600,000. It is located in the Gissar Valley. Its manufactures include textiles, electrical equipment, machinery and processed food. It is a principal transportation centre. Khujand (formerly Leninabad) is the country's second largest city with around 160,000 people.

2.3 Economy

The civil war that started in 1992 disrupted the economy considerably, causing production to drop, unemployment to rise and the budget deficit to grow. In 1994 Tadjikistan's GDP was estimated at US $ 2 billion. Disruption of railway connections caused the closure of the country's largest aluminium plant at Tursunzade, west of Dushanbe. In autumn 1995 the Government turned to rapid privatisation in an effort to repair the economy.

In May 1995, Tadjikistan introduced its own currency, the Tajik rouble (754 Tajik roubles equal US $ 1, April 1998). In 1994 Tadjikistan's chief trading partners were the Netherlands, Switzerland, Belgium, United Kingdom and the United States.

Agriculture is the largest economic sector in the country, amounting to 45% of employment in 1991. The principal crop is cotton, which is grown on irrigated lands in the far north and southeast. Grain, primarily wheat, is grown extensively on non-irrigated lands. Other major crops include vegetables, potatoes and fruit. Cattle and sheep are also raised.

Mineral resources in the republic are also extensive and include coal, lead, zinc, iron ore, petroleum, natural gas and antimony. Considerable industrialisation has taken place since the 1930's. The chief manufactures include cotton and silk textiles, fertilizers, footwear, wine and carpets. Tadjikistan is a large producer of hydroelectric energy, some of which supports a domestic aluminium industry. Expansion of hydroelectric capacity is planned.

2.3.1 Railways

Although small in size the railway plays an important role in the development of the country connecting into Uzbekistan for international traffics.
Like the other railways in Central Asia there has been a lack of investment in the railways particularly in the infrastructure and rolling stock maintenance areas.

3 Legal situation

The main task of the legal expert is stated to be:

Examination of the legal framework and status of the Railway, its respective powers, obligations and responsibilities and its relationships to the Ministry of Transport and Communications and other Government agencies including price control and anti-monopoly authorities.

The task was handicapped by an inability to travel to the country, due to the hazardous security situation. This report is based upon general knowledge of the structures of the former Soviet Union, and information supplied from the Tadjik railway administration.

3.1 Legal Framework-Summary.

Railways in Tadjikistan are part of the network developed by the former Soviet Union and were regulated accordingly. With independence an entirely new situation arises; the developments since independence are described in outline in this report.

In the former USSR railways were divided into 27 separate administrations, which reported to Moscow. One of these administrations covering the region of Uzbekistan, called the Central Asian Railway, included the railway in Tadjikistan. These railways reported to the USSR Ministry of Railways and were, in effect, subdivisions of that Ministry. Thus the present railway administration in Tadjikistan is a recent creation.

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The railway infrastructure is owned by the state in the person of the State Property Committee.

Agreements have been entered into with the administrations of neighbouring railways. A Council of Railways in C.I.S. countries meets and regulates these arrangements.

The existence of a Draft Decree "On State Support and Development of the Railway" is a positive indication of recognition by the Government of the need to provide an effective legal environment for railway transportation in Tadjikistan.

3.2 Monopoly and Price Control Issues.

Price control is exercised by the state within the framework of the Law "On Monopoly" adopted in 1997.

No subsidy is paid for services that constitute public service obligations.

3.3 The Railway Law.

The enactment of Decree "On State Support and Development of Railways" is under consideration.

Previous consultants produced a draft for a railway code that was intended for use as a standard model for the central Asian countries

It is certainly the case that local circumstances will vary, and law which is adopted must take this into account. Indeed, in order to achieve precisely the same objectives in two different jurisdictions would almost certainly require some differences of approach in each.

From the positive beginning which the draft Decree represents, further progress may be achieved by making further refinements and amendments and introducing new provisions before it is enacted into law. Recommendations in this regard are set out below.

3.4 Recommendations.

It is recommended that the Charter of Tadjikistan Railways should accommodate the organisational structure, accounting and reporting procedures contained in the management re-organisation proposals listed in the re-structuring study. It should be amended to transform Tadjikistan Railways into a state owned joint stock company (or a corporation which resembles a joint stock company) with the Chairman and Board appointed by the appropriate state authority; the Board should in turn appoint the Chief Executive and the senior management who should report directly to the Chief Executive. The Chief Executive and the senior management, as appropriate to meet each particular situation, should appoint other Tadjikistan Railways staff. The focus of Tadjikistan Railways should be that of a commercial enterprise, consistent with the strategy, policy and objectives of the state relating to railway transport.

The pending enactment of a Decree "On State Support and Development of the Railway" offers a unique opportunity to establish a legal environment within which railway transport will prosper and better serve the interests of the state and the interests of its customers.

It is recommended that the following issues are addressed:

The Law should legislate for railway transport as a system of transport rather than as a state monopoly conferred upon Tadjikistan Railways.

In the case of Tadjikistan Railways it should provide that management, within the context of the performance agreement referred to below, shall be independent in the direction, management and administration of Tadjikistan Railways and from the administrative and economic control and internal accounting of the state (but under the general supervision of the state), and managed according to the principles which apply to commercial companies.

It should provide that railway infrastructure should be owned by the state; management of the infrastructure should in future be undertaken on behalf of the state by Tadjikistan Railways (or other railway infrastructure manager) on the basis of a commercially orientated contract, to be interlinked with the performance agreement referred to below.

In this way the state will be fully informed of where money is being spent and on the physical state of the infrastructure and participate in the planning process in accordance with the objectives for railway transport.

It should require that the accounting system of Tadjikistan Railways clearly separates infrastructure matters from other activity and that separate accounts are maintained for public service obligations thus ensuring transparency in financial matters.

Organising formally separate divisions or profit centres within what is today Tadjikistan Railways, would meet this purpose.

It should facilitate the corporatisation of Tadjikistan Railways.

It should provide that an access fee be charged in respect of each service (passenger and freight) for the use of the railway infrastructure - to be paid by all operators including Tadjikistan Railways (into the infrastructure fund).

It should provide that Tadjikistan Railways when offering services as operator should primarily have regard to commercial considerations.

It should provide for a system of licensing the competence of railway operators and their rolling stock, to apply to international (including state railway companies) as well as to national operators. All licensed operators should be entitled as of right to access to the railway infrastructure on non-discriminatory terms.

It should define the role of the state, to be exercised through the Ministry of Transport. This role should include the following functions:

- entering into agreements with Tadjikistan Railways on the maintenance and specification for development of the infrastructure and the cost and time within which this will be done;

- entering into agreements with Tadjikistan Railways and other railway operators for the discharge of Public Service Obligations (including free and concessionary travel) on a contractual and commercial basis;

- entering into a performance agreement with Tadjikistan Railways and monitoring compliance; in this connection it is believed that if Tadjikistan Railways exchanges its monopoly for a system of ongoing performance agreements (with appropriate adjustments mechanisms for accommodating unforeseen circumstances) greater trust will be established in the relationship;

- specifying the form of accounts to be maintained by Tadjikistan Railways and other reporting requirements;

- undertaking the function of price control where the protection of customers in monopolistic situations is necessary;

- licensing the competence of railway operators and their rolling stock;

- supervising public safety in railway operations by establishing a railways inspectorate with right of access to inspect the railway infrastructure; the inspectorate to request where necessary the state to make regulations relating to the public safety of railway operations;

- setting terms for third party access for operating trains on the railway infrastructure generally, and ensuring that the user fees payable to the infrastructure manager are adequate and non-discriminatory vis a vis Tadjikistan Railways and other users.

It is clear that these objectives cannot all be implemented in the short term, therefore the Railway Law should make provision for transitional arrangements during the intervening period.

The approach used in drafting should be to set a framework within which there will be flexibility that will enable the development without legal impediment of a successful railway transport system.

The Law should also allow for the possibility of the state entering into an agreement with the state railway authority of Uzbekistan for the provision of supervisory and regulatory services, as an alternative to developing this expertise in Tadjikistan

These recommendations highlight a number of important matters which should be addressed, and are not intended to be seen as covering all the other necessary matters which require legislation.

4 Institutional management re-organisation

4.1 State/Railway relationship

4.1.1 The need for external restructuring

The internal reorganisation of TZD as proposed will **not** be sufficient to prepare the present railway administration of Tadjikstan for the future challenges. As was the case with railways in most Western European countries TZD needs entrepreneurial autonomy in order to survive and perform well in the arising national and international transport market. This can only be achieved if the relationship between TZD and the state is completely reshaped. We call this the external reform of TZD. A number of good reasons can be given to the Government of Tadjikstan why the ongoing discussion of a draft for a new railway law should be used to get the reshaping process started.

4.2 Appraisal of present situation

4.2.1 Need to save public money

Tadjikstan is a country trying hard to develop its economy and the living standard of its population. In order to achieve this, capital investment is necessary. As the experience in other parts of the world has shown railway restructuring and streamlining can essentially reduce the financial burden on governments (and tax payers) and set capital free that might be used to develop the railway system faster or be spent for other purposes. It also makes the country globally attractive for foreign investors because the financial situation will be more transparent.

4.2.2 Need to attract private capital

It would also be a relief for the government budget if private capital could be attracted to investing into some of the railway activities. Prerequisites for interesting private capital are efficiency and business profitability or at least a solid prospect for it. This prospect does, however, not exist for the moment in TZD as there are doubts about micro-economic profitability of large parts of its traffics. Although TZD's profit and loss account seems to show positive results, considerable backlogs in maintenance and in renewal investment that needs depreciation, may contribute to a wrong picture. In this situation and as long as TZD is maintained as a government administration it will be rather difficult to attract private risk capital.

4.2.3 Competition from other modes

TZD with its 423 km of lines is a relatively small railway in a large country whose surface area is 143,100 sq. km and whose population is estimated to be 5,6 million. It has a very low share in the total passenger traffic - even if we exclude the urban bus transport -, but still a relatively important share in freight traffic:

Competition between road and rail is limited to the very few corridors where trains are run. Only there we can speak of a multimodal transport market in the sense that real competition exists between different means of transportation with regard to quality and price.
This competition being already harsh at the present time, since parts of the trucking business and of the bus transport industry have been privatised, TZD has to expect a far heavier struggle for market shares in the coming years. Market economy will more and more replace the former system of state planning, private forms of market participation will largely outnumber state regulated product and service output. Road infrastructure will improve essentially under the pressure of the owners of private cars, and the increasing number of freight truckers will take

advantage of this, as the experience not only with countries in the West but also in other countries of the former Soviet Union shows.

It is therefore in the interest of the Republic of Tadjikstan that its railway, as an energy-efficient and environmentally friendly means of transportation with a considerably high rationalisation potential, will be prepared to face future developments in the transport market.

4.2.4 The international dimension

The globalisation of competition does not only take place in the sector of agricultural and industrial products but also in the service sector, where transport is one of the most important elements. The prospect for exporting commodities of all kinds and for participating in the world markets is only promising for the Tadjik economy if transport services have a high performance level in the country. In order to survive in this world market it will not be sufficient for TZD to offer a high technical standard in the fields of infrastructure and rolling stock guaranteeing the transport quality required. Also a customer-oriented and service-minded high quality organisation will be needed to an extent which can in no way be ensured by a government administration, as numerous examples in other countries have shown. This is particularly true for rail transit services.

4.2.5 Restructuring cannot be postponed

Quite a number of our high level interview partners in Tadjikstan who do not refuse restructuring of the railway in principle, would however like to postpone it until the necessary technical upgrading of their production system will be achieved. Seeing their priorities in this latter field they feel they have to concentrate additional efforts on implementing government plans for the construction of new railway lines.

At any rate, a detailed look at the draft for a new railway law leads to the conclusion that the Tadjik government and parliament are very hesitant to reduce the state's grip on the railway management.

However, in the consultants' view restructuring of TZD cannot wait. It should be started as soon as possible. The restructuring process which will take quite a number of years anyway should be conducted in parallel with the technical upgrading and modernising activities, even though a hard strain will be put on all those who have management responsibilities in TZD.

4.2.6 Privatisation or corporatisation

The further development of TZD and the reshaping of the relationship between TZD and the government will have to take place within the larger environment of Tadjikstan's situation in general and its economy in particular. This environment has to be reform-friendly. In other words, it would be premature to push TZD into a privatisation process without having achieved similar development in the majority of other branches of the economy where, according to the information given, 85 % of the railway freight business is done with government controlled undertakings. This is the reason why out of the two options

a. privatise TZD and then make it efficient, or
b. make it efficient and privatise it perhaps at a far later stage,

we recommend the second alternative and propose the corporatisation of TZD as described below.

4.3 Policy issues

4.3.1 Issues identified

Comparing the present situation of TZD with the objective of transforming it into a commercially acting, market-driven and financially self-sustaining organisation, it is evident that a certain number of issues have to be solved in the restructuring process.

4.3.2 Problems of government managed enterprises like TZD

The experience in the countries of Western Europe with a tradition of state owned companies and heavy state participation in the economic activity of the country has shown that in the long run this is not only very costly but also very often inefficient. State run enterprises have enormous difficulties to compete with private ones in the deregulated market. That is why there should be a decisive move towards separating economic activities as strictly as possible from true government functions such as ensuring fair competition on the market, safety control, regional development, social welfare etc.

4.3.3 Incompatibility of government's and railway's interests

The hierarchical subordination of the railways under the government can, and mostly does lead to management decisions that are not compatible with the entrepreneurial, particularly commercial, interests of the railways which will have to obey to the rules of the rising transport market.

4.3.4 The problem of public service obligations

Public service obligations (for example low tariffs) are imposed on TZD in the general interest of the country but the government does not pay any financial compensation covering the corresponding lack of revenue. This might not make it a priority for TZD to invest into certain services and the result can be a degrading quality and a further loss of customers. In TZD revenue from profitable freight traffic serves to cross-subsidise passenger traffic. Although such cross-subsidisation is generally admitted as a sound instrument on a short term basis throughout the world, in the medium and long run such a policy can be disastrous for the railway undertakings like for any other enterprise.

4.4 Proposals for a new State/Railway relationship

4.4.1 Principles for a new framework

As was the case in Western European countries before the restructuring of their railways it seems that the Tadjik Government plays a multi-functional role vis-à-vis its railway namely as

- the industrial supervisory authority, above all concerning the elaboration of and the respect for the safety regulations,
- the purchaser of services of public interest from the railway,
- the owner of the railway organisation,
- the financing body of large parts of the railways' capital needs,
- the political institution interfering with railway matters on behalf of the general interest of the country.

These five functions are carried out arbitrarily in daily administrative management. The result is a lack of transparency in the relationship between state and railway, which makes it difficult to fix business responsibility, and prevents a clear answer to the question whether TZD globally or its

individual performances are micro-economically profitable or not. It also bears the heavy risk that public money is wrongly allocated and thus wasted.

The existing relationship between the Tadjik state and its railway should be changed in the sense that entrepreneurial and state functions are clearly separated and interference of the state in the business management of the railway eliminated.

4.4.2 The remaining role of government

The remaining role of the government vis-à-vis the railway would be that of

a) the owner, limited by law,

b) the railway sector supervisory authority, particularly concerning safety, guaranteeing fair competition between the modes, licensing railway enterprises and deciding of transport policy in general,

c) the purchaser of all services which are in the global interest of the country and defined in private law contracts between the railways and the purchasing bodies,

d) the provider of finance for the investments into the transport infrastructure of the country on an equal basis for all transportation modes.

It is also recommended that not all of the remaining state functions should be performed by the same government body, like for example the Transport Ministry, but by several. Thus,

function a) should be in the responsibility of the state property Ministry (or similar),

function b) in that of the Transport Ministry (or corresponding body in the Cabinet of Ministers),

function c) in that of the bodies deciding about services in the general interest like the Ministries responsible for social welfare, defense, regional development etc. using their own budget respectively for the purchase of the services, and

function d)in that of the Transport Ministry (or corresponding body in the Cabinet of Ministers) and of the Finance Ministry

4.4.3 The role of the state with respect to infrastructure

As proposed already the state will keep a public service responsibility in the field of infrastructure investment. It is recommended that the government - according to the budget possibilities and the criteria of fair and equal treatment with respect to other modes - will assist in financing the railways' investments into infrastructure. If an investment required by the government for its own or for community reasons does not show any precalculated micro-economic profitability in TZD's view the latter must be allowed to refuse it. Otherwise TZD would have no chance whatsoever to act like an independent commercial corporation. The government can of course finance the investment - and the other expenditure resulting from it - on its own. In this sense it seems necessary to undertake micro-economic profitability studies concerning the rather politically motivated construction of new lines.

All other investments, particularly those into the rolling stock, should have to be financed by TZD itself.

When creating the new Railway Corporation it has to be made sure that government as the owner not only provides for a good juridical start but also for a healthy capital basis, according to international standards, which will permit a normal investment policy. Debt burdens that might presently exist for TZD should be eliminated.

4.4.4 The role of the state with respect to over-staffing

Over-staffing has been a major problem of most railways all over the world. TZD does not seem to be an exception.
As mentioned earlier in this report both passenger and freight traffic by rail have immensely decreased in Tadjikstan since the breaking up of the Soviet Union. This negative development has unfortunately not yet come to a halt. Even in case that TZD will hopefully succeed in stabilising the traffic level in the near future it would be an illusion to think that, under normal circumstances, figures of former decades could ever be reached again.

As the cost structure has not followed the decline of traffic and revenue, all necessary and possible measures to adapt the railway organization by down-sizing it have to be undertaken. Next to the other restructuring measures staff reduction has to be a priority target as staff costs represent still a considerable part (roughly 19 % in 1996) of the total cost of the railway undertaking. **According to the statistics received there was not only no reduction of staff in 1994, 1995 and 1996 but there was a considerable increase. This trend has absolutely to be reversed and it was encouraging to learn that in January 1998 a staff reduction programme has been started and will seriously be implemented.**

It must be recognised, however, that in the present economic and social situation of Tadjikstan and according to the consultants' experience with other countries, it is impossible to take measures which are too radical in this respect.
On the other hand this social problem cannot be left as a burden on the railway undertaking because the real cost structures would be falsified in that case, and for a commercially acting corporation there is nothing worse than lack of transparency and unjustified over-costing.
In reality it is the task of the state to deal with this social problem and if the state wants to use its railway undertaking as an instrument to solve it, then this is a good example for a service in the public interest which has to be compensated financially by the government. On behalf of the state TZD can and should in that case of course put up a program of financing early retirement, training and retraining etc. and contribute actively to further possible solutions. But if the new corporation is to be given a fair start, it must be done without this financial burden.

It is also recommended that the government of Tadjikstan relieve TZD of any staff costs arising from the lack of security in freight transport. Indeed, it should be considered as a matter of general security that freight transport on rail should be safe from robbery and theft as long as road transport security is taken care of by the general police, paid by the state.

As a means for solving the overstaffing problem we recommend TZD to introduce immediately and to apply consequently a ban on recruitment. On the other hand we acknowledge that existing staff cannot be completely retrained and that in certain sectors, as for example in information technology, young specialists have to be hired.
We also recommend to continue without delay the transfer of staff which are not related to railway core activities, to other organisations, and to relieve TZD's budget correspondingly.
The main down-sizing efforts, however, should take place concerning the ordinary railway activities.

4.5 Performance Agreement

We recommend the conclusion of a Performance Agreement between the government and TZD which will facilitate a constructive relationship between the two partners by fixing rights and obligations for both of them, and which will mainly include the following provisions:

- Period of Agreement (five years would be reasonable)
- Use of state owned property (land, buildings, equipment, etc.) by TZD, especially land usage and development
- Definition of what constitutes the railway infrastructure

- General policy of government for the period of the Agreement
- General policy of TZD with focus on provision of passenger and freight services, renewal of infrastructure, financial management and restructuring

The Performance Agreement will also contain the following provisions:

- A mission statement for TZD

  The Tadjik Government will have to define the purposes of TZD and the conditions under which it will develop its activities. The main items in this respect should be

  - The operation of a railway on the Tadjik State railway system
  - Provision of passenger and freight services in a commercial manner
  - Regulation of the use of the railway infrastructure by other enterprises permitted to operate thereon
  - Undertaking other related and ancillary activities as determined by the government or the Board of the railways (to be discussed later)

- A strategy, which is the framework for achievement of TZD's mission

  Specific objectives, under the strategy in the areas of

  - The customer
  - Passenger services : operations, tariffs, and marketing
  - Freight services : operations, rates and marketing
  - International dimension
  - Infrastructure renewal
  - Information technology
  - Improvement of management
  - Human resources
  - Public service obligations and related social fares
  - Social services
  - Finance, accounting and costing systems

- An investment plan

- Performance Factors

- Execution of Contract

4.6 Further restructuring options proposed - third party access

As the political aim should not be to privilege TZD and maintain it in the status of a rail traffic monopolist, but to encourage efficient rail transport on a general basis, third parties should not only be allowed to build and operate access lines but to operate freight and passenger trains on the main network. There they would be in competition with TZD. They would have to pay the same user fees as the operating Business Units of TZD and should not be discriminated against in any way. The licensing of these railway enterprises should be regulated by law. Competitive pressure, cost reduction and innovative ideas would result from this new possibility. It would be irrelevant whether the operators were state-owned or private. Own account traffic should in any case be made possible.
Services in the public interest as mentioned above could in that case be purchased by the responsible government bodies through tendering procedures in which the winner would be the tenderer with the lowest need of government money and the best offer as far as quantity and quality of the performance is concerned.

In order to make sure that third party operators are treated without any discrimination the neutral arbitration function which is proposed within TZD's new organisation on the General Director's level would in this case have to be taken out of the railway corporation and remain separate, perhaps attributed to the Transport Ministry (or the body responsible for railways within the Cabinet of Ministers).

4.7 Accompanying measures needed

The restructuring of TZD will only be a success if accompanying political measures are taken by the government of Tadjikstan in the field of harmonisation of competition between modes in the transport market.
The consultants advise the introduction of strict control of allowed weight, of permitted drivers' working hours and other social regulations as well as of prescribed speed in the field of passenger and freight traffic on the road.
It is also recommended that road traffic (private car, bus and truck) should bear infrastructure costs to the same extent as the railways, at least in the medium and long term. This could be achieved via road taxes, fuel taxes - as recently introduced by law in Kyrgyzstan - or any other means of taxation. External costs should as far as possible be included in the taxation for all modes in order to avoid wrong allocation of scarce investment money in the interest of the country as a whole. The Tadjik government should not wait to become active in this respect until it is too late, i.e. until the road transport interests have become so powerful that it will be difficult - as is the case in Western Europe - to guarantee equal treatment of all modes. In the case that for example road traffic will be privileged in one way or the other the government will have to subsidise the railway infrastructure correspondingly.

At any rate, the environment friendliness of the railway mode and its relatively enormous external cost advantages (noise, pollution, need of land, energy consumption, accidents etc.) have to be taken into account.

4.8 Strengths of a small railway

Although TZD is a small railway which is largely dependent on its big neighbors as well as on the Russian railway organisation, it would be a mistake for TZD just to wait for new initiatives from them and to play only the role of a „follower". According to the well known slogan „SMALL IS BEAUTIFUL" and in spite of the enormous difficulties that have arisen for TZD after the break-up of the Soviet Union, a smaller organisation such as TZD can be restructured more easily, can more quickly shed excess bureaucracy, is more flexible, can master its overhead costs more easily and is in a position to attain commercial efficiency within a shorter period of time.
What TZD has to do is to make clear to its powerful foreign partner railways that it represents an economic value to them because it acquires new international traffics, takes care effectively of exporting and importing customers residing on the territory of Tadjikstan, and can offer a fast, reliable and safe transit service through the country.

In that sense TZD could take over the role of a driving force with new ideas, helping to push its neighboring giants into the right direction. Thus it should be in the interest of TZD to expand its business outside of Tadjik territory and to come to an agreement with its immediate neighbors to mutually allow use of their respective infrastructure against payment of a user fee. The Central Asian railways could in that case follow the initiatives that have been taken in the European Community by which hindering national borders are being abolished for transborder railway traffic.

The positive aspect of such a step would be the introduction of competition between the railways with all the beneficial consequences that this could have. And finally, would the Uzbek government in that case still have a major interest in investing scarce capital into a by-pass to avoid Tadjik territory and have direct access to its Ferghana Valley?

Precondition for such a system would be that non-discrimination of the infrastructure users would have to be controlled and guaranteed by a neutral international body and lastly by court.

4.9 Internal re-organisation of TZD

4.9.1 Introduction

The re-structuring of TZD cannot be achieved satisfactorily unless a new management organisation structure is put in place. The present organisation served well over the past few years since the break-up of the former Soviet railway system, laying the basis for a separate and independent national railway administration of Tadjikstan.

As has been underlined earlier in this report there are many reasons for adapting the existing organisation to future needs and challenges. TZD must urgently be made more efficient and customer oriented, must reduce its production costs and reach a higher degree of transparency in its decision making process in order to be prepared for the rising transport market in an increasingly deregulated economy.

It is generally considered desirable to have separate funding, accounting and management for infrastructure, which is seen as a public-funded asset, in the general interest. There is a need for greater commercial freedom and separate accountability in the provision of passenger and freight services. There is a growing trend internationally to consider third party access to national rail systems. Although this is unlikely to be a short term requirement for TZD it should be considered as a real longer-term possibility, given the general tendency of replacing monopolies by competitive systems leading to cost reducing pressure as well as better performance and innovation and given also the possible interest of TZD to expand its business across the national border into neighbouring countries on the basis of reciprocity agreements.

4.9.2 Present organisation structure of TZD

The present organisation structure of TZD is characterised by a strict top down management, the top being the Cabinet of Ministers. It appears to leave hardly enough flexibility margin for business management at the Director General level, and even less farther down the hierarchy. Except for minor changes, this seems the case for all organisational measures, the fixing of tariffs, rates and fares, the decisions concerning investment priorities, staff numbers etc.

The railway organisation, an enterprise called Railway Department in Tadjikistan with its accounts separate from those of the rest of the government, is formally headed by the Director General (Head of Railway) who coordinates the different services. These are grouped on a purely functional basis.

The present organisation of TZD is of a traditional functional type and has the advantages and disadvantages associated with it. They are largely influenced by the existing state-railway relationship.

There seems to be significant scope for rationalisation of activities and functions within the present structure. Re-organisation can, above all, lead to more transparency in the management process and define responsibilities better. The establishment of a new relationship between the state and the railway organisation as proposed above is, however, a prerequisite for a successful internal re-organisation.

It seems that, below the Director General level in TZD, responsibilities for the most onerous functions are concentrated in the hands of three leading managers, and the question arises whether under these circumstances delegation of power to lower levels is possible and to which extent it could be put into practice.

Although the organisation of TZD could be significantly improved, while retaining a functional structure, we do not consider that this approach would be sufficient to meet the coming needs. Our proposals for a new organisation are based on a new type of structure, which will provide a firm foundation for the future development of TZD.

4.9.3 Organisation principles and trends

Traditionally railways all over the world have in the past organised their management structures on functional principles. This involves grouping activities according to their different functions. A functional approach to organisation has also been common in many other types of enterprise. Manufacturing companies, for example, frequently organise their activities around marketing, engineering, production and finance. In many railways the functional groupings have been operations, commercial, engineering and finance.

The functional principle of organisation is a well proven management system. It provides for strong centralised top down management and control as is presently the case with TZD. It makes efficient use of people and their specialised skills, and facilitates training and development of staff. It provides a logical basis for allocation of separate functional responsibility.

However, a functional-type organisation structure also has certain disadvantages which become all the more evident as well defined business responsibility decides about success or failure in a market driven economy. Functional departments can become too focused on their own specialty and fail to act in a way which achieves the overall objectives of the enterprise. Departments can become over-specialised, uncoordinated with other departments and resistant to change. Only the Chief Executive can in that case be held responsible for profit performance, and this is an unnecessary and inconvenient high level of hierarchy. In many Western European railways this has led to a lack of motivation and commitment with all management levels.

In order to overcome the disadvantages of the functional type of organisation, many enterprises now organise their management structures on the basis of product or service. The Chief Executive can delegate responsibility to product managers whose units are largely functionally self-sufficient and who can therefore carry real profit responsibility. The contribution (in profit or loss) of individual products or services can be more readily identified at corporate level. The cost transparency obtained is also a precondition for successful bankable feasibility studies and investment calculation.

There is a more recent development of the product-type organisation, which has proved very effective. This involves the creation of Strategic Business Units (SBUs) within the enterprise. SBUs have their own product or service line, have their own marketing, sales and production, their own regional and local management representation, with real profit responsibility. They develop their own missions and goals, within the framework of the corporate mission, and prepare their own strategic plans. SBU managers are expected to have the drive and entrepreneurial skills of the manager of a private business.

Many railways all over the world are re-organising at the present time. Most - and not only in Western countries - are moving away from functional organisations to a greater or lesser extent. Great Britain has established separate private companies providing the various services. Sweden has transferred infrastructure to a separate state administration, and the rest of the railway is divided into business units covering passenger and freight operations, rolling stock maintenance and property. Both the Netherlands and Spain have moved to a structure based on strategic business units, one each for the passenger and freight businesses, infrastructure, rolling stock maintenance, and property; the Director General co-ordinates the activities of the business units, supported by a small headquarters group. Germany has restructured its railways in a similar way; from 1998 the business units will be developed into separate limited stock companies coordinated by a management holding; it has opened the

infrastructure for third parties that have the same rights and obligations as the national railway's own freight and passenger business units.

4.10 Proposed organisation structure

4.10.1 Overall structure

Our proposed structure shown on the organisation chart (Annexes) is based on the principle of separate Business Units for passenger and freight services which are the main commercial activities of TZD, as well as for infrastructure management. We propose that traction and heavy maintenance of rolling stock be split up and transferred into the Business Units Freight Traffic and Passenger Traffic. This will not prevent the workshops from looking for orders of customers outside TZD for provision of services at a profit and to invite private capital to participate in joint ventures later.

The separate establishment of the Infrastructure Business Unit will introduce costing transparency in this sector and will facilitate potential third party operator access in the future.

We propose that many functions be devolved to the SBUs; however there are other tasks which should be retained at TZD headquarters outside the Business Units because they can be provided centrally more economically and effectively, or because they are essential to enable TZD to operate as a single corporation. For this purpose we recommend the establishment of a Unit for Corporate Services.

Each Business Unit should be responsible for its own marketing and sales, be they performed within or outside the corporation, for the operation of its services, the management of its own staff and its own accounting and controlling. This will create a specific cost consciousness, will allocate profit responsibility to each Business Unit for the services it provides, and also give control over the resources it needs to achieve profitability. Each SBU will operate very much like a private commercial company.
The guiding principle for the new organisation structure in detail must be that the Business Unit management has a maximum influence on the development of costs related to its performance output. Another leading principle to be applied is that decisions should be taken as far as possible at the level on which the value is added.

We propose that each of the Business Units and the Corporate Services Unit be led by a Director. These four Directors, under the Chairmanship of the General Director, will constitute the Executive Board of TZD. The Executive Board should meet regularly in order to co-ordinate the activities of TZD.

The Executive Board - chaired by the Director General - will be the supreme executive organ responsible for overall direction of TZD, in accordance with the corporate mission, strategy, policy and budget as established by law or as agreed with the responsible government body.

The Executive Board will coordinate the activities of the three Business Units and the Corporate Services Unit, monitor their performance and take corrective action where necessary.

The services which we propose to be grouped in the Corporate Services Unit are

- Corporate Planning,
- Finance & Controlling,
- Computer Systems,
- Procurement and Real Estate,
- Organisation,

- International Relations,
- Human Resources,
- Legal Services and Audit.

Since TZD is a relatively small organisation there will not be the need for a manager for every one of the functions. Some of the functions might be grouped under the direction of the same person.

4.10.2 Freight Business Unit

The Freight Business Unit will have its own marketing and planning, sales, stations as well as operating and technical, workshops and traction, finance/controlling/administration and human resources functions.
It will develop and sell freight services in the national and international markets. It will operate its own wagon fleet and undertake routine maintenance. It will employ, manage and develop its own staff. It will prepare its own financial plans and budgets, and define its products/services. It will operate as a self-contained business with profit responsibility, within the overall corporate goals and strategies of TZD, and in collaboration with the other Business Units and the Corporate Services Unit in TZD. It will be encouraged to compete for engineering work, and should have the potential to win profitable business from operators of industrial railways, from railways in neighboring countries and other industrial customers.

The Unit's main functions will be:

- transport of goods in a safe, reliable, cost effective and profitable manner
- fixing of tariffs and rates
- development and marketing of logistical systems
- development of combined transport
- expansion of international traffic and liaison with foreign customers, shippers and ports
- management of the assets like stations and freight terminals
- management of wagon fleet including routine maintenance and heavy overhaul with the possibility to receive profitable maintenance and repair orders from outside customers
- supply of traction for freight trains including the assignment of train crews
- realisation of financial and other targets set down at TZD corporate level

The proposed organisation structure for the Freight Business Unit is shown in annexes

4.10.3 Passenger Business Unit

Like the Freight Business Unit the Passenger Business Unit will be independent and self-contained. It will be structured in a similar way with its own management of marketing and planning, sales, stations, operating and technical, traction and heavy overhaul of rolling stock, human resources and finance/controlling/administration. It will be encouraged to compete for engineering work, and should have the potential to win profitable business in the field of maintenance and overhaul from other passenger traffic operators, from railways in neighbouring countries and other customers.

The main functions of the Unit will be:

- provision of cost effective and safe public passenger transport in the form of long distance (national and international) and commuter service with the goal of profitability
- ticket pricing and fare structure development for attractive future-oriented services for passengers
- management of the assets, particularly the passenger stations
- management of the coach fleet including routine maintenance and heavy

overhaul with the possibility to receive profitable maintenance and repair orders from outside customers
- supply of traction for passenger trains including the assignment of train crews
- realisation of financial and other targets set down at TZD corporate level

The proposed organisation structure for the Passenger Business Unit is shown in annexes

4.10.4 Infrastructure Business Unit

We propose that all infrastructure activities and functions should be grouped together in an Infrastructure Business Unit. This will facilitate separate accounting for the infrastructure and its separate funding from public sources and thus make it much easier to prevent cross-subsidisation between the different functions in the Corporation. This is very much in line with international trends whereby the provision of the infrastructure is seen, in principle, to be a public service in the same way as it is available for the competing modes. This facilitates an equal treatment of all modes and thus permits harmonisation of the competitive conditions. When making contributions to the funding of transport infrastructure the state has the possibility and the obligation to take account of the social costs (pollution, accidents, energy supply etc.) caused by the different modes. It can privilege investments into the infrastructure of those modes which produce advantages for the country as a whole.

The establishment of a separate Infrastructure Business Unit will also facilitate charging for use of the infrastructure and access of third party operators, if that is considered desirable at some time in the future.

The Infrastructure Business Unit will be self-contained with its own managers for planning and for sales of train paths, for path management and operating, construction, track maintenance, signalling and communications, human resources, and finance/controlling/administration.

In the field of construction the Infrastructure Business Unit will be encouraged to compete for public and private orders from outside the railways - as this has already been initiated in TZD - and should be put into a position to win profitable business in this way.

The Infrastructure Operations Manager will carry responsibility for central dispatching, controlling track capacity and train running for both passengers and freight. He will be responsible for the overall timetable and will have a neutral position with respect to selling train paths to the Freight Business and Passenger Business Units of the Corporation or to third party operators.

The main functions of the Unit will be:

- provision of a safe, high quality infrastructure system
- maintenance of the system in the most cost effective manner
- development of an infrastructure plan and of the corresponding implementation strategy in harmony with the TZD overall corporate plan
- marketing of train paths with the minimum goal of covering the infrastructure costs not taken care of by government's public service subsidies
- realisation of the financial and other targets set down at TZD corporate level

The proposed organisation structure for the Infrastructure Business Unit is shown in the annexes.

4.10.5 Corporate Services Unit

The Executive Board of TZD - chaired by the Director General - will have overall responsibility for the performance of the Corporation and the coordination of the Business Units. The Board and its individual members, as Directors of their respective Business Units, will be assisted in their tasks by a Corporate Services Units, also headed by a member of the Board. This Unit will supply services that are more economic to provide centrally rather than be duplicated in each of the Business Units, or that are necessary for ensuring the unity of the whole of the Corporation.

We propose that the Corporate Services Unit will be responsible for:

- corporate planning, which will draw together the plans of the Business Units, ensure that they are in harmony with overall TZD objectives, and with each other, and present the overall corporate plans for corporate strategy including economic studies and forecasting
- computer systems, information technology and data network services
- finance and controlling, providing financial accounting, budgeting, treasury and funding services, monitoring of capital expenditure
- procurement which will set the purchasing procedures for all Business Units, and carry out purchasing of designated items
- real estate which will develop property and optimise use and financial return on TZD properties
- development of the overall organisation structure of the Corporation
- international (bilateral and multilateral) relations including memberships of TZD in international organisations, translating and interpreting functions
- human resources, setting overall TZD policies and procedures, on human resources, and providing central pay negotiations, training and other services
- legal services, ensuring compliance with all legal requirements and providing contract drafts
- internal audit, providing internal financial monitoring and ensuring the integrity of TZD's systems and procedures

The proposed structure for the Corporate Services Unit is shown in the annexes.

These proposals will provide an optimum balance between the functions devolved to the Business Units to enable them to function in an efficient commercial manner, and those functions properly retained at an overall level to maximise the benefit of TZD's corporate identity, synergy and strength.

4.10.6 Other services

- **Secretariat of Director General**

We propose that the Head of DG's Secretariat - directly subordinate to the DG - will have the following main functions:

- Support the Director General in his coordinating activity within the Executive Board
- Support the Director General when representing the Corporation outside
- Ensure smooth and effective functioning of the Board
- Coordinate the activities of the assistants and secretaries within the DG's Secretariat
- Advise the DG and the other members of the Board in matters of protocol

- **Press and Public Relations Service**

We propose that the Head of the Press and Public Relations Service will also be directly subordinate to the DG and have the following main functions:

- Close relationship with press, broadcasting and television
- Ensuring corporate identity and positive general image of TZD
- Publishing and distributing documents concerning the Corporation
- Taking care of national visitors

- **Safety and Arbitration Unit**

In our view a small central Safety and Arbitration Unit should be established and directly subordinate to the Director General. It will have the task to assist the Director General in solving disputes between the Passenger Business Unit and the Freight Business Unit concerning the required use of infrastructure, or between these two Units and the Infrastructure Business Unit concerning the responsibility for irregularities in traffic and their causes.
As long as or in the case that internal buying/selling relationships, as proposed below, between the Units underlie the risk of monopolistic pricing in the absence of outside competition, the Safety and Arbitration Unit will play the role of an internal price control body.

Besides, it will carry responsibility for monitoring overall safety and could supervise the presently existing Environment Protection Laboratory.

- **Ancillary services**

Where appropriate, ancillary functions can of course - and this is strongly recommended - be taken over on the national, regional or local level by subsidiary companies under the condition that these are attributed full commercial autonomy as well as result responsibility and that they are financially self-standing, which means potentially profit making. Every subsidiary company should be attributed to one of the Business Units.

- **Regional and local level**

We propose that local services remain directly subordinate to headquarters' control but that they be attributed to the three Business Units according to their specificity. In case that TZD's top management, because of the far distances within the country, sees a need for coordination in the regions, the possible regional manager should only be attributed the role of a regional arbitrator without executive power and that of the representative of the Director General vis-à-vis the regional and local authorities.

4.10.7 Management relationships within TZD

It is recommended to create a selling/buying relationship between the Business Units.

One of the main selling/buying relationships will be the one between the Freight and Passenger Business Units on one hand and the Infrastructure Business Unit on the other. The latter will be responsible for a well functioning railway network, set up train paths and sell them to the former, who will pay user fees on a train-km basis.

4.10.8 Implementation plan

The task of changing the organisation structure to the proposed new structure is a very significant one. The change must be carefully planned and will require the full commitment of the Director General and the other members of the Executive Board.

We are proposing the establishment of a Re-organisation Task Force under the direction of the Director General, with responsibility for planning and coordinating the implementation of the new organisation structure. Each member of the Board will establish for his Business or Services Unit a change team which will carry out the changes required, under the overall direction of the Re-organisation Task Force.

We anticipate that the proposed changes can be fully implemented within three years time although transition solutions might be necessary in some cases.

The members of the Re-organisation Task Force should include representatives of each Business and Services Unit, assisted by an expert consultant facilitator respectively.

The objectives of the Re-organisation Task Force would be to:

- develop a master plan for all the activities that must take place over the entire re-organisation implementation period
- issue guidelines to the Change Teams in each Business Unit and in the Corporate Services Unit
- coordinate and approve the plans of the Units' change teams
- monitor and report to the Executive Board on progress. Amend plans as necessary
- assist the Unit Change teams in resolving difficulties that may arise, and in taking corrective measures to maintain the momentum of change

The Unit Change Teams should contain representatives from the main functional areas in the Unit. The Unit Director may chair the Team or delegate the chairmanship to a competent senior manager. In any case the Change Team will be responsible to the Unit Director, subject to the coordination of its work by the Re-organisation Task Force.

The objectives of the Change Teams will be to:

- develop detailed implementation plans for their individual Units
- ensure that the individual Unit plans are in harmony with the overall re-organization plan and with each other
- submit plans for approval to the Re-organisation Task Force and report on progress

The relationships between the Re-organisation Task force and Unit Change Teams are shown in annexes

4.11 Further restructuring options

4.11.1 Attraction of private capital

As mentioned earlier in this report it would be an advantage for TZD, as well as a financial relief for government, if private capital could be attracted to the railway business. It can be thought of as joint ventures in future subsidiaries of the Business Units as mentioned above, particularly in the fields of Combined Transport, where opportunities will arise for financing and operating modified rolling stock, and planning and developing suitable depots and handling systems. Similarly in the area of infrastructure, there are many opportunities for joining with private companies in maintenance of track and signalling.
In the rolling stock area there are many possibilities to enter into joint ventures in maintaining the rolling stock fleet for TZD and for selling on surplus capacity to neighbouring railways. Examples in the field of passenger traffic are:

The use of railway real estate (for example a railway station) by a joint venture - TZD bringing in the building and the surrounding area and the private investor financing the refurbishment of the station and bringing in the management know-how could lead to profitable business through establishment of shops, restaurants, cinemas etc. by small entrepreneurs.

The other example would be a hotel joint venture to which TZD would contribute the construction ground near the railway station and the possibility to make hotel reservations through the general railway reservation system, and the private partner would finance the construction of the building and contribute the hotel management know-how.

4.11.2 Tendering procedures

As soon as TZD acquires the legal status of a corporation it should rapidly introduce tendering procedures in the field of procurement of products and services. Competition between providers within Tadjikstan and/or foreign providers should be used to maximum advantage of TZD with the aim of reducing costs.

4.11.3 Outsourcing

TZD's Board should be given the task to permanently take into consideration the possibility of purchasing services from third parties instead of producing them within the railway. There should be no ideology playing any role in this respect; only thorough calculation undertaken case by case will show the financial advantages or not of outsourcing.

5 Financial Review

5.1 Objectives

Tajikistan Railways is in the process of reviewing and reorganising its operations and management to recognise its changed status as an autonomous enterprise in a free market system. To enable Tajikistan Railways to operate in this changing environment it must have available adequate financial data and management information to make strategic decisions and to inform management and providers of capital and credit of the financial consequences of the decisions taken and of performance.
Ultimately, Tajikistan Railways should produce annual accounts for its shareholders and stakeholders, such as its employees and providers of capital and credit, in accordance with Generally Accepted Accounting Principals (GAAP), and in accordance with International Accounting Standards. These accounts should be subject to independent audit on an annual basis.
The financial accounts, produced in accordance with the prescription used under the Soviet system, by Tajikistan Railways, indicate a profit being earned on an annual basis. These accounts require review to reflect results more in line with GAAP.

5.2 Data collection

Information and data used in this report was obtained from an interview with an executive of the Railway Company and was not verified or substantiated in any way. The executive is the leading economist in the financial services department. The fact that a visit to the company was not possible, due to the political situation, has restricted this report to some basic comments and observations.
The Balance Sheet at 1st January 1998 was reviewed.

5.3 Present situation

The present reporting system concentrates on gross revenues and detailed cost analysis on an accruals accounting basis. This system is that used under the Soviet regime. The finance function appears to operate as an autonomous department, in which the end product is an end in itself, rather than a reflection of the operations of the railway, and a management tool with which to direct the enterprise. Independent audits have not been carried out on the financial statements.

5.3.1 Profit performance

The Railway Company reports a profit annually, which in 1997 was 510 million Tajikistan Roubles, roughly equivalent to US$500,000. However a review of the balance sheets shows a sharp deterioration in the cash and current asset position of the enterprise. There is a major build up of accounts payable. This suggests that the result for the year is more likely break-even or even a loss, rather than a profit.
The Company does not provide for bad debts and there are a number of debts outstanding, which, under GAAP, would be provided for. Depreciation is provided for at between 10% and 15% of cost, and is insufficient to provide for replacement. This is especially so as routine maintenance is being postponed due to lack of funds and available specialist equipment.
It must be concluded therefore that the real situation is a loss for the year, with little prospect for any real improvement in results in the near future.

5.3.2 Financial accounting

The Railway Company uses the same basis and format of accounts as was used under the Soviet system, and is in common with the system used in the other CIS countries. This system

produces a large amount of data. This data can be used as a management tool, though at present divisional managers are unaware of their financial performance, and there is no reporting of actual results against budget.
The present accounting conventions do not recognise losses such as bad debts and losses on barter, in a consistent manner. Depreciation is inadequate to provide for replacement of equipment. There is no provision for independent audit of the financial statements, and this creates an inherent uncertainty as to the accuracy and consistency of the financial statements.

5.4 Recommendations

The system of financial accounting needs to be simplified and updated to supply timely information to management to enable control be exercised over the entire enterprise and to provide a sound basis for decision making.
The finance function must be considered as a service department to the operational departments of Tajikistan Railways. The information produced must be accurate, timely, consistent and presented in a manner easily understood by the users of the information.

5.4.1 Income analysis

The analysis of income between freight revenue and passenger revenue and other items is a straightforward exercise. The area of bartered goods is one area of difficulty and any losses incurred should be shown as a reduction of the appropriate main revenue stream. For example, if barter is used as revenue for freight transport, and a loss is suffered on realisation, that loss should be booked against the freight revenue earned.

5.4.2 Cost analysis

The present system of cost analysis needs to be changed and brought into line with modern financial reporting requirements. It is normal for the accounts system to have a coding system that identifies costs under various headings, predetermined by management, and appropriate to the business. A modern system of coding will generally include the following features:
Departmental Analysis
Location Analysis
Expense Analysis
This system allows for the production of reports, which can be tailored to meet specific requirements, and to enable local and department heads to take responsibility for their area of management. In practice this type of coding system is achieved by use of alpha-numeric or numeric codes, which identify the various constituents of the expense. The system should be simple and easily understood by both the finance personnel and user groups.
For example payroll may be allocated the expense code 100, and all payroll payments will be thus coded. The Locomotive depot may be allocated the alpha code LM and all payments for locomotive department wages will be code LM100. The Dushanbe area may be coded DU and all payments relative to the Dushanbe area will be thus coded. So a payment for wages from the Dushanbe Locomotive depot will be coded DULM100.
The system allows for further sub-codes within a main code. If it is considered desirable to analyse overtime wages, the code 105 could be allocated to all overtime wages.
This type of coding enables reports to be drawn up in accordance with management wishes and requirements.
The design of the coding system needs to be very carefully addressed and the training and familiarisation for implementation managed with care and sensitivity. The coding, if properly implemented, will enable accounts to be produced to GAAP.
The classification and stratification of assets and liabilities is also a major item for consideration when designing the coding system.

5.4.3 Budgets

Budgets are prepared annually and this process must be strengthened to ensure that the figures produced are as accurate and realistic as possible. The budgetary process must include all operational and departmental managers, who must subscribe to the entire process. The budgetary process is the starting point for the implementation of a modern management reporting system. It will, in the case of Tajikistan Railway, also entail considerable training and explanation to educate and enthuse the managers regarding the process. The budget divides into four sections, the Income budget, the Overhead budget, the Cash Flow budget and the Capital expenditure budget. Each area of managerial responsibility must appoint a liaison person to assist in the preparation of the budgets with the assistance and guidance of the Finance department.

- **Income budget.**

The income budget is produced from an assessment of the various revenue earning services provided by Tajikistan Railways. The manager in charge of Freight and the manager in charge of Passengers will have the primary responsibility for the figures included in the income budget. The budget will be further sub-divided into a budget for Freight transport, Passenger transport, Other Activities, and Non-Sale Items.

- **Freight transport**

The manager in charge of freight has the ultimate responsibility for the freight transport budget. Freight transportation income is a function of freight tonne kilometres and carriage rate. The rate per Tonne /Km is a commercial decision which has many influences, including competition and political considerations. This must be determined at the outset of the process. The assessment of the volume of freight will be taken after consultation with the marketing and sales departments under the control of the manager in charge. The budget when completed should note the basis on which the decisions were taken. The effect of any non-cash items should also be noted, as this information will be needed to integrate the cash flow forecast with the profit and loss budget. Examples of non-cash items are goods received in exchange for services. The budget should be broken down into the agreed reporting periods. This should be monthly.

- **Passenger transport**

The manager in charge of passengers has the ultimate responsibility for the passenger transport income budget. Passenger transport income is a function of passenger miles and tariff. The load factor on passenger trains can be reasonably forecast from the historical data that already exists, and the trends shown in recent years. The tariff is set taking into account government and social policy.

The responsibility for determining the load factor rests with the transportation manager. The tariff is a matter for negotiation, between the Board and the government. The basis for the assumptions made must be clear and noted.

- **Other activities**

These activities will be subsumed into the operational activities and budgeted within that area of responsibility.

- **Non-sale items**

These activities will be subsumed into the operational activities and budgeted within that area of responsibility.

- **Overhead budget**

Historical data exists to enable realistic budgets to be prepared on all major items of expenditure. In addition to monetary budgets, activity budgets should be made for suitable categories. For example, numbers of employees by department and location should be budgeted. The expenditure figures should be analysed by department and should be the responsibility of the department head. Included in the overhead budget will be items such as depreciation, which are non-cash items and these should be highlighted to ensure they are correctly dealt with in the cash-flow forecast.

The categories of expenditure under which they are analysed needs radical review and updating. This has already been addressed in the report under the heading of Cost Analysis. The reporting of expenditure need to be done on a commercial basis having a view to modern financial reporting requirements.
Certain areas of expenditure presently borne by the Tajikistan Railways should more properly be categorised as Social Costs, which do not add value to the railway system, but which are an integral part of the present cost structure of the Tajikistan Railways. These items need to be included in the budget, as with all other costs. They should be highlighted to enable the Tajikistan Railways board negotiate with government regarding these costs.

- **Cash flow budget**

This is an integral part of the budgetary process and is essential for management to assess the capability of the railway to achieve its various operational goals. At present certain obligations of the railway are being deferred, and unpaid due to lack of funds. Also planned and necessary maintenance is being postponed, which is resulting in operational difficulties. This cannot continue indefinitely. Management cannot allocate resources on a priority basis without adequate and accurate information.
The budget should include the totals from the Revenue budget, the Overhead budget adjusted to exclude non-cash overheads such as depreciation, and the Capital budget. A realistic assessment of the timing of Revenue receipts, Overhead payments, and Capital costs must be made to manage the resources of Tajikistan Railways. These timings should be assessed on a monthly basis, so that any short-term deficits can be foreseen, and temporary credits arranged to accommodate the deficits.

- **Capital budget**

The need to produce an annual Capital budget is fundamental to the business. This should be done in conjunction with the department heads, and items for inclusion should have supporting documentation justifying the proposal, from an operational and financial perspective. The approval of items in the Capital budget must take into account the financial return from the investment, the effect operationally of the decision to invest or not and the availability of finance, either from within the railway's own resources, by borrowing the funds or by the injection of equity finance. Priorities will have to be assigned to the items on the budget, consistent with the actual performance of Tajikistan Railways. The Capital budget must be approved at Board level.

- **Overall budget**

The person responsible for that department must approve the overall budget at individual department level. The relevant manager must then approve it. The finance department must produce the consolidated version of the budget, which should be approved by the Chief Executive, and finally by the Board of Directors. The approval system is an integral part of the budgetary process, and ensures that people are aware of their responsibilities in achieving the targets set.

5.5 Management reporting system

To be of benefit, the reporting system must follow exactly the format and contents of the budget. Monthly management accounts should be produced, with comparison to budget and variances noted. Comparison will be given for the corresponding period in the prior year. Figures are generally reported on a monthly basis with the year to date also given, against budget and the prior year. In this way progress can be assessed and reviewed. It is also necessary for a management commentary by each manager to be appended to the management figures. Non-financial information should also be reported, such as Freight/Tonne/Kms, Passenger/Kms, and Payroll numbers.
As monthly figures are produced at present, this should not present too much difficulty. Training will be necessary for staff to learn and understand the concepts and detail included in the revised coding system. There will also be a cultural change in reporting to lines of management not presently receiving this type of information. It will be a major task of management to educate and

inform all persons involved in the process to ensure full compliance and co-operation with the system.
The reports to management should reflect the level of responsibility, and the detail included is appropriate to that level. For example, at department level, each cost and revenue category should be shown against budget, whereas at Board level consolidated summaries are appropriate.
For the system to work effectively it is essential that reports are issued to those responsible for the activity. For example, the senior manager in Khojnd should receive a management report showing the revenues and costs under his control. Similarly, the senior executive of the MIS department will receive a management report on his/her department, against budget and the prior year. As this is a non-revenue earning department, this will be a significant change in culture within the organisation.
It is absolutely essential that the accounting system be an integrated one, with one set of figures being used for all purposes. This requires that the nominal ledger be used for all reporting purposes, and that the coding system in use is understood and operated by all functional areas.

5.6 Corporate planning

This function comes under the direction of the Finance Department, and is responsible for drawing up longer term strategic plans over five and ten year periods.
The Department must operate as a service department to the operating divisions, acting as a facilitator and co-ordinator for the planning process.
The need for strategic corporate plans is fundamental to ensure the ordered and co-ordinated development of the enterprise.
Corporate planning requires high level inputs from all departments, in particular the operating departments. The process is akin to the budget process, but takes a longer, and therefore more general, look at the factors affecting the enterprise. The primary base of assumptions will generally be on the basis of similar levels of activity, revenues and costs. These assumptions will then be modified on the basis of inputs from the Marketing, Planning and Sales Departments of each Division, together with an assessment on the likely result of forecast economic growth or decline in the region. These factors are then used to forecast over a five and ten year period on an annual basis, the volumes of business, and the resultant revenues. The costs associated with the forecast level of activity are then assessed.
The ability of Tajikistan Railways to fulfil the forecast level of activity from an operational point of view must then be considered, and recognition taken for shortfalls in rolling stock or deficiencies in trained personnel. The impact of these deficiencies must be assessed to clarify if they can be overcome by investing in new rolling stock or retraining or whatever the deficiency happens to be.
The corporate plan should be adopted each year by the Board of Directors, and should be reviewed and updated on an annual basis, taking into account the achievements, successes and failures of the past.
The corporate plan will be an overall strategic document, which will outline the general direction in which the Board of Directors determine the enterprise should go. It will address the major issues of Revenue sources, Costs, including payroll numbers and social costs, maintenance schedules and capital expenditure. It will have regard to available capital, the need for borrowing, and the ability of the enterprise to service any such borrowing.
The Corporate Plan should be considered and used as a guideline when reviewing applications for capital expenditure and the allocation of resources. It should assist in creating an ordered and priority driven allocation of funds and operation assets.

5.7 Accounts considerations

5.7.1 Depreciation

Tajikistan Railways has provided depreciation on an historical cost basis. This is inadequate and will not be adequate to provide for replacement equipment. This is particularly so as the routine maintenance programme is being deferred due to lack of funds and equipment. This will

inevitably lead to a shorter useful life for the assets, and a corresponding requirement to replace them more quickly than had been anticipated.
A policy of providing for depreciation on replacement values should be introduced.

5.7.2 Bad debt provision.

Tajikistan Railways does not write off any debts that are uncollectable. There are debts being carried in the system which are uncollectable. This policy does not help management assess its asset base as it overstates the asset position.
Bad Debts should be written off as they are incurred.

5.7.3 Independent audit

There is no statutory requirement or regulation requiring the financial statements to be subject to independent audit. It is desirable that this be introduced to give management, the Board of Directors and the government assurance on the integrity and consistency of those statements.

5.8 System requirements

For the purposes of the accounting system, a reasonably simple system, probably PC Network based, would be adequate for the foreseeable future. The activity level in terms of transactions is not particularly high. The turnover in 1997 does not warrant a large-scale installation. The largest system is the payroll and this will require a specially written program. The payroll system can be integrated by means of a bridge into the nominal ledger system. The nominal ledger requirements are such as can be processed by any number of standard packages, without modification.
It may be considered appropriate to consider available systems with the other CIS Railway companies, and to agree on a common system. This would facilitate training and implementation, and transferability of data.

5.9 Conclusion

The lack of profitability and cash flow means that urgent and drastic action must be taken to ensure the continuance of the operation. It cannot survive without restructuring, operationally and financially.
The present accounting system needs to be changed to bring it into line with modern reporting systems. The management information system needs to change to reflect modern structures.
The base information is available within Tajikistan Railways to implement these changes.
Company wide involvement will be necessary to ensure the changes proposed meet the needs of management.
Training will be necessary to ensure a speedy and accurate transfer to the new system.

6 Cost and Financial Analysis

6.1 Financial analysis and control

Due to lack of a suitable M I S it has proved very difficult to get the neccessary data to clearly examine the financial state and prospective profitability of the railway's constituent businesses.

6.2 An outline approach to railway business evaluation.

Financial analysis and control concerns the overall financial evaluation of the profitability of the business. This may be further analysed into identifiable constituent parts. At its highest level this is the 'Profit and Loss Account' for the business as a whole. The next level of business evaluation is the identification of those parts of the business for which meaningful costs and associated income can be determined. For example, profitability statements can be prepared separately for the Freight business and the Passenger business, and also for sub-divisions of these main businesses. These identifiable parts of the business can be called 'Profit Centres'.
In addition, overall and localised cost control and productivity monitoring, down to Cost Centre level, is accomplished through the budgeting process in which predetermined levels of activity and associated expenditure and income (where appropriate) are measured against actual performance.

6.3 Budgetary control and cost centres

The Budget Process is a means of setting out the plans of an organisation. The process for the railway should start by agreeing the amount (volume) of traffic, both freight and passenger, that will be carried in the future period and the revenue to be earned, and also identifying the resources necessary to achieve that business plan.
The revenue income for the railway is earned by selling services--to freight customers, and by carrying passengers. Such income will only materialise if the railway provides the service that the customer requires and at a price that seems reasonable. The planning of service provision starts with market research to know what the customer wants by way of a transport service, and how the railway can satisfy these needs by running trains commensurate with the assessed demand.
A budget of expected income is prepared for each Profit Centre - that is, each identifiable portion of the overall business for which a reasonable assessment can be made of the revenue income, and the associated costs of production.
The expenditure budget is the financial measure of the use of resources and facilities necessary to achieve the production of the transport service. The various functions within the railway organisation (selling/marketing, operations, maintenance and infrastructure, etc.) will each have input into the overall production plan. The cost of that input will be reflected in their individual budgets.
Financial and management control may be exercised through the setting of targets or budgets. To be effective the output should be managed in small packages-that are in defined parts of the production area, which is the responsibility of one manager or supervisor. This area of responsibility is called a Cost Centre. A single manager may be responsible for several Cost Centres.
In assessing the costs associated with a Profit Centre, some costs centres will provide work or services to only one profit centre whereas most cost centres will provide service to several Profit Centres and some means will be required to apportion the costs between them. The method of apportionment will vary according to the type of work or service performed and the ability to measure the output to provide a fair method of sharing these joint costs. The method may be based on share of the total hours of use or distance travelled, or quantity of stores consumed e.g. fuel for locomotives can be assessed as 'litres per gross tonne kilometre' x cost per litre issued; the time cost for using rolling stock would be calculated in terms of 'cost per hour in service'.

6.4 Business units

Business units can be defined as those elements of activity, within the overall railway organisation, where the income and expenditure associated with production of the service/ activity are identifiable, thus enabling a view to be taken of the 'profitability' of that activity.
The main activity of a railway is the production of passenger and freight train services. There may, in addition, be several other activities undertaken by the railway, which it is appropriate to regard as businesses. Examples of these additional business units include the 'Industry Units' and the "Management of the Railway Infrastructure",
The state may assume ownership and responsibility for the railway infrastructure, but the day to day management of the railway infrastructure may be delegated to the railway, for the duration of an 'Operating Contract' between the state and the railway.
The Business Units must be meaningful and practical, and be able to determine both receipts and costs, if they are to be used as a basis for business evaluation and decision making. The use of resources and their associated costs must be sufficiently particular to the specific services of the Business Unit to make their identification and method of allocation to that business appear to be sensible. That is, after time for adjustment and understanding the methodology, these costs could be 'avoided' by the railway in the absence of that specific Business Unit. Receipts also must be reasonably attributable to the services provided, although some 'joint revenue' (between competing and connecting business units) may be inevitable.
The proposal for creation of Business Unit reporting can be accomplished using present manual accounting systems, but would also work more efficiently if the railway adopted a computerised Financial Accounting and Management Reporting system (MIS).
Making progress towards the efficient management of these Business Units may suggest certain organisational changes, which will provide for executive responsibility for managing and controlling the income and expenditure attributable to each Business Unit. As an initial stage, it is suggested that the railway identify Business Units for Passenger; Freight; Infrastructure; and possibly also for certain 'Industrial Units'

6.5 Traffic costing or business evaluation

The main aim of Traffic Costing or Business Evaluation is to assist management to understand the commercial viability of the various 'transport products' (block train freight services, wagon load freight, express passenger or local passenger trains) that are provided by the railway company. The process of Traffic Costing is not the same as an annual 'profit and loss account', but is an assessment of the economic value to the business, and therefore uses a 'longer term' (or smoothed average) view of costs.
Traffic Costing may be used to provide an advisory service to the marketing departments as an *aid* to understand tariff setting and profitability; and also by the financial planning department for use in determining longer-term strategy and investment decision making.

6.5.1 The application of traffic costing

The application of Traffic Costing requires an understanding of railway operations. The analyst needs to identify the various processes that are involved in the provision of train services in order to prepare a meaningful analysis of the available financial and statistical data. The costs of some of these processes will vary proportionally with the volume of service or traffic activity on the railway, whereas other cost will only change as performance requirements trigger the provision of additional resources (e.g. a 'step change') There are other costs which do not appear to vary with the volume of activity e.g. the provision of basic track and signalling facilities.

6.5.2 Calculation of unit costs

The calculation of unit costs appropriate to the activity involves the identification of the activity and the application of the related production statistics. For example, fuel for train working may be expressed as a cost per gross-tonne-kilometre, whereas train crew or locomotive drivers can be measured as a cost per productive driving hour-derived from the cost of salaries and other

directly associated payroll costs for loco drivers at the depot which provides the train service, divided by the number of productive train hours worked by that depot, over the same financial period.

6.6 An approach to measuring cost and profitability of railway traffic

The value of railway traffic may be assessed by measuring the current income against the identifiable direct expenditure incurred in carrying the traffic, and viewing the (positive) balance as a contribution to the indirect joint and common costs of all other expenditure, such as administration and the cost of providing and maintaining the infrastructure.
From information available at the depots it is possible to analyse the staff costs in the Locomotive department to drivers, by type of traction. Thus it is possible to establish an approximate cost for drivers' costs for passenger and freight working.
There appears to be an adequate source of expenditure analysis at locomotive department depot level to provide a form of 'Depot Costing System' which can identify cost of maintenance by type of traction, or at least by 'workshop' within the repair works.
Fuel for traction may be allocated between passenger and freight on the basis of the gross-tonne-kilometres produced.
Part of the infrastructure costs may be debited to passenger on the basis that a portion of track maintenance costs are incurred because of the higher standard of track required to run a passenger service. Similarly the standard of provision and maintenance of signalling equipment is higher on passenger routes.

6.7 Proposed cost and profitability analysis system

In proposing a costing system for any business, it must be recognised that the prime purpose of the system should be to provide meaningful information on a regular basis to managers at the lowest possible level, so that they can fully appreciate the costs and "profitability "of their part of the organisation, measured against an agreed budget or "transfer price" within the business sector. The objective must surely be to assist in the promotion of a business that provides "value for money spent".
A suitable Cost and Revenue Analysis System will require to reflect the various "business activities" of the railway. In any railway the basic unit of production is a train. The costing and revenue analysis system is therefore attempting to identify the costs and revenue associated with the running of a train service.
The first main division is to identify the Core Business-that is to account for Passenger, Freight, and Other Activities in such a manner that the cost of providing the service can be matched with the revenue generated by that part of the business activity. It may then be possible to further sub-divide each activity into sectors to which revenue and costs can be specifically identified.

6.7.1 Identification and allocation of costs

A clearer understanding of how costs arise, and of asset utilisation will help to identify any over-provision of facilities, and point the way toward a more profitable railway. Costs on a railway arise and change in several different ways, depending on the nature of the cause of the cost.
All costs incurred by TZD will be accounted for via a Cost Centre and can be compared each accounting period with a cost centre Budget. Each cost centre can also calculate Productivity Indicators, which can be used in comparing the work output, appropriate to the cost centre. For example a train crew depot could calculate the total number of traincrew man-hours as a ratio of the productive train hours worked from that depot, and the civil engineer can calculate the number of man-hours per kilometre of track maintained in the month.

7 Management information system

7.1 Introduction

Tadjikstan is an independent state which was formerly part of the Soviet Union.
Tadjikstan Railway (TZD) with its 423 km of lines is a relatively small railway, which employs 7,333 staff, carries 0.9 million passengers and 0.6 million tonnes of freight each year.
The management of the railway is being restructured in line with government policies and trends in other Central Asian Railways.
This restructuring, which will reflect an enhanced business focus, will result in a new organisational structure with associated management information needs.
Railways in the Soviet Union were administered as an entity with all significant decisions being made in Moscow with Russian as the "railway" language and all activities being carried out by a universal code of practice.
This uniformity applied to MIS in the same manner as it applied to railway operations and manifests itself in the form of large computer systems which were operated in a consistent manner throughout the Soviet Union.

7.2 Current management information systems (MIS)

7.2.1 Central control under Soviet Union

The management information systems, like the railway operations in the Soviet Union, were highly integrated and controlled by the Ministry of Railways (MPS) in Moscow.
Included in these arrangements was a Soviet Union wide computer network based on a central computer centre (MCC) in the MPS in Moscow and a large number of regional computer centres (RCCs) strategically located throughout the Soviet Union.
Each railway station was assigned to an RCC. The railway stations in the Tadjik area were assigned to an RCC located in the Uzbeki city of Tashkent. Consequently, the computer equipment which had served the Tadjik area remained in Uzbekistan on the dissolution of the Soviet Union.
Two major computer applications systems, ASOUP and EXPRESS, were the primary users of this Soviet-wide network. ASOUP is a wagon information system and EXPRESS is a passenger ticketing and revenue accounting system.
Not having the funds necessary to acquire an IBM mainframe, TZD has had to enter into a two year agreement with the Uzbek RCC for the processing of data relating to freight traffic in Tadjikstan on the ASOUP system.
The integrated working which was a feature of the railways during the days of the Soviet Union has continued since the dissolution of the Union.

7.2.2 Integration in C.I.S. and Baltic States

The railways in the independent countries which were formerly part of the Soviet Union continue to use Russian as the "railway" language and to use a standard set of operating rules and regulations throughout the C.I.S. and Baltic States.
This close working has resulted in the continued use of ASOUP and EXPRESS with the MPS in Moscow continuing to act as the central support (management, development and operation) of the computer network and the software of these major systems.
The continuing central role of the MPS is demonstrated by the fact that the MPS continues to oversee the inter-railway settlement of payments for freight traffic on railways in the C.I.S. and the Baltic States.
Railways in states such as Tadjikstan which did not have an RCC within their new territorial boundaries have had to depend on the use of an RCC in an adjacent state to maintain their participation in systems such as ASOUP and EXPRESS.

Accordingly, the TZD has to rely on an Uzbekistan RCC in Tashkent for its ASOUP processing, database maintenance and interactive links to the MCC in Moscow. RCC "Tenant" users such as the TZD do not have access to the full facilities of ASOUP.

7.2.3 MIS developments under TZD

TZD has sought to redress this situation by commencing a programme of system development based on PC's during 1997.

- ASU - This is a PC based system for the management of the TZD wagon fleet,
- Information Inquiry System - This is a LAN based system in the TZD central administration,
- Dispatcher Information System.

The development work undertaken in 1997 is continuing in 1998 with a programme which includes:

- continued development on the ASU system,
- development work on a control system for the TZD container fleet,
- development work on a PC based alternative for the mainframe based ASOUP system.

7.2.4 Limitations on TZD development initiatives

It is indicated that it has not been found possible to replicate the full functionality of the mainframe based ASOUP system using PC's.
It has also been pointed out that the implementation of systems such as those referred to above is inhibited by a lack of communications links between the TZD central administration and the railway stations.

7.2.5 Passenger ticketing

No information has been provided regarding how passenger tickets are issued or processed. There is no indication of EXPRESS the centrally controlled passenger ticketing system being used.

7.2.6 Other activities

While the information supplied advised that there were two computer networks in the TZD administrative headquarters no indication was given of the functions which were carried out on the computers on those networks.
For example, there is no information regarding how basic tasks such as wages calculation, inventory control, revenue accounting, financial accounting, management accounting, asset records etc., are undertaken.
The absence of information can only be taken to indicate that these functions are largely manual and as a consequence highly labour intensive.

7.2.7 Migration to PCs

Available information indicates that the development of PC based systems, which appears to have commenced in 1997, has been focused on wagon and container control.

7.2.8 Computer hardware

The TZD is using two types of computing power:

- the processing power of the Tashkent RCC for the ASOUP system,
- a population of micro-computers, in the 486 to Pentium range, some of which are on two LAN's in the TZD central administrative headquarters.

7.2.9 Computer network

Information necessary to produce a diagram of the disposition of computer resources and illustrating the extent of computer networking has not been supplied. Perhaps, given the current political situation in Tadjikstan, this lack of information arises from security reasons.

7.2.10 Communications network

The information supplied indicates that the TZD employs a combination of private railway communications lines supplemented by lines rented from Tadjik Telecom.
It is also advised that the local computing networks are based on coaxial cable and that transmission speeds of 1,200 bps obtain.
TCP/IP and IPX communications protocols are said to be in use.
No information has been supplied on the extent of these communications links.

7.2.11 Computing languages etc employed

The developers of the PC application systems use the following tools:

MS-DOS,
WINDOWS95,
WINDOWS NT,
PASCAL,
FOXBASE,
ARAT.

7.2.12 Intention to purchase:

SUBD,
ORACLE,
DELFIE.

7.3 Recommendations

7.3.1 Limitations of information

The absence of access, for very good reasons, to the Tadjikstan locations coupled with the limited data provided on the computing and communications systems is a profound inhibitor when making recommendations.

Notwithstanding these inhibitions, there are a number of recommendations which may be made in the context of the expressed need for restructuring in TZD.

7.3.2 Management of MIS development

There is a need to ensure that investment in MIS supports the new management organisation in the achievement of TZD business objectives.

It is recommended that an MIS Steering Committee be established to:
- determine MIS policy,
- assess proposals,
- set implementation priorities,
- control MIS costs.

This group, which would be led by the Director General of TZD, would be guided by its assessment of how proposed projects would contribute to the achievement of TZD business objectives in a competitive environment.

Project proposals would:
- originate in the Business Units,
- be assessed for technical feasibility by the Computing section, and
- be costed in conjunction with the Finance Director.

Project proposals would be presented to the MIS Steering Committee by the proposing Business Director supported by the Head of Computing.

Approved projects would be passed to a Business Unit Working Party which would be responsible for the development and implementation of the project:
- to specification,
- as scheduled, and
- within the approved cost budget.

Business Unit Working Parties would consist of representatives of the Business Unit and the Computing section. These Working Parties would be led by the Director of the Business Unit or a nominee of the Director. The Computing section or an external contractor would undertake work on a sub-project basis for the Business Unit Working Party.

The leader of each Working Party together with the lead Computing representative on the Working Party would report to the MIS Steering Committee on progress against specification, cost and schedule. It would be the responsibility of the MIS Steering Committee to initiate project performance audits following a period of live running.

The adoption of this approach to MIS development should ensure that:
- business focused cost effective applications systems which yield improved services to the customers in a cost effective manner are implemented,
- the business unit managements had a sense of system ownership with an associated sense of responsibility for the successful implementation and operation of new systems,
- computer applications were developed for all aspects of TZD.

7.3.3 Information quality

The introduction of a new management organisation with a competitive business focus will generate a demand for information to be available as required.

The servicing of this demand will call for the availability of an appropriately organised database with online enquiry tools which enable the end user to access the database and formulate enquiries with a minimum of effort.

It will be essential to ensure that there is consistency in information produced whether in scheduled reports or in response to ad-hoc enquiries. To meet this requirement data should be entered once and held in one database which is accessable to all users in accordance with a hierarchy of access rights.

7.3.4 Data coding

The manner in which data is coded at source will be central to the achievement of good information.

A coding system must condense information, ensure uniformity of presentation, eliminate ambiguities, and facilitate sorting and filing.

The coding system must enable each item in the list to which it refers to be identified in a single, reliable and easy manner. The code chosen then makes it possible to achieve the necessary one-to-one relationship between an item and the symbol which represents it. It should also enable items in the list to be described.

A coding structure must therefore essentially meet the following requirements:

Permanence:	the code allocated must remain unchanged for as long as possible,
Simplicity:	the code must take account of the conditions under which it is to be used and the personnel using it,

Accuracy:	there must be no ambiguity in allocating a code to an item or in recognising an item from a code,
Conciseness:	codes should use the minimum number of symbols, taking into account the requirements expressed by the users, and if at all possible have a constant length,
Enhancement:	it must be possible to update the code in the event of the number of items in the list being increased,
Numeric:	so as to avoid difficulties associated with the use of different alphabets.

It is important that a coding structure should have sufficient provision for an expansion so as to avoid the problems/cost of upgrading computer applications and/or having to undertake tasks such as the re-marking of railway rolling stock.

The efficient operation of a coding structure depends on code allocation being vested in a single authority.

Where a coding structure is used by two or more sections of an organisation, there is a need for agreement between the parties as to which should be the code allocation authority or as to whether code allocation should be vested in a committee representative of the participating sections.

Prime data should, as far as is feasible, be entered by the persons who are involved in the events to which a transaction relates. Online validation of data at the time of input will contribute greatly to the accuracy of data being input and to the overall accuracy of data being held in the computer system.

It is recommended that priority should be given to a review of the methods employed when analysing income and expenditure with a particular emphasis on the coding systems which are in use.

The review should assess the capacity of those coding systems to support the information needs of the new management and organisational structure.

It will identify ambiguities and omissions in the existing systems and make proposals regarding the course of action which should be followed, that is whether the existing coding systems should be upgraded or if, in fact, it would be better to develop new coding structures which reflected the new management requirements and the increased use of integrated MIS applications.

7.3.5 Accounting

It is recommended that the accounting needs of the restructured TZD should be met by the acquisition of an accounting package.

The selected accounting package should:

- be an industry recognised package,
- be hardware independent,
- have vendor/agent support in the region.
- support integrated financial and management accounting,
- support multiple currency accounting,
- support the processing of non-financial data,
- support multiple users,
- accept transaction input over a network,
- accept journal data by file transfer over a network,
- have a user friendly report writer,
- support data with desktop tools such as spreadsheets and word processors,
- include a user access control process.

It is expected that an integrated accounting system would, in addition to providing improved management information, yield savings in administrative costs through:

- the integration of data entry into the originating workplace,
- avoidance of duplication of data entry,
- the exchange of data with other systems over the computer network,
- abolition of manual analysis of data,
- abolition of manual preparation of reports,
- improved access to data on file in the database.

Subject to verification that accounting procedures are not already supported by a modern computer based accounting system, it is proposed that a provision in the region of US$140,000 should be made for the acquisition and customisation of an accounting software package, and personnel training.

7.3.6 Human resources

Organisational restructuring inevitably involves human relations issues. It is to be anticipated that the TZD with its large personnel numbers will not be an exception.

The implementation of a Human Resources policy within the context of an organisational and management restructuring will require that information on personnel numbers, grades, education, skills is readily available. It is essential that figures which are used as the basis of management decisions are consistent and accurate.

There is a need to maintain a close relationship between the Human Resources records of employee numbers and the numbers persons being paid through the Payroll.

Given that there has been a start to the networking of PC systems, it is also recommended that the possibility of installing a combined Human Resources / Payroll system should be explored. This recommendation is made on the basis that the payroll is currently manual.

In the event of a suitable payroll system being already in place or if it is not found feasible to install a combined Human Resources / Payroll system, it is recommended that a Human Resources system which has the capacity to accept data by file transfer from the Payroll system should be installed.

It is recommended that TZD should seek to meet its needs in these areas through software package acquisition before embarking on a programme of in-house development. This recommendation is particularly applicable to the Human Resources area where, in the context of a restructuring programme geared to a new competitive environment, TZD would be entering into an era of which it has no previous experience.

In the absence of data on the current status of Payroll and Human Resources systems, it is not possible to make specific proposals in this area.

7.3.7 Training

The successful implementation of an MIS Programme of Development depends on the commitment of management and staff to the objectives of the programme, and on the availability of the necessary skills to implement and operate the various segments of the applications which are being developed.

It is recommended that the policy in relation to MIS should become part of the general management and other personnel training which is undertaken in support of the organisational restructuring.

Technical personnel will have to be trained in the skills required to design, develop and install these new systems.

Business unit personnel will have to be given training in specification of needs, the testing of systems, the installation of systems and the ongoing management of systems.

User personnel will have to be trained in the tasks which constitute the daily running of the systems.

7.3.8 ASOUP

Given the significance of transit traffic in the overall viability of TZD, it is recommended that TZD should take steps to ensure that any local freight system should have full compatibility with ASOUP and total acceptance from the ASOUP railways.

7.3.9 Communications network

Stand-alone PCs have a potential for problems such as:
- duplication of keyboard data-entry,
- non-standard application development,
- absence of data security,
- inadequate or non-existent back-up procedures,
- private files unavailable to other users,
- inability to access files on other computers.

It is recommended that TZD should adopt a policy of progressively extending the computer networking to all PCs within as short a timeframe as funding availability permits.

The implementation of this recommendation should increase the usefulness of PCs which are currently operated in stand-alone mode.

Networking those PCs would:
- remove the need for duplicate data entry,
- avoid the hazard of data-entry errors,
- give ready access to the databases on the network,
- increase the availability of the PCs for data processing.

Communications and Information Technologies are becoming increasingly integrated. The quality of available communications links can be the determining factor as to whether, or not, an MIS project is viable.

The recommendations of the Module E study of communications will be central to the succesful extenstion of information and communications technology in TZD.

8 Railway operations

8.1 Objectives of this report

The objective of the task was to analyse the state of operational efficiency of Tadjikistan railways and the identification of possible improvements by low cost investments. The railway operation has been reviewed and proposals for cost reductions in railway operations have been made.

All efforts bear in mind that the former Soviet Union Railways achieved a grade of compatibility of systems that is unique in the world. This compatibility opens great possibilities for future markets to railway authorities and should be maintained.

8.2 Introduction

Once a part of the former Soviet Union railway, the present Tadjikistan railway infrastructure was designed to handle large quantities of goods and large numbers of passengers. Since freight and passenger volumes have dropped significantly it can be assumed that line capacity constraints do not exist under the present traffic volumes. Since there is no prospect for traffic volumes to rise again to previous levels, it is likely to remain as at present for the forseable future.

With the severe drop in transportation quantities that followed the breaking up of the Soviet Union and the independence of the Tadjikistan Republic, the needs for a re-orientation of Tadjikistan railway became evident.

8.3 The railway network

The railway network consists of 423 kilometers of single track. The railway connects up to the much larger Uzbekistan railway network.

8.4 Mode of operation

The mode of operation of Tadjikistan railway is based on the standards set during the time of the Soviet Union. All standards and rules for railway operations, for train configuration, marshalling, operation control and timetable planning methods etc. are based on the rules and procedures valid prior to independence. Every aspect of operations focused on achieving a fail proof railway system with several layers of redundancy.

Traffic on Tadjikistan railway lines is controlled by semi-automated signal boxed.

8.5 Train operation

Train operations are by diesel electric locomotives. There is no electrification of any rail line in Tadjikistan.

8.6 Safety

There is no doubt that TZD is a very safe railway and has a very good safety record.

The basic rules and regulations TZD is presently observing are the ones applied by the Ministry of Railways in Moscow.

8.7 Operation key parameters

8.7.1 Maximum speed and speed restrictions

There are two categories of maximum speeds:

- 90 kph for passenger trains
- 80kph for goods trains

On main tracks, a 40 kph speed restriction is applied to pass switching points in diverging direction. In addition to this general restriction, there are two types of locally applied speed restrictions:

- permanent speed restrictions
- temporary speed restrictions

The permanent speed restrictions are published in a booklet that is valid for the duration of the timetable period. The temporary speed restrictions are introduced on the spot in case of track failures, maintenance activities or other related reasons.

Speed restrictions are introduced mainly on account of bad conditions of sleepers.

8.7.2 Axle load, train lengths and train loads

Information under this heading could not be obtained.
The length of loop tracks is between 850 and 1050 metres.

8.7.3 Signalling equipment

Like in all former Soviet Union railways, in Tadjikistan the signalling equipment has been installed in two major investment phases:

- during the 60's and 70's most of the lines were equipped
- during the 80's signalling equipment of part of the main lines as well as the major stations has been replaced by more modern equipment

Further detailed information under this heading could not be obtained.

8.7.4 Telecommunication equipment

Detailed information under this heading could not be obtained

8.8 Evaluation of operation performance

The railway system's major function is the transport of bulk products, such as, cotton and aluminimum. The present rail services are hampered by poor maintenance and shortage of spare parts, both for the rail network and rolling stock.

8.8.1 Freight traffic

Freight traffic is running on a low scale, both on the northern line and the southern lines.

- **Container facilities**

Detailed information under this heading could not be obtained.

- **Loading and unloading facilities**

Detailed information under this heading could not be obtained.

8.8.2 Passenger traffic

Tadjikistan railways is operating a small number of passenger trains on the network. The passenger train operation programme has been taken over from the past. There has been no re-orientation in the concept and the services, both in terms of comfort and speed, are slowly deteriorating.

8.9 Recommendations

Our recommendations for improved operations of Tadjikistan railways focus on six different issues.
These are:

- develop a new operation strategy
- increase of line speed
- close stations no longer needed for operation purposes
- reorganise the passenger traffic concept
- modify the freight traffic concept
- upgrade the container loading and unloading facilities

8.9.1 Develop a new operation strategy

The present operation strategy of Tadjikistan railways has come down from the past. In a context of growing competition of transport modes, the railway is forced to accept the strengths of competing modes and to identify its own strengths and, of course, its own weaknesses. As a result of this analysis, objectives have to be defined, which express:

- public requirements
- needs of the customers
- efficiency and cost effectiveness of the services provided

8.9.2 Increase the speed

The speed on the lines should be increased. This requires capital investment as laid down in the infrastructure part of this report.

8.9.3 Close stations no longer needed for operation purposes

The average distance between stations on the Tadjikistan railway lines is approximately 15 kilometres. This is in many cases way above the requirements needed for the present and future operations programme. We recommend closing of stations no longer needed for crossings and passings and removal of the access tracks and switching points.

For this purpose it is necessary to conduct line capacity calculations. We propose calculations based on the internationally recognised Method of Line Capacity Calculation according to UIC 405 R.

All future planning on the TDZ network makes it necessary to establish universally recognised standards.

8.9.4 Reorganise the passenger traffic concept

The passenger traffic concept should be reorganised in order to make it more cost effective.

8.9.5 Upgrade the container loading and unloading

Tadjikistan railway officials are well aware of the potential that lies in intermodal traffic.

9 Infrastructure

9.1 Characteristics of tracks

As in the former Soviet Union width of railway track in Tadjikistan is 1.520 mm.
The main features of the Tadjik railway network are given in the table below:

Main track	482.5 km	
Siding	81 km	
R 75	0 km	0%
R 65	245 km	51%
R 50	201 km	42%
R 43	36.5 km	7%
Continuous welded rails	19 km	5%
Concrete sleepers	206 km	43%
Timber sleepers	276.5 km	57%
Switchgears	494 units	
18%	32 km	

All lines are in single track.

The structure of the standard track:

- rails 50 kg/m
- normal bars 12,5 or 25 m
- timber sleepers (most often pine) at a distance 54 cm
- laying on supporting cushion with spikes
- anchors
- ballast 30 cm

Recently a 19km section has been upgraded by laying continuous welded rails on concrete sleepers. These concrete sleepers of Russian or Kazakh production are monoblock with fastening KB.

To improve the quality of tracks at damaged sections, several concrete sleepers are laid into the track.

On the territory of the Republic there are no electrified lines.

9.2 Tadjik railway network

The Tadjik railway is divided into the South network and the North network.

There are 110 km of tracks in the North and 313 km in the South.

9.3 General state of tracks

9.3.1 Analysis of speed limitation

There are three main reasons for speed limitation:

1 poor quality of sleepers
2 problems of structures
3 depreciation of rails

The poor quality of sleepers is the most important problem.
It is the reason why speed limitation is reaching 40 km/hour on 18 km.

In some sections speed is limited to 60 km/hour due to insufficient repair works in areas where sleepers are not suitable any longer.

In the South there are speed limitation to 15 km/hour due to poor quality of timber sleepers.

9.4 Typical operations

9.4.1 Capital repair: replacement of tracks and ballast

These operations are performed in accordance with the rule of 750 000 000 ton of freight traffic (gross weight).

Due to low loading of the railway (at present the traffic is only 200 000 000 ton of gross weight), the tracks will be replaced only in five years.

At present the Tadjik railway has no heavy mechanised equipment for these type of works.

A contract with RMC (fundamental Repairing Group) of Uzbekistan is under way to execute track replacement works in the North section.

9.5 Current repair

These works are carried out by service sections.

The most frequent types of works:

- replacement of sleepers
- leveling of joints
- leveling of track
- lining
- laying of ballast
- replacement of rails

Most of these works are carried out manually.

9.6 Repair works

9.6.1 Repair brigades

A service section is responsible for repairing the track.

The works are divided in several service sections throughout the whole territory.

There are:

- 11 service sections in the North
- 26 service sections in the South
- 3 brigades for repairing structures
- 1 mountain brigade repairing the damages caused by rockfalls and landslides.

Each section has 5 brigades with 12 people in each and maintains from 20 to 23 km of track.

Each service section has:

- 1 tractor
- 1 truck for workers
- 1 generator
- 1 set of portable tools (mechanic cross-cut saw, hand-drill...).

9.7 Inspection car

The railway has no measuring car.

To determine internal defects of rails 9 fault detectors (ultrasound or mechanic echo sound led on the platform) are used.

- 4 fault detectors are used at section Leninabad
- 3 fault detectors are used at section Dushanbinski
- 2 fault detectors at Kurgan-Tube section.

9.8 Mechanical machines

- SPM

This is a small tamping machine equipped with 4 tamping devices.
Productivity of the machine is 200 m/hour.

- 2 trolleys equipped with two raising levers
- 2 machines for track inspection
- bunkers (funnels) for ballast.

9.9 Track components

9.9.1 Rails

R 75	0 km	0%
R 65	245 km	51%
R 50	201 km	42%
R 43	36.5 km	7%

Due to low utilised capacity of the railway, rails have low depreciation and their replacement is not envisaged in the next 5 years.
In respect of rails replacement the preference should be given to long rails.
Utilisation of long welded rails would allow significant saving in maintenance (25%), as it would not be necessary to repair joints.

But this technology cannot be used with present sleepers and clamps.

Long rails could be utilised only with replaced track and concrete sleepers.

Joints maintenance represents the most part of repair works.

Levelling of joints is done manually.

Replacement of rails grooves is made often.

9.9.2 Sleepers and fastenings

- **Timber sleepers**

Timber sleepers amount to 57% of all sleepers. The repair of these sleepers is a major problem. These sleepers are imported from Russia.

Mostly they are made of pine although today different types of trees are used. Protection of sleepers with creosote is not always well provided. There are many deteriorated sleepers on the railway.

Rails are settled on metal supports. Rails are fixed with clamps. If a clamp hole becomes unsuitable, it is impossible to drill a new hole to prolong the life of sleepers and clamps. TZD has enough clamps, there is no need to import them.
The rules on technical maintenance require speed limitation to 40 km/hour at sections where 70% of sleepers have deteriorated.

The priority on this sections is to replace sleepers. We propose to provide for mechanised replacement of sleepers at these sections, which would allow easier technical maintenance of joints.

The rules on technical maintenance require speed limitation to 60 km/hour on sections where 50% of sleepers are deteriorated.
Due to difficulty of maintenance, many deteriorated sections, where originally speed was limited to 40 km/hour, have been repaired partially only to increase speed to 60 km/hour.
Some sleepers should be replaced on these sections so that speed could be increased.
It is possible to use concrete sleepers for better and longer utilisation.

- **Concrete sleepers**

Concrete sleepers are laid in some sections between wood sleepers in order to increase quality of the railways.
This year TZD is planning to purchase 20 000 concrete sleepers.

The used clamps are Russian clamps KB. Maintenance of these clamps is difficult.
Big corrosion problems appear on clamps, particularly at the place of bolt fixing.
These problems lead to poor quality of rails and are the main reasons of poor electric isolating.
Cost of each system of clamps for one sleeper is USD 27.

- **Ballast**

Ballast is mainly imported from Uzbekistan.

9.9.3 Track equipment

The main track and sidings have 494 switchgears. There has not been any case of speed limitation because of deterioration of the equipment.

9.10 Technical maintenance personnel

The technical maintenance of 482.5 km is provided by 940 workers, 1.95 people per 1 km.

Mechanisation of technical maintenance and improvement of track components materials should allow to decrease volume of works for some repair brigades.

The main operations are the following:

- replacement of sleepers
- leveling of track
- grinding of rails

The purchase of a tamping machine would allow saving of much time in the maintenance of track geometry.

The purchase of material to equip the mobile brigade in charge of the replacement of sleepers and improvement of sleepers (new wood sleepers or concrete sleepers) would facilitate work on "sleepers replacement".

One repair brigade is responsible now for 20 and more km of track. Each brigade consists of 12 people.
Mechanisation of works on leveling and sleepers replacement would allow to reduce the number of workers in brigades to 8 people.

On the other hand, specialised brigades for mechanised works should be organised.

The current situation:
15 brigades, 12 workers in each, or 180 workers in total.

9.11 New line project

The Tadjik Government has given agreement for the construction of the new railway line between Kurgan-Tube and Kuleb.

The construction of the new line started in 1996.

In 1997 by-pass railway has been put into operation (for turning locomotives) at Leninabad station.

9.12 Structures

There are 69 bridges, but no tunnels.

Types of bridges	Number
Metal bridges	30
Mixed or ferro-concrete bridges	39

The 2 main bridges are metal.

Length of these bridges:

247 m - on Vahsh river
126 m - on Kafernigan river

These bridges are in good condition and are not subjected to damage.

The 145 mixed and ferro-concrete bridges represent many small hydraulic structures.

These structures are in good condition and their number is sufficient. In the period of snow melting there are no problem of drainage.

9.13 Recommendations

- **Improvement of track components**

In general we can say that technical maintenance suffers due to a lack of materials.

The purpose of investments will be the following:

- urgent purchase of sleepers
- provision of TZD autonomy by inviting third party to invest in concrete sleeper production.

Wood sleepers

The purpose is to cancel speed limitation to 40 km/hour on all lines. Speed is limited on 35 km of the railway. Wood sleepers are necessary for total replacement of sleepers at the mentioned sections.

Actions	Supply of 60,000 wood sleepers
Budget	USD 1 500 000

Concrete sleepers

1. Replacement of timber sleepers with concrete sleepers.
2. Organisation of concrete sleepers production internally (on the basis of ZBK-1; there is an agreement).

The priority on sections with damaged sleepers should be their replacement with wood sleepers.

However, it is necessary to avoid deterioration of the remaining parts of the network and to maintain the partially repaired sections where speed limitation to 60 km/hour still remains.

We propose to buy 10,000 sets of concrete sleepers, which will replace wood sleepers to avoid deterioration.

Actions	Purchase of 10000 ferro-concrete sleepers
Budget	USD 500 000

- **Improvement of the plant for production of sleepers**

Despite the problems of poor quality of tracks, it is important to secure autonomy of TZD in provision with sleepers in future.

The need for sleepers are justified by the new line project. We propose to invest in the sleepers production plant.

These investments will allow:

- to help to improve the plant
- to provide metal armature for the production starting

Actions	Investment in the plant
Budget	USD 500 000

9.14 Improvement of technical maintenance

9.14.1 Equipment

At present most repair work is executed by hand. The present equipment has become out of date, obsolete, and repair is becoming more and more difficult due to a lack of spare parts.

This investment would allow purchase of the necessary equipment for brigades.

Equipment	[illegible]	[illegible]	[illegible]
Generator	9 000	10	90 000
Drill	7 000	10	70 000
Mechanic cross-cut saw	9 000	10	90 000
Tool for clamps removal	10 000	5	50 000
Tool for clamps driving in	24 000	5	120 000
Jack 5 t	1 200	10	12 000
Sleeper screw drivers	5 000	10	50 000
Lorry 1 t	450	10	4 500
Lorry 4 t	4 000	5	20 000
[illegible]			[illegible]

[illegible]	Purchase of tools
Budget	USD 500 000

9.14.2 Mechanisation of the technical maintenance

The technical maintenance of tracks consists mainly in a cycle of large works (full replacement) and in a cycle of medium repair (partial replacement of material).

These operations are performed by PMS and need to be well mechanised.

Full replacement, for example, requires well equipped machines for such work, which would allow to achieve the average productivity - 1000 m for the period of work.

Lack of materials and almost constant mobilisation of machines to the construction of new lines cause delay of these large operations, performing current repair instead of them.

Compared to highly mechanised works on replacement, poor mechanisation of current repair should be noted.

Today all operations are executed by hand, despite the fact that heavy equipment makes any small operation hard and very long.

We propose to mechanise works on current repair fully to give it more importance, to avoid delay of large operations and to maintain tracks more effectively and with minimal costs.

Operations provided more often by brigades on technical maintenance are operations on levelling and laying of tracks and replacement of sleepers.

- **VPO and SPM**

TZD has VPO and SPM machines to support geometry of tracks.

VPO is designed mainly for construction works and large replacement works and is not suitable for repair work.
SPM is a small machine with low productivity.

These two machines are not in working condition today.

We recommend purchase of mixed type 08 machine which would allow performance of current repair. This machine is able to maintain about 1000 m for the period of work.
Annually, the most part of railways can be maintained.

Actions	Purchase of machine of type 08
Budget	USD 1 750 000

- **Machines for sleepers replacement**

Operations on sleepers replacement are the most frequent operations in technical maintenance. Sleepers should be replaced either due to mechanical reasons (damage, scratches), or due to isolation problems of wood sleepers.

It is very difficult to execute these operations by hand, especially when the replacement should be with heavy concrete monoblock sleepers.

Operations on systematic replacement of wood sleepers will be a long process, if it is done by hand, and in the result the whole track can be destabilised for a long time.

We propose to invest in the material which would allow creation of a mobile brigade on sleepers replacement.

This brigade will be equipped with:

- 2 machines for sleepers replacement
- 2 sleeper screw drivers
- 1 mechanical cross-cut saw for wood
- 1 one-dipper excavator
- 1 small tamping machine (4th level)
- 1 machine (for material)
- 1 machine (for brigade)

Actions	Purchase of material
Budget	USD 1 400 000

9.15 Investments

9.15.1 General investments

Name		Quantity	
A – Improvement of components			
Concrete sleepers	50	10 000	500 000
Wooden sleepers	26	60 000	1 500 000
Improvement of the plant			500 000
B - Improvement of technical maintenance			
Tools			500 000
C - Mechanisation of technical maintenance			
Tamping lining machine	1 750 000	1	1 750 000
sleepers inserting gang equipment	1 400 000	1	1 400 000
TOTAL			6 650 000

9.15.2 Annual investments $ US

Name					
A - Improvement of components					
Concrete sleepers	250 000	250 000			
Wood sleepers	500 000	500 000	500 000	500 000	500 000
Improvement of the plant	100 000	100 000	100 000	100 000	100 000
B - Improvement of technical maintenance					
Tools	500 000				
C – Mechanisation of technical maintenance					
Tamping lining machine		1 750 000			
Sleepers inserting gang machine	1 400 000				
TOTAL	2 750 000	2 600 000	600 000	600 000	600 000

10 Rolling stock

The rolling stock of TZD is maintained by two departments:

Locomotives by the Locomotive Department.
Freight wagons and passenger coaches both by the Wagon Department.

Each department has separate depots in Dushanbe, and on the line in the north of Tadjikistan through Khudzhand

The northern line is mainly a transit route for Uzbekistan traffic, which is hauled through Tadjikistan by TZD.

The central line serves Dushanbe, and runs from the border to Yangi Bazar.

The southern line from the border to Kurgan-Tyube, Vakhsh, and Yavan is not connected to the central line, except through Uzbekistan, but maintenance is carried out in Dushanbe.

Some parts of the report are incomplete due to the curtailment of site visits, and the lack of promised information from TZD.

10.1 Locomotives

10.1.1 Main line diesel locomotives

The TZD main line fleet consists of 37 locomotives, of which 31 are currently available for traffic. The age profile of the locomotives is as follows:-

AGE	up to 5	5-10	10-15	15 20	20-25.	25-30	over 30	TOTAL
2TE 10L					6			6
2TE 10V				29				29
2TE 10U	2							2
Total	2			29	6			37

The TRACECA Rolling Stock Maintenance Report July 1997 shows a fleet of 42 locomotives, but since then some of the older locomotives have been scrapped. All locomotives except one were then reported as operational, but since then there has been a reduction in availability - numbers have fallen to the current figure of 31, which is still more than operational requirements.

The condition of the locomotives is as follows:

TYPE	TOTAL	CONDITION				
		Parts	Factory repair	Depot repair	Serviceable	Operating Daily Need
2TE10L	6	0.5			5.5	
2TE10V	29	0.5			23.5	
2TE10U	2				21	
TOTAL	37	1	?		31	26

The operating daily requirement is for 9 main line locomotives at Dushanbe and 17 at Khudzhand.

The 2TE10 diesel-electric locomotives are 6000 hp and are all Russian built by Lugansk. A locomotive consists of two 3000 hp units permanently coupled back to back. The same two units always operate together throughout their life, and both have the same number. The series have gradually developed from 1966 (L series), 1975 (V series), 1979 (M series), and 1989 (U series). The locomotive horsepower has remained at 6000 hp, but tractive effort has been increased from 2x375 kn. to 2x399 kn. They are basically freight locomotives. Maximum speed is 100 kph, and bogies are the three axle CO-CO type with all axles motored. Axle loading 23 tonnes.

Two new TE10U locomotives were purchased in 1996 at a cost of US$ 1.5m each.

It has not been possible to obtain reliability figures. The basic configuration of two units back to back means that the possibility of a complete failure in service is very much reduced. The drivers are trained to, and indeed undertake, running repairs in service.

The engines are the weak point of the locomotives, particularly the cooling systems and the fuel injection equipment. It is normal practice to remove the engines for attention at TR3. The locomotives are basic electro-mechanical units, which can be understood and adjusted by the drivers in the event of an on line failure. Radiator segments are reported as a major cost, with each locomotive section requiring 46 new segments every year at a cost of US$ 1077 per segment.

The age profile and fleet size is such that within the next ten years no replacement locomotives are required. The FSU regulations imposed a life limit, but as the locomotives are confined to Tadjikistan, TZD have the freedom to extend the life span in future if practicable.

10.1.2 Shunting locomotives

The TZD shunting locomotive fleet consists of 19 units, which are all available.
The age profile of the locomotives is as follows:-

AGE	up to 5	5-10	10-15	15-20	20-25.	25-30	over 30	TOTAL
TEM2				6	5	1		12
TEM2Y	1							1
ChME3		3	3					6
Total	1	3	3	6	5	1		19

.All 19 shunting locomotives are reported as currently operational.

TYPE	TOTAL	CONDITION				
		Parts	Factory repair	Depot repair	Serviceable	Operating Daily Need
TEM2	12				12	
TEM2Y	1				1	
ChME3	6				6	
TOTAL	19				19	17

All the shunting locomotives are single units. The older 1200 hp diesel electric TEM2 locomotives are more reliable than the 1000 hp diesel-electric Czech built CKD ChME3 locomotives.

The mechanical components of ChME3 locomotives, particularly engines and air compressors, are unreliable.

10.2 Recommendations

10.2.1 Recommendations:-main line diesel locomotives

There are sufficient locomotives to meet the short term TRACECA fleet size recommendation of 23 locomotives (46 units). This figure is in line with the proposed revised operating requirements for main line locomotives. There is no need to replace locomotives within the next ten years, and the fleet size is sufficient to cover future operational requirements, provided a full programme of major overhauls (KR) is funded.

In the short term a programme of investment in factory exchange of the existing main line locomotive engines should be considered to help increase reliability and prevent a future shortage of locomotives, problems caused by shortage of spare parts, and lack of maintenance facilities.

Factory re-conditioned engines for the TE10 main line locomotives are currently understood to be on offer from the Bransk plant at US$ 96,000, with 80% change of parts, and a guarantee of 5 years in service.

Developments in modern world market single unit locomotives should be followed and the adoption considered for future replacement of freight locomotives. Improved reliability would far outweigh any advantage of double units, with much lower running and maintenance costs.

Replacing the 2TE10 locomotives with new generation 4000 hp locomotives with much greater adhesion giving the same haulage capacity would also give operational savings, as well as maintenance savings.

Joint ventures between Russian or Ukrainian locomotive manufacturers and world market manufacturers will probably produce the next generation of freight locomotives. This is examined later in this chapter. These new locomotives will have their designs well proven in service before there is a need for TZD to purchase.

Future developments relating to the extension of electrification on the main line in the north, and diversionary routes in Uzbekistan, may determine a different course of action

10.2.2 Recommendations: shunting locomotives

The age profile shows that no investment in new shunting locomotives is required within the next five years, but consideration will have to be given to replacement or life extension in years 6-10.

The number of operational shunting locomotives exceeds the recommended TRACECA short term requirements of 15 by 3. Funding should be made available to carry out a full programme of major overhauls (KR).

10.3 Passenger coaches

10.3.1 Overview

The TZD fleet consists of 348 coaches:-

Type		TOTAL
Sleeping cars	tsmk	1
Sleeping cars	sv	10
Hard-seat compartment		170
Couchette cars	tsmo	138
Mixed class		7
Restaurant cars	tsmr	14
Postal/Luggage	tsmp/ tsmb	2
Service cars		4
Electrical power cars		2
Total		348

10.3.2 Recommendations: passenger coaches

The condition of passenger coaches is not attractive to passengers as practically all maintenance funds are required to maintain the basic safety features of running the coaches.

It is recommended that coaches should have their passenger amenities upgraded by additional work on interior surfaces, floor coverings, fabrics and fittings during DR.
Funds will have to be made available for purchase of materials for this.

10.4 Wagons

10.4.1 Overview

The current traffic can be met with the existing operational fleet, but there may be a shortage of covered wagons due to a general shortage of timber in Tadjikistan for wagon repairs.

	WAGON TYPE	TOTAL
KR	Covered KR	493
TS	Tank TS	293
PL	Flat	584
PV	Open top h.s.	90
	Others	210
XX	Refrigerated	579
	TOTAL	2249

The designatory code number for TZD wagons is 66

10.4.2 Recommendations: freight wagons

The age profile of the wagon fleet, and the wagon condition is such is such that a replacement programme need not be started immediately. However it is considered that a replacement programme could be deferred further if the life of the wagons can be extended.

The obstacle to this is the CIS regulations which place an absolute limit on the life of a wagon irrespective of its usage and condition. Consideration should be given to pressing to have the regulations changed so that suitable wagons can continue to be repaired and kept in service.

10.5 Locomotive depots and workshops

10.5.1 Overview

There are three locomotive running depots on TZD at which drivers are based, as follows:

Dushanbe
Khudzhand
Kurgan-Tyube

The depots at Dushanbe and at Khudzhand both undertake maintenance on all locomotives up to TR3.

Dushanbe depot consists of three lines, and has a drop pit for wheelset removal. There are jacking facilities, and engines can also be removed, although equipment is in poor condition and space for engine overhaul is extremely limited.

The depot dates from 1929, and was enlarged in 1966 and 1981. The depot can hold five double units for repair, as well as three separate spaces for servicing.

The wheelsets are dealt with in an adjoining lean-to which is only partially enclosed. There are no wheel turning facilities as the underfloor lathe is not operational.

There are separate shops for turbochargers, bearings, brake components, and machining facilities components.

The load bank for engine testing is not working.

There is a new depot under construction in Khudzhand, where formerly work was carried out in the open air. A new underfloor lathe and lifting jacks have been provided.

10.5.2 Locomotive maintenance

Maintenance procedures of TZD are as follows:

TO1	Inspection by driver (daily)
TO2	Inspection and lubrication in depot (every 3 days)
TO3	Depot check - engine, elect brushes, etc. (2TE10 - every 17 days or 7200 km). (ChME3 - every 30 days).
TR1	Depot repair - fuel injection, turbocharger, clean motors etc. (2TE10 - every 2.3 months or 30,000 km). (ChME3 - every 7.5 months).
TR3	Depot repair - remove bogies, engine 2TE10 (2TE10 - every 12 months or 180,000 km). (ChME3 - every 2 5 years).
KR1	Major overhaul (2TE10 - every 5 years or 720,000 km). (ChME3 - every 7.5 years).

KR2	Major overhaul	(2TE10 - every 10 years or 1,440,000 km). (ChME3 - every 15 years).

There is no central CIS control of locomotive maintenance, unlike freight wagons and passenger coaches, where regulations are tightly controlled and updated centrally. Each railway can now set standards of its own, subject to Transport Ministry approval.

TZD, in common with most of the CIS railways, has eliminated the TR2 repair and brought forward the TR3 repair to a frequency of 12 months. TZD do not however have the full facilities for the complete TR3 repair.

There are four driving teams assigned to each locomotive. The more highly qualified drivers operate the passenger trains. There is a shortage of suitable skilled labour in the depots.

10.5.3 Major overhauls

TZD does not undertake any major overhauls KR1 (5 years) or KR2 (10 years) to locomotives themselves in Tadjikistan as it does not have the facilities.

Locomotives are sent to Tashkent for major overhauls. A KR1 for a 2TE10 is reported to cost US$ 180,000 per loco, a KR1 for a shunting locomotive is US$ 150,000, and must be paid for in hard currency.

Currently TZD are considering sending locomotives in future back to the factory in Lugansk, Ukraine, for major repair

MAJOR OVERHAUL (KR) RECORD

	Main Line		Shunting	
Year	Plan	Actual	Plan	Actual
1993		2		3
1994		3		1
1995		3		-
1996		5		3
1997		2		-

10.5.4 Recommendations: locomotive depots and workshops

The size of the fleet does not justify expenditure for the provision of facilities for TZD to undertake their own major repairs (KR).

However hard currency must be made available for a full programme of KR overhauls to be carried out in other CIS countries.

The split between the northern line and the remainder of the network, with a 700km transit through Uzbekistan, Turkmenistan, and Uzbekistan again, makes rationalisation of maintenance facilities difficult.

Dushanbe Works should be equipped to carry out as much as possible complete TR3 maintenance. New lifting jacks should be purchased. The main principle should be to have the capability for the removal and exchange of parts, except engines, with stocks held of re-conditioned components for unit exchange. These units should be available on a unit exchange basis, with spare units held in store at all times.

A satisfactory stock of spare parts should be held, and stock levels kept high enough to avoid any interruption to the work flow. A stockholding of around US$ 0.5 m of parts will be required.

Costs are estimated at US$ 0.5m for equipment, including jacks and the start of a programme of machine tool replacement.

Generally the Dushanbe depot is in reasonable condition, but US$ 0.25 m should be allowed for general maintenance, structural repairs, power and lighting improvements.

It was not possible to determine requirements at Khudzhand depot.

10.6 Passenger coach depots

10.6.1 Overview

The maintenance of all passenger coaches on TZD is carried out at a depot in the outskirts of Dushanbe, built in 1996, and at a more recently constructed depot at Makhram on the northern line.

The works at Makhram also carry out the annual DR overhaul of all TZD passenger coaches.

Coaches were formerly sent to plants in Russia, Ukraine or Uzbekistan for major repairs (KR), but there are now the facilities for this category of work to be carried out within Tadjikistan. A KR1 in Moscow is reported as 120m. Russian Roubles, and KR1 in Tashkent as US$ 50,000.

It is reported that Germany gave 10m.Marks (US$ 5.8m.) for the purchase of spare parts for German built passenger coaches.

The TRACECA Rolling Stock Report gives the following information on the Dushanbe passenger coach depot:
The depot is new and was commissioned in 1996. The coach repair depot is open sided, and is equipped with lifting jacks and a gantry crane.
Bogies are stripped for overhaul, but there is a lack of facilities such as bogie washing, crack detection, and bearing measuring equipment.
The wheel shop is equipped with a Ukranian wheel lathe (1995).
There is a machine shop equipped with seven modern machine tools, but skilled labour is a problem. There is equipment for checking shock absorbers, but it is not operational due to a lack of spare parts.
There are ancillary shops for brake equipment, batteries, couplers, as well as a joinery shop (not operational due to a lack of timber), and a blacksmith's shop (not operational).
The coach wash is not operating.

The new passenger depot at Makhram alongside the freight depot is still under construction, although it is in use.

10.6.2 Passenger coach maintenance

Maintenance procedures of TZD for coaches are as follows:

TO1	Inspection during train preparation
TO2	Seasonal preparation - summer/winter (6 monthly)
TO3	Technical Inspection (annual)
TR	Unscheduled running repair
DR	Depot Repair (annual)
KR1	Major Overhaul (5 years)
KR2	Major Overhaul (20 years)

The above maintenance procedure is laid down by the CIS Council of Railway Administration in Moscow. TZD must adhere to the agreed standards, as coaches travel over international borders.

10.6.3 Recommendations: passenger coach depots

A satisfactory stock of spare parts must be held, and stock levels should be kept high enough to avoid any interruption to the work flow. A stockholding of around US$ 0.5m should be held at all times.

Parts requirements should be forecast in detail 12 months in advance, and the forecast reviewed at 3 monthly intervals.

Improvements are required in facilities for component washing, and in equipment for testing and measuring.

10.7 Freight wagon depots

10.7.1 Overview

The TZD freight wagon fleet is maintained by two depots, one for the northern line at Makhram, and one for the central line at Dushanbe, each depot being responsible for the running maintenance of wagons on their respective sections of the lines.

There are Technical Examination Units (TEU) based all along the lines at places where freight trains stop, or wagons are attached or detached, reporting back to their respective depots.

The only depot with facilities for major repairs (KR) is the new depot at Makhram.

The wagon depot at Dushanbe does not have enclosed facilities for wagon repair, with all work in the open air, including the overhaul of bogies. It was formerly the old passenger coach depot. There is accommodation for the jacking of two wagons.

Wheelsets are removed in the open air, and are taken to a wheel shop with a Rafamet wheel lathe (20 years old), and a separate bearing overhaul area.

There are other small shops for timber preparation, air brake components, couplers, a machine shop, and a smithy.

The TRACECA Rolling Stock Report gives the following information on the Makhram wagon workshop:

The depot is well designed and was constructed in 1996. It has four tracks and can accommodate around 16 wagons.
The bogie shop area is fitted with new gantry cranes, a bogie washing machine, and a wheel lathe.
The maintenance lines are equipped with lifting jacks.

Depot staff levels are as follows:

	Dushanbe	Makhram
Skilled	30	26
Other workers	720	387
Tech., Admin., Management	29	92
Total	779	505

In addition there are 252 staff in Technical Examination Units at eleven locations throughout Tadjikistan.

10.7.2 Wagon maintenance

Maintenance procedures are as follows:

TO	Inspection in traffic.
TR	Running repair.
DR	Depot Repair (every year-tanks and open top; 2 years others)
KR	Major Overhaul every 8-12 years, depending on wagon type. (Refrigerators only - every 5 years)

TZD must adhere to the agreed standards adopted by the CIS Council of Railway Administration in Moscow, but if wagons for internal traffic are segregated, they may be exceeded. Maintenance appears to be excessive, as it is based on time elapsed, with no provision for maintenance based on condition or on kilometres covered.

There is a proposal by the CIS Commission of Wagon Service Specialists to change the DR repair from time based to 100,000 km (i.e. equivalent to 1 to 1.5 years for an operational wagon with normal operation).

Maximum wagon life by CIS regulations is 30 years (average, depending on type of wagon, but acid tanks wagons, for example, have a life of 16 years)), which means that no wagon older than the limit can go to another CIS country.
Bogie side frames and bogie bolsters also have a 30 year maximum life - the date is cast in.

The central wagon control computer in Moscow still operates, logging all wagon data - age, mileage, location etc. All wagons must stop for maintenance at the appropriate time, except for internal use. There is special dispensation to complete journeys for wagons already loaded.

Major Repairs (KR) to freight wagons

		1996	1997
KR	Covered	53	18
TS	Tank	15	22
PL	Flat	1	7
PV	Open Top HS	69	35
	Others	-	-
XX	Refrigerated	48	31
	Total	186	113

10.7.3 Recommendations: wagon depots and works

Consideration should be given to concentrating all DR depot repairs, as well as KR major overhauls, at the new depot at Makhram to avoid the costs of improving the facilities at the Dushanbe depot.

Separate specialised units should be set up as part of the above depot for component repairs for the whole of Tadjikistan.

Maintenance procedures for wagons are still strictly regulated through the CIS Council of Railway Administration. It is consequently unlikely that one country could deviate from the laid down requirements because of the control of wagon condition at border crossings. However, the possible move to km based wagon maintenance from time based maintenance should be pursued.

The need to have wagons examined at frequent intervals should be reviewed.
European practice is to examine wagons only at the commencement of the journey.

10.8 Investment plan summary

INVESTMENTS US$ million	TOTAL	FIVE YEAR PLAN 1	2	3	4	5
Upgrade LOCO WORKSHOPS		0.75	0.50	0.50	0.50	0.50
Spares Stock LOCOS		0.50	0.50	0.50	0.50	0.50
Spares Stock COACHES						0.50
TOTAL		2.25	1.50	1.50	1.50	1.50

10.9 Spare parts

In addition the TRACECA Rolling Stock Report recommends an urgent investment in spare parts of US$ 3 m. which is mainly required for consumable spares on current repairs. The consultants agree that this amount is of the right magnitude,

As well as political considerations, there are genuine logistics reasons for the desire to be self sufficient in spare parts supply. To obtain any quantity of spares requiring hard currency, high level government approval is required for every transaction, no matter how small. The supply system in CIS does not appear to have adopted to meeting customer requirements, and having parts available for sale to support products, rather than producing parts as directed for distribution to a central plan. TZD does not appear to have a central purchasing facility, putting the burden on user departments to obtain supplies. This may be an area where the EC could provide assistance in formulating buyer/seller relationships.

10.10Developments in world market locomotive technology.

World-wide competition between motive power suppliers has led to the development of quality equipment with high reliability and availability for service coupled with minimum maintenance needs.

Modern locomotives, incorporating the latest developments in diesel engine and transmission technology, require less maintenance than units of out-dated design. The immediate effect of this is that when purchasing replacement units the number of spare units needed to cover for maintenance and repair is lower for the new units. It is possible to readily achieve fleet availability levels of over 95% in early years of service, and later, when the maintenance pattern of the fleet has stabilised into its regular pattern, for heavy repair and overhaul, availability up to 90% is achievable.

There has been extensive research in the field of power and control electronics for diesel motive power. The use of modern power and control electronics facilitates the control of the generator and traction motor currents without the use of the highly rated resistors needed by the older systems thereby saving energy and fuel.

The control flexibility of power electronics enables electric rheostatic braking to be continuously blended with the air braking, to apply full braking effort to the locomotive while minimising the use of the air brake, with a saving on the wear and tear to the brake rigging and the brake blocks.

One of the critical parameters in diesel locomotive design, especially for freight traffic, is the adhesive weight of the unit. The locomotive adhesive weight on any network determines the maximum trailing load of train that can be operated on the system. When the trailing load is too great for the wheel-to-rail adhesion conditions prevailing the locomotive wheels slip, the wheels

may suffer damage and the train may not move. With up-to-date electronics it has become possible to detect and correct this slipping so quickly that the effective adhesion is increased by up to 50%. In practice this means that single locomotives can operate heavy trains that formerly required two locomotives.

The diesel engines have been developed to a stage where major intervention for maintenance is seldom needed before 1.0M kilometres of service. The engines are more durable and this reflects itself in the lower consumption of spare parts which contributes significantly to lower maintenance costs.

The net effect of all the developments, as outlined above, is that it is now possible to buy fewer locomotives when replacing existing units. Depending on the general operating pattern of the railway one new locomotive can replace two or more old units.

General Motors are developing a prototype AC traction locomotive of 4000 hp under a joint venture agreement with Ljudinovo Locomotive Works in Russia. Two eight axle locomotives are being manufactured at the Russian plant. This locomotive, TERA1 (RA meaning Russian and American) should be capable of hauling 4500t (the average train weight is about 3000t) on a gradient of 9°/00 (γ=0,33 compare to 0,22 of a TE10). The speed limit will be 115 km/h. The locomotive is designed for a life of 35 years. One locomotive would be the equivalent of a two unit 2TE 10 locomotive. Production should start in 1999 at a cost of US$ 3 m.

In addition, General Motors, in partnership with Siemens, have also signed a memo of understanding for the inclusion of ac traction and microprocessor controls in a proposed heavy haul prototype which would be built jointly with Lugansk Locomotive Works, Ukraine.

GE Transportation Systems, in partnership with Adtranz, have signed a letter of intent with the Russian Ministry of Transportation to place an order for the recently developed "Blue Tiger" series of modular locomotives. Again this locomotive will replace two unit locomotives of existing design and technology.

11 Human Resources

11.1 Preamble

This information comprises the report of the Human Resources Consultant on the team and reflects the information gathered in respect of Tadjikistan. As a visit to Tadjikistan was not possible during the study the report is based on information acquired mainly through questionnaire and analysis of relevant documentation.

The report is based on information which has been made available to the Consultant. There may be information to which he has not been privy and some of this information may be fundamental to the recommendations made.

The HR Consultant takes this opportunity to thank those who helped with information in the compilation of this report, particularly given the difficulties involved with communications during the study period.

11.2 Introduction

The purpose of this report was twofold.

First, to gather information on the Human Resource elements of TZD, it's people, structures and HR policies and procedures.
The second purpose, given the changes required for TZD to become a commercially viable entity, was to analyse the information gathered and to examine the capability and gearing of the organisation to respond to these challenges and to increase its effectiveness as it moves forward.

The conclusions lead to proposals and recommendations in relation to the Human Resource at both organisational and functional level. In putting forward these reccomendations there is a recognition that there must be a balance between the urgent need to change and the retention of the positive aspects of TZD, particularly the skills and commitment of the employees.

Note: Where the abbreviation TZD is used in this report it refers to the Railway Company in Tadjikistan.

11.3 Context

11.3.1 Background to the railway

The railway in Tadjikistan is currently a state owned enterprise.It is a relatively small network, not unified and very much an appendix to the three much larger railway systems in central Asia.

There is a total of 423 km of railway within Tadjikistan comprising three separate lines, two in the south and one in the north. All are part of the former Central Asian Railway.
In the south there are two separate branches from Termez in Uzbekistan. One runs from the Uzbek border through Dushanbe to Yangi Bazar. The second runs from the Uzbek border via Kurgan-Tyube to Vakhsh and includes a branch (with a different gauge) to Kulyab. Together these total 313 km.
The remaining 110km is in the north of the country and consists of part of the main east-west line between two parts of Uzbekistan, from Samarkand eastwards to Andijan in the Ferghana Valley. Most of the traffic on this line is through traffic and the Uzbeks plan to bypass Tadjikistan with a new line through Angren. If this happens, while the line would remain in place, it is unlikely to be supported beyond Tadjik borders and would also lose the vast bulk of its business.
The impact on TZD of effectively losing 25% of its total km would have significant implications for staffing which is already at a seriously high level.

The rail connection between the southern and northern sections of the KZD system goes, not only through Uzbekistan, but also through Turkmenistan.

Transport is predominantly by road and while rail traffic, and revenues, have fallen significantly since 1991, the rail system is viewed as having a vital role in international trade.

In autumn 1995 the Tadjik government decided to turn to rapid privatisation to arrest the continuing downturn in the economy. There is, therefore, a real and serious commitment at government level to implementing an effective restructuring of TZD.

11.4 The education system

Normal schooling is from 6 to approx. 17 years of age.
As with all central Asian countries there is a twin track approach to education from approximately 15 years of age. At that point students can attend a Teknikum (Technical School) to pursue more vocationally based education. Following two to three years they graduate as skilled workers. The majority of students continue their general academic education to 17 years of age.

Professional or 'Specialist' staff in the railway will normally have progressed through third level.

Education at all levels is free but budgetary constraints in recent years have reduced government spending.

There is no impact, as yet, from private business schools and the continuing isolation of Tadjikistan means that the very basics of change in this field have yet to start.

While English is taught more extensively in school than heretofore there is little evidence of its use in business. The low levels of English language usage is also a barrier to the fast and effective absorption of modern business theory and practice, most of which is carried out or at least documented in English.

11.5 The economic context

Over the last three years the average salary levels within TZD were as follows:

1995	2,894 roubles
1996	11,705 roubles
1997	17,834 roubles.

These figures can be taken as an example of the underlying serious inflation within the Tadjk economy and that trend is worrying.

The fact that wages appear to be keeping abreast or ahead of inflation (a twofold increase in TZD salaries in September 1997) may be a popular trend but it also impacts on peoples' expectations for their future state within the economy. This could also impact rail company employees expectations as to levels of severance and ongoing support in the event of assisted staff reductions. Failure to match these expectations could result in a greater than anticipated resistance by individuals to voluntary departure.

There is also a high level of unpaid salaries within the Economy as a whole. This could also be a negative force in employees considering the options 'to go' or 'to stay'

11.6 The social safety net

11.6.1 Social welfare

Employers pay a tax-deductible contribution to the Social Insurance fund. Each local employee also pays a contribution.

Benefits are payable in two ways, social security and social assistance.
Social security includes pensions, unemployment, sick benefit and disability benefit and amounts paid are based on an individual's previous contributions.
Social assistance is paid where family income falls below a given minimum level and these payments are not dependent on previous levels of contribution. The constant upward revision of payment amounts continues to undermine confidence in the system and there is no doubt that leaving relatively secure state employment and potentially coming under the sphere of a social welfare system under such pressure raises barriers to change.

The primarily agrarian nature of the Tadjik economy (the least urbanised of the CIS) means that significant reform of the social welfare system, particularly in the early stages, places a disproportionate burden on those in the industrial and commercial sectors.

11.6.2 Redundancy

While there is an understanding of the concept of job redundancy and an acceptance that it is inevitable as the economy reforms, there is no formal provision for redundancy payments.

11.6.3 Pensions

The pension system is currently being reformed as part of the Social Welfare system.
A combination of serious inflation and insufficient contributions will continue to undermine confidence in the current system where benefits were not aligned with contributions.

11.7 Current situation

11.7.1 Structures and staffing

The railway company is headed by a Chief Executive, The Director General, with three senior managers reporting directly in to that post, the First Deputy Director General, the Deputy Director General and the Chief Engineer. Organograms which have been made available suggest that this group comprise a collective senior management team with some 12 functional managers/departments reporting in directly.

This structure which is detailed below, and the staff numbers shown, are as presented by the Human Resources Department.

Average number of staff	1994	1995	1996	1997
1.Basic activity				
traffic/operating	3347	3784	4226	4361
auxiliary activities	936	976	1102	1126
loading/unloading	86	80	77	80
overhaul/heavy repair	103	124	161	173
Total staff basic activity	4472	4964	5566	5740
2.Industrial activities	-	434	445	472
3.Construction	148	144	167	157

4.Trading activities	673	670	694	465
5.Medical institutions	260	266	273	271
6.Educational (preschool) institutions	201	209	214	228
Total staff	5754	6687	7359	7333

As can be seen by even a superficial examination of these figures the trend is upward apart from a slight overall reduction in 1997 compared to 1996. These figures, and the trend, contrast sharply, for example, with the freight traffic figures which show a decline from 6m tonnes in 1990 to 0.61m in 1996 and 0.92m in 1997.
There are of course other considerations in determining staffing levels and the total km of track, total freight wagons and total passenger coaches has remained relatively constant. A simple relationship between staffing levels and levels of business is not necessarily the answer and new targets do require serious analysis of crewing levels, potential for application of technology and restructuring of TZD as a whole. However, what is clear is that an increase in total staff from 5754 to 7333 (a 27% increase) from 1994 to 1997cannot be justified. There are indications of a commitment to reduce staffing levels and a programme has apparently been put in place from January 1998.
The long term success of this programme will not be evident for some time and there is no doubt that it needs to be pursued with vigour and maintained if it is to have any chance of seriously addressing the underlying issues of overstaffing.

While all railways have multiple locations, the particular situation faced by TZD is quite unusual. The entirely separate locations in North and South of the country must be taken into account. This will be vital in the long term consistency of Human Resource policy and procedure and for the development and maintenance of an on-line Human Resource data base. It is also highly important in the short term when strategies are being developed for the dissemination of the company's mission, objectives and change program.

11.8 Numbers employed

11.8.1 Staff reduction

An increase over a four year period of 1600 staff is hardly indicative of any existing commitment to reducing staff numbers.

It could have been expected that the enormous decline in traffic would be reflected in a reduction in total employment. The small reversal in 1997 (some 30) may be an indicator of resolve, particularly coupled with the move to actively tackle the issue from January of this year.

11.8.2 Retirement

In accordance with the Legislation of the Tadjik Republic and Labour Law, the normal retirement age for men is 60, for women 55.
For particular categories this is reduced to 55 for men and 50 for women.

11.8.3 The legal position of employees

TZD employees are not life time civil servants and can be dismissed where thy do not satisfy the required profile.

11.8.4 Further analysis

It is essential to comprehensive recommendations on the human resource that further, detailed, analysis is carried out. The lack of an on-line data base militates against that.

Any further breakdown of staff by category, skillset or age distribution was not available to the consultant.

11.9 Auxiliary activities

The range of activities and departments that fall into the category of Auxiliary is not totally clear from the information provided. This category certainly includes the following:

	Number of staff
Educational (preschool) institutions	228
Medical Institutions	271
Total	499

It is also likely that it includes the food supply collective and elements of the construction, water supply and special services fields for which separate staffing levels were not made available.

They are certainly not core activities and they are even more distant from the business activity of TZD than the 'non-core' distinction now implies to business in other countries.
In most cases these activities remain after the Soviet era and although changes have been put in place in recent years these activities still appear on organisation charts.

While they are often shown 'below the line' in lists of staff numbers the fact is that they are still shown as an integral part of the railway companies activities.

There are implications to the removal of these sections from the railway company. Obviously there is the immediate direct reduction of a minimum of at least 500 staff along with a potential further indirect reduction of those within the railway company proper who are involved in administering the different groups. More importantly, however, is the psychological and cultural impact that such a decision will have. It would be a clear statement that these activities, while important to staff in a social sense, have no place within the running of a rail transport business. Their removal will also free up management to concentrate on business without the inefficiency implicit in managing such diffuse activity.

In the event of the transfer of full responsibility for these activities elsewhere the issue of continuation of the benefits to staff must be addressed. It is highly likely that staff will seek the retention of all such benefits, particularly given the rapidly changing economic circumstances.

The consultant was not in a position to examine the Company-Union Collective Agreement but the detailed arrangements covering these benefits need to be considered and a consultative process started to ensure their retention does not deter the removal of Auxiliary department staffing levels from TZD.

11.10 Job Value

The source for determining Job Value is a National Job Coding System which lists all jobs and specifies the qualifications required to attain that level. No opportunity was available to examine this practice in sufficient detail but it appeared to be similar to DOT, CODOT and other systems used in USA, UK and France.

11.11 Training and development

11.11.1 General

Most training activity is focused on technical and operational matters and is based on the assumption that the existing systems and procedures will remain

There are plans to open a branch of the Tashkent Railway Institute in Dushanbe which will provide the opportunity to more quickly and effectively train and retrain employees as well as being more cost-effective. However such training will continue to address mainly technical aspects of railway operations and there is little evidence available that business education, or the skills and competencies to progress the organisation, will be to the fore.

11.11.2 Management development

Business education does not happen to the same extent as in other countries and there is a resultant lack of exposure to the theory of modern business management. The very low levels of knowledge of English is a major hurdle to studying business as a subject. There is also the question of cost.

While more senior management within the railway can overcome these hurdles through attending programmes outside the country the numbers and attendant cost make this impossible for all. This has implications for the cascading of business principles down through the middle management levels of TZD to the workforce and will make the selling and embedding of change even more difficult.

11.11.3 HR education

There is no evidence of formal training in Tadjikistan for HR professionals. To work at the assigned specialist grade, according to the classification of jobs, requires a tertiary qualification. However HR work is recognised as requiring experience as well as a disposition to work with people and on people related issues. This 'disposition' would not appear to equate with the concept of Competency.

11.12 Flexibility and movement

No exact figures were available to indicate existing or potential staff movement.
All movement is now internal. In Soviet times there was also substantial external movement but this has ceased.

While there is a full listing of qualifications by employee there was not available a skills inventory and the ease with which staff can be effectively relocated or transferred as part of a job reduction plan would be hampered by this lack of information.

11.13 Trade unions and consultation

11.13.1 Collective agreement

There is one trade union within the Railway Company which operates as the TSD Trade Union Working Committee. This Union represents all employees. There is a Trade Union Chairman with subordinate organisations in each Department.

The Union is regulated through a Trade Union Board.

Typically, Collective Agreements within the CIS are similar to those in western economies with variations and levels of detail in some areas.

General Provisions include:

- Change only through mutual consent.
- A disputes procedure followed by an arbitration aspect that refers lack of agreement to the country's labour code
- The introduction of changes and additions, including a joint meetings process between the management and the Union Presidium.
- Commitment to enter negotiations on change
- Recognition of the Agreement as the basis for defining and regulating the mutual obligations of the parties

11.13.2 Reduction in employment levels

Recognition must be given to the role of the TSD in the event of a reduction of activity in TZD.

Discussions have to address the realities inherent in a change process, and reflect the need to gain commitment from all employees and from those to whom they currently look for leadership. The lack of a formal redundancy process, the high levels of unemployment, the relatively highly levels of pay and benefits of railway employment and the volatility of the economy all also dictate the need to consult and negotiate with TSD.

11.13.3 Working arrangements

Working time is based on an eight hour day.

Where night work is required, shift premiums are paid and overtime is paid for unplanned weekend and public holiday work.

Some part time working occurs, particularly with mothers and with those attending further education courses.

11.14 Analysis and recommendations

11.14.1 The Challenges

There are two main challenges facing TZD.

1. Reduction in employee levels
2. Reorganisation, particularly the recommendation to restructure TZD into Business Units.

- **Reduction in Employee levels**

The reduction of employment levels cannot be achieved solely through the divesting of Auxiliary activity.

There will need to be substantial reduction in operational staff.
An example of the possible reduction in staff numbers is in track maintenance where mechanisation can double the km responsibility of a team with consequent reduction in staffing levels required.
The speed at which this is achieved depends on the mechanisation of corrective maintenance which will in itself lead to changes in work practices.
However, until such investment is made the maintenance function will remain in its present manual mode and will require manning levels similar to those currently in place.

The application of technology will in the long term reduce the number of administrative staff who are mainly involved in routine clerical tasks. There may be a need to increase the number of computer and other specialists in the short term.

Any such short term increase should be handled on a fixed term contract basis.

Recommendation:

It is essential that detailed plans for staff reductions, showing clear time lines, are developed. These must

- be aligned with investment plans and
- must also take acount of short term peaks where additional development, training and parallel activity is required.

• Reorganisation:

The restructuring of TZD, particularly into business units, will be a complex and difficult task. This complexity and difficulty will be dramatically increased if it is carried out at the same time as a dramatic reduction in staffing levels.

An in-depth assessment of competencies is required particularly at management/leadership level. This will allow for the fact that many of the employees, even at management level, will not have been exposed to broad management development.

The jobs clasification system currently in use is restrictive in the context of future development and there needs to be a broadening of the analysis and the introduction of the concept of competencies as best practice.

Consideration should be given to the use of diagnostic tools and feedback sessions particularly for managers.
A difficulty in doing this is the lack of knowledge of English; many of the better tools in this field have been developed in the UK and US.

Recommendation:

The transition will require a detailed Job Design process resulting in role descriptions for all jobs. These should be accompanied by person specifications, using competencies for management and specialist jobs. This to be followed by skills inventories for all key staff to enable effective allocation of staff and retraining where necessary.

11.15 The issues to be addressed

11.15.1 Management of the change process

The planning, facilitation and management of a change process is difficult in ordinary circumstances. This change initiative is further complicated by

- a lack of experience at leadership level and at employee level of driving change
- serious budgetary considerations in terms of the speedy investment required in the railway and in technology
- similar budgetary constraints in installing supported severance arrangements
- a lack of fluency in the English language, restricting access to much of the literature and case material on change management
- a lack of an on-line data base on the human resource

It is essential that those who are taking ownership of the process are fully supported in all of these areas.

Additionally they need the ongoing support of change teams to research, facilitate and plan the process prior to launch and ongoing as implementation takes place.

Recommendation:

The senior management team need to be guided through the development of a comprehensive strategic plan.

- **Change teams.**

Teams need to be established to support the change process.
Individuals must to be identified to work within these teams, the initial team reporting directly to and working with the Chief Executive Officer at the Strategy Formulation and Objective setting stage. The establishment of further teams to support each senior manager can follow, as appropriate, as the change process evolves.
These teams will report to senior managers leading the change implementation and will focus more on the achievement and monitoring of objectives and the tactical elements of the process. These individuals need to be carefully selected and, while specialist knowledge of the railway must be within the teams expertise the individuals must be selected based on the relevant competencies (leadership, energy, independence of thinking etc.)

Change teams need to be described, with Job Profiles and Person Specifications for each role. These specifications to be competency based

The workforce needs to be trawled to identify potential team members.

Team members need to undergo education and training particularly in Strategic Management, Objective Setting, Team Working, Communication and Problem Solving. They must have or quickly develop a high level of skill in computer applications.

Recommendation:

Change teams need to be established as soon as possible, initially with external skilled facilitation and change management expertise, but resourced mainly from existing employees.

- **Environment and severance**

A key issue in the successful reduction in staff numbers is the gap between the relatively secure employment in the railway company and maintaining that standard of living in the open market place.

As far as railway company employees are concerned this context is important if they are expected to voluntarily leave the railway and enter what many may still see as a grey economy. There is no doubt that the railway is seen as a relatively secure employer, but also as a responsible player within the legal system. At less skilled levels of the workforce, the length of service, earnings levels, may not be as great a deterrent as at the specialist and management levels. These more educated levels also contain those who will be expected to take ownership of, lead and sell the change process, a process which will result in significant reductions in employment levels.
All of those to whom we spoke recognised the need to reduce staffing levels but all, also, saw minimum if any reduction in specialist staffing levels.

There was an openness among the employees regarding the lack of work and an acceptance of the concept of jobs becoming redundant.

The concept of a job being redundant exists and is accepted. However the consequences may not be and the Collective Agreement certainly is clear on the commitment to retain staff despite the downturn in business. It is fair to note that many collective agreements in other countries have similar sentiments despite the acceptance that there can be staff reductions. In many cases they are designed to place a stake in the ground and the removal of the stake merely requires to be added to the bill.

A severance package:

- must be attractive enough to achieve the required reduction.
- will typically include an early retirement option
- will insist that exception must be eliminated (for example all existing pensioners must terminate)
- will use service as a multiplier
- will include incentives or options covering education, retraining and possibly financial support in entering self employment.
- will consider a continuation of the benefits perks already enjoyed, but only for a specific limited period following termination.
- will normally be open to all employees.
- will insist that, on application, those who wish to leave do so as soon as is practicable.

Recommendations:

A serious study must be made of the future shape of the organisation resulting in exact numbers of employees required to make the company viable in the future. These conclusions along with the busines rationale supporting them must be convincingly communicated to the workforce.

The severance package, content and funding must be designed and agreed so that it can be communicated simultaneously to all employees at the same time as the future plans are being rolled out

• Culture

To overcome resistance to change and resistance to voluntarily leaving the organisation all employees need to clearly understand the new business reality. That the new company will be radically different from the present one must be communicated to all.

Recommendation:

Clear and early decisions need to be made, communicated and implemented in relation to changes such as:

- the divestment of non-core activity
- a more radical implementation on the non replacement policy
- the prompt retirement of all employees at the company's discretion rather than on a voluntary basis

• Collective agreements

Agreements between the company and the union need to be examined

- as a check list of what is at issue in terms of work practices for the future organisation
- as a listing of all the terms and conditions enjoyed by employees, pensioners and certain ex-employees of the railway company. These must be dealt with in some predictable way if they are not to become a source of future undermining of railway costs.
- as a source of the undertakings which are in place relating to employment, voluntary severance, retraining and so on
- as an indication of the role of the Trade Union as a full participant in the decision making process

Recommendation:

There must be a detailed analysis of the exact meaning and practice of existing agreements
A strategy must be developed as to how to move forward effectively given the existence of the union and such agreements.

• Education and training

There will be substantial training needs arising from the proposed changes.
The following is a summary of the key activities which need to take place.

- identification of competencies for senior management and leadership positions and asessment of employees who show potential for entry to these roles.
- to support the understanding of the business rationale for the change, there needs to be business education for keyholders in the communication chain and basic business literacy training for all employees.
- all those involved in managing, leading and facilitating the change process need support, preferably training, in English.
- to support the increased need for Human Resource professionals (HR specialists within Business Units) those currently in HR roles and those identified as having potential need to be trained in current best practice
- to support the establishment of an integrated on-line Human Resource database will require training in whatever CPIS is installed and in common computer applications
- identification of training needs for all core groups and the development of training plans
- based on analysis of new roles and as staff reductions take effect a detailed retraining plan will be required
- for all future training serious consideration must be given to the establishment of in-house training activity rather than the expensive external activity currently in place. This should include buying in expertise where this does not currently exist within TZD.
- all training needs to be coordinated through the change groups. It is essential that all training is geared towards the new organisation or to the process of getting there. Any non essential training may be a drain on resources and if it is seen to take place may also undermine the credibility of the change plans.
  Much of the training requirement will emanate from the change groups. Where requests arise elsewhere they must be evaluated and cleared as in line with the company's objectives.
- the concept of competencies needs to be introduced. All those involved in training (trainers, change team members) should be at least exposed, and preferably trained, in the concept.

• Human Resource function

The particular experience of dealing with Industrial Relations, which normally rests within a HR department, will be essential to managing discussions on change and on future roles with the Trade Union, although developing strategies to deal with future partnership may be set elsewhere e.g. within the high level task force.

It was not possible to carry out a detailed analysis of specific experience of HR staff but, the breadth of the functions role is similar to that in HR Departments in the EU.
The expansion of Human Resource management to it having a functional presence in each Business Unit and, more immediately the need for a key group with knowledge of and commitment to the change process will require an increase in the number of HR professionals. There needs to be an early identification and development of a cohort of such HR professionals. This must happen at an early stage and the analysis should start with the current HR Department.

There will be a requirement for the development and dissemination of best practice policies and procedures to bring the company through the change process and to maintain the culture and practices required to continuously improve in the future. This will require HR staff to be exposed to HR policies and practices from other organistaions and business cultures.

Recommendation:

The existing group, augmented by those identified as having potential, should be given a formal HR education in the concepts and practices of modern HR Management. This should start as soon as possible.

• Communications

Communications is key to

- the roll-out of the plan and the communication to all employees of the mission and purpose of the new organisation
- the maintenance of an up to date HR database
- the periodic communication of progress as the change takes effect - vital to morale
- the speedy response to variation in the change process so that contingency can take effect

A key part of any change process is the ability to gather information, analyse, communicate decisions, keep people – management and those affected – appraised of progress, changes of direction, morale boosting achievement of goals and of milestones, getting feedback.

This communication must be timely, fast and complete.

This needs special attention and will need the power of technology and will need those at the core and those delivering and feeding back the messages to be trained, together. All slippage in the process will dilute the change process.

Recommendation:

A communications strategy must be developed as part of the change plans.

• Information systems

Access to information on the Human Resource in TZD will be crucial to any attempts to restructure.

If a Business Unit structure is adopted, with distributed HR expertise within each Business Unit, then access to on-line HR information will be essential. This will require a LAN and a sophisticated Computerised Personnel Information System (CPIS). There are a wide range of compatible CPIS currently available

This system should be integrated with the payroll system and although payroll, as the disbursement of monies, should be part of the financial organisation, the driving of the information should be within a central HR Department.

It is also possible to integrate electronic attendance systems which drive payroll and also feed into the hugely time consuming control of absenteeism. The distribution of such a system is, admittedly, difficult where employees are in remote locations and is also dependent on the computer network already being in place for operational reasons.

The northern and southern regions will each require a HR presence and this is an additional reason for a CPIS.
There is an urgent need to establish an on-line Human Resource database. This will provide the organisation, the leadership and the change teams with the information required to make timely and informed decisions at the strategy stage as well as at the tactical stages as the change process evolves.
It will also empower the Human Resource function, give confidence to the professionals involved and align them as a key support to the change teams.

Recommendation:

There should be an urgent review of available Computerised Personnel Information Systems with the objective of buying and installing as soon as possible. The selected CPIS should be capable of integration with payroll.
The hardware in place must serve all those requiring to interrogate the database on-line as well as those who will input data to the system. This is estimated to be

HR Department: five to six units (most input will take place in central HR)
Business units: six units (2 in each business unit HR department)
Change teams; four units (1 senior team, 3 busines unit teams)

Note: these are gross figures for each area and depending on timing of activity the total hardware requirement could be netted to 7 or 8 units.

12 The future

In order to meet the challenges of the future it will be necessary for the railway to be restructured. There is little doubt that at the moment the railway is not sustainable into the future.

The railway will have to increase its depreciation provisions in order to meet the present and future investment needs. There is an immediate problem to overcome the backlog of work which has not been done in recent years. This is particularly true in relation to the infrastructure where investment in new sleepers is urgently required.

To get this investment from outside sources it will be necessary to show that the railway has the abiliity to pay back any borrowings incurred. Stated very simply, investment should be equal to depreciation plus profit.

The main areas for current investment are infrastructure, MIS, and rolling stock maintenance facilities.

12.1 Investment proposals

12.1.1 Infrastructure

There is an urgent need to invest in new sleepers in both timber and concrete. This will allow a number of speed restrictions to be removed thus improving the efficiency of the railway.
Most of the track maintenance work is currently carried out by manual means and the investment in small tools and equipment will allow for more efficient and better quality work.
All modern railways carry out track maintenance and alignment using mechanised on track equipment and it is proposed that the railway invests in a new tamping machine which could also assist in heavy track renewals.

12.1.2 MIS

Like the other CIS countries there is a need to upgrade the MIS in Tadjikistan Railways. New software and a network of PCs is suggested. The investment should commence with software in accounting and human resources packages.

12.1.3 Rolling stock facilities

There is a need to invest urgently in spare parts and to upgrade a number of maintenance facilities. An indicative programme is provided for in the investment proposals.

12.2 Five year investment plan

An indicative investment plan is given below. Due to the non availability of information it cannot be considered as final. Previous experience suggests that the proposals outlined below will give reasonable rates of return of the investments outlined.

All investments shown in $US

YEAR	1	2	3	4	5
MIS	250,000	250,000	250,000	250,000	250,000
INFRASTRUCTURE					
CONCRETE SLEEPERS	250,000	250,000			
TIMBER SLEEPERS	500,000	500,000	500,000	500,000	500,000
PLANT	100,000	100,000	100,000	100,000	100,000
TOOLS	500,000				
TAMPING MACHINE		1,750,000			
SLEEPER INSERTION MACHINES	1,400,000				
ROLLING STOCK					
UPGRADE LOCO WORKSHOP	750,000	750,000	750,000	750,000	750,000
LOCO SPARE PARTS	500,000	500,000	500,000	250,000	250,000
PASSENGER COACHES SPARE PARTS	500,000	500,000	500,000	250,000	250,000
TOTAL	4,750,000	4,600,000	2,600,000	2,100,000	2,100,000

12.3 New management approach

A railway pursuing commercial objectives has a totally different management approach from one which focuses on producing transportation with little regard to the amount of equipment employed, the productivity with which it is used, or the resulting costs. Equally important is the fact that business has now to be obtained against powerful competition and changing economic and social factors and is no longer directed to rail by decree.
Institutionally, these factors are recognised in the proposed new status of TZD, including the new statutory background, the contract relationship with government, the Performance Agreement and the Public Service Contracts for unremunerative services, which will have been signed with government and local authorities. The Director General and the Directors will have full and accountable responsibility for achieving results and are strengthened in this by their membership of the Executive Board, which may also include members with wider responsibilities in government and industry, who can contribute different expertise, experience and guidance.
The approach of management to its task - its working styles - is now different. It focuses, particularly, upon:

- the overriding need to secure profit;
- determination to provide railway service only for traffic types and flows which can be made profitable;
- recognition that many previous railway activities are not profitable and cannot be made so and therefore must not be pursued by TZD unless directed by government and accompanied by full financial compensation;
- a critical approach to productivity and economy;

- a thorough understanding of customers' interests, business activities and processes and the mutual benefits arising from jointly planned movements by rail;
- a complete knowledge of the activities, charges, strengths and weaknesses of competitive transport systems;
- a comprehensive understanding of railway costs, their causes and the way they behave under the influences of changes in volume, operating methods or external influences etc;
- the application of a frugal instinct, which seeks to achieve the maximum output from the minimum input of resources;
- the devolution of responsibility and accountability to the lowest possible level where a comprehensive view can be obtained and effective decisions taken. This dictates the subordinate organisation structure and guides the concentration of traffic and location of operational resources which will maximise the potential for productive results and delegated responsibility and authority;
- the support of this delegation of management by a firm system of control made possible by a comprehensive computer driven management information system. This operates by the input of data at original source through the distributed computer network and new communications links and the production of information in forms meaningful to each level and location of management;
- the principle that plans and budgets begin at the lowest level and are consolidated and developed as they move up the chain to the Director General by monitoring, rectification and improvement.

12.4 Marketing, product development and planning

The TZD of 2000 should be a market oriented business and must provide services which the customers require at prices they are prepared to pay but which meet all the financial needs of TZD to cover its operating costs and provisions for the future to keep it in business. It follows from this that TZD must know all about its customers - existing and potential; their areas of business and processes, their opportunities for using other forms of transport; what they can afford or are willing to pay for transport; how their transport requirements can best be met by railways; what steps can or should be taken to shape movement patterns to assist TZD in providing the best and the most economical patterns to mutual advantage.

This wide spread of knowledge is what is meant by knowing the market or "marketing" and TZD must become fully competent in this area. It must develop experts in the markets for particular commodities of goods or passenger services, who will be able to guide TZD in understanding the needs of its customers and converting them into service specifications which will tell the operating department how they should be met. This knowledge will be the basis of all future investment in physical assets - each project must be supported by an evaluation of the way in which it will encourage new business or help existing business to be more profitable.

The accumulation of marketing ideas and project plans forms the overall business plan, which in turn is backed up by the operating plan, which describes how the business plan is to be serviced and the engineering plan which detail the resources used and technical activities which are in support. The financial aspects of each of these plans are revealed in the budget - the financial plan - and there will be an investment plan which will contain all the proposals for investing in new assets to maintain the railway in good physical state or improve its quality and to meet new opportunities.

13 Regional co-operation

13.1 Introduction

There is good co-operation between the Railways of the Central Asian Republics and there is no reason to believe that this will change. The railways all use the same rolling stock, the same track standards, and rule books. There is even a common operating language, i.e. Russian. However, interoperability standards have to be maintained. Maintenance procedures have to be modernised and improved on. There are many advantages to be gained from joint purchasing of equipment including spare parts. The railways have to be marketed as a unit to improve their competitiveness in the international market. IT systems must be seen as a unified system to avoid duplication and the limitation of capability.

In the EU considerable efforts have been devoted to ensuring efficient interoperability, better management and more transparent financial transactions. The institutional position of the railways has been improved and a number of new laws drafted to ensure that there is harmonisation of competition between the different modes. As a result the point of view of the railway has become clearer in the political area resulting in a more sympathetic understanding of the problems of railway transport. The future of the railways in the EU is now irrevocably bound up with continuing co-operation and closer working between the different systems. It is recognised that the railways have a major role in the development of the common market.

Collaboration among the Central Asian Railways is just one part of the greater picture of collaboration in all sectors of the economy in the region. Considerable economic benefits are to be gained through this approach.

Below are listed the areas for development of future co-operation. Some of the topics are complex and there is a need for further examination and elaboration. It is recommended that technical assistance be provided to support the efforts of the railways in this area, with a view to a steady increase in universally beneficial regional collaboration.

13.2 Possible areas for development of co-operation

13.2.1Intermodal traffic

The TRACECA Study on Tariffs and Timetabling, carried out by SISIE-Calberson, identified a number of problems in the intermodal area. Rail costs are good generally by comparison with road. There are however bottlenecks on the TRACECA route, notably at Poti where the intermodal facilities are overloaded and the rates are high. This situation is being dealt with by investment in port facilities. Marketing is not good. Price alone will not attract the desired business volumes. The route must be sold to shippers.

The study identified the need for improvements in:

- Pricing and invoicing
- Documentation
- Conditions of carriage
- Information

The conclusions reached in the study were that there should be:

- Improvements of services for western clients including simple documentation and direct trains
- New pricing policy including more flexibility
- Improved marketing
- Implementation of common operator principle

Implementation of the common operator principle will require that a company or joint entity be set up. It will be necessary to:

- Select a key man as the Managing Director.
- Appoint Board of Directors
- Incorporate the Common Operator Company under private law
- Institute a new law based on European model
- Ensure adequate capitalisation
- Ensure open competition

The potential for increased intermodal business is substantial. To improve market share the railways must increase their co-operation and improve their performance, as already outlined.

The railway companies have some reservations about the proposals but it is anticipated that with further discussion, the difficulties can be overcome.

13.2.2 Rolling stock purchasing, leasing and maintenance

The consultants are of the view that there is a limited potential for increasing co-operation in the maintenance area between the different railways. Generally the distances involved are very long so that moving rolling stock around to other systems workshops would give rise to decreased availability and would reduce the potential for dealing with breakdowns and emergencies. There are, however, some areas in which maintenance is shared on an advantageous basis, notably Kyrgyzstan, Tadjikistan and Uzbekistan.

There is considerable scope for improving maintenance performance through the use of replacement units. This practice needs to be introduced in all the states. Rolling stock availability could be improved enormously if replacement units such as engines and electrical units were readily available to deal with failures on a plug-in basis. There is an obvious need for a centralised company/ies, which would repair such units on a production basis. As well as improving availability, this will also have the very desirable effect of improving engineering standards thus further enhancing performance. A company of the type required could be set up on a joint venture basis with the involvement of all the railways.

In the longer term, consideration should be given to the setting up of a leasing company, which would provide rolling stock on long/short term leases. If required, arrangements could be made for the leasing company to maintain the equipment on a kilometre running charge. This principle is well established in Western Europe. The company could also expand into the area of purchasing, so that orders for the different companies could be pooled. There are obvious financial advantages arising from this form of large-scale procurement. This company could also be set up on a joint venture basis with participation of the railway companies.

13.2.3 Development of regional track access

The principle of access to the infrastructure of the railway companies should be expanded and encouraged. It should be possible for trains, including locomotives to be operated outside their own particular system on an agreed basis. This will reduce time lost at border crossings and make for more efficient use of staff and equipment. It will also encourage competition, which should lead to better fares and qulaity of service in the passenger area.
Open access to freight operators, both private and public, would also result in improvements in efficiency, service and rates for customers. There are particular opportunities for block train operation here, whether within a national system or operated cross-border.

13.2.4 Infrastructure charging

Implementation of the recommendations for the establishment of infrastructure departments and the introduction of a track charging system will provide a more realistic basis for traffic costing. Opportunity should be taken to review the charges for track usage between the different countries. Efforts will have to be made to arrive at a more flexible approach in this area so that new lines will not be proposed to obviate using the track in an adjacent system.

13.2.5 Interoperability

While all the countries at the moment are using rolling stock and equipment in accordance with former soviet standards, this position may change in the future. Some of the railways may purchase equipment from outside the CIS. It is essential that specifications for these procurements, while meeting international standards, should also be compliant with the present Central Asian (CIS) railway standards. Otherwise the danger is that new equipment and standards may hinder the present smooth interoperability.

A considerable proportion of the current rolling stock and other equipment of the railways is out of date and in need of replacement. This is a situation which is facing all the Central Asian Railways. They must ensure that the introduction of modern technology will be seamlessly inserted into the existing systems without any negative effects on interoperability.

A protocol on standards for the five railways should be discussed and agreed. Procurement procedures will also need updating and modernisation in a co-ordinated fashion. This is referred to elsewhere in this report under recommendations for technical assistance in procurement.

13.2.6 Information Technology

The installation of a modern IT system, supported by a new communications system is proposed for the Central Asian railways. Experts from the UIC are preparing proposals for the telecommunications system under Module E of this project. New hardware and software is envisaged to provide a platform for the necessary MIS systems. Transfer of information between the systems is an essential ingredient of the proposal. Common protocols will be necessary. This project will not realise the huge advances projected without maximum co-operation between the managers and experts in the different railway systems. There must be consultation at regional level on the procurement of hardware and software to deal with the common computer protocols already referred to and also to ensure that best possible prices are secured for the installation of this equipment on an all system basis. Given that the software requirements are essentially the same for each country (although varying in scale) there is a clear advantage in common procurement of the IT package.

13.2.7 Marketing

The railway product must be presented and marketed as a single unit, both internally and internationally. The railways cannot be competitive without having a joint approach. An image must be created which will become recognisable to the public at large. A common approach to this must be established. It will in time be necessary to market the passenger services, particularly tourist traffic, abroad. This can obviously be done more efficiently, with greater impact and at lower cost, on a combined basis. It is also vital to market the freight services as already discussed in the intermodal section above.

13.2.8 Training Programmes

The railway sector in each of the Central Asian countries is generally well served with technical training institutes. However, in the move to the commercial restructured railway there is a need for training in disciplines new to the traditional railway, such as marketing, Information Technology, business management and organisation principles. It is suggested that this training should be organised on a regional basis to minimise costs and improve regional interaction.

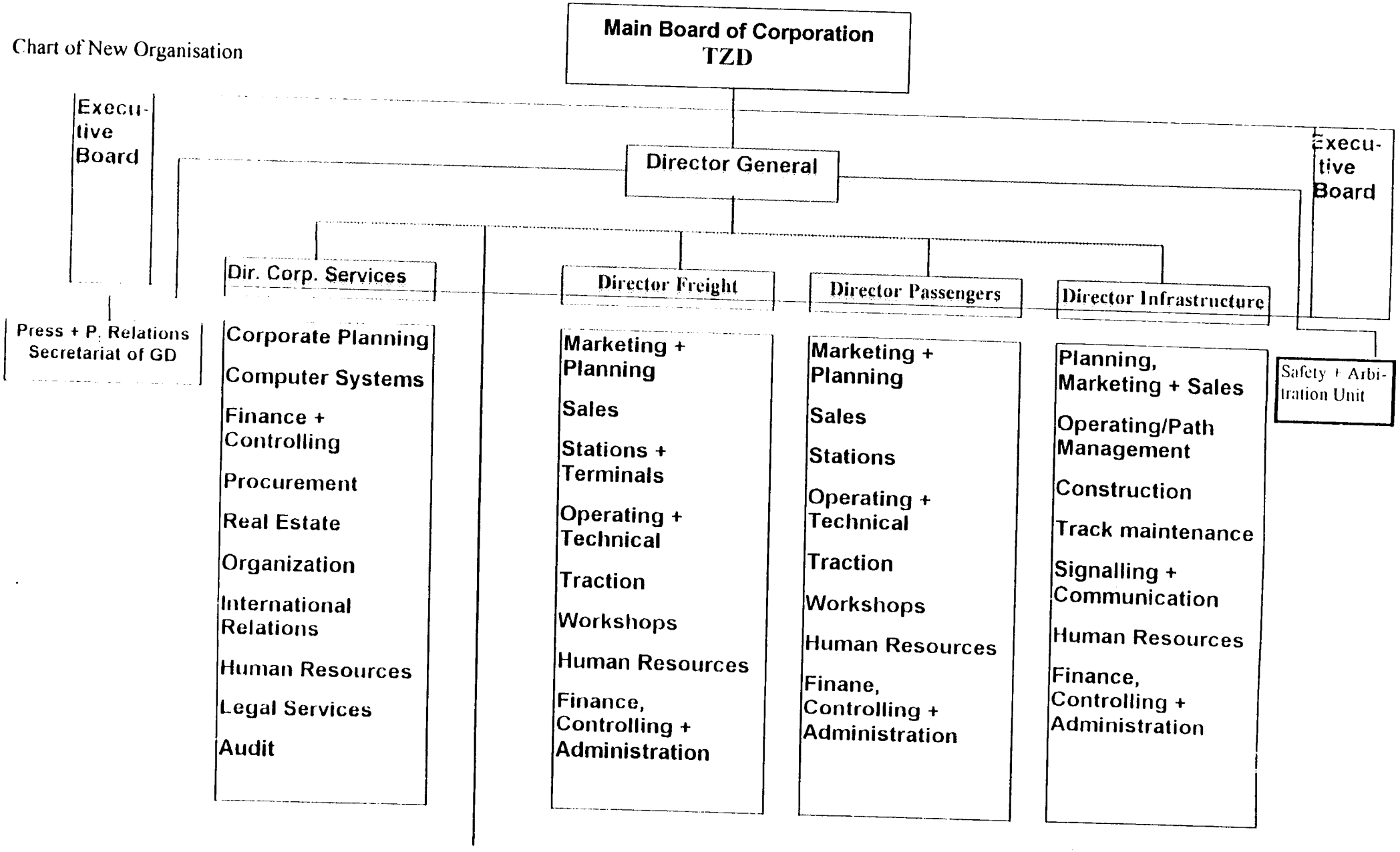
13.3 Technical assistance for support of regional co-operation

Implementation of the proposals outlined above to further collaboration between the railways requires high level commitment and the dedication of the relevant Ministries and higher railway management's. Appropriate railway experts will have to be assigned to various tasks. They will have to adapt to new technology and ideas. This process should be assisted by technical co-operation using external experts.

ANNEXES

TZD

Chart of New Organisation



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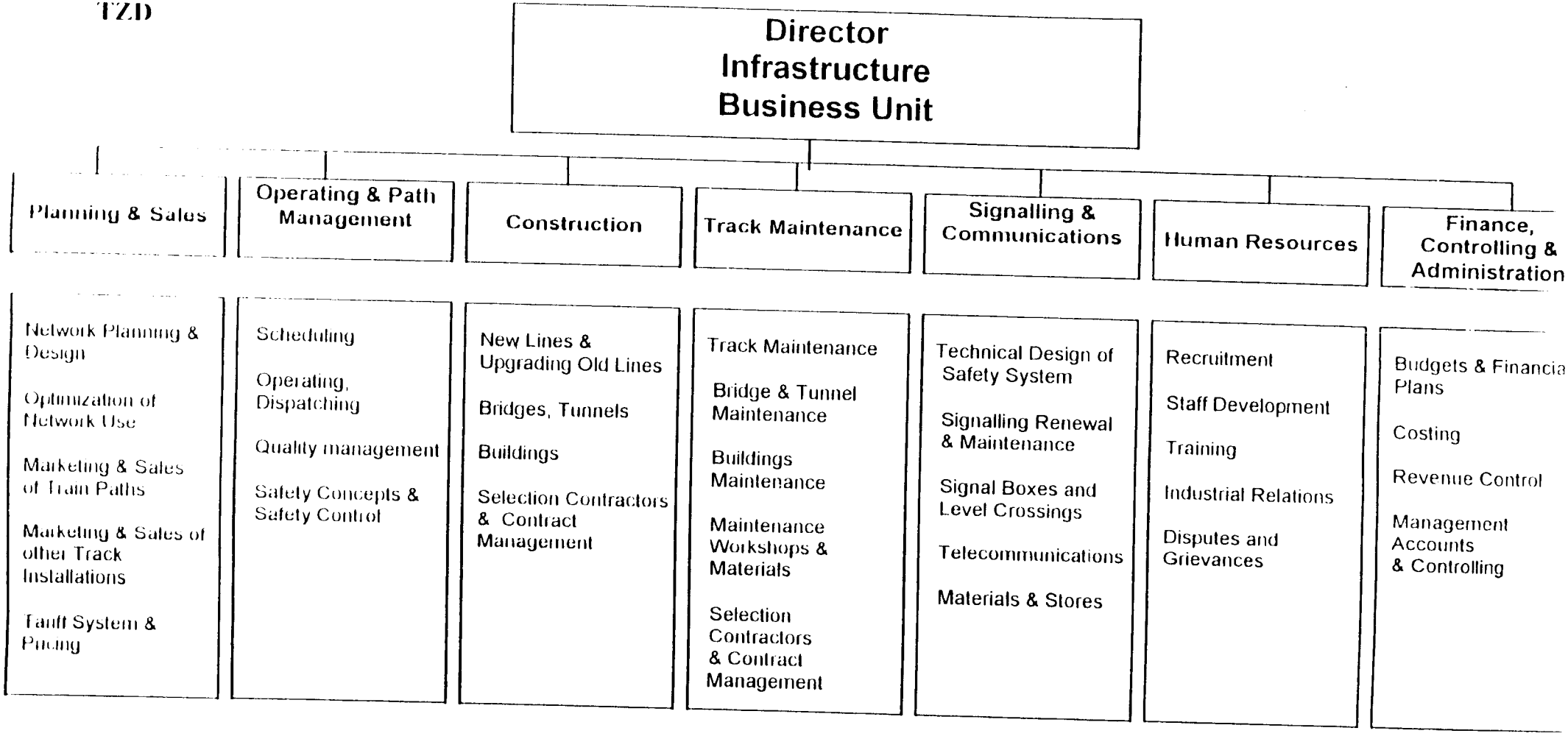
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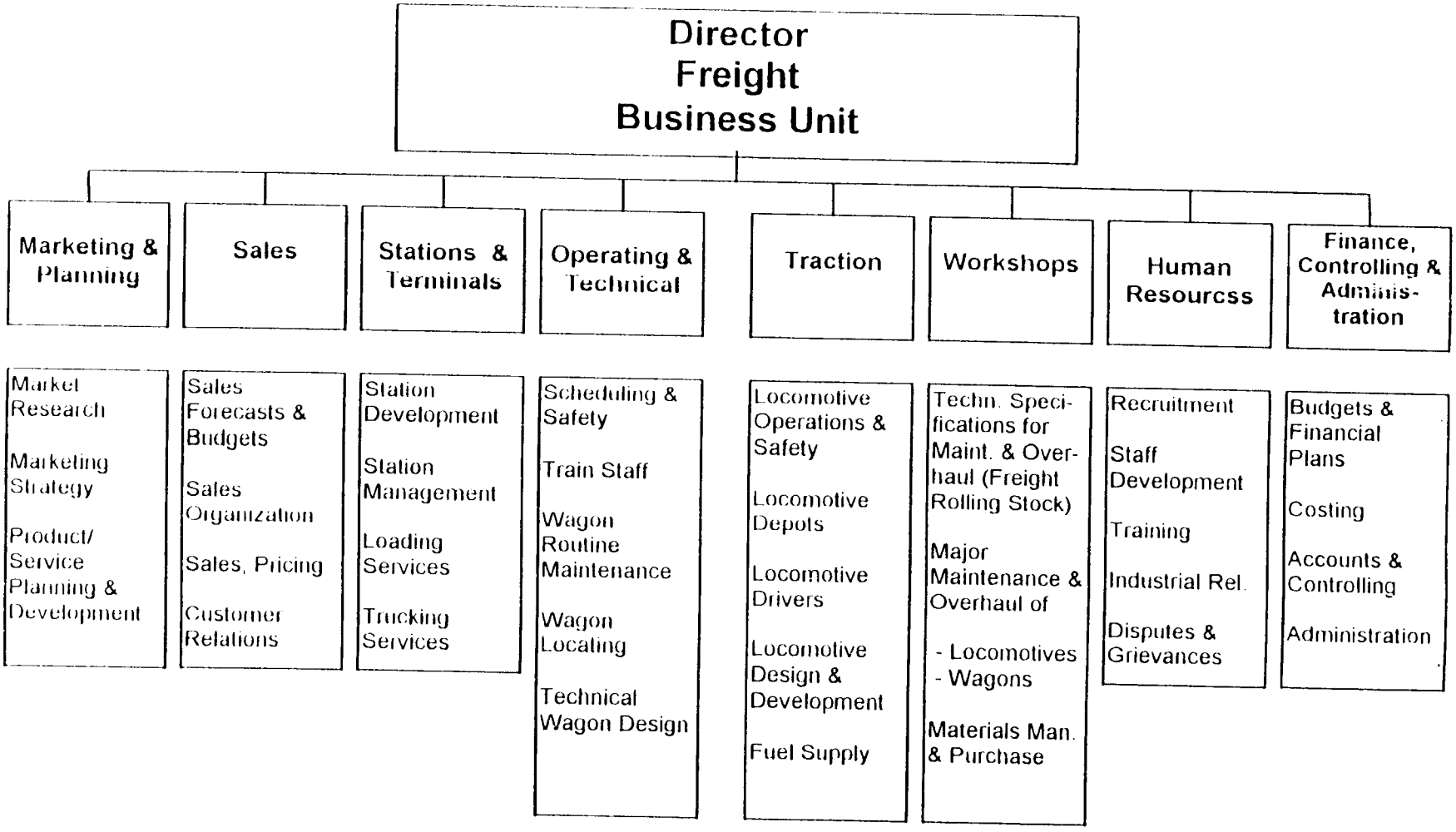
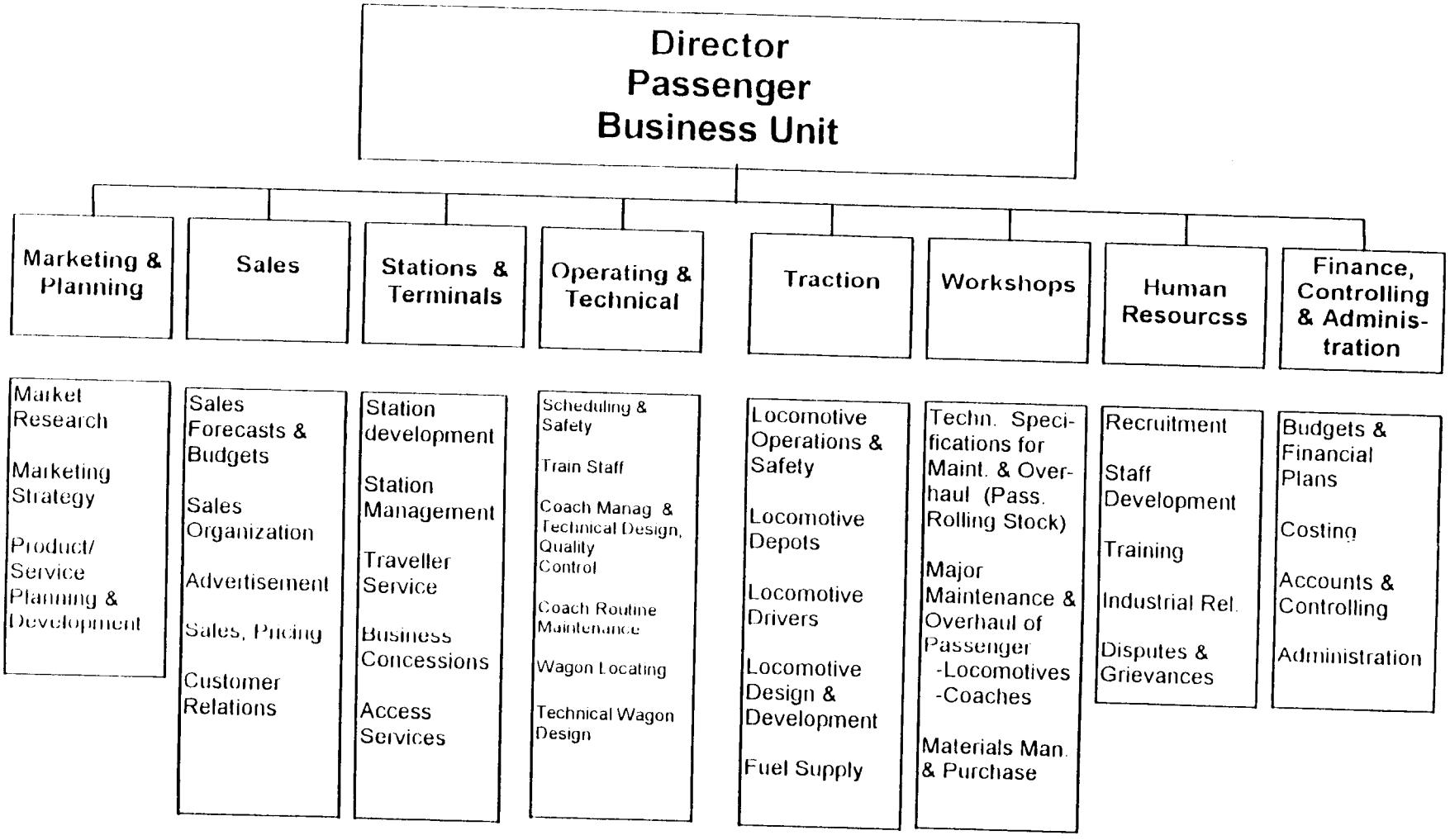
Business Unit
Planning & Sales
Operating & Path Management
Construction
Track Maintenance
Signalling & Communications
Human Resources
Finance, Controlling & Administration
Network Planning & Design
Optimization of Network Use
Marketing & Sales of Train Paths
Marketing & Sales of other Track Installations
Tariff System & Pricing
Scheduling
Operating, Dispatching
Quality management
Safety Concepts & Safety Control
New Lines & Upgrading Old Lines
Bridges, Tunnels
Buildings
Selection Contractors & Contract Management
Track Maintenance
Bridge & Tunnel Maintenance
Buildings Maintenance
Maintenance Workshops & Materials
Selection Contractors & Contract Management
Technical Design of Safety System
Signalling Renewal & Maintenance
Signal Boxes and Level Crossings
Telecommunications
Materials & Stores
Recruitment
Staff Development
Training
Industrial Relations
Disputes and Grievances
Budgets & Financia Plans
Costing
Revenue Control
Management Accounts & Controlling

TZD


Director
Freight
Business Unit
Marketing & Planning
Sales
Stations & Terminals
Operating & Technical
Traction
Workshops
Human Resourcss
Finance, Controlling & Adminis-tration
Market Research
Marketing Strategy
Product/ Service Planning & Development
Sales Forecasts & Budgets
Sales Organization
Sales, Pricing
Customer Relations
Station Development
Station Management
Loading Services
Trucking Services
Scheduling & Safety
Train Staff
Wagon Routine Maintenance
Wagon Locating
Technical Wagon Design
Locomotive Operations & Safety
Locomotive Depots
Locomotive Drivers
Locomotive Design & Development
Fuel Supply
Techn. Specifications for Maint. & Overhaul (Freight Rolling Stock)
Major Maintenance & Overhaul of
- Locomotives
- Wagons
Materials Man. & Purchase
Recruitment
Staff Development
Training
Industrial Rel.
Disputes & Grievances
Budgets & Financial Plans
Costing
Accounts & Controlling
Administration

TZD


Director
Passenger
Business Unit
Marketing & Planning
Sales
Stations & Terminals
Operating & Technical
Traction
Workshops
Human Resourcss
Finance, Controlling & Adminis-tration
Market Research
Marketing Strategy
Product/ Service Planning & Development
Sales Forecasts & Budgets
Sales Organization
Advertisement
Sales, Pricing
Customer Relations
Station development
Station Management
Traveller Service
Business Concessions
Access Services
Scheduling & Safety
Train Staff
Coach Manag & Technical Design, Quality Control
Coach Routine Maintenance
Wagon Locating
Technical Wagon Design
Locomotive Operations & Safety
Locomotive Depots
Locomotive Drivers
Locomotive Design & Development
Fuel Supply
Techn. Specifications for Maint. & Overhaul (Pass. Rolling Stock)
Major Maintenance & Overhaul of Passenger -Locomotives -Coaches
Materials Man. & Purchase
Recruitment
Staff Development
Training
Industrial Rel.
Disputes & Grievances
Budgets & Financial Plans
Costing
Accounts & Controlling
Administration

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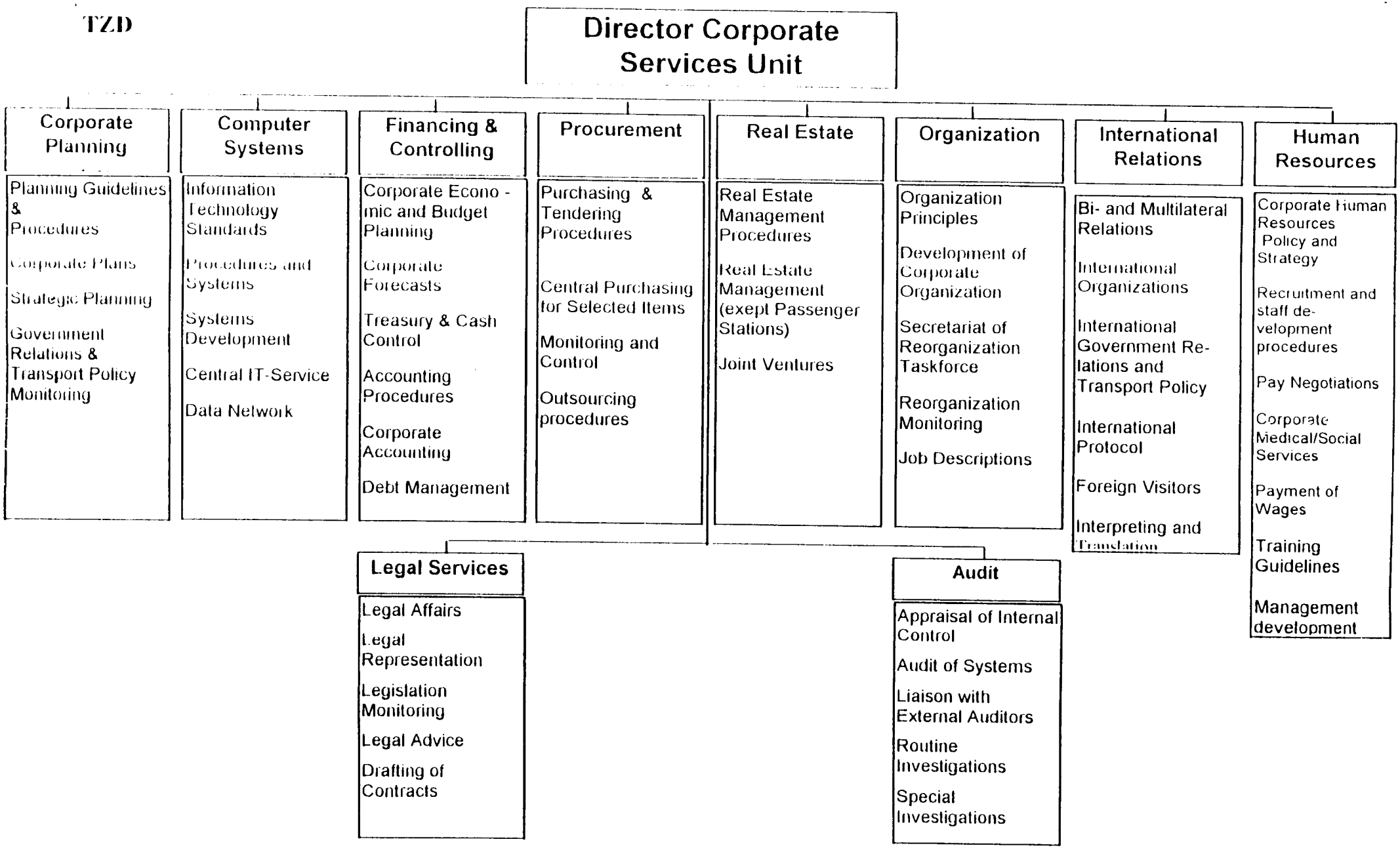
Director Corporate Services Unit
Corporate Planning
Planning Guidelines & Procedures
Corporate Plans
Strategic Planning
Government Relations & Transport Policy Monitoring
Computer Systems
Information Technology Standards
Procedures and Systems
Systems Development
Central IT-Service
Data Network
Financing & Controlling
Corporate Econo - mic and Budget Planning
Corporate Forecasts
Treasury & Cash Control
Accounting Procedures
Corporate Accounting
Debt Management
Procurement
Purchasing & Tendering Procedures
Central Purchasing for Selected Items
Monitoring and Control
Outsourcing procedures
Real Estate
Real Estate Management Procedures
Real Estate Management (exept Passenger Stations)
Joint Ventures
Organization
Organization Principles
Development of Corporate Organization
Secretariat of Reorganization Taskforce
Reorganization Monitoring
Job Descriptions
International Relations
Bi- and Multilateral Relations
International Organizations
International Government Re- lations and Transport Policy
International Protocol
Foreign Visitors
Interpreting and Translation
Human Resources
Corporate Human Resources Policy and Strategy
Recruitment and staff de- velopment procedures
Pay Negotiations
Corporate Medical/Social Services
Payment of Wages
Training Guidelines
Management development
Legal Services
Legal Affairs
Legal Representation
Legislation Monitoring
Legal Advice
Drafting of Contracts
Audit
Appraisal of Internal Control
Audit of Systems
Liaison with External Auditors
Routine Investigations
Special Investigations

TZD

Reorganization Implementation Structure