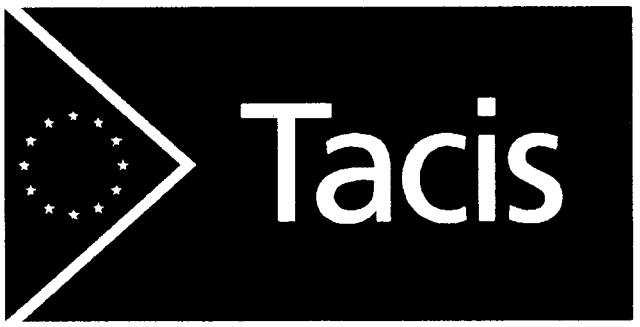

Azerbaijan Railways Restructuring

Final Report, volume 2
Experts' Commentaries

February 1999

RESTRUCTURING OF THE AZERBAIJAN RAILWAYS

Experts' Commentaries

Passenger

Freight

Network Infrastructure

Rolling Stock

Ancillaries

RESTRUCTURING OF THE AZERBAIJAN RAILWAYS
EXPERTS' COMMENTARIES

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1 INTRODUCTION

The objective of this project is to establish a detailed strategic business implementation plan to support the Azerbaijan Governments in restructuring the railways. These commentaries support the Business Plan which is a 5-year plan (1999-2003) which has been developed for the railway. The aim is to stabilise and then improve the commercial performance of each railway through the appraisal of practical traffic forecasts, revenue opportunities, restrictions and limitations on resource availability and also assessing the potential to improve productivity and performance.

A key objective of the strategic business plan is to establish a vision for the future shape of the Business Units in accordance with the policy of operating this system as a state-owned enterprise, market led and providing social services at a reasonable cost in line with government agreement. The 5-year Business Plan will to provide a base of the preparation of the annual revenue and investment budgets and also determine profitability forecasts. This Business Plan aims to constitute a Master Plan for railway development. It provides a 5 year Rolling Business Plan which will serve as a base for budgeting and can be updated annually in the light of performance and investment availability. The Business Plan is essential to providing a focus for management strategy which will support performance improvement in both the service and financial areas. It is particularly important as a management tool in the context of the introduction of the new organisation. Through the Plan objectives can be determined and progress monitored effectively. Business operations and marketing can also be adjusted to changing requirements and a MIS can be used to monitor progress in accordance with targets.

1.1 Corporate Objectives

The railway in Azerbaijan has been operated as state run enterprise under article 6 of the 1992 Law on Enterprises and a defined legal entity. It has had a number of fully owned subsidiary companies and has entered into joint ventures with foreign organisations . The General Manager reports directly to the Council of Ministers and the Government has traditionally had a major say in determining Railway policy.

1.1.1 Government Objectives

The Government requires implementation of the new railway law to enable the incorporation of the railways as State-owned joint stock company under the direction of the Ministry of Transport in Azerbaijan and the Cabinet of Ministers in Azerbaijan. The Government also requires the reorganisation of the respective railways into specific divisions as identified in this Plan which business plans allocated to each of the divisions. The Government requires the railways to complete the drafting of the technical specifications for the investment component of the proposed EBRD loans. The government seeks support for the development of the total railway system with IFI support.

1.1.2 Railway Objectives

Objectives The railway management teams will implement their new management structures and organisation on the timetable for implementation shown in this Plan and the railways will also implement the 5-year Business Plans. The railway will also implement the Environmental Management Plan prepared with the consultants.

The Railways general objectives and goals are to:

- Implement new relationships between the Government and the Railway.
- Implement new management structures and develop Business and Service units.
- Create a customer oriented ethic aimed at achieving profitable, cost effective performance which meets rail users requirements.
- Develop a marketing approach to the management of each sector.
- Development of Laws similar to those of the EU.
- Implementation of "fast trains" in both passenger and freight sections.

2 PASSENGER BUSINESS

2.1 Background

The proposed organisational structure for the railway has split it into 6 main groupings of which the freight business is one. The main activities of the business can be divided as follow:

- Marketing
  - Traffic costing
  - Tariff setting
  - Revenue collection
  - Timetable development
- Contracting
  - Internal
    - Rolling stock
    - Infrastructure
  - External
- Human resources
- Finance
- Operations
  - Train crews
  - Freight stations
  - Marshalling yards
  - Freight terminals
  - Performance
  - Train control and monitoring

The main changes proposed give the business the ability to be free standing in terms of costs and revenue. It will own none of the infrastructure and as such will pay the infrastructure business for access to the track and property it needs. Similarly it will rent its locomotives and wagons from the rolling stock company.

The staffing levels below have been identified to the freight business through a process of disaggregation of the present activities into their component parts and summating the figures from these basic building blocks.

It is considered that a 30% reduction in staff numbers is achievable during the life of the business plan through the actions outlined in the freight business section.

The following table provides the total staff numbers for each year of the plan

	Base year	Year 1	Year 2	Year 3	Year 4	Year 5
Freight	3021	2930	2725	2507	2307	2122
% change		3%	7%	8%	8%	8%

The figures do not include any provision for the introduction of driver only operation as it is not considered that this will be achievable during the plan timescale. It should be investigated however to understand the requirements and trials introduced on certain traffic flows as considerable cost benefits stem from this method of operation.

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2.1.1 Passengers Carried by Type of Service

Table 3.
2 shows the number of passengers by type of service between 1995, and 1998.

Table 3.2 Passenger demand by service type 1996-98 (000's)

Type of service	1995	1996 6 mths	1996	1997 6 mths	1997 9 mths	1997	1998 6 mths	1998 est.
International								
• In bound						78.0	59.2	118.4
• Out bound						50.3	60.3	120.6
• Transit						11.0	12.8	25.6
• Total	7		6		88	139.3	132.3	271.6
Local	2553		1495		953	1242.9	553.8	1107.6
Suburban	6395	1541.8	3081	989.2	1824	2406.8	1407.7	2815.4
Total	8955	2278.8	4582	1679.2	2865	3789.0	2093.8	4194.6

Table 3.3 Passenger kilometres by service type 1996-98 (millions)

Type of service	1995	1996 6 mths	1996	1997 6 mths	1997 9 mths	1997	1998 6 mths	1998 7 mths	1998 est.
International									
• In bound						13.2	10.1		20.2
• Out bound						10.9	13.7		27.4
• Transit						5.3	5.7		11.4
• Total	1		1		17	29.5	29.4	42.2	59.0
Local	650		458		291	389.5	182.2	208.0	364.4
Suburban	140	47.7	99	27.9	51	70.4	69.4	75.0	138.8
Total	791	270.4	558	234.0	359	489.3	281.1		562.2

Table 3.4 Average passenger haul by service type 1996 – 98 (km)

Type of service	1995	1996 6 mths	1996	1997 6 mths	1997 9 mths	1997	1998 6 mths	1998 est.
International								
• In bound						170	171	171
• Out bound						217	227	227
• Transit						481	441	441
Total	143		167		193	211	222	222
Local	255		306		305	313	329	329
Suburban	22	31	22	28	28	29	49	49
Total	88	119	122	139	125	129	134	134

Between 1996 and 1998 total passenger demand seems to have stabilised at between 3.8 and 4.6 million pass per annum. 1998 traffic flows are expected to recover from the fall in 1997 mainly caused by a decline in suburban traffic. International demand has increased dramatically albeit from a small number and within 6 months of 1998 international passenger traffic has matched figures for the whole of 1997. Transit traffic represents less than 10% of total international traffic.

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2.2 Objectives

With passenger volumes appearing to stabilise the key strategic objectives of the Passenger business unit will be to:

- Maintain market share over the 5 year plan to achieve 620.7 million passenger kilometres in year 2003.
- Introduce new management structures and procedures to achieve increases in productivity performance and efficiency
- Create a marketing strategy to achieve targeted annual growth and set tariffs to achieve profit revenue and cost targets
- Through track upgrading, renewal of rolling stock and locomotives achieve increases in speed and reliability
- Separate the passenger business into two profit centres – inter city and regional.
- Achieve productivity improvements for;

- Locomotives of 20%
- Coaches of 20%
- EMUs of 10%
- Staff of 30%

- Review the frequency of stations so that they are;

  **km or more apart on local services (non PSO)
  Only major cities served by new inter city services of express trains.

- Improve integration between rail and none rail passenger transport (eg. bus feeder services) covering routes where rail services have been withdrawn.

A key development in respect to this plan is that the railways develop their tariffs as shown in the Plan. This is a strongly recommended policy to ensure the viability of the railways and of the proposed rehabilitation measures. This is strongly linked to the development of a high quality of service to its clients. Clearly there needs to be improved marketing and improved cost accounting to enable managers to strengthen the sales efforts and performance on profitable opportunities. If the railway has to provide social services, for example, such as subsidised passenger transport there needs to be a method for compensation for such deficits from the Government. The costs of all rehabilitation measures shown in this Plan represents a heavy burden for the cashflow and therefore the priorities are shown as follows:

- Permanent Way (priority 1)
- Wagon repair works (priority 1)
- Stations (priority 2)
- Rolling Stock (priority 3)
- Locomotives (priority 3)

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2.3 Market

The average hauls of the different passenger categories typify the size of the country and the skewed distribution of the population and rail network density in favour of Baku. Local passenger hauls have changed little since the passenger km trend has followed that of passenger demand. Hauls of both international and suburban passengers have increased reflecting the improvements in international stability in the region and also the change in the suburban passenger market where the shorter distance trips have been lost to competition whereas rail has remained competitive on longer distance trips. The improvement in suburban traffic statistics may also be result of improvements in traffic data collection and ticket fraud.

The average hauls of international traffic also reflect the current pattern of international services and regional stability. All international services to/from Georgia to Russia and Ukraine have to travel across Azerbaijan (a journey of approximately 700km). In addition there would also be transit traffic from Baku port to the Georgian and Russian borders (approximately 500km and 200km respectively). Transit traffic from Iran to Russia would travel about 390km.

Overall passenger traffic contributes only 3% of the railways turnover and although the focus of investment will be on commercial freight operations the re-structuring plans shown here recommends solutions to the viability and funding issues involved in continuing the provision of passenger services.

It is not easy to identify the market share currently held by the rail passenger business however it is fair to say that rail's market share has declined as a result of growth in competing modes such as air and bus. Competition is strongest on suburban routes and this market segment is expected to decline or remain static in the short term unless measures are introduced to improve the attractiveness of these services. Growth in the rail market share is therefore likely to come mainly on long distance and international routes where the distance factor can give rail the advantage and will be in line with economic growth.

As a result of using ticketing data as the main source of identifying patronage there is a probable underestimation of the number of passengers using the trains in the past. Rationalisation of services is inevitable but it will be essential to retain and introduce services that maximise patronage in the time table.

Primarily, a result of poor infrastructure but also procedural delays, journey times are uncompetitively long. It is hoped that with necessary improvements in infrastructure alone there will be a significant drop in journey times.

The concept of separating the passenger market into two types, regional and intercity needs to be developed. Effort should be spent in developing the intercity service provision as a "flagship" service operating on a minimal, if any, subsidy with excellent marketing and offers.

Facilities on trains range from simple hard seat carriages to international coaches with sleeping facilities and air conditioning. The passenger business needs to identify the size of market willing to pay for extra comfort at a premium. It may be viable to reduce the number of sleeper coaches and replace them with airline style seats to boost patronage. Alternatively the poor comfort offered by some carriages may be deterring some of the market.

There is a need to review the viability of each station and other locations where trains need to stop. By reducing the number of stations and stops journey times will fall particularly for the intercity service and this will be paralleled by a reduction in operating costs.

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Historically the passenger business has not been able to cover its own expenditure through revenue collected from its passengers. It is unlikely that in the short term the passenger business will be able to achieve profit in the commercial sense of the word. However by developing services which are more customer oriented then the business will have the opportunity to raise tariffs at minimum cost in terms of loss of market share. The passenger business, in the short term at least, has to receive a subsidy or withdraw unprofitable services. This subsidy may come from two sources. Firstly the government may choose to subsidise those services which it believes are essential in terms of social need. The subsidy must be conditional on the continuing performance of these services in terms of meeting social objectives and in a cost-effective manner that is maximising revenue direct from the passenger on unprofitable services. The alternative is to continue cross-subsidy from other revenue generating businesses (namely freight). The criteria for subsidy should be the same as those if the subsidy came from the government. The freight business would need to know in advance of each year the subsidy required by the passenger business in order to plan to minimise its effects on the freight business performance.

The concept of fair competition in the transport market needs to be discussed with government. Government subsidies to competing air services and free road access for buses and cars needs to be reviewed as these give such modes an advantage over rail.

2.4 Operating and Financial Performance

2.4.1 Operating Performance and Targets

Passenger services have generally been maintained in the face of declining patronage leading to reduced average loadings. However, international services to Russia were only resumed in 1997 after the disruption in Chechnya and Dagestan. These services used to carry load factors of up to 85% of capacity. ADDY has estimated that traffic on these services will eventually reach 25% of total passengers carried.

The productivity of passenger services has declined with passengers per train falling from 125 to 79 as shown in Table 5.5 between 1995 and 1997. Performance in 1998 is expected to increase. The 1997 passenger kilometre figures were 12% below plan, broken down as follows:

- Suburban services achieved 83% of plan
- Local services achieved 86% of plan
- International services achieved 84% above plan

For 1998 the year to July figures for passenger kilometres show that the railway is performing better than plan, particularly for local and suburban services as follows:

- Suburban services 17% above plan to date
- Local services 17% above plan to date
- International services 6% above plan to date

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Table 3.5 Key operating performance indicators

Indicator	1995	1996	1997
Passengers (mill)	9.0	4.6	3.8
Passenger km (mill)	791	558	489
Passenger train kms mill	6307	5960	6247
Of which electric	2740	2786	3030
Diesel	411	392	445
EMU	3156	2782	2772
Loco km mn	3754	3686	3967
Of which electric	3300	3251	3473
Diesal	454	435	494
EMU			
Vehicle km mn	57736	52982	48573
Of which electric haul	37172	35170	32727
Diesel haul	6999	6586	5002
EMU	13565	11226	10844
Gross tonne km (excl loco) mill	3540	3248	2968
Of which electric	2316	2180	2033
Diesel	442	417	308
EMU	782	650	627
Passengers/train	125	93	79
Passengers per coach	14	11	10
Technical speed (km/h)	34	38	34
Commercial speed (km/h)	31	31	32

Between 1995 and 1997 technical and commercial speeds have remained fairly static.

Passenger train kilometres in 1997 were approximately 60% of all train kilometres despite ADDY being predominantly a freight railway.

The average load on trains has declined by 37% since 1995.

The estimated number of passengers per coach has fallen by 29% since 1995.

2.4.2 Train Capacity

The 1998 timetable reports the typical capacities of international and long distance services. Trains are made up of a combination of the following wagons;

- International standard – 18 passengers
- Compartment standard – 36 passengers or less depending on needs of staff
- Reserved standard – 54 passengers
- General standard – 81 passengers

International services operate from Baku to Moscow, Kiev, Tbilisi, Astrakhan, Rostov and Makhachkala. In addition there are transit services from Tbilisi to Moscow and Kiev. The capacities on these trains are shown in Table 6.6.

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Table 3.6 – Existing train capacity one way – International Services

Standard	Baku-Moscow	Baku-Kiev	Baku-Tbilisi	Baku-Astrakhan	Baku-Rostov	Baku-Makhachkala
International	1	1	1	0	0	0
Compartment	6	4	6	6	5	1
Reserved	8	8	3	9	4	4
General	0	0	0	0	0	0
Total	15	13	10	15	9	5
Frequency	2 weekly	Weekly	Daily	3.5 weekly	3.5 weekly	3.5 weekly
Capacity	658	586	390	660	352	248
Annual capacity (est)	68620	30558	142350	120450	64240	45260

Source: 1998 timetable

Given that the 6 month total of international passengers is 132314, the average international passenger load factor is about 28%.

The 1998 timetable also indicates the train capacity for local services from Baku to Akstafa, Yalama, Khankendi, Astara, Kazakh, Belokani, Beyuk-Kazik, Goradiz and Gyanja. The capacities are given in Table 3.7.

Table 3.7 - Existing train capacity one way - long distance local services

Standard	Akstafa	Yalama	Khankendi	Astara	Kazakh	Belokani	B-Kazik	Goradiz	Gyanja
International	2	0	0	1	1	1	0	0	1
Compartment	5	0	4	3	9	3	4	4	2
Reserved	0	0	3	5	5	3	5	6	4
General	0	5	0	0	0	0	0	0	0
Total	7	5	7	9	15	7	9	10	7
Frequency	Daily	2 daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily
Capacity	210	374	266	392	590	284	410	464	302
Annual Capacity est.	76650	258420	97090	143080	215350	103660	149650	169360	110230

Thus on long distance domestic services the total annual capacity is 2.6 million passengers or 7252 passengers per day. Given that the number of local passengers in the first six months of 1998 was 553803 then the load factor for local passengers on local trains is estimated at 42%.

2.4.3 Punctuality

Punctuality was reported as not being a major problem on domestic services. The main cause of concern was on international services particularly to Russia. Border delays on these services have resulted in journey time increases from 42 hours to 64.

Punctuality is probably the most important performance measure for level of service to the customer. Table 3.8 shows how the passenger service performed in 1997.

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Table 3.8 - Punctuality Statistics for 1997

Criteria	Direct and local services	Suburban services
Total trains planned	**9003**	**49457**
• Of which departed	100%	100%
• Of which on time	98%	99.5%
• Of which delayed	2%	0.5%
Total delay departure time (hours)	**249**	**198**
Total trains traced by sections	**9171**	**51434**
• Of which arrived on time	91%	99%
• Of which arrived reduced delay	3%	-
• Of which arrived delayed	6%	1%
Total delay arrival time (hours)	**1712**	**634**
Total delay time (hours)	**1961**	**832**
Fault of delay to arrival (% of hours)		
• Carriage service	1.4%	0.3%
• Locomotive service	10.8%	27.3%
• Wagon service	8.2%	0.2%
• Electric supply service	43.3%	42.3%
• Signalling/Communications	0.3%	2.1%
• Track Service	2.2%	6.2%
• Non-acceptance by neighbouring divisions	0.1%	-
• Same by tracks (?)	-	-
• Forwarding of priority trains	-	-
• Other reasons (power cuts etc.)	33.6%	21.8%

As can be seen the punctuality figures are comparable with Western European standards. The main causes of delay are locomotives and electricity supply.

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2.4.4 Financial Performance

Table 3.9 - Income and Expenditure 1995 to 1997 (US$ millions)

	1995	1996	1997
Freight revenue	63.0	69.1	77.4
Passenger revenue	1.8	2.2	3.5
Other revenue	11.5	21.2	29.2
VAT	8.6	7.0	11.9
Total turnover	**67.7**	**92.5**	**110.1**
Cost of Sales	37.1	57.4	86.0
Gross Profit	**39.0**	**35.1**	**24.1**
Depreciation	1.6	1.9	14.7
Net Operating Profit	**37.4**	**33.2**	**9.3**
Other income	9.7	11.1	22.0
Other Expenditure	12.5	15.3	25.8
Pre tax profit	**34.6**	**29.5**	**5.5**
Tax	12.0	10.2	1.7
After tax profit	**22.6**	**19.3**	**3.8**
Exchange rate (Manat:US$)	4416	4305	3900

Source: EBRD
Note the 1997 figures have been adjusted to transfer post tax salary bonuses to pre tax payments.

Since 1995 efforts to improve revenue capture have resulted in steep fare increases. ADDY has also introduced an incentive system to improve revenue collection on suburban trains with encouraging results. This system includes penalising both the passenger and the responsible staff for failing to collect the correct fare. Ticket cashiers are also encouraged to sell 250 tickets per day. The total effect of all the measures introduced is an almost doubling of passenger revenue. Despite this fares remain cheap compared with other countries meaning that the passenger business remains unable to cover its costs and therefore, as shown in Table 5.10 required a cross subsidy of 78% from the freight business.

Table 3.10 ADDY Net Operating Profit and Loss by segment 1995 to 1997

	1995	1996	1997
Passenger			
Revenue (Mt bn)			
International/local	8	8	15
Suburban	0.04	1	1
Sales plus depreciation (Mt bn)			
International/local	42	38	50
Suburban	29	22	22
Surplus (Mt bn)			
International/local	(34)	(30)	(35)
Suburban	(29)	(21)	(21)
Freight + Passenger			
Revenue (Mt bn)	286	307	349
Sales plus depreciation (Mt bn)	232	231	297
Surplus (Mt bn)	54	76	31

Source based on CIE Report Table 2.21.

Passenger yields since 1995 have increased from 10.1 Manats per passenger km to 33.3 manats per passenger km. Estimates for 1998 put the figure at between 40 and 50 manats per

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passenger km. As table 3.11 shows international and local passengers account for the majority of passenger revenue.

Table 3.11 – Revenue by Passenger Type

Passenger type	1995	1996	1997
Revenue (Mt m)			
Suburban	404	767	1002
Local	7569	8422	9634
International	18	112	5641
	7991	9301	16277
Average Yield (MT/pkm)			
Suburban	2.9	7.7	14.3
Local	11.6	18.4	24.7
International	18.0	112	18.8
Total	10.1	16.7	33.3

In 1997 passenger revenue collection achieved 6969 million Manats from passenger services (excluding luggage and sleeping vouchers). This was achieved as follows:

- International passenger revenue – Manat 1155 million (15% above plan)
- Local passenger revenue – Manat 5852 million (6% above plan)
- Suburban passenger revenue Manat 1002 million (20% above plan)

For 1998 the first six months revenue from passenger services (excluding luggage and sleeping vouchers) stood at 6172 million Manat. By the end of July this figure rose to 6259 million Manat. This compares against plan as follows:

- International passenger revenue – 1240 million Manat (75% of plan to date)
- Local passenger revenue – 4225 million Manat (94% of plan to date)
- Suburban passenger revenue – 794 million Manat (13% above plan to date)

Using these figures it estimated that revenue will achieve an estimated 24093 million Manat. (Including luggage and sleeping vouchers). This is an increase in revenue from 1997 of 48%.

2.5 Traffic Projections and Trends Analysis (5 years)

The historic trend in passenger traffic is reported in Table 3.1 above. The trend is summarised by a sharp decline since 1995 followed by signs of stability.

2.5.1 International Situation

International traffic in particular has made a significant recovery from a mere 1 million passenger kilometres in 1995 to an estimated 59 million for 1998. Much of this increase is a result of the resumption of services across the Russian border following stability in Chechnya and Dagestan.

Azerbaijan's ongoing dispute with Armenia has led to prolonged closure of this border and the severance of Azerbaijan from its enclave of Nakichevan. The dispute has also had an effect in Nagorno – Karabakh where rail services have effectively ceased.

Although the rail link terminates at the Iranian border there is a sizeable potential demand for

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traffic between Azerbaijan and its southern neighbour. Relations between the two countries are handled with great care of the significant Azerbaijani minority population in Iran. Future relations between the two countries will largely depend upon future of oil exploitation in the region.

The future development for international traffic will depend mainly upon:

- The growing economic prosperity and political development of the region
- Developments in relation to Armenia
- Stability in Chechnya and Dagestan
- Developments concerning oil particularly affecting relations with Russia and Iran.
- Resumption of direct services between Georgia and Russia/Ukraine as a result of normalisation in Abkhazia.

2.5.2 Economic Projections

The overall economic outlook depends on three key factors:

- The rate of foreign investment, primarily in the oil sector
- Developments in the border areas with Armenia and, to a lesser extent, in neighbouring Dagestan and Chechnya to the north
- Continued progress in economic stabilisation and structural reform

The forecasts assume that stabilisation and structural reform continue within Azerbaijan. However, they assume that the relationships with neighbouring countries are unlikely to be sufficiently normalised in the next five years and so result in major changes in passenger demand. This situation needs to be continually reviewed in each year of the plan. Developments within Azerbaijan are assumed to be favourable to external financing. Table 3.12 summarises forecast growth rates from a number of sources.

Table 3.12 Economic Growth Forecasts Azerbaijan 1996 - 2003

	1996	1997	1998	1999	2000	2001	2002	2003	Growth 1997:2003
Real GDP growth – Azerbaijan		-							
Actual	1.3	5.8							
Minimum			6	5	5	4	3	3	1.29
Maximum			8	11	15	12	10	10	1.89
EIU			7	8					
PlanEcon			6						
Expected			7	8	10	8	7.5	7.5	1.59

Nevertheless, even with these relatively high growth rates Azerbaijan's GDP in 2003 would still be only 75% of its 1989 level.

The GDP forecasts for neighbouring Caucasian countries are shown in Table 3.13.

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Table 3.13 Economic Growth Forecasts Georgia and Armenia 1996 - 2003

	1996	1997	1998	1999	2000	2001	2002	2003	Growth 1997:2003
Real GDP growth									
-Georgia									
Actual	11.4	11.3							
Minimum			9	7	7	7	5	5	1.47
Maximum			12	10	10	10	10	10	1.80
EIU			10.0	8.0					
IMF	10	10	10	8	8	8	6	6	1.56
IBRD	8	10	10	8	8	8	6	6	1.56
PlanEcon	14	12	11	10	9	-	-	-	-
Expected			10	8	8	8	7	7	159
-Armenia									
Actual	5.8	3.1							
EIU			5	6					
Expected					5	5	5	5	1.42

2.5.3 Traffic Forecasts

In 1997 the railway reported that its passenger traffic amounted to 489 million passenger kilometres. In 1998 passenger traffic is expected to increase to 562 million passenger kilometres. Whilst this represents a 15% increase passenger kilometres has fallen at an average of about 11% per annum since 1995. The forecasts are summarised in Table 3.14 below.

The forecast assumptions prepared by EBRD have been used to determine the anticipated passenger traffic growth between 1998-2003.

Total passenger traffic is expected to grow at an average annual rate of 2% less the effect of tariff increases. Growth by passenger type may be broken down as follows:

International – 3% per annum
Local – 3% per annum
Suburban – 1.5% per annum

These figures are based upon the assumption that as the economy improves domestic passengers are likely to a) switch from suburban rail to competing modes, b) switch from suburban rail to longer distance services and c) enter the market as passengers of longer distance services as opposed to suburban services.

As a result the total number of passengers carried by ADDY is forecast to rise from an estimated 4.2 million in 1998 to 4.4 million in 2003.

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Table 3.14 - Forecast Passenger traffic trends (millions)

	1997	1998	1999	2000	2001	2002	2003
International passengers	0.14	0.26	0.27	0.28	0.28	0.29	0.30
Local passengers	1.24	1.11	1.14	1.16	1.19	1.22	1.25
Suburban passengers	2.41	2.82	2.83	2.84	2.86	2.87	2.88
Total passengers	**3.79**	**4.19**	**4.24**	**4.28**	**4.33**	**4.38**	**4.44**
International pkm	29	59	60	62	63	65	67
Local pkm	390	364	373	383	392	402	412
Suburban pkm	70	139	139	140	141	141	142
Total pkm	**489**	**562**	**573**	**585**	**596**	**608**	**621**

2.6 Competition Evaluation

There are clearly rivalries in the Azerbaijan passenger market between competitors the effect of the current situation reveals the following key influence:

Azerbaijan Railway

Strengths	Weaknesses
Infrastructure Management & Personnel Operations Corporate culture	Investment Quality Resources Finances
Opportunities	**Threats**
New investment Customers Traceca Marketing & Sales Organisational Technology Productivity Regulatory	Competitive Political Economic Social

Azerbaijan's car ownership levels, although increasing, remain relatively low at around 50 per 1000 inhabitants (1995) and are unlikely to increase rapidly for at least the medium-term. Passenger traffic in the medium-term is likely to face strong competition from buses and, given the financial performance of the segment, should probably withdraw from a number of suburban and branch line services. However, the main line serves a number of relatively large centres and should have the potential to compete effectively against bus competition at least for the medium term. Underlying demand is likely to grow more or less in line with the economy, although this will be dampened by any fare increases which maybe introduced to improve the cost recovery.

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It is essential to focus on key changes that will happen in the next few years in order to seek to be better than competitors and so influence customers to choose to travel by rail. This means understanding what plans competitors have for their product development, new technology and equipment and commercial issues.

2.7 Passenger Strategy

2.7.1 Business Objectives, Standards and Service Levels

The business goals for ADDY are as follows:

Business Strategy	Implementation
• Costs reduction	Rationalisation Productivity improvement Investment
• Quality Standards	Quality assurance Greater competence Improved infrastructures Better training
• Customer Service levels	Customer charter Quicker response to customer needs Comfort and personal service Co-ordination with marketing efforts

The principal business objectives of ADDY are to deploy its capability and resources to achieve its strategic goals and to meet market needs in order to earn profitable revenue. This will be done through positioning the passenger business relative to competition to rail in Azerbaijan to enable the railway to achieve competitive advantage. The main corporate strategy will therefore be to increase the value of the railway to the Government in respect to its return on investment.

The general direction in which the railway will move forward over the 5 years of the plan and beyond is to achieve significant improvements in quality and performance in order to achieve target growth.

This plan contains the methodology and interaction within management to enable the plan to be followed up in a committed and flexible manner within the organisation and so each functional group needs measures and budgets to implement with routines for monitoring progress.

The critical strategic factors in achieving the plan are as follows:

- Putting customer needs first
- Creation of a commercial *modus operandi*
- Risk minimisation
- Staff motivation

These factors underline the mission of the passenger business.

The business focus must be directed at satisfying the needs of the customer (formerly known

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as the passenger) and meeting his or her requirements consistently and economically. This requires the development of quality procedures as part of the marketing strategy. The marketing strategy itself must include a thorough understanding of ADDY's customers and the strength and weaknesses of the competition. A customer's charter may be considered which states publicly how the business will treat its customers and what level of service the customer should expect from the business.

The passenger business needs to adopt the drive to obtaining a commercial return on its activities. In the purest sense this means a change from the conventional quantitative measures of performance such as passenger kilometres to one where each element of the business generates a profit and contributes to the overall success of the business. Unlike the rail freight business unit the passenger business may have duties and responsibilities which cannot produce a positive return from customer revenue alone. This does not reduce the need for the passenger business to develop proper traffic costing procedures nor to provide a proper understanding of the individual cost elements for each traffic flow. When the costs for each type of traffic are known a tariff policy can be developed to ensure commercial viability.

Safety, together with environmental awareness is good for business and one of the traditional advantages that rail has over competing modes. The passenger business must achieve appropriate standards in both areas to ensure compliance with regulations and satisfy public expectations. Public image or profile can be a powerful weapon or a weak link in the marketing armoury of the railway. The standards should be set to achieve risk levels that are as low as reasonably practical. Present arrangements need to be assessed to eliminate prescriptive standards and, where appropriate, introduce output standards and specifications based on sound commercial and operating judgement. The strategy should introduce modern risk analysis and risk management techniques that then become an integral part of ADDY's standard procedures.

High morale and a well motivated work force is essential if customers are to be attracted to the passenger business. As part of the quality management system a training programme should be developed for all employees covering customer care, management skills and technical development. All employees need to understand the "mission" of the passenger business and to this effect a mission statement should be prepared and distributed. Staff need to appreciate the value of each others work and incentives should be in place to encourage better than expected performance. Performance monitoring of all staff from senior management downwards should be undertaken via regular peer appraisals. At these appraisals strengths and weaknesses can be identified along with remedial action. Most important of all a culture of positive thinking and proactivity needs to be developed with innovation encouraged at all levels in the organisation.

Critical targets to be met in respect to achieving the strategic goals are summarised as follows:

ACTIVITY	TARGET
• Punctuality	95% of trains to arrive at destination in 5 minutes of timetable time
• Fares	Annual increase to be 2.5% per annum in real terms
• Cleanliness	Long distance services cleaned at end of each single journey or on inspection. Short distance services to be cleaned at least every 6 hours or on inspection

• Overcrowding	Inter city services should not exceed seating capacity. Standing passengers allowed on services where average passenger journey time is not more than 20 minutes.
• Reduced journey times	Reduced journey times by 50% on long distance services. All services to benefit from reduced station stopping times.
• Customer information	Telephone customer centres to handle enquiries and pre bookings set up at main intercity stations. Clear and earliest possible advance warning of cancellations/delays/platform changes etc. Ticket sales and offer information available via media, travel agencies, hotels, sister railways and possibly "website".
• Total Quality Management	Adopt "mission statement" and "customer charter", operate quality management system based upon and aspiring to IS09001

There are some management concepts in this plan which are new to ADDY.

The organisation needs to be evolving and achieve positive change by learning continuously with a culture of:

- knowledge
- customer service
- quality
- continuous improvement
- people orientation
- high competence.

All of which can encourage employees to be flexible and creative in contributing to their jobs through participation in the workplace and integration and understanding between groups of managers and employees.

Business Sectors

The passenger business can be split into a number of sectors. These are identifiable because they require different handling, emphasis and meet different market needs and can be identified by defining different product/market combinations.

An example that could be adopted by ADDY is two profit centres namely;

- Intercity (International and long distance domestic services)
- Regional (short distance suburban services)

Inter city and regional services should be operated as commercial services and therefor would require a Public Service Obligation from the state.

Any business activity from which the current passenger business receives revenue and incurs expenditure other than the carriage of passengers should be considered for franchising or withdrawal. Some "social need" services such as mail and prisoner transportation should be

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operated directly by the appropriate government departments independent of the passenger business. These departments should have their own direct contract with the rolling stock business and infrastructure business as early as possible.

2.7.2 Passenger Network Adjustments

The amount of infrastructure and rolling stock that the passenger business needs to rent should be the minimum consistent with the ability to handle the present traffic levels and allow for the predicted traffic flows.

The passenger network has changed little despite the drop in passenger demand since the late 1980's. Passenger demand over the next five years is expected not to achieve more than 29% of the 1990 total of 15 million.

Since Azerbaijan's independence there has been some reorientation in the direction of passenger traffic. Services through Nagorno Karabakh and via Armenian territory to Nakichevan have ceased. Services to Russia and Ukraine were disrupted by war in Chechnya. In addition services from Georgia to Russia and Ukraine now have to pass through Azerbaijan owing to problems in Abkhazia.

Table 3.15 summarises the analysis of the 1998 train timetable. As can be seen the busiest sections of track are on the east-west axis between Baku and the Georgian border. The busiest sections are between Baku and Evlakh with 9 to 13 pairs of passenger trains operating on a daily basis.

Average timetable speeds are very low, largely as a result of wait times at stations and border crossings.

Many of the services operate throughout the day or operate in early morning and evening only. A number of services particularly long distance and international operate over night.

The following steps are recommended:

- Increase travel speed on all services in line with the upgrading planned for the east – west line.
- Eliminate unnecessary delays, e.g. Border delays and stops at non-passenger stations
- Develop the concept of express trains by stopping less frequency on inter city services
- Reschedule services to minimise night time travelling on routes within Caucasus
- Station closures and service withdrawal.

It is expected that by 2003 there will be a 50% reduction in journey times as a result of upgrade/renewal of rolling stock and infrastructure and a 20% improvement in reliability. On all regional services stops at stations should not exceed 2 minutes. With the exception of termini, stops on inter city services should be reduced to 5 minutes.

International Services (part of the Intercity profit centre)

International services should continue to operate to the current destinations from Baku Passenger station. The current frequency should be maintained unless market analysis suggests that demand can justify more services although consideration should be given to reducing the train size in the light of the low load factors. Station passenger figures for 1997 show that 71% of international passengers board at Baku. In addition there are probably a number of local domestic passengers who use international services. By restricting international trains solely for the use of international passengers then all of the following improvements can be made:

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- Journey times could be improved by reducing the number of stops on trains between Baku and major destinations across the border.
- Negotiations should be entered into particularly with Georgia and Russia to eliminate border delays.
- Customs checks should be carried out airport style at Baku station and at "check in" points at stations en route. Alternatively, they could be carried out on board whilst the train is in motion. This will help eliminate border delay and on train passenger delay.
- Locomotive and rolling stock inspection should take place prior to the train's timetable departure with no inspections at or near borders.
- Crew changes and loco changes should be eliminated on journeys between Baku and Tbilisi and on Azerbaijan territory.

All of this should be accomplished by 2003.

Table 3.15 – Summary time table Characteristics 1998

Section		Number of train pairs per day			Stations where passengers processed in 1997	Maximum stops in time table	Average time table speed
	Km	Int'l	Local	Suburban			
Akstaba–Kazakh	12		1		2	3	24.0
Alyati (Main) – GadjiPabul	44	3	6	2	3	4	50.5 48.4 44.7
Balajazi–Alyati (Main)	69	3	8	2	4	7	63.0 44.7 38.0
Alyati (Main) – Osmanli	60		2		3	8	26.9
Osmanli–Astara	183		1		8	24	23.4
Osmanli–Goradiz	144		1		12	23	27.0
Baku – Balajazi	9	1	10	2	3	3	23.7 19.9 15.1
Baku–Sumpait Main	55	5			1	3	36.3
Gyanja–Akstaba	96	3	3		9	9	50.4 39.3
Akstaba–Beyuk Kesik	43	3	1		6	6	16.7 36.6
Evlakh–Gyanja	66	3	4		6	7	43.2 37.5
Beyuk Kesik – Gardabani	12	3			1	2	23.3
GadjiPabul–Evlakh	167	3	6		10	15	45.1 38.2
Balajazi–Sumpait Main	26	2	2		3	4	22.5 31.2

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Sumpait Main – Km 2454	166	7	2		16	19	24.7 33.9
Evlakh–Bard	32		1		2	2	49.9
Evlakh–Belokani	164		1		4	7	31.3

The expected journey time improvements in Azerbaijan for international services are shown in Table 3.16.

Table 3.16 – Proposed journey time improvements

Route	Current 1998	Zero delay	2003 Target
Baku – Russian border	8h 28m	5h 15m	4h 14m
Baku – Georgian border	14h 06m	10h 16m	7h 03m

Long distance intercity services

A network for intercity services within Azerbaijan needs to be agreed on the lines of major population centres. Using the 1997 passenger loading figures as a proxy the network may resemble the following:

Baku Passenger --------179km Khachmas
Baku Passenger -------- 289km Evlakh ---------- 101km Dollyar ---------- 34km Gyanja
Gyanja ---------- 74km Tauz ---------- 21km Akstafa ---------- 12km Kazakh
Evlakh ---------- 32km Barda
Baku Passenger -------- 291km Lenkoran

As for international services the service should be non-stopping between the intercity stations with target speeds double current speeds. Improved speeds based upon the above network are shown in Table 3.17.

Table 3.17 Target speed improvements on domestic intercity journeys

Line section	Current 1998	Target 2003	2003 time
Baku – Khachmas	33.9	67.8	2h 39m
Baku – Evlakh	37.8	75.6	3h 49m
Evlakh – Dollyar	39.3	78.7	1h 17m
Dollyar – Gyanja	39.3	78.7	0h 26m
Gyanja – Tauz	39.3	78.7	0h 56m
Tauz – Akstafa	39.3	78.7	0h 16m
Akstafa – Kazakh	24.0	48.0	0h 25m
Evlakh – Barda	49.9	99.8	0h 32m
Baku – Lenkoran	28.7	57.4	5h 04m

Reduced journey times provide the opportunity to give the intercity services priority timetabling during day times. This will avoid the extra costs of providing sleeping facilities. For example the target journey time between Baku and Akstafa should be 7h 02m allowing for station stopping times at Evlakh, Dollyar, Gyanja and Tauz. Thus a 4 train service could operate with departure times of 06:00 and 12:00 from Baku and Akstafa and arrival times of 13:02 and 19:02.

Regional Services

The future of regional services is to an extent uncertain. The business contains all slower local and suburban passenger services and acts as a feeder into intercity services as well as

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transporting the majority of short distance trips. Unlike inter city services, regional services cannot expect to make a profit without additional revenue from the government or other railway businesses and maintain current or improved levels of service. It is envisaged therefore in the business plan that some form of subsidy will be provided and directed towards supporting lines and stations which, whilst justified in terms of social need, would otherwise be closed on commercial grounds.

Any subsidy is unlikely to be of the same order as the current cross subsidy from the freight business. The passenger business may therefore have to make some unpopular decisions concerning the withdrawal of local and suburban services (including station and line closures) in order to make savings on operating costs and to divert resources to where there is a greater return for regional services.

ADDY currently has no plans to reduce the number of passenger stations. However a review of their number is strongly recommended. Currently there are 60 to 65 unmanned stations mainly on EMU services. These should be assessed in the first instance.

The regional service will be characterised by a larger number of stops and slower journey times compared with inter city services and a more frequent service where there is a market. Data provided for 1997 shows that there are 121 stations that processed passengers in that year. It is recommended that stations which cannot process passengers (issue and collect tickets) should be closed thereby improving network capacity, reducing train journey times and saving station operating costs.

The average distance between the 121 passenger processing stations is about 15km. Where distances between stations are less than 15km then station closures should be considered. This should be done on the basis of operating costs, ticket revenue, passenger throughput and whether the station/line receives government revenue under the PSO contract.

The following sections of line will need to have their station frequency reviewed:

- Osmanli - Goradiz
- Evelakh – Gardabani
- Balajazi – Sumpait Main
- Sumpait Main – Km 2454

It is assumed in the business plan that the above station closures will go ahead but that there will be no total line closures. It is believed that the government will prefer to support a minimum standard of service on the existing passenger network than see line closure which would worsen the isolation of many rural communities.

The frequency of service on the lines will need to be reviewed. In the first year of the business plan, a detailed passenger survey needs to be carried out to identify load factors on local and suburban services. Where load factors per train are less than 50% then the frequency of service should be reduced and rescheduling needs to be considered. A minimum frequency of four train pairs per week should be considered on the least used lines.

Currently there is an estimated 10 passengers per coach on all services. This is about 19% load factor on a 54 seat coach and 12% load factor on an 81 seat coach. In order to improve the load factor the average train length will need to be halved at the very least.

2.7.3 Passenger Marketing and Fares Policy

This section of the plan summarises the fares, yields and revenues to be achieved in the course of the plan.

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There is low revenue yield on ADDY Passenger services and the reasons identified for this situation include:

- Fare evasion
- Obligations placed on ADDY to offer reduced fares to certain categories of passenger (officials, elderly, war veterans, invalids, refugees).
- The need to gain approval from government for tariffs.

The steps identified for ADDY to take to improve overall yield includes:

- Continue the fare collection incentive policy and extend it where necessary
- Reduction of fare evasion by improving ticket inspection, removing on train ticket sales developing automatic ticket machines and operating manned and unmanned ticket barriers
- Total independence from government in setting tariffs
- Remove Government determined fare concessions or ensure that Government reimburses passenger business with lost revenue from these fares.

Fares Policy

As ADDY is a Public Sector organisation domestic fares have traditionally been subject to approval by the Government committees with fare increases, when permitted, normally made at the same percentage rate across all services. In reality the scenario of the Government rejecting tariff proposals put forward by ADDY is rare.

On international services ADDY's share of revenue is based upon journey length within Azerbaijan. This is reasonable as long as allowances are made to cover the costs of handling passengers at stations, turn around of rolling stock at termini and other non-distanced based costs. Equally important is that the revenue share given to ADDY should reflect the costs incurred by the passenger business in infrastructure and rolling stock hire. An additional problem with international services is exchange rate risk. Fares at Baku are priced in Manats, which are closely linked to the US dollar. The Georgian parts of fares to Tbilisi for example, are tariffed in Swiss Francs. Clearly there is a risk of exchange rate loss or gain on the price of tickets.

The new fare strategy recommended in this business plan results in fares being increased by an average of 2.5% per annum across the domestic network in real terms. Increases on individual services should vary from zero to 10% depending upon the estimated price elasticity of each route with fares on the least sensitive routes being increased most.

The increase in total revenue from the passenger business is planned to increase as follows:

- 1998 24093m Manats
- 1999 26194m Manats
- 2000 28483m Manats
- 2001 30796m Manats
- 2002 33692m Manats
- 2003 36651m Manats

These figures are based upon the 1998 revenue for the first six months of 12046m Manats including 132m Manats for luggage and 5742.6m Manats for sleeping vouchers.

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Table3.18 - Planned Passenger Revenue & Yields

	Passenger Km 1998 – 2003	Revenue Manats 1998-2003	Yield (Manats/pkm) 1998-2003
Total	489m – 621m	24093m – 36651m	42.9 – 59.1

The strongest competitor to rail is the bus. Whilst the threat from buses is recognised on suburban routes there is an increasing threat from competition on longer distances. The long distance bus fleet is being modernised resulting in improvements in quality of service. Typical bus routes operated are shown in Table 3.19

The average single fares on these bus routes in 1998 are shown in Table 3.19. Rail fares based upon a 59.1 Manat/km constant rate compare very favourably. In reality however, rail fares are probably stepped based upon distance (say 60-65km intervals) with higher rates on shorter distances.

Table 3.19 Examples of Bus competition in 1998

Operation	Rail km	Railway Manats	Road km	Bus Manats
Baku – Gadjipabul	122	7210	116	10000
Baku – Kurdamir	197	11643	190	16000
Baku – Ujar	244	14420	234	19000
Baku – Evlakh	289	17080	279	21000
Baku – Barda	321	18971	304	22000
Barda- Evlakh	32	1891	25	3000
Barda – Ujar	77	4551	70	6000
Barda – Kurdamir	124	7328	114	10000
Barda – Gadjipabul	199	11761	188	15000
Baku – Mingacevir	319	18853	305	25000
Baku – Gyanja	356	21040	364	45000

A simple conclusion from this exercise is that there is probably greater scope for fare increases on longer distance services than there are on shorter distance services. However if fare increases are to be targeted at long distance (i.e. inter city services) then this must be accompanied by improvements in level of service particularly journey times and frequency which compete with those of buses. In terms of frequency for example, all the above bus services operate at least daily. In the case of Baku to Mingacevir and Gyanja the service operates every 4 hours and 5 hours respectively.

The current fare system is based upon 4 classes of travel. During the course of the business plan the distinction between 4th and 3rd class should disappear so that only 3 classes of travel are offered. As overnight services are replaced by daytime services, 18 sleeper (1st class) coaches should be reduced in number. Thus by the end of 2003 1st class services should only exist on international routes (renamed international class). All domestic services should consist of 2nd and 3rd class standard coaches (renamed 1st and 2nd class).

In line with the upgrading of rolling stock the 4th class fare will be gradually abolished and so will the first class fare on domestic services. Child fares will be between 50% and 66% on domestic service depending on class and 70% on international class.

A range of promotional fares designed to stimulate the domestic market and support the services with low load factors will be introduced, such as:

- family tickets

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- youth fares
- group fares
- elderly fares

Over time these promotions should be seen as ways of "topping up" revenue chests (marginal revenue) given that the majority of the cost of operating a service has been met by full fare passengers and/or subsidy. If this is not the case there is a danger of worsening losses on services owing to too large a proportion of discounted fare passengers.

More complex ways of increasing marginal revenue are as follows:

- Discounts if journeys are bought in advance of day of travel on unrestricted seating coaches (tickets used to be sold up to 40 days in advance. Now it is only 5 days).
- Last minute discounts on restricted seating coaches including upgrade discounts to higher classes.
- Discounts if journeys are made on services with lower demand e.g. off peak services.

In the long term promotions could become more innovative including:

- Charter/franchised services offering tourists "Orient Express" style travel across Caucuses.
- Tickets linked with hotel accommodation, shopping discounts, pop concerts etc.

The benefits of new infrastructure and operational improvements will become more apparent across the network during the period of the plan.

In the medium term the railway's average yield per revenue passenger kilometre will improve due to:

- increased passenger demand as a result of attractive offers, demographic trends and economic growth

- a shift from short distance to longer distance travel

2.7.4 Business Development

The key aim of the marketing initiatives is to make the benefits of rail known to customers and potential customers. The customer buys advantages and solutions and these need to be promoted through effective marketing in respect to:

- Advertising
- Sales promotion
- Publicity
- Sales letters
- Brochures

The business should start categorising demand so that offers are well targeted to maximise demand and revenue. A target customer matrix may consist of categories such as long distance and short distance travellers, business and leisure passengers, international, transit and domestic passengers.

Corporate identity is important. There should be a clear distinction between Intercity and regional services visible to the customer. The customer should easily find his coach and seat on the Inter city service each time he uses it. Thus a consistent sequence of carriage types and numbering is recommended on all inter city services. Inter city travellers should also expect higher comfort standards (e.g. No overcrowding, clean coaches, soft furnishing, air

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conditioning, clear information and welcoming attitude from staff). On regional services customer expectations are likely to be lower given that traffic is more regular. However basic standards of cleanliness, clear information and correct attitude from staff should still apply.

2.7.5 Concession Fares and Loss Making Services Subsidy

As mentioned above government determined concessionary fares should either be withdrawn or government should reimburse lost revenue if it is considered that the railway is providing a social service by carrying these passengers. A distinction should be made between concessionary fares and promotional fares. Both may target a similar customer type e.g. the elderly. However in the case of the latter the passenger business is trying to increase marginal revenue from this type of passenger and therefore should carry the risk of the promotion failing.

Concessionary fares are awarded to groups such as children, disabled, war veterans and railway staff (the latter make up 15% of total passengers). In addition there is a 20% discount for Azerbaijanis on international tickets.

The passenger business is faced with three options in dealing with loss making services namely:

- Withdraw all loss making services
- Obtain government subsidy under PSO contract
- Continue cross subsidy from other railway revenue businesses.

Given that the first option is doomsday scenario and would simply "not be allowed" to happen this plan offers the other two options as the only choices.

The passenger business has to enter into urgent negotiations with the government to determine the future of loss making services and to ascertain if the government is willing to support any or all loss making services. These services should be identified by the end of year 1 of the plan so that timetable reorganisation can commence in year 2. It is likely that any government subsidy will not commence until year 3 and will not be as large as the subsidy provided from the freight business. By the end of year 2 the freight business cross subsidy will be reduced to zero.

If government money is not forthcoming and yet the duty to provide these services is still that of the railways. Then cross subsidy is inevitable.

With either subsidy option the following criteria are recommended:

- The subsidy should be specific, that is, aimed at specific passenger services.
- The amount of subsidy required must be known in advance of each business year
- The amount of subsidy should be reduced in line with productivity and cost improvements
- The subsidy should be conditional on providing specified levels of service
- The subsidy should become transferable that is available to a competitor who can offer a more cost effective yet identical or higher level of service than the current passenger business

In the case of the final criterion consideration may be given to subsidising a bus service or even purchasing trucks to serve the most isolated and rural settlements as alternatives to a train service.

The operation of postal/prison services should be entirely financed by the government. Post wagons should be owned by the post office and provided by a separate contract with the rolling stock business. The wagons should be staffed by the post office. The wagons will be merely

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attached to timetable passenger trains.

The passenger business should not receive revenue from such services nor be charged any of its costs. There should however be a mechanism by which financial compensation is paid in the event of poor performance to the detriment of the level of service of the passenger business or government operated services.

2.7.6 Quality of Service Targets

Over the years the railway has had to cut down on service quality and the product has degraded. This plan recognises the need to upgrade the product, improve train services, station facilities and customer care and also create a modern brand image for the railway.

A key aim is to push for new business in the following sectors

- International travel
- Long distance domestic travel

and to maintain a market presence in suburban and short distance travel sectors.

There is a need to improve product performance and it is proposed to establish staff training programmes on customer relations, interpersonal skills and product offers on the technical side. The plan proposes investment in refurbishment of rolling stock, introduction of improved information systems and ticket sales equipment. There are also plans for upgrading station facilities including waiting rooms and ticket hall refurbishment, renovation of sanitary facilities, resigning and other public information systems.

Quality of service targets must be developed to measure performance and to satisfy customers that published service levels are being provided or bettered. As a marketing tool they will show potential customers that the railway is capable of delivering its promises.

As a first step identifying what customers are willing to pay for and collecting feedback on existing services is essential. ADDY has carried out customer consultations in the past albeit not frequently. One such survey showed that the introduction of new rolling stock between Baku and Astara had a positive effect on patronage.

Where service levels are inadequate management action can be targeted and results tracked to ensure effective action is being taken. This activity demonstrates to the customer that the business cares and acts positively.

Quality of service targets should include the following:

- Train performance:
  - Delays
  - Journey time achievement
  - Punctuality
  - Reliability
  - Passengers conveyed
  - Overcrowding
  - Cleanliness

- Passenger station performance
  - Passengers handled
  - Duration of stopping times
  - Coach placement and suitability
  - Cleanliness

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Comfort

In developing these targets it is essential that they are SMART i.e.:

- Specific
- Measurable
- Achievable
- Realistic
- Timely

2.7.7 Passenger Stations Plan

The condition of many stations is poor due to age and maintenance backlog. Most of the passenger stations including Baku, Gyanja and Yalama require repairs to roofs and platforms. In addition given current passenger traffic flows many stations are overdesigned and inefficient. With the exception of the stations named above, passenger station facilities do not hinder train operations and passenger services.

Improvements to passenger stations should be prioritised on the line Baku – Beyuk Kyasik. The station improvement programme should be costed in three phases:

Phase 1 – station building, platforms and other facilities for passenger traffic at Baku and Gyanja should be rehabilitated.

Phase 2 – prioritised rehabilitation of stations between Baku and Beyuk Kyasik

Phase 3 – prioritised rehabilitation of remaining stations following review of station numbers.

The role of passenger border stations needs to be reviewed in line with the recommendations made above for international services. If passenger stations at borders remain justified then improvements at Yalama should be considered as part of Phase 2.

Prioritisation for rehabilitation should be based upon revenue and passenger throughput by line first and then by station.

Following normalisation in Nagorno Karabakh there may be a number of stations, which will require rebuilding. These should be integrated into the station development plan prioritised according to potential need.

2.7.8 Passenger Operating Strategy and Performance

(a) Passenger Operating Strategy

The advantage of operating to a timetable is that it allows the allocation of rolling stock and train crews to specific times and reduces the number of resources required and hence operating costs. The operational availability of rolling stock including locomotives and EMU motor units should be maximised by using them over more than one consecutive train crew shift.

Given the size of the passenger business it is not likely that it will be able to support its own locomotive fleet. Locomotives should therefore be hired as and when needed from the rolling stock business.

The drivers of passenger locomotives and their assistants are a higher unit cost than their freight counterparts. Whilst it is recommended that they should remain an asset of the passenger business, surplus staff should be "hired out" to the freight business.

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(b) Performance

The monitoring of passenger operating performance is essential:

- to the understanding of the business
- as a basis for targeting improvements
- to develop future plans
- to deliver a quality product
- to ensure customer satisfaction

This information forms a key part of the management information system.

Performance targets need to be developed in line with the quality of service targets. An example of passenger train departure and arrival targets is given in table 3.20.

Table 3.20 - Passenger train departure and arrival targets

Time departing	% target	Time arriving	% target
On time	95	On time	80%
0 – 5 minutes	98	0 – 5 minutes	95%
0 – 30 minutes	100	0 – 30 minutes	99%
0 - 30+ minutes	100	0 – 30+ minutes	100%

The practise of allocating fault for delay hours on arrival should be adopted if it has not already been done so as it highlights areas where remedial action should be targeted. This practise should be continued with attributing criteria agreed between railway businesses so that a system of financial penalties for poor performance and rewards for good performance can be adopted.

Times at stations also need to be monitored. For each service the actual wait time should be compared with planned wait time. As mentioned above most planned times will be no more than 2 minutes on regional services and 5 minutes on intercity services.

Improvements to transit times have already been indicated earlier in the business plan.

(c) Train composition

Each train should be assembled in the correct sequence by the rolling stock business prior to its presentation to the passenger business.

Prior to reclassifying coaches the recommended sequence should be:

4th class	3rd class	Staff car	Restaurant	1st class	2nd class

After reclassifying coaches:

2nd class	Staff car	Restaurant	International	1st class

A consistent train composition across all services allows passengers to find their seats in less time. This improves level of service and reduces delays at stations.

For EMU trains the sequence should remain unchanged.

In order to maximise utilisation of resources both human and technical the plan has a

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developed cost structure based on work schedules produced from role assignment and timed activities. These costs form the basis of the budget.

2.7.9 Passenger IT Management Information Systems

The level of automated information systems within the passenger business needs to be improved in line with the requirements of the business managers as the market-oriented business develops. Current information systems should be reviewed and if they are unsuitable to needs should be dispensed with. Where current systems are suitable they are to be enhanced. Resources should be targeted at areas where no suitable information system exists.

In modern market economies supplies and demands constantly and quickly change and so the manager needs accurate and timely information in order to protect the business and profits. Given the constraint on investment therefore efforts should be concentrated in developing systems in areas of the greatest financial risk to the railway.

As the system develops it is likely to develop in the following way along similar lines to the information system required by the freight business.

The type of output would include:

- Movement information for coaches, locomotives and trains (particularly against performance targets)
- Location information for the above
- Status of rolling stock (load factor, availability)
- Service history of rolling stock and projected maintenance programme
- Train characteristics (length, presence/absence of carriage types etc.)
- Details by customer category (numbers to date, revenue to date, haul to date etc.)
- Advanced booking sales by train/service
- Fares/offers
- Reservations
- Special instructions and information bulletins
- Time table details, travel advice
- Ticket sales by train, line and station.

As can be seen a lot of this information would be of use also to the customer and ways of making relevant information available (online) would provide added value to the service and improve customer satisfaction.

An important priority is the extension of the Trans–Caucuses communications line from Georgia to Baku. This will allow greater efficiency, monitoring, control and management of the railway.

(a) Border Crossing procedures

The present border crossing procedures require trains to stop for lengthy periods at borders for railway operational and engineering procedures as well as customs. Border stops of over 3 hours are normal. Western European practise needs to be adopted to reduce border delays if possible to zero. In addition neighbour countries should permit locomotives and train crews to work across the border to avoid stopping at locations where the only purpose is to change either locomotive or train crew.

2.7.10 Cost and Revenue Accounting

Cost accounting should be developed as part of an integral part of the Passenger IT and

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Management Information system.

Cost accounting should be a function of the Marketing department within the passenger business. This will enable one department to understand the balance between costs and revenue and ensure that a holistic approach is adopted towards customer service and business decisions.

The specification and design of the accounting system is fundamental to deriving maximum flexibility of management information and permitting changes and upgrades as business and technology develops. The key starting point is to define profit centres (the lowest level at which revenue and costs are balanced to give profit and loss and balance sheet information.

The key sectors within the passenger business may be considered as:

- Inter city business
- Regional business

These may be considered profit centres where costs and revenues are balanced. This will then enable the process of traffic costing to be completed from which fares can be set for specific types of customer.

Within each profit centre there will be several cost centres which should define the key activities (not locations) where costs arise e.g.

- Train handling
- Passenger station handling
- Administration etc.

Each cost centre must be carefully defined and will each be split into a series of location codes. The location codes are the smallest accountancy split for a particular activity. At certain locations it may not be possible to allocate all costs to a particular activity as in the case of where a member of staff undertakes an activity for more than one business sector. In such instances ADDY would need to define a set of rules or guidelines for the allocation of the cost split. The diagram below indicates the structure of a theoretical cost accounting system.

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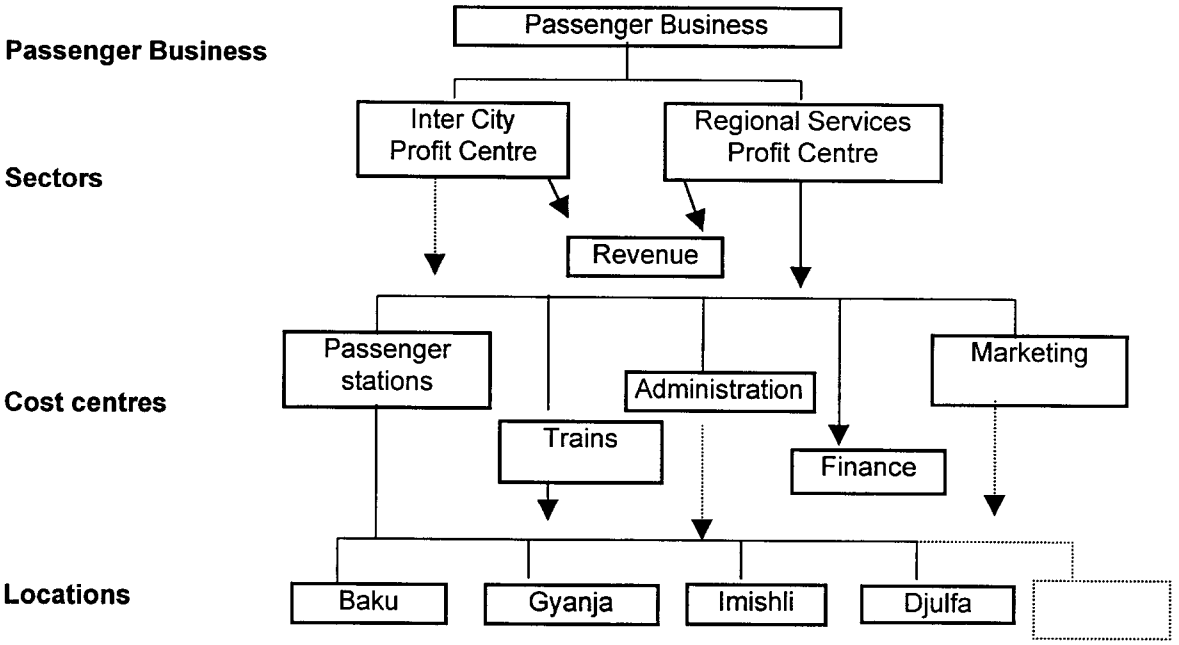

Revenue accounting should follow similar principles to cost accounting in that it should be developed to account for and provide management information at the lowest level of activity. Revenue could be split by:

- Customer type
- Class of travel
- Origin and destination
- Type of ticket (concession, offer or normal rates)
- Time of travel
- Business sector

The split should enable a detailed evaluation of costs and revenue at base activity level.

Table 3.21 shows timetable of activities proposed for the setting up of the accounting systems.

Table 3.21– Timetable for implementing new accounting systems

Year	Activity
1999	Set up new railway organisation and allocate assets accordingly Develop profit and cost/revenue accountancy systems Develop internal contract structure and framework agreements (with other SR business units) Negotiate subsidy (PSO contract) approval with Government
2000	New organisation goes live Undertake shadow running of the accountancy systems Agree internal contracts and operate on shadow basis Operate PSO contract or other subsidy on shadow basis
2001	Internal contracts go live Accountancy system goes live PSO contract or other subsidy goes live
2002	Review and update systems and current business plan
2003	Finalise 2004 5 year business plan

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2.7.11 Rolling Stock, needs and forecast

The recent traffic results and predictions have shown that the most realistic level of business will be 1% lower than the optimistic TEWET forecasts (in terms of passenger kilometres in 2000).

(a) Locomotive requirement

The current roster (October 1998) is believed to be 44 locomotives (including 4 diesel). Each locomotive consists of two permanently coupled units. It is assumed that these locomotives operate on all international and local services.

Table 3.22 below shows how locomotive productivity may be improved.

Table 3.22 - Forecast Locomotive Roster 1998 - 2003

		Average passenger kilometres per locomotive per day					
Year	**Passengers**	**26354**	**28028**	**29778**	**31680**	**33663**	**35722**
1998	1372234	**44**	41	39	37	34	33
1999	1406334	45	**42**	40	38	35	33
2000	1441281	46	44	**41**	38	36	34
2001	1477097	47	45	42	**39**	37	35
2002	1513803	49	46	43	40	**38**	36
2003	1551421	50	47	44	41	39	**37**

The business plan assumes a utilisation improvement of 20%. This will see the average passenger train kilometres per locomotive per day increase to 35722 by 2003. The improved utilisation will result in the locomotive roster fall from 44 in 1998 to 37 by the year 2003. The changes in operating practises are fundamental to achieving this target.

(b) Passenger coaches

The 1998 timetable lists the rolling stock composition for international and long distance local services. Based upon this information the minimum roster is as given in Table 3.23.

Table 3.23 – Train sets rostered for international and long distance services 1998

To/from	Coach type (capacity					Hours/week	Minimum Sets rostered/day
Baku	18	36	54	81	Total		
Moscow	1	6	8	0	15	232	1
Kiev	1	4	8	0	13	226	1
Tbilisi	1	6	3	0	10	224	1
Astrakhan	0	6	9	0	15	207	1
Rostov	0	5	4	0	9	245	1
Makhachkala	0	1	4	0	2.5	102	0.5
Akstafa	2	5	0	0	7	140	1
Yalama	0	0	0	5	10	175	2
Khankendi	0	4	3	0	7	119	1
Astara	1	3	5	0	18	175	2
Kazakh	1	9	5	0	30	182	2
Belokani	1	3	3	0	14	182	2
B-Kazik	0	4	5	0	18	189	2
Goradiz	0	4	6	0	10	140	1
Gyanja	1	2	4	0	7	133	1

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Total	12	81	83	10	186	2671	19.5

For international services it is assumed that one train set is provided by ADDY and the other by the destination country. Thus the minimum roster is 186 coaches (excluding timetable restrictions etc).

Figures for daily fleet requirement have been quoted as 264 (December 1997) and 391(Statistics Department).

The international and local trains are expected to move 423.246 million passenger kilometres in 1998 in Azerbaijan. Thus depending upon which figures are correct, each timetable carriage handles an estimated 8224 to 2966 passenger km per carriage per day. For the business plan it has been assumed that a timetable fleet of 264 carriages is correct with each carriage handling 4392 passenger kilometres per day.

Productivity for loco hauled carriages is assumed to increase by 20% over the 5 years of the plan. No allowance for maintenance is needed, as coach availability is at least 21% above the daily requirement at any one time.

Table 3.24– Planned requirement of carriages per year by seating capacity

	18 berths/seats	36 berths/seats	54 seats	81 seats	Total
1998	13	115	126	10	264
1999	13	111	122	10	255
2000	12	107	117	10	245
2001	11	103	113	10	237
2002	11	99	108	10	228
2003	11	95	104	10	220

The improvements in productivity will require increases in the daily amount of passenger/km per carriage in Azerbaijan as shown in Table 3.25

Table 3.25 – Planned increases in passenger/km per carriage per day on loco hauled services

Year	P/km per day per carriage
1998	4392
1999	4670
2000	4963
2001	5276
2002	5606
2003	5959

Following reclassification of rolling stock and reduction in night-time services on domestic routes the rolling stock requirements will be as shown in Table 3.26.

Table 3.26 – Loco hauled carriages required following reclassification

Year	International Class/18	1st class/36	2nd class/54	Total
1998	5	119	136	260
1999	5	115	132	252
2000	5	110	127	242
2001	5	106	123	234
2002	5	102	118	225
2003	5	98	114	217

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(c) Restaurant cars

All international services/overnight services should be equipped with restaurant cars. Buffet services should be available on all other inter city services. It is recommended that catering services should be offered for franchise in order for the passenger business to minimise its financial commitments. Where demand for restaurant/ buffet car facilities is not cost effective kiosk/trolleys should be substituted. This will be the decision of who ever manages on board catering.

The number of restaurant cars in use currently is estimated at a roster of 10. This figure is expected to remain constant during the course of the plan.

(d) EMU services

It is assumed that EMU trains operate all suburban services.

The trains operate mainly on routes in the Apsheron Peninsula and out of Gyanja, normally in 4 car sets. Half the cars are motored and half are trailers. The daily requirement is 18 four car sets at Baku and 6 four car sets at Gyanja.

The 1998 estimate of suburban passenger kilometres is 138756000. Thus each four car set will need to handle 15840 passenger kilometres per day. This is equivalent to 321 passengers per day over an average distance of 49 km.

Utilisation of EMU trains is assumed to increase by 10% over the 5 years. This would mean that EMU daily roster would fall to 22 by 2003 and the daily passenger km handled per set would increase to 17865 passenger km.

(e) Luggage, parcel, mail services

It is not certain whether these services are still provided by ADDY. If they do it is strongly recommended that mail services should be taken over by the Postal Service of Azerbaijan whose responsibility would then be to identify coach requirement and negotiate with the rolling stock business.

If the post service is to remain part of the Passenger business then there is no clear reason why mail and parcel operations cannot be handled using the same types of coaches.

Subject to the continuation of these services the estimated requirement on a daily basis for these coaches throughout the plan is 10.

2.7.12 Train Crew Levels and Rostering Practices

Train crews are currently part of the locomotive department. It is recommended that they are transferred to the passenger business as appropriate. This will enable the business to have tighter control over one of the main cost elements and develop an independent strategy appropriate to its needs.

Train gangs (drivers plus assistants) working for the passenger business are assigned to trains and not locomotives this means that the shift for each gang varies on a daily basis but not exceeding the total monthly shift hours of 170.

The total pool of train gangs is currently split between 6 regional depots and total 1156 drivers and 849 assistants. Of these the passenger business uses the following numbers:

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- 124 locomotive drivers and 117 locomotive assistants
- 136 EMU drivers and 109 assistants

In addition to drivers and assistants on EMU trains there are also 3 inspectors per shift as part of the incentive to reduce fare evasion.

The number of train gangs required by the passenger business is expected to fall following the adoption of the recommended measures in this business plan.

2.7.13 Human Resources, Employment Levels and Labour Productivity

The proposed organisational structure of the railway has split it into 6 main groupings of which the passenger business is one. The main activities of the business can be divided as follows:

- Marketing
  - Traffic costing
  - Tariff setting
  - Revenue collection
  - Timetable development

- Contracting
  - Internal
    - Rolling stock
    - Infrastructure
  - External e.g.
    - Catering
    - Laundry

- Human Resources
- Finance
- Operations
  - Train crews
  - Passenger stations
  - Performance
  - Train Control and monitoring

The staffing levels below have been identified to the passenger business through a process of disaggregation of present activities into their component parts and summating together. It is considered that an overall reduction in staff of 30% is achievable during the life of the business plan as a result of productivity improvements and other actions outlined in the passenger business plan. With the exception of the marketing department and replacement of essential staff, zero recruitment policy should be adopted across business activities with immediate effect.

The marketing department will be expected to grow by retraining of existing staff from other activities and moderate external recruitment where skills are not internally available. Growth in the marketing department must be linked tightly to performance of the business against plan.

Reductions in staff costs may be achieved by the following means:

- Outsourcing of activities (e.g. franchising of catering services)
- Greater use of part time staff
- Pay cuts
- Voluntary redundancy
- Compulsory redundancy

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- Zero recruitment (e.g. zero replacement of retiring staff)

Table 3.27 - Projected Staff changes in Passenger Business

	1998	1999	2000	2001	2002	2003
Total Employees	3473	3369	3133	2882	2652	2440
% change		3%	7%	8%	8%	8%

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3 FREIGHT BUSINESS

3.1 Background

The break-up on the FSU generated a decline in traffic on ADDY as on all other FSU railways. This was then aggravated by the general unrest in the Caucasus, which closed key routes and for long periods effectively cut the three local railways off both from the rest of the FSU network. as well as from Turkish and Iranian Railways to the south. Freight traffic on ADDY declined from 90 million tonnes in 1990 to 9 million in 1995, with a sharper decline from 40 billion net tonne-km to 2.4 billion because of the severe reduction in long haul and international traffic. Since then, however traffic has begun to recover. It reached 11.2 million in 1997 and is on target to reach 12.5 million in 1998.

The bulk of traffic loaded in Azerbaijan is in the previous Baku Division (80-85%), with about 10% in the previous Gyandja Division (amalgamated with the Baku division in September 1998) and 5-10% in the eastern section of the Nakichevan Division. The western section of the Nakichevan Division is isolated from the remainder of the system and carries very little traffic.

Domestic traffic is dominated by over 4 million tonnes of refined oil products transported for the State-owned fuel company from its Baku refinery. The two largest flows are fuel oil to power stations at Ali Beyramli (nearly 1 million tonnes) and at Mingecevir (over 2 million tonnes), together with several smaller flows of refined products (petrol, diesel etc.) to regional centres. Construction materials (mainly sand and gravel), are the other major domestic traffic, mostly hauled from the north-west of Azerbaijan to the Baku region.

Export traffic is also dominated by oil and oil products. A major factor behind the increase in international traffic in 1997 was 850,000 tonnes of Tengiz oil carried for Chevron to Batumi on the Black Sea. This was carried by ship across the Caspian from Aktau in Kazakhstan and unloaded at new transhipment facilities (financed by Chevron) at Dyubendi, north of Baku, which have been designed for a capacity of 3.5 - 4.0 million tonnes[1]. In addition to the Chevron traffic, about 0.7 million tonnes of crude oil is also exported for SOCAR from a terminal for on-shore production at Ali Beyramli, as well as from other minor on-shore facilities. SOCAR also exports refined products to Georgia from the Baku refinery. Some refined product carried by ship from Turkmenistan is exported to the Black Sea (started in 1998) from a new terminal in Baku Old Port.

Imported traffic is presently dominated by general freight, associated with the expanding Azeri economy. The main traffics include grain, flour and sugar from the Black Sea ports and Russia, cement from Turkmenistan and steel from Russia and Georgia, supplemented by manufactured and food products.

Transit traffic mainly consists of cotton, west bound from Uzbekistan to Poti, which grew sharply in 1997, and refined oil products from Turkmenistan to the Black Sea ports. East bound traffic is mainly grain for Uzbekistan, and manufactured and food products.

Table 4.1 summarises the inter-railway volumes in 1997 by entry and exit point.

[1] As this is loaded onto rail in Azerbaijan, this is classed as export traffic for statistical purposes by ADDY. The same reasoning is used for Turkmenistan refined products transhipped in Baku Port. However, Turkmenistan refined product which is carried in rail tank cars on the Turkmenbashi-Baku ferry is classed as transit traffic.

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Table 4.1 Inter-railway Freight Traffic Volumes 1997 (000 tonnes)

From To	Azerbaijan	Baku Port	Yalama	Beyuk Kasik	Astara	Djulfa	Total
Azerbaijan	6000	5	561	2552	-	4	9118
Baku Port	216	-	28	214	-	-	458
Yalama	717	26	-	68	17	-	828
Beyuk Kasik	520	299	16	-	1	-	836
Astara	2		2				4
Djulfa	27						27
Total	7482	330	609	2834	18		11271

During 1997, the Yalama route became much busier as reliable services through Chechnya to Russia have developed. The Djulfa connection only serves the isolated Nakichevan section. Table 4.2 gives a more detailed analysis of October 1997 traffic patterns by segment and commodity.

Table 4.2 Freight Traffic October 1997 by Segment and Commodity

	Tonnes (000)	Ntkm (mill)	Revenue (mill mt)	Av. haul (km)	Yield (mt/ntkm)
Local					
Petrol	32	7	1913	229	258
Kerosene	12	3	677	228	247
Diesel	45	7	2217	163	300
Fuel oil	238	61	13706	258	223
Construction materials	83	23	2706	281	115
Cement	11	2	336	220	138
Other	43	10	2073	233	207
Total	464	113	23628	243	209
Import					
Petroleum products	10	1	161	89	181
Iron and steel	19	4	714	234	163
Timber	14	4	702	256	192
Construction materials	10	3	434	297	156
Cement	21	1	53	25	101
Grain and flour	37	9	1133	247	125
Other	28(1)	10	1442	363	140
Total	139	32	4639	228	146
Export					
Crude oil	137	53	2073	390	39
Kerosene	31	14	1145	469	79
Diesel	73	33	2232	450	68
Fuel oil	83	42	2498	500	60
Other petroleum products	22	6	1330	273	222
Other	22	8	1753	334	230
Total	369	156	11031	422	71
Transit(2)	36	17	1486	474	87
Total	1008	317	40786	315	129

(1) Includes 16,000 tonnes of sugar
(2) Includes 9,000 tonnes of cotton

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3.2 Objectives

With freight volumes stabilising key strategic objectives of the Freight Business Unit will be to:

- maintain market share over the 5 year plan to achieve 16 million tonnes km in year 2003.
- introduce new management structures and procedures to achieve increases in productivity performance and efficiency.
- create a marketing strategy to achieve targeted annual growth and set tariffs to achieve profit revenue and cost targets
- through track upgrading and signalling improvements and rationalisation achieve increases in speed and reliability of freight trains;
    - speed of 33%
    - reliability of 20%
- introduce freight timetables to operate for all freight trains and in particular between the principal marshalling yard at Baku and the remaining freight stations.
- increase block training working to reduce the level of marshalling.
- achieve productivity improvements for:

- locomotives of 30%
- traincrews of 15%
- wagons of 20% for Oil: 10% for others

- close the majority of freight stations on the designated Trans-Caucasian routes and concentrate activities at:

    Baku Tov
    Karadag
    Kyrdamir
    Mingetshaur
    Gyandja
    Shamkhor and
    Dollyar.

Other freight stations to be reviewed where loaded tonnage is less than 20,000 tonnes per annum or the total number of wagons loaded and unloaded is less than 2000 per annum and either closed, with transfer of activities concentrated at adjacent retained freight stations, or developed into concentration locations themselves.

retain the major oil terminals.

- develop intermodal systems in respect to combined transport and containerisation at Baku as part of the port developments and Gyandja.

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3.3 Market

The export oil has increased in volume and export traffics are the largest single segment by volume. However, unit yields for local traffic are far higher than for the export traffics and over 50% of revenue still comes from the local traffic. The export crude oil traffic is from Ali Bayramli to Georgia whilst the refined product exports are from the Baku refineries.

Traffic volumes on the Trans-Caucasian line steadily increase from 3.7 million tonnes p.a. at the border to a maximum of about 8 million tonnes p.a. near Baku. Between Baku and Alyat, the route carries traffic not only for the trans-Caucasian line proper but also for the main-line to the south and south-west. Volumes slightly reduce after Qaradag, where a cement plant is located, and again after Alyat but then increase after Kazi Magomel, where the crude oil export traffic from the on-shore terminal at Ali Beyramli joins. Volumes then progressively reduce along the route, particularly after Yevlak, where the fuel oil traffic to Mingechavir diverges, until the border is reached. Table 4.3 gives traffic volumes for 1997 by line section. Traffic on this line represents about 70 percent of net tonne kilometres on the network as a whole.

Table 4.3 Freight traffic volumes - Trans-Caucasian route 1997 (million net tonnes)

From	To	Net tonnes (million)		
		West-bound	East-bound	Total
Balajari	Qaradag	5.6	2.4	8.0
Qaradag	Alyat	5.5	2.1	7.6
Alyat	Kazi Magomel	4.8	1.9	6.7
Kazi Magomel	Yevlak	5.3	1.7	7.0
Yevlak	Gyanja	4.1	1.5	5.6
Gyandja	Agstafa	3.0	1.1	4.1
Agstafa	Beyuk Kasik	2.8	0.9	3.7

The recent signing of a co-operation treaty between the Trans-Caucasian countries including Georgia, Azerbaijan and Armenia in Baku on 8th September 1998 may affect the present border closures but this has not been reflected in the business plan assumptions.

3.4 Financial Performance Trends and Targets

It has been assumed that real freight tariffs will be in line with the figures below:

- Transit and export oil -
  reduce by 10% in 1999 then at 5% per annum until 2003 then constant.
- Other international freight -
  reduce by 6% in 1999 and then 5% per annum to 2003 then constant.
- Local freight -
  temporarily reduced by 25 million manat in 1998-99, then increase by 10% in 2000 and 2001 and 5% in 2002 then constant.

The Railway does not provide for bad debts in its accounts.

3.5 Traffic Projections and Trends Analysis

Freight traffic is projected to grow overall by 5.7% per annum between 1998 and 2003. Freight

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Tonne Kilometres grow from 4 billion in 1998 to 5.4 billion in 2003. Freight Tonnes transported grow from 12.5 million tonnes per annum to 16.5 million tonnes in 2003.

Within this overall figure it is anticipated that transit and export oil would increase to 5 million tonnes by 2003 then remain constant. Other international freight would increase to 4 million tonnes in 2003. Local freight would increase to 7.5 million tonnes in 2003 then remain constant.

3.6 Competition Analysis

As in most FSU countries, road competition is largely insignificant for the majority of traffics carried by rail. There are rapidly increasing numbers of container trucks but this is not a significant segment of rail's traffic. In the medium-term, it is unlikely that rail will lose short-distance traffics. However, as ADDY is essentially a transit railway and mover of block trains within the country wagon load traffic is a small proportion of the total tonnage conveyed and any losses would be insignificant.

Oil pipelines present the greater threat in the long term and some traffic will transfer when the new AIOC Early Oil Western Route pipeline becomes operational in 1998. There are plans to build another pipeline but it is unlikely to be constructed before 2002 and could be delayed for several years.

The proposed concentration of activities to a limited number of freight stations and working closely with freight road hauliers to provide an integrated transport facility through railheads should also stem loss of business whilst improving the attractiveness and competitiveness of rail.

3.7 Freight Strategy

3.7.1 Business Objectives, Standards and Service Levels

The key business objective of a restructured ADDY should be the safe, timely and efficient movement of freight to provide a commercial return that creates a sustainable and growing business, generating a profit and providing rewarding work for its employees.

The business focus must be directed to satisfying the customer and meeting his or her requirements consistently and economically. This requires the development of quality procedures as part of the marketing strategy which must include a thorough understanding of ADDY's customers and the strengths and weaknesses of the competition. It may also be appropriate to develop a customer's charter that sets out in principle how the business will handle its customers and what service(s) they can expect from ADDY.

The creation of a commercial return and hence a profit will require a change from the present tonne/kilometre performance culture to one where each element of the business generates a profit and contributes to freight's overall success. To achieve this will require the development of traffic costing procedures to provide a thorough understanding of the individual cost elements for each traffic flow. When the costs for each type of traffic are known a tariff policy can be developed to ensure commercial viability.

Safety is a given for railway operation and is one of the traditional advantages that rail has over

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road transport. Safety is good business, as is environmental awareness, and ADDY must achieve appropriate standards in both areas to ensure compliance with regulations and satisfy public expectations. These standards should be set to achieve risk levels that are as low as reasonably practicable. This process will require an assessment of present arrangements to eliminate prescriptive standards, where appropriate, and introduce output standards and specifications that are based on sound commercial and operating judgement.

The business strategy should, therefore, include the introduction of modern risk analysis and risk management techniques which then become an integral part of ADDY's standard procedures.

The table below summarises the strategy

Business Strategy	Implementation
• Costs reduction	Rationalisation Productivity improvement Investment
• Quality Standards	Quality assurance Greater competence Improved infrastructure Focused training
• Customer Service levels	Customer Charter Quicker response to customer needs Performance contracts Co-ordination with marketing efforts

3.7.2 Freight Network Adjustments

In 6.6.1 the need to eliminate unnecessary costs to improve financial performance is highlighted. The amount of infrastructure and rolling stock that the freight business needs to hire should be the minimum consistent with the ability to handle the present traffic levels and allow for predicted growth.

The track layouts at stations, freight stations and marshalling yards have not been rationalised since 1988 despite present traffic levels being 20% of those in 1988 and predicted to reach less than 30% of the 1988 levels by the end of the 5-year business plan.

The infrastructure reflects the traffic flows and patterns that existed on 1988. The current traffic flows and patterns are completely different from those of 1988 both in quantity and direction. The present traffic split is 50% for transit traffic, travelling on an east - west axis, with 80% being loaded in Azerbaijan. The remaining 50% is domestic traffic either starting or finishing in Azerbaijan.

Ideally the transit traffic would pass through Azerbaijan without stopping and would require no facilities other than at the port, terminal or border. The facilities at the latter should only be for customs purposes as there need be no railway reason for stopping there.

(a) Freight Stations

It follows therefore that the domestic traffic needs considerably less infrastructure than previously. The freight stations on the Trans-Caucasian route should be rationalised and activities concentrated at:

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Baku Tov
Karadag
Kyrdamir
Mingetshaur
Gyandja
Shamkhor and
Dollyar.

Other freight stations to be reviewed where loaded tonnage is less than 20,000 tonnes per annum or the total number of wagons loaded and unloaded is less than 2000 per annum and either closed, with transfer of activities concentrated at adjacent retained freight stations, or developed into concentration locations themselves.

Retain the major oil terminals.
The table below details the freight station loading and unloading statistics for the first 6 months of 1998.

Information on loading and unloading of wagons for the Azerbaijan State Railway for 6 months 1998 (January-June)

Gyanja division

N	Name of the station	Loading		Unloading Wagon
		Wagon	tons	
1.	Akstafa	81	3814	79
2.	Gyanja	372	17790	2013
3.	Udjari	62	3191	866
4.	Kazi-Magomed	5	115	28
5.	Poyli	10	187	2
6.	Tauz	2032	13920	91
7.	Dollyar	611	36922	62
8.	Kushi	32	1718	23
9.	Geran	9	366	58
10	Evlakh	86	2685	643
11	Barda	654	39281	281
12	Lyaki	35	991	141
13	Mingechaur -city	912	57522	24879
14	Kyurdamir	347	18828	314
15	Gey-Chellyar	38	1648	7
16	Beyuk -Kyasik	12	525	21
17	Soyuk-Bulag	1	15	-
18	Kasakh	123	7068	28
19	Sheki	55	1827	357
20	Kakhi	43	1478	28
21	Zakatali	36	706	112
22	Tatlu	2	40	14
23	Kovlyar	38	1837	301
24	Dzegam			14
25	Shamkhor	1618	92436	327
26	Alabashli	14	593	27
27	Kysyldja	419	20950	
28	Belakan	16	284	2
29	Zazali	161	6270	35
30	Dalimamedli	17	812	68

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31	Kyurok-chai	2	43	40
32	Mingechaur-main station	4	190	94
33	Myusyusli	28	872	1
34	Mugan	5	200	355
35	Padar			17

Baku division

N	Name of the station	Loaded		Unloaded
		wagons	tons	wagons
1.	Baku	49553	2935090	4751
2.	Kishly	776	25739	9954
3.	Baladjari	212	9887	1116
4.	Pirsagat	-	-	5
5.	Navagi	-	-	-
6.	Ashbulakh	1	10	-
7.	Alyati	32	1194	131
8.	Duvannyi	62	3720	296
9.	Sangachali	40	810	153
10	Karadag	1369	89885	886
11	Puta	229	15094	41
12	Eybat	87	2916	15
13	Khyrdalan	42	1193	2599
14	Gyuzdek	5421	373632	5
15	Sumgait	854	39457	3794
16	Nasosnyi	97	4073	172
17	Shirvan	19	556	5
18	Yashma	2	75	7
19	Sital-chai	-	-	-
20	Kilyazi	8	248	21
21	Zorat	-	-	-
22	Siazan	-	-	10
23	Kizil-Burun	5	141	53
24	Gil-gil-chai	121	7510	-
25	Divichi	36	2089	265
26	Sarvan	17	668	-
27	Charkhi	164	8799	20
28	Khachmas	23	561	139
29	Kusar-chai	2	66	1
30	Khudat	16	486	39
31	Ledjet	-	-	-
32	Yalama	14	410	88
33	Bina	244	14920	1468
34	Govsany	12	301	10
35	Dyubendi	16033	855951	75
36	Pirshagi	1	60	29

Nakhichevan Division

1	2	3	4	5
37	Astara	163	8903	464
38	Dashburun	34	1279	187
39	Imishli	43	1611	454

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40	Vataga	1433	89523	98
41	Saradjalyar	16	727	111
42	Port-Ilyich	17	546	315
43	Masalli	13	507	523
44	Djulfa	479	24659	43
45	Girdani	2	91	75
46	Salyani	54	1915	967
47	Lenkoran	2	104	124
48	Ali-Bayramli	649	33952	8711
49	Sharur	-	-	255
50	Ordubad	23	1317	11
51	Nakhichevan	11	660	196
52	Novogolovka	10	468	194
53	Sabir	59	2748	221
54	Myursali	4	40	-
55	Saatli	-	-	64
56	Kasumli	10	213	112
57	Kamyshevka	1	25	4
58	Neftechala	13	557	1
59	Khalach	-	-	23
60	Goradiz	-	-	33

(b) Marshalling Yards

The main marshalling yard at Baku should be restructured to handle domestic traffic sorting with some additional capacity to hold transit traffic that is either waiting forward transit, requires a technical examination or change of locomotive/driver.
This should permit a reduction in the number of tracks to 25.

(c) Station Layouts

The majority of stations have loop lines in addition to the main lines and have two crossings permitting movements between the main lines at either end of the station. This level of infrastructure is excessive for the level of traffic and loop lines should only be retained where it is necessary for one train to pass another. Similarly the crossings should only be retained where it is necessary to reverse trains or provide a facility to handle emergencies or contingencies. In most cases only one crossover is needed at either end and it is recommended that the facing crossover is removed as it generates a higher safety risk and requires more maintenance than a trailing crossover.

At some stations there will be no need for any facilities other than the main lines which will allow simplification of the signalling and control arrangements. The consequential introduction of additional auto block facilities will speed up journey times and permit a reduction in operating costs.

3.7.3 Freight Marketing and Tariff Policy

(a) Freight Marketing

It was identified that a key business objective was to focus on the customer.

Individual customers and the freight market generally are changing in response to market forces and the emerging economic climate both in Azerbaijan and in the countries who forward and receive traffic that is conveyed over the ADDY network. ADDY must therefore be responsive to and have a system that can identify change at both international and customer

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level.

It will be the responsibility of the Marketing department to develop such techniques and to maintain a regular dialogue with its customers. This department must become the driving force of the business by satisfying the customer, identifying traffic opportunities and capturing profitable business. It must be seen as the one railway point of contact for existing and potential customers by co-ordinating the activities of the other departments to deliver the product that it is selling. The activities of running the railway should be invisible to the customer with the Marketing department acting as the link between the railway and the customer.

It will also be the responsibility of the department to develop mutually beneficial business partnerships through contractual arrangements with other transport operators for the following activities:

- Collection and delivery of freight between freight stations and customers' premises
- Warehousing
- Documentation
- Loading and unloading
- Freight movement information
- Special loads

(b) Tariff Policy

The Marketing department will be responsible for defining the business economic internal rate of return and the development of a tariff policy to deliver it.

As a first stage it will be necessary to identify the costs associated with the conveyance of particular traffics and in some cases at the level of individual traffic flows.

This requires the introduction of a traffic costing system that can identify the avoidable(i.e. how much would be saved if the traffic was not carried) costs of carrying a particular flow of traffic. The following cost items will need to be included in this system:

- Infrastructure costs of carrying the traffic for:
    - Track
    - Signalling
    - Electrification
    - Telecommunications
    - Structures and Freight Stations
    - Timetable arrangements

    In most instances the freight business will pay a defined track access charge to the infrastructure business that includes the above items.

- Rolling stock costs for:
    - Locomotives
    - Wagons

    these will be rental costs for the hire of these items

- Staff costs for:
    - Drivers and their assistants
    - Shunting and marshalling
    - Freight station activities
    - Administration
    - Overheads

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3.7.4 Business Development

In developing its freight business ADDY must concentrate on rail's traditional strengths of long haul, bulk traffic. Rail in western Europe only becomes competitive with road for transits longer than 300 km. This is not the case in Azerbaijan since road competition is not so well developed but it gives an indication of what may happen in the future. As transit traffic accounts for 80% of ADDY's freight business future efforts must be to retain the present profitable flows and develop block load traffic. Attention to the following areas will be necessary to provide a continually improving quality of service whilst reducing costs:

- Journey times
- Empty wagon provision
- Terminal and border delays
- Operational practices
- Operational delays
- Customer information
- Simplification of documentation

ADDY must critically examine its present wagon load traffic to understand its contribution to the overall business. Where it is shown that some traffics do not cover their costs ADDY will have to make a conscious decision either to cross subsidise from other parts of the business or withdraw from that sector of the market.

There will be more containerisation of non bulk goods and as the economy improves more 'white goods' will flow, predominantly in containers. The traditional loading and unloading methods will need to be replaced by greater mechanisation for handling container and palletised goods. ADDY will have to decide whether this is core to their business or would be better handled through private sidings or by franchised terminal operators at their rented freight stations.

Identifying non bulk traffic that can be handled at a competitive price will be one of the main challenges facing the marketing department as rail's traditional monopoly is eroded. The development of strategic partnerships with emerging transport operators at an early stage is essential as ADDY needs to lock them into its system before they develop too great an independence.

ADDY must recognise that with the change in the business structure new railway operators could set up in business as direct competitors. It may be appropriate therefore to split the freight business into identifiable market segments e.g.

- Oil
    - Transit
    - Internal
- Containers
- Construction
- Others

This would create a closer customer focus within the freight business. It would give a greater cost awareness and assist the business sector in improving service delivery whilst being closer to the customer and should improve market intelligence for future business opportunities.

3.7.5 Quality of Service Targets

Quality of service targets must be developed to enable the business to measure its performance and to satisfy customers that the contract service levels are being provided or bettered. They should also be used to indicate to prospective customers that the railway is capable of delivering its promises.

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Where service levels are inadequate then management action can be targeted and results tracked to ensure effective action is being taken. This can then be used to give comfort to customers that the business cares and is acting positively.

Quality of service targets should include the following:

- Train performance
    - Delays
    - Journey time achievement
    - Punctuality
    - Reliability
    - Tonnage conveyed

- Freight Station performance
    - Tonnage forwarded/ received
    - Loading/Unloading times
    - Wagon placement
    - Wagon suitability
    - Freight Station delays

In developing these targets it is essential that they are SMART i.e.:

- Specific
- Measurable
- Achievable
- Realistic
- Timely

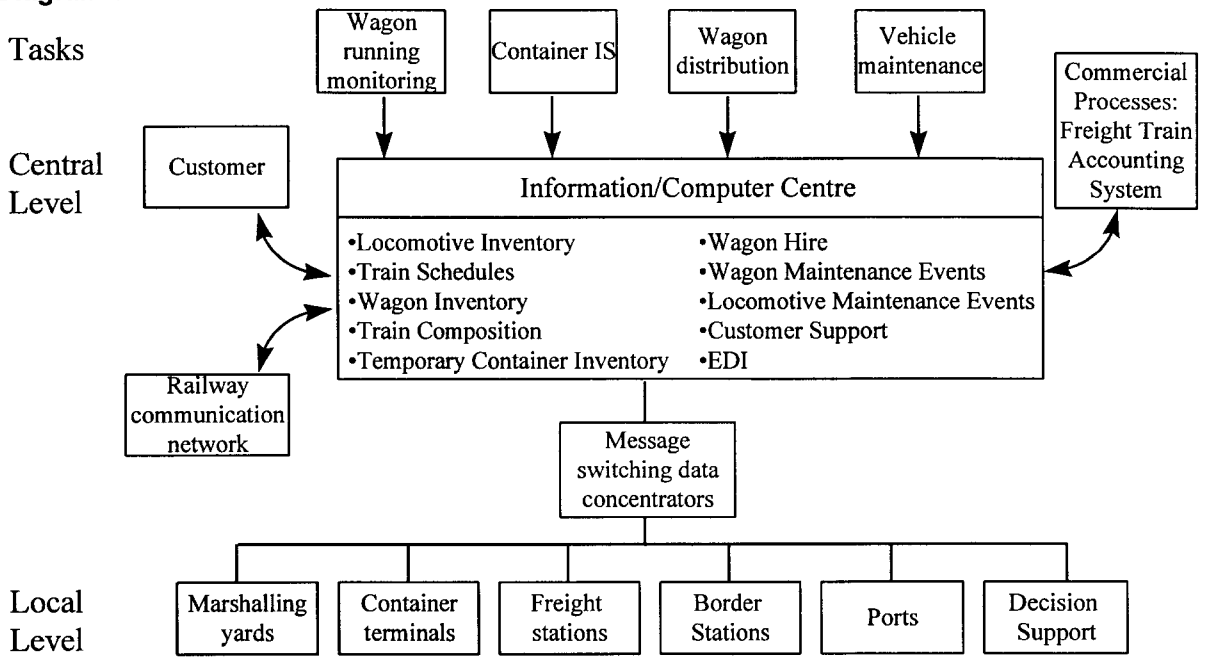
ADDY currently measures many of its activities including some of the above. The list is not exhaustive and quality of service targets should be developed as a integral part of the management information system. Where appropriate these should be driven by the need to satisfy customers and they should be shared with them as part of service delivery and to confirm contract compliance.

3.7.6 Freight IT and Management Information Systems

Freight IT and Management Information Systems are the backbone of modern railway businesses. They are able to link the main activities to give an holistic approach to managing the business and this often extends to interfaces with the systems of other transport operators and customers.

The diagram below shows a typical two level Freight Train Operating System with its external interfaces.

Diagram 6.4



Source: Tewet report

The system is designed to provide the following:

- Operational information including:
  - Movement information of wagons and locomotives
  - Location information of wagons and locomotives
  - Status of wagons and locomotives e.g. loaded/empty/maintenance
  - Wagon and locomotive details including maintenance history and current maintenance schedules
  - Train formations and details e.g. weight, length, special restrictions

- Commercial information including:
  - Forwarder and Receiver
  - Tariffs
  - Wagon consignment information e.g. contents, weight, destination
  - Special instructions
  - Automatic billing
  - Revenue collection and receipts

It can be seen that the operating and commercial process systems are linked and drive all aspects of the business to provide the key elements that form the basis for management decisions and action.

3.7.7 Freight Accounting Systems

Freight Accounting Systems should be developed to be an integral part of the Freight IT and Management Information System

Freight accounting should be a function of the Marketing department which will give them responsibility for the whole freight business. This will enable one department to understand the balance between costs and revenue and ensure that an holistic approach is adopted towards customer service and business decisions.

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The specification and design of the freight accounting system is fundamental to deriving maximum flexibility of management information and permitting changes and upgrades as business and technology develops.

The key starting point is to define the profit centres. They are the lowest level at which revenue and costs are balanced to give profit and loss and balance sheet information.

ADDY must decide which are the key sectors within the freight business as a whole e.g.

- Oil business
- Container business
- Construction business
- Others

ADDY may consider that the individual sectors above should be further sub divided into sub-sectors. The oil sector could be separated into individual traffic flows e.g.

- Chevron traffic
- Domestic traffic etc.

Each of these would then become a profit centre where costs and revenues are balanced. This will then enable the process of traffic costing to be completed from which tariffs can be set for specific traffics and flows.

Within each profit centre there will be several cost centres which should define the key activities (not locations) where costs arise. e.g.

- Train gangs
- Freight station handling
- Freight station shunting
- Administration etc.

Each cost centre must be carefully defined and will each be split into a series of location codes. The location codes are the smallest accountancy split for a particular activity.

Location codes are set up for each location where a particular activity (as defined above) takes place. At certain locations it may not be possible to allocate all costs to a particular activity. This may occur, for example, where a single member of staff undertakes an activity for more than one (sub-) sector or business. In such instances ADDY would need to define a set of rules or guidelines for the allocation of the cost split.

The diagram below indicates the structure of a theoretical cost accounting system.

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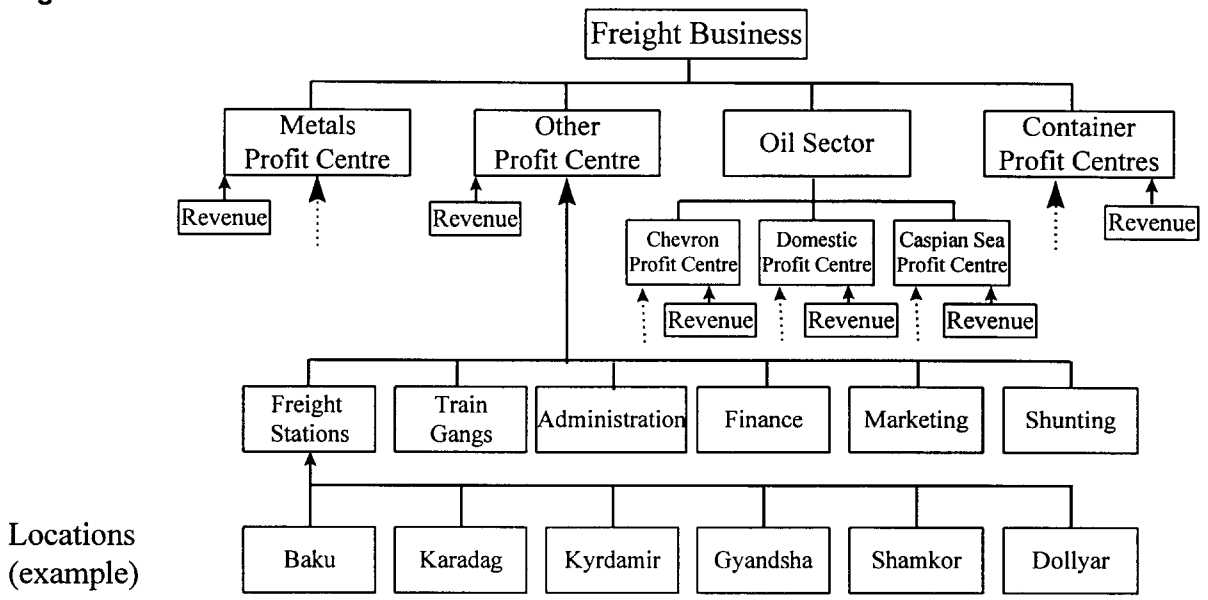
Diagram 5.5



Revenue accounting should follow similar principles to cost accounting in that it should be developed to account for and provide management information at the lowest level of activity. Revenue should be split by:

- Customer
- Commodity
- Wagon type
- Origin and destination
- Line of Route or other geographical grouping
- Sub sector and Sector

The split should enable a detailed evaluation of costs and revenue at base activity level

The development of a modern and flexible freight accounting system, similar to that described above, will be a major task for ADDY to undertake early on in the five year business plan. It is, however, a fundamental element of the proposed business restructuring and a basic requirement for a commercially focused organisation.

The following timetable of activities is proposed for the setting up of the systems

Year	Activity
Year 1	set up new organisation and allocate assets accordingly
	develop profit and cost centre accountancy system
	develop internal contract structure and framework agreements
Year 2	new organisation goes live
	undertake shadow running of the accountancy system
	agree internal contracts and operate on a shadow basis
Year 3	internal contracts go live
	accountancy system goes live
Year 4	review and update systems and current business plan
	review and update systems and current business plan
Year 5	finalise 2004 business plan

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3.7.8 Freight Operating Strategy and Performance

(a) Freight Operating Strategy

The present strategy is based on maximising train length. When the correct tonnage or number of wagons is reached arrangements are made to send it forward. As such freight trains do not run to a timetable though a theoretical timetable is produced at the start of each timetable period.

With the level of traffic now operating this system is wasteful of resources in that locomotives and train gangs are on constant standby. The benefit however is that track capacity usage is minimised as the least number of trains are operated between any two points during a 24 hour period. Although there are infrastructure problems there is surplus capacity so optimising train paths is not an issue in Azerbaijan.

Freight trains should be operated to a timetable in the same manner as passenger trains. This will allow the allocation of locomotives and train gangs to specific times and reduce the number of resources required and hence operating costs.

It is recommended that the introduction of a fully scheduled freight timetable should be progressed at the earliest opportunity in line with the present timetable planning process.

At present train gangs are allocated to individual locomotives. This is a recent practice adopted to overcome the poor reliability of the locomotive fleet. The theory is that each gang (3/4) allocated to a locomotive understands its workings and are able to rectify problems when away from the depot. This results in locomotives being changed when train gangs are changed. If this occurs away from the depot the locomotive stands idle until the same train gang has rested (12 hours) before being available to work another train.

This practice must be reduced and eventually eliminated as the most expensive resource (locomotive) is limited in its operational availability by the hours of the least expensive resource (train gang). Consideration should be given in the short term to creating a dedicated locomotive fleet to work key traffic flows e.g. transit oil between Dubendi and Batumi. A similar arrangement could apply to train gangs who would be trained and if necessary paid accordingly. Locomotives would then only be changed at the border.

Local freight trains collecting and delivering wagons between sidings, the main freight stations and marshalling yards should also operate to a timetable. The customer should be involved in this process to ensure optimisation of working arrangements.

(b) Performance

The monitoring of freight operating performance is essential to the understanding of the business; for use as a basis for targeting improvements; to develop future plans; to deliver a quality product and to ensure customer satisfaction. This information forms a key part of the management information system.

Performance targets need to be developed in line with the quality of service targets (6.6.5). At present ADDY measures and records a wide range of data concerning its freight movements. With the development of a freight timetable new data will be required to measure actual performance against the plan and to measure productivity of its resources (e.g. locomotives, wagons, staff). An example is given below:

Freight train departure and arrival targets

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departing	% target	arriving	% target
On time	95	On time	80
0 - 30 minutes late	5	0 - 30 minutes late	10
31- 60 minutes late	0	31- 60 minutes late	9
60+ minutes late	0	60+ minutes late	1

Freight train performance at Freight Marshalling Yards and Freight Stations- to measure the achievement of the time taken at each booked stopping point on the journey in comparison with that in the plan:

Location:

Train number	Plan time	Real time	Difference	% Real v Plan
2222	60	65	5	108
2223	120	100	(20)	83
2224	90	90	0	100

3.7.9 Marshalling and Shunting Practices Systems

Freight train marshalling and shunting by its very nature delays wagons and should be reduced to the minimum necessary to achieve an effective and efficient operation. Ideally the number of marshalling/shunting movements should not exceed the figures in the table below.

Shunting or marshalling movements by traffic type

	Movement type			
Train type	Transit	Forwarded	Received	Local
Block load	1	1	1	2
Wagon load	2	2/3	2/3	2-4

The creation of a timetable service pattern will enable a review of the working hours necessary to handle traffic at the freight stations and marshalling yards. The increase in block trains and in containerisation will further reduce the need to marshal and shunt trains as the proportion of wagon load traffic decreases.

The present and predicted traffic levels are insufficient to support 24 hour operation of freight facilities with the exception of those required for some oil traffics.

Train movements should be planned and the workload assessed to calculate the optimal solution by balancing the effect of rationalisation and cost reductions on quality of service delivery and the risk to performance.

The local trains collecting and delivering wagons for the freight stations situated between the main marshalling yards should be formed into individual sections for each freight station at the marshalling yard. Wagons for the first freight station would be marshalled at the rear of the train, those for the next freight station inside the first section and so on.
An example for a train between Baku and Gyangja is given below:

Locomotive	Gyandja	Mingetshaur	Kyrdamir	Karadag

At each freight station the wagons for delivery would be detached from the rear of the train whilst wagons being collected would be attached at the front. This avoids intermediate shunting and marshalling and speeds the movement of traffic.

At the main marshalling yard of Baku the number of sidings should be reduced to 25 sidings.

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3.7.10 Terminal Handling, Loading and Unloading

The number of freight stations should be reduced to those where a reasonable level of activity currently exists and can be predicted to continue and develop in the future. The following freight stations are identified for retention:

Baku Tov, Karadag, Kyrdamir, Mingetshaur, Gyandsha, Shamkhor, and Dollyar,

the freight stations below to be reviewed to consider their viability:

Khatshmas, Kiliasi, Sumgait, Gyuzdek, and Vatagi,

All others should be closed and their activities and equipment ,if suitable, transferred to the remaining locations.

Gyandsha should be developed to handle 40ft containers as a suitable location in Azerbaijan if the level of container traffic develops in a similar way to Europe but this is not proposed as part of the 5-year plan. Development of Kishli-Baku is not proposed but should have its activities transferred to Baku Sea Port providing the container terminal is developed as proposed under a separate initiative.

A key strategic business decision to be made is whether freight station terminal management should be a core activity of the freight business. This includes the following areas:

- shunting
- loading and unloading
- terminal equipment ownership, operation and maintenance
- staffing ownership and arrangements
- documentation

There are several options which need to be evaluated individually to satisfy the particular circumstances at each terminal. The following options should be considered:

1. Retain ownership and total control of operation
2. Retain ownership but franchise one or more activities to another company
3. Retain ownership but share costs and activities on a contracted basis
4. Sell the terminal activity to another company but contract to undertake certain activities
5. Sell the terminal activity to another company

The relationship with other transport operators and customers using the terminal together with the value of the traffic to the freight business will influence the final decision for each location.

3.7.11 Border Crossing Procedures

The present border crossing procedures require trains to stop for lengthy periods for both railway operational and engineering procedures but mainly for customs purposes. Border stops of over 3 hours are normal.

In western Europe border procedures have been changed through adoption of internationally developed agreements concerning both customs and railway operating and engineering standards. These arrangements have either reduced the time taken to complete border procedures or in some cases eliminated stops at borders.

Azerbaijan and Georgia achieved a considerable reduction in border station stop times with the introduction of the Logistics Express container train. Both countries are members of OSShD and are party to the treaties dated 13.5.1995 on corridor transports. Only Azerbaijan is

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currently a associate member of the UIC.

It is an indication of what can be achieved and both countries are recent signatories to an agreement made at the Baku conference (on 8 September 1998), together with the majority of the other TRACECA route countries, to work towards the adoption of western European practice. This will pave the way to reduce the lengthy border station stops that currently apply.

As part of this process both countries should consider the benefits of permitting locomotives and train gangs to work across the border to avoid stopping at a location where the only purpose of the stop is to change either locomotive and/or train gang.

3.7.12 Rolling Stock Needs and Forecasts

The recent traffic results and predictions have shown that the most realistic level of business will be some 50% greater than the pessimistic TEWET forecasts.

(a) Wagon requirements

The 1998 traffic levels of 12.5 million tonnes could be handled with an operational wagon fleet of 5046 wagons. During the business plan period productivity improvements of 20% for oil wagons and 10% for others are assumed which will require 5437 wagons to handle the forecast of 16.5 million tonnes in 2003. This assumes a 300-day operating year with 10% of the fleet undergoing repairs or maintenance at any one time.

A key area for improvement is the wagon round trip times being achieved currently. These vary from 6 days to 60 days dependent on the type of wagon. Major strides to improve wagon loading and unloading times must be pursued with senders and forwarders. Wagons must not be used for storage as they lose revenue generating opportunities which in turn requires a larger wagon fleet than is commercially viable and require additional facilities to repair, maintain and store these additional wagons. 6 days are being achieved for local oil traffic and with the operating and infrastructure improvements contained on the business plan it should be the minimum target for all wagons used either internally or for traffic to/from Georgia.

The table 4.6 below details wagon requirements during the business plan years

Table 4.6 Azerbaijan wagon requirements

	Year					
Wagon type	1998	1999	2000	2001	2002	2003
Covered	562	606	637	643	643	638
Flat	485	522	550	555	554	550
Semi	610	658	692	698	697	693
Tank	2333	2438	2485	2431	2353	2265
Refrigerator	92	99	104	105	105	104
Other	965	1040	1095	1105	1103	1096
Total	5046	5364	5564	5537	5455	5347
Annual Tonnes	12508000	13903000	15081000	15690000	16156000	16545000

(b) Locomotive requirements

With the present locomotive and train gang operating arrangements locomotives rarely achieve a working day of more than 12 hours and 8 hours is nearer the norm. This accounts for the present level of utilisation where locomotives are achieving an average of 202km per day with a daily tonne.km per locomotive of 258. The reasons were explained in 6.6.8 as were some short and long term solutions.

The following table 4.7 indicates the effect of improving productivity during the 5 year plan.

Table 4.7 Azerbaijan freight locomotive requirements

	Year					
Locomotive type	1998	1999	2000	2001	2002	2003
Electric	51	53	54	53	51	50
Diesel	3	3	3	3	3	3
Civil	17	18	18	18	17	17
Shunting	92	82	72	65	60	55
Annual Tonnes	12508000	13903000	15081000	15690000	16156000	16545000

The business plan assumes a 30% productivity improvement during the life of the business plan. The number of electric line haul locomotives peaks in 2000 at 54 then reduces as the tonnage rise slows down but productivity continues to improve giving a 2003 requirement for 50 electric locomotives. This level of reduction requires the changes to operating practices and infrastructure improvements to reduce journey times outlined elsewhere in the plan.

It has been assumed that diesel locomotive requirements will remain constant during the plan time scale with minor fluctuations in civil locomotive requirements corresponding to infrastructure activity. Civil locomotives have also been assumed to be part of the freight business leasing requirements but they could be leased by the infrastructure business direct from the rolling stock business. It is recommended however that they are part of the freight business as they own the drivers who will operate the locomotives.

Shunting locomotive requirements show a more dramatic reduction to reflect the proposed rationalisation of freight stations and yards and subsequent concentration of freight activities at a few locations. They fall from 76 to 45 during the plan time scale. These figures assume that the freight business would lease all shunting locomotives from the rolling stock business then sub lease shunting locomotives to the passenger business as necessary.

3.7.13 Train Crew Levels and Rostering Practices

Train crews are currently part of the locomotive department. It is recommended that they are transferred to the freight and passenger business as appropriate. This will enable the businesses to have a tight control over one of the main cost elements. This also recognises the difference between the two businesses and will enable them to develop independent strategies appropriate to their individual needs.

Train crew levels are based on two types of rostering practice.

- Line haul freight
- Local freight and shunting

(a) Line haul freight

For line haul freight the number of train gangs(a driver and assistant) is based on the number of locomotives required. Three or four train gangs are allocated to each locomotive. The requirement for locomotives is calculated annually from the projected number of tonne kilometres. This figure is supplied by the economics department.

Train crews work an average 170 hours per month working an 8 hour day (that can be extended to 12 hours). After each turn of duty they are entitled to 12 hours rest. The 3 or 4 gangs allocated to a locomotive are called in for duty on a rotational basis when required.

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(b) Local haul freight and shunting

Local haul freight and shunting locomotives operate on a four gang rotational basis working 12 hour shifts with alternating 24 and 48 hours rest intervals between. This gives 24 hour continuous coverage

The following table details the train gang depot establishments as at 1.3.98

	Diesel		Electric		EMU		Total	
Depot	**Driver**	**Asst**	**Driver**	**Asst**	**Driver**	**Asst**	**Driver**	**Assistant**
Baku	5	5	4	4	125	97	134	106
Baladjari	250	227	206	128	6	6	462	361
Gyandja	201	114	100	49	11	12	312	175
Salyani	-	-	54	54	-	-	54	54
Imishli	42	39	73	42	-	-	115	81
Djulfa	23	30	56	42	-	-	79	72
Total	521	415	493	319	142	115	1156	849

The Trans-Caucasian line is operated by locomotives and train gangs from:

Baladjari and Gyandja depots.

Both depots will be required throughout the duration of the business plan for freight traffic.

As discussed previously the following measures are recommended for adoption and will reduce the number of train gangs required.

- Introduction of a freight timetable
- Roster gangs to trains not locomotives in a similar manner to passenger services
- Review shunting and freight station arrangements to reduce activities to meet business requirements.
- consider the introduction of driver only operation.

3.7.14 Human Resources, Employment Levels and Labour Productivity

The proposed organisational structure for the railway has split it into 6 main groupings of which the freight business is one. The main activities of the business can be divided as follow:

- Marketing
  - Traffic costing
  - Tariff setting
  - Revenue collection
  - Timetable development
- Contracting
  - Internal
    - Rolling stock
    - Infrastructure
  - External
- Human resources
- Finance
- Operations
  - Train crews
  - Freight stations
  - Marshalling yards
  - Freight terminals
  - Performance

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The main changes proposed give the business the ability to be free standing in terms of costs and revenue. It will own none of the infrastructure and as such will pay the infrastructure business for access to the track and property it needs. Similarly it will rent its locomotives and wagons from the rolling stock company.

The staffing levels below have been identified to the freight business through a process of disaggregation of the present activities into their component parts and summating the figures from these basic building blocks.

It is considered that a 30% reduction in staff numbers is achievable during the life of the business plan through the actions outlined in the freight business section.

The following table provides the total staff numbers for each year of the plan

	Base year	Year 1	Year 2	Year 3	Year 4	Year 5
Freight	3021	2930	2725	2507	2307	2122
% change		3%	7%	8%	8%	8%

The figures do not include any provision for the introduction of driver only operation as it is not considered that this will be achievable during the plan timescale. It should be investigated however to understand the requirements and trials introduced on certain traffic flows as considerable cost benefits stem from this method of operation.

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5 ROLLING STOCK

5.1 Strategy

5.1.1 Structure

It is proposed to establish a Rolling Stock Business Unit as a stand alone unit which will carry out maintenance and overhauls for the Passenger and Freight Business Units on locomotives, passenger carriages, and freight wagons. It will operate as an autonomous enterprise with its own technical, workshops, accounts sales and human resource managers. It will negotiate contracts for the supply of maintenance services to the Passenger and Freight Business Units.

The option should be kept open for the Rolling Stock Unit to own rolling stock, which it would then lease to the Passenger and Freight Business Units and to other licensed operations.

The Rolling Stock Unit will be encouraged to provide engineering services to third parties on a commercial basis.

The principal functions of the Rolling Stock Service Unit will include:

- major maintenance and overhaul of rolling stock, including locomotives (electric and diesel), passenger carriages and freight wagons;
- contract with Passenger and Freight Business Units, and third party customers where profitable, for major maintenance, overhaul and other engineering services;
- development of best practice methods, systems, equipment and workshops for engineering work;
- management, training and development of staff;
- achievement of financial and other targets set by Rolling Stock Unit and approved by Board of SR.

The organisation for the Rolling Stock Business Unit is shown in the Annexes. The top management organisation of Georgian Railways is also given.

5.1.2 SWOT Analysis

There is a popular management tool used in analysing businesses. It examines the strengths, weaknesses, opportunities and threats of the business. This is usually referred to as SWOT analysis. Using this technique the Rolling Stock Business Unit is analysed below:

Strengths

- Management expertise
- Monopoly situation
- Own workshops
- Large fleets
- Dedicated workforce

Weaknesses

- Old locomotive fleet
- Old wagon fleet

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- Old passenger fleet
- Lack of spare parts
- Lack of modern management techniques
- Management organisation

Opportunities

New organisation
New management technique
New focus on business
Autonomy
Work for third parties
Less staff
Bigger profits
Reduction in fleet size
Sell off surplus assets

Threats

New pipe-lines
Competition from other maintenance businesses
Loss of business to road haulage

5.1.3 Mission Statement

TO PROVIDE AND MAINTAIN LOCOMOTIVES, FREIGHT WAGONS & PASSENGER COACHES TO MEET THE REQUIREMENTS OF THE FREIGHT AND PASSENGER BUSINESS UNITS AT A COMPETITIVE AND PROFITABLE PRICE

5.1.4 Human Resources

There is little doubt that the Rolling Stock Unit is currently grossly over-staffed. This is due to a number of factors. The matter has not been helped by the present situation, which allows staff to remain at work after the official retiring age. Neither is the situation helped by the current low level of state pensions and this problem cannot be solved by the Rolling Stock Unit alone and must be tackled as an overall problems in Azerbaijan Railways. The current levels of employment is about four thousand. It is likely that with improved management and working techniques this number could be reduced to substantially lower numbers in the region of 1,500 or less.

An opportunity exists to re-train staff in modern workshop practices such as quality programmes and world class manufacturing techniques. This involves participation by all levels of staff and in the consultants experience can result in a big improvement in staff morale and big productivity gains.

This involves people working smarter but not necessarily harder.

5.1.5 Manage Information Systems

In order to operate a good business management require a good management information system which would give useful and timely information. Unfortunately computerisation and the necessary communications highways are some years away.

In the meantime it is recommended that local area network computers be set up which would assist in tracking locomotives, freight wagons and passenger coaches, costing, human resources, etc. This information could then be despatched in the short term to a central location by email.

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5.1.6 New Workshop Technique

World Class Manufacturing Techniques

This involves setting up teams including management and operatives into teams to decide on the best method of carrying out maintenance work on all rolling stock. Generally work teams are set up to carry out the work and they work as a **team.**

The fact that the people who are involved in the actual work on the ground are consulted and decide the best method will give them a feeling of being involved in the decision making process and will improve the morale of the staff concerned. In the experience of the consultants big productivity gains can be gained.

It is suggested that if it is decided to introduce such techniques that this be introduced initially as on a shop by shop basis.

Productivity

There is a common practice in the west whereby production targets are set in advance and agreed with the workforce. If these targets are exceeded, then the workforce benefit by enhanced payment.

In this way both the enterprise and the workforce gain. The enterprise gains by increased production and the workforce by improved payments.

Quality

The introduction of Quality Management Systems can be expected to give benefits in both output and quality.

5.1.7 Safety Systems

Safety is paramount importance to all railway operations. Railways for too long have been very inward looking. This has changed in recent years where the experience gained in the Nuclear and Chemical Industries has been used to good effect in the railway industry.

Leaders in the chemical field have been ICI Imperial Chemical Co in the UK. They have developed their own Safety Rating System. Some railways have adopted an international Safety Rating System, which was developed in the United States. Similar systems have been introduced in British Railways and Irish Railways.

This allows the railways concerned to measure their management of safety in a logical manner and is subject to external audit. There are different levels of competencies which can be aspired to on a year by year basis and this method introduces a discipline which benefits the railway in the long term by the reduction in accidents and fatalities and represents a good return in time and effort.

To implement such a system requires a big commitment from management and staff. The level of safety required under this system is not easy to attain.

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5.2 Contracts with Freight and Passenger Business Units

5.2.1 Rolling Stock Requirements

A selling buying relationship will be set up between the Rolling Stock Business Unit and the Passenger and Freight Business Units. It is the responsibility of the Rolling Stock Business Unit to provide rolling stock to the operating business units to the specification laid down by these business units.

The specification will include:

Locomotives

- the number of locomotives required during the daily cycle
- trailing load
- max speed
- journey time required
- type of locomotive
- location

Of course this would be agreed between the Rolling Stock Business Unit and the Freight and Passenger Business Units.

Freight Wagons

- number of wagons
- wagon type
- location
- max speed
- journey times
- braking characteristics

Like the locomotives these would be agreed in advance in discussions.

Passenger Coaches

- number of passenger coaches required
- location
- max speed
- quality
- heating
- catering cars
- sleeping cars

It is quite clear that the number of units of locomotives, passenger coaches, and freight wagons available exceeds what is required in the foreseeable future.

This will present a dilemma both for the operating units and the Rolling Stock Business Unit. On the one hand the Freight and Passenger Business Units will want the flexibility of having additional rolling stock available to them if and when required. There will of course be a cost associated with this.

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5.2.2 Objectives of the Rolling Stock Business Unit

- provide a quality service at a competitive price
- make sufficient profit to have a sustainable business

It is the Freight and Passenger Business Units responsibility to determine the number of rolling stock units required, or as an alternative they could supply the Rolling Stock Business Unit with their timetable, and leave it to the Rolling Stock Unit to determine the total number of units required including those that would be required for maintenance on an ongoing basis.

The Rolling Stock Business Unit will have to take the following into account when determining the numbers of the various types of rolling stock required.

Operating procedures
locomotive availability
wagon availability
passenger coach availability
line speed
line temporary speed restrictions

5.2.3 Issued to be addressed

Some issues to be addressed include

- through running of locomotives
- transfer of drivers and assistants to the Freight and Passenger Business Units
- scrapping and disposal of surplus rolling stock
- rationalisation of maintenance depots
- staff reductions
- re-organisation

Through Running of Locomotives

Currently locomotives operate in confined areas with frequent changing of locomotives during the journey. This causes additional delays and reduces the availability and utilisation of the locomotive fleet.

It is strongly recommended that this practice be changed in order to improve the availability and effectiveness of the service.

Transfer of drivers and Assistants to Freight and Passenger Business Units

In order to give as much control as possible to the operating business units it is proposed to transfer drivers and their assistants to the Passenger and Freight Business Units. This will allow the units to roster more effectively and to improve the overall cost effectiveness.

Consider should be given in the future to the introduction of one person operation of locomotives. This will involve close liaison with the Safety to ensure that safety in operation is not impaired.

Disposal of surplus Rolling Stock

This is an issue, which requires immediate attention and if nothing else will focus the mind on the future requirements of the businesses. This issue has been discussed elsewhere in the report.

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Rationalisation of Maintenance Depots

In looking at the future business requirements it will be necessary to carry out some rationalisation as it is accepted that the level of business will never return to that which pertained prior to 1990.

Staff Reductions

Rationalisation will bring with it staff reductions ad this coupled with the introduction of new workshop practices will inevitably lead to a surplus staff situation.

At present legislation does not assist reducing staff numbers the only solution may be to introduce a voluntary redundancy programme and a non recruitment policy.

Reorganisation

The re-organisation proposals present an unique opportunity to introduce real business focus into the organisation.

The three main areas of locomotives, freight wagons and passenger rolling stock will have their own managers who will carry the responsibility for their area of the business.

5.3 Fleet Conditions

5.3.1 Locomotives

Main Line Electric Locomotives

The ADDY electric main line fleet consists of 238 locomotives, of which 150 are currently available for traffic. They are used for both freight and passenger working.

The age profile of the electric locomotives is as follows:-

Type Age	under 5	5-9	10-14	15-19	20-24	25-29	over 30
3VL 22M	-	-	-	-	-	-	1
VL 23M	-	-	-	-	-	-	2
VL 8	-	-	-	-	-	14	178
VL 11M	-	43	-	-	-	-	-
TOTAL	-	43	-	-	-	14	181

The age profile is such that all the electric locomotives, with the exception of the fleet of 43 VL 11 locomotives, which are comparatively new (1988), have exceeded their 28 year life. The FSU regulations imposed a life limit, but as, unlike wagons and coaches, the locomotives are confined to Azerbaijan, ADDY have the freedom to extend the life span if practicable, and intend to keep the life expired locomotives in service if possible. However there is a requirement for a major investment in new locomotives to be considered in less than 10 years time.

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The condition of the locomotives is as follows:

TYPE	Total Fleet	Condition			Operating
		Downgraded	Major Repair Overdue	Serviceable	Daily Requirement
3VL 22M	1	1	1	-	}Freight :42
VL 23M	2	2	2	2	}Passgr :40
VL 8	192	192	138	111	}Civil eg :14
VL 11M	43	-	26	37	
TOTAL	238	195	127	150	96

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Numbers for main line locomotives are per complete operational locomotive.
i.e. 1 locomotive = 2 permanently coupled units.
There are four crews attached to each locomotive.

The TRACECA Rolling Stock Maintenance Report July 1997 gives a fleet of 253 locomotives with 152 available.

The VL8 is a freight locomotive, but now operates mainly on passenger duties.

One of the major problems with the reliability of the VL8 locomotives is the deteriorated condition of the electrical wiring insulation. There are also problems with the insulation of electrical machines.

On average there are about one or two breakdowns in service each week which require the locomotive to be assisted. Main causes are traction motor flash-overs, wiring insulation breakdown, motor-compressor and pantograph problems.

The VL11 locomotives operate mainly on freight duties and are more reliable than the VL8 locomotives, but with electronic components they are not as easily repaired as the simpler VL8.

Characteristics of the Main Line Electric; 3 kV DC, locomotives are as follows:

Type	Axle arr.	Weight tons	Maximum axle load	Continuous power (kW)	Maximum. Speed (km/h)	Tractive power kN (start)
VL 22 M	CoCo	132	22,0	1860	80	378
VL 23	CoCo	138	23,0	2740	100	446
VL 8	2xBoBo	2x92,0	23,0	2x1880	100	2x298
VL 11	2xBoBo	2x92	23,0	2x2300	100	2x306

The VL electric locomotives are all 3000v DC. The VL22 date from 1941, the VL8 from 1957, and the VL11 from 1975, onwards.

Main Line Diesel Locomotives

The ADDY main line diesel locomotive fleet consists of 101 locomotives, of which 18 are currently available for traffic. The locomotives operate mainly on the line to the south to Astara, which is not electrified beyond Osmanli, nor is the line in the occupied territories from Goradiz to Ordubad.

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The age profile of the locomotives is as follows:-

Type / Age	Under 5	5-9	10-14	15-19	20-24	25-29	over 30
TE3	-	-	-	-	2	34.5	6.5
2M62	-	22	-	-	-	-	-
2TE10M	-	24	-	-	-	-	-
3TE10M	-	-	1	9	2	-	-
TOTAL	-	46	1	9	4	34.5	6.5

The fleet of modern 2TE 10M and 2M62 locomotives, acquired just before the break up of the FSU, means that ADDY is relatively well equipped with diesel power compared with many other CIS railways.

The condition of the ADDY diesel main line locomotive fleet is as follows :

TYPE	Total Fleet	Condition			Operating
		Downgraded	Major Repair Overdue	Serviceable	Daily Requirement
TE3	43	43	5	6	}Freight ; 3
2M62	12	5	7	8	}Passgr : 4
2TE10M	22	-	15	5	}Civil eg : 1
3TE10M	24	-	19	3	
TOTAL	101	48	46	24	8

Numbers for main line locomotives are per complete operational locomotive.
i.e. 1 locomotive = 2 permanently coupled units.

The TRACECA Rolling Stock Maintenance Report July 1997 gives a fleet of 88 main line diesel locomotives with 30 available.

However a considerable proportion of the fleet is overdue major repair (KR) which must be done in other countries.

ADDY, unlike some other CIS railways, do not differentiate between locomotives for freight operations and passenger operations. All main line locomotives operate as a pool.

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 cooling systems and cam-shafts. Most of the locomotives are basic electro-mechanical units, which can be understood and adjusted by the drivers in the event of an on line failure.

The characteristics of the main line diesel locomotives are as follows:

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Type	Axle arr.	Weight tons	Maximum axle load	Power kW (continuous)	Maximum. Speed km/h	Tractive power kn. (start)
TE 3	2xCoCo	2x120,6 2x127,0	20,1 21,2	2x1472	100	2x285
2M 62	2xCoCo	2x120,0	20,0	2x1470	100	2x350
2TE 10 M	2xCoCo	2x138,0	23,0	2x2208	100	2x399
3TE 10 M	3xCoCo	3x138,0	23,0	3x2208	100	Maximum. 932

The 2TE10 diesel-electric locomotives are 6000 hp and consist 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.. Maximum speed is 100 kph, and bogies are the three axle CO-CO type with all axles motored. Axle loading 23 tonnes. The 3TE10 locomotives are the same locomotive with an additional section in the middle.

Shunting Locomotives

The ADDY shunting diesel locomotive fleet consists of 179 locomotives, of which 89 are currently available for shunting duties.

Type	under 5	5-9	10-14	15-19	20-24	25-29	over 30
TEM1	-	-	-	-	-	-	1
TEM2	-	2	32	39	38	7	4
ChME3	-	39	11	-	-	-	-
TOTAL	-	41	43	39	38	7	5

The condition of the diesel shunting locomotives is as follows :

TYPE	Total Fleet	Condition			Operating Daily Requirement
		Downgraded	Major Repair Overdue	Serviceable	
TEM1 TEM2 ChME3	1 128 50	1 29 -	1 70 20	1 70 18	}Freight : 70 }Passgr : incl }Civil eg : 6
TOTAL	179	30	91	89	76

The number of shunting locomotives available for service has dropped in the last year, as the TRACECA Rolling Stock Maintenance Report July 1997 gives a fleet of 179 diesel shunting locomotives with 112 available.

All numbers for diesel shunting locomotives are given per individual unit, as they operate as such, i.e. 1 locomotive = 1 unit.

The backbone of the shunting locomotive fleet is the diesel-electric ChME3 single unit locomotives, which develop 1000 hp. The older single unit diesel electric TEM2 locomotives develop 1200 hp, and are more reliable.

The mechanical components of the ChME3 locomotives, particularly engines and air compressors, are unreliable. The traction motors and generators are generally OK. There is a

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shortage of parts, particularly compressors. Parts are expensive, and it is much more cost effective to buy parts to maintain the older TEM2 fleet.

The characteristics of the diesel shunting locomotives are as follows :

Type	Axle arr.	WeighT (tons)	Maximum axle load	Power kW	Maximum Speed (km/h)	Tractive Power Kn (start)
TEM 1	CoCo	126 120	21,0 20,0	736	90	347
TEM 2	CoCo	120	20,0	883	100	347
ChME 3	CoCo	123	20,5	993	95	356

The TEM1 shunting locos date from 1958, TEM2 from 1967, and the ChME3 from 1965.

Electric Multiple Units

The ADDY fleet of electric multiple units consists of :

Type	under 5	5-9	10-14	15-19	20-24	25-29	over 30
ER2	-	-	8	31	16	15	4

The condition of the multiple units is :

TYPE	Total Fleet	Condition			Operating
		Downgraded	Major Repair Overdue	Serviceable	Daily Requirement (motor units)
ER2	74	2	36	46	Baku 36 Gyanja 12

They operate mainly on local services on the Apsheron Peninsula and out of Gyanja, normally in 4 car sets. Half the cars are motored, and half are trailers. Above units are motor units, giving 18 four-car sets in Baku and 6 four-car sets in Gyanja.

There have been no internal improvements made to the railcars to make them attractive to passengers. They are providing basic transportation for workers.

The characteristics of the EMU railcars are as follows :

Type	No. of cars	Weight M=motor T=trailer DT=cab t. DM=cab m.	Maximum. axle load	Power per motor car (kW)	Maximum. Speed (km/h)	Current
ER 2	10/12	M: 54,6 T: 38,3 DT: 40,9	19,9	800	130	3 kV DC

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5.3.2 Passenger Coaches

The ADDY passenger coach fleet consists of :-

	AGE	Under 5	5-9	10-14	15-19	20-24	25-29	over 30	TOTAL
TSMO	Open - 54 seat/36 sleeper	-	48	181	68	59	26	-	382
TSMK	Compartment - 36 sleeper	-	61	86	42	57	51	4	301
SV	Comfort 18 sleeper	-	2	5	10	6	3	6	32
TSMR	Restaurant cars	-	-	21	3	4	-	-	28
TSMB	Postal / Luggage	-	-	-2	3	9	26	5	45
	Service	-	-	-	2	-	1	3	6
	Technical	-	-	-	-	-	4	11	15
ZAK	Others (prison vans)	-	-	-	2	1	2	1	6
	Total	-	111	295	130	136	113	30	815

Jan 98, -age profile adjusted.

Of the fleet of 815 carriages, 715 (87%) are passenger carrying, and of these around 300 are unfit for service, giving an available fleet of around 415.
The availability of the coaches at present is as follows :

			Stored	KR Overdue	DR overdue	Available	Daily Need
TSMO	Open - 54 seat/36 sleeper	382	37			153	136
TSMK	Compartment - 36 sleeper	301	31			145	115
SV	Comfort 18 sleeper	32	-			19	13
TSMR	Restaurant cars	28	7			10	10
TSMB	Postal / Luggage	45	6			24	10
	Service	6	6				-
	Technical	15	15				-
ZAK	Others (prison vans)	6	6				-
	Total	815	108	39	344	351	284*

Dec 97

It has been difficult to reconcile passenger coach figures. Statistics Dept. give the following :

Total fleet	813
Out of order	316
Left in occupied territory	12
Other railway use	12
In operation (working fleet)	473
Spare and available	82
Timetable	391

No new coaches have been purchased since the formation of ADDY.

There is no programme for replacement of passenger coaches.

Tacis

This project is financed by the European Union's Tacis Programme, which provides grant finance for know-how to foster the development of market economies and democratic societies in the New Independent States and Mongolia.

The Passenger Depot gives a much higher figure for coaches overdue major overhaul (KR). They state that 60% of the fleet is overdue KR.

The condition of the coaches is not attractive, as all available funding has been used in safety related maintenance.

Type		Origin	Air Conditioning	Other details
TSMO	Open - 54 seat/36 sleeper	Russia	NO	Plats cart
TSMK	Compartment - 36 sleeper	Russia	NO	
TSMKr	Compartment - 36 sleeper	Germany	YES	
SV	Comfort 18 sleeper	Germany	YES	Ritz
TSMR	Restaurant cars	Germany	YES	
TSMB	Postal / Luggage	Russia	NO	
	Service			
	Technical			
ZAK	Others (prison vans)			

5.3.3 Freight Wagons

The age profile of the ADDY wagon fleet is as follows:

	Age	under 5	5-9	10-14	15-19	20-24	25-29	over 30
KR	Covered	6	380	1047	1241	1416	873	680
PL	Platforms	2	494	721	793	1053	695	601
PV	Open semi	10	992	1228	1241	1059	435	236
TS	Tank	-	370	655	692	799	700	1012
RF	Refrigerated	-	160	412	780	441	338	78
	Hopper	122	115	84	33	56	89	748
	Others	-	676	1082	891	602	290	648
	Total	140	3117	5229	5671	5426	3240	4017

Dec 1997

In addition there are 2.500 wagons in Nakhichevan.

The wagon fleet condition is as follows:

TYPE	TOTAL	Need repair	KR Overdue	DR overdue	Available for use	Daily requirement
Covered KR	5127	2617	543	3752	2510	572
Platforms PL	3892	2896	202	1860	996	485
Open semi PV	4634	780	421	4082	3854	610
Tank TS	3866	873	896	3328	2993	2333
Refrigerated RF	2105	188	118		1917	92
Others	3849	783	223	2170	3066	965
Total	23,440	8,173	2285	15,192	15,336	5,229

Statistics - Oct 98

This project is financed by the European Union's Tacis Programme, which provides grant finance for know-how to foster the development of market economies and democratic societies in the New Independent States and Mongolia.

Of the available 15,336 wagons, about 7500 are held in reserve, with 500 used for internal railway traffic, and 2000 for other railway needs, including 1230 for housing refugees and 523 refrigerated motor units.

The only area where there is a shortage of wagons is for oil tankers. 400 tankers have been hired from Ruski Mir, and hire of other tank wagons is being considered.

Maximum train weight of loaded wagons westwards is 2500 tonnes.

All freight wagons (except refrigerators) have one standard freight bogie, the CSRIK 3, and although basic, it requires a considerable amount of maintenance, particularly centre castings and bearings, All bogie side frames and cross bearers are scrapped after a life of 30 years. The year is cast into the frame.

Air distributors require overhaul every year. All freight wagons have been fitted with composition brake shoes for over 20 years. Life is 20/30 times greater than cast iron.

The refrigerator wagon fleet is consists of about 405 five car sets (4 cargo plus 1 generator / compressor. unit), as well as a number of single vehicles with 2 small diesel generators. ADDY count the generator units in the 5 car sets as part of the refrigerated wagon fleet.

5.4 Maintenance Facilities and Organisation

At the break-up of the FSU, all the facilities in the territory of what has become Azerbaijan, for locomotives, passenger coaches, and freight wagons, were basically running maintenance facilities only.

The only exception to this was the Baku Tank Wagon Repair Works, which was one of three works in the centralised soviet system for the overhaul of tank wagons from the entire network. The other two were Gyzlarbat in Turkmenistan, and Vladikavkaz in Russia.

As the overhaul of all other types of stock was carried out in what is now other countries, ADDY has had to either look for hard currency to have the work carried out abroad, or try to create facilities in house for major overhauls.

All passenger coaches and freight wagons moving outside Azerbaijan must comply with rigid CIS standards of overhaul and inspection. Locomotives, being confined to Azerbaijan do not, and ADDY can agree its own standards.

5.4.1 Locomotive Depots

Depots

There are six main locomotive running depots on ADDY, at which locomotives are maintained, as follows :

Location	Year of constr. / re-construction	Staff	Type of Repair		Condition
			Electric	Diesel	
Baku	1957	660	TR3	-	Reasonable
Balajari	1962	1475	TR2	TR2	Reasonable
Gyanja	1890/1980	984	TR2	TR2	Reasonable
Salyany	1941	104	-	TR1	Poor
Imishli	1950	366	TR2	TR3	Reasonable
Djulfa*	1940	393	TR1	TR1	

*Djulfa is in Nakhchevan and is currently isolated from the rest of the system (but part of Salyany division)

In addition there are sub-depots at which locomotives are based - a sub depot of Gyanja at Akstafa on the main line towards the Georgian border, and sub-depots of Balajari at Kasi-Magomed, where the lines to Astara and Imishili meet the main line, and at Shurabad, on the line to Yalama north of Sumgait. A sub-depot at Divichi on the same line near the Russian border was closed in July 1998. There is a sub-depot of Imishli at Mindshevan in the occupied territory.

It is intended to transfer the sub-depot at Akstafa closer to the Georgian border at Beyuk-Kyassik.
Cost is estimated at US $ 300 / 500,000

Locomotive Maintenance

Maintenance procedures of ADDY are as follows:

ELECTRIC LOCOMOTIVES

TO1	Inspection by driver (daily)	
TO2	Inspection and lubrication in depot (every 2 days)	
TO3	Depot check - elect brushes etc.	(VL22/23 VL8- every 11,000 km.) (VL11 - every 12.000 km.)
TR1	Depot repair - clean motors etc.	(VL22/23 VL8 - every 22,000 km.) (VL11 - every 25,000 km)
TR2	Depot repair -adjust contactors, dashpots, change brushes etc	(VL22/23 VL8 - every 165,000 km.) (VL11 - every 175,000 km.)
TR3	Depot repair - remove bogies	(VL22/23 VL8 every 330,000 km.) (VL11 - every 350,000 km.)
KR1	Major overhaul	(VL22/23 VL8 every 660,000 km). (VL11 every 700,000 km.)
KR2	Major rebuild	(VL22/23 VL8 every 2,000,000 km or 12 years). (VL11 every 2,100,000 km or 12 years).

DIESEL MAIN LINE LOCOMOTIVES

TO1	Inspection by driver (daily)	
TO2	Inspection and lubrication in depot (every 3 days)	
TO3	Depot check - elect brushes, engine etc	(2TE10 every 7,200 km. or 17 days) (TE3 every 7,500 km. or 18 days) (M62 every 8,000 km. or 18 days)
TR1	Depot repair - fuel injection, turbocharger, clean motors etc.	(2TE10 - every 29,000 km or 2.3 months). (TE3 every 30,000 km. or 2.5 months) (M62 every 40,000 km. or 3 months)
TR2	Depot repair -renew piston rings etc	(2TE10 every 115,000 km or 9.2 months). (TE3 every 120,000 km. or 10 months) (M62 every 120,000 km. or 9 months)
TR3	Depot repair - remove bogies	(2TE10 every 210,000 km or 18 months). (TE3 every 210,000 km. or 18 months) (M62 every 240,000 km. or 18 months)
KR1	Major overhaul	(2TE10 every 680,000 km or 4.5 years). (TE3 every 720,000 km. or 5 years) (M62 every 720,000 km. or 4.5 years)
KR2	Major rebuild	(2TE10 every 1,360,000 km or 9 years). (TE3 every 1,440,000 km. or 10 years) (M62 every 1,440,000 km. or 9 years)

SHUNTING LOCOMOTIVES
Both TEM1/2 and ChME3

TO1	Inspection by driver	(daily)
TO2	Inspection and lubrication in depot	(every 3 days)
TO3	Depot check - elect brushes, engine etc	(every 30 days)
TR1	Depot repair - fuel injection, turbocharger, clean motors etc	(every 7.5 months).
TR2	Depot repair - renew piston rings etc.	(every 15 months)
TR3	Depot repair - remove bogies,	(every 2 5 years).
KR1	Major overhaul	(every 7.5 years).
KR2	Major rebuild	(every 15 years).

ELECTRIC MULTIPLE UNITS
ER2

TO1	Inspection by driver	(daily)
TO2	Inspection and lubrication in depot	(every 3 days)
TO3	Depot check - elect brushes, etc	(every 5 days)
TR1	Depot repair - clean motors etc	(every 50 days).
TR2	Depot repair -	(every 150,000 km)
TR3	Depot repair - remove bogies	(every 300,000 km.).
KR1	Major overhaul	(every 600,000 or 4 years).
KR2	Major rebuild	(every 1,800,000 or 12 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.

This project is financed by the European Union's Tacis Programme, which provides grant finance for know-how to foster the development of market economies and democratic societies in the New Independent States and Mongolia.

Unlike some other CIS countries, ADDY have not eliminated the TR2 repair for budget reasons and reduced the TR3 repair interval from 220,000 km to 180,000 km. as they do not currently have the full facilities for the complete TR3 repair. A TR3 repair costs around US $ 37,000.

Although the maintenance intervals may be based on kilometres or time, invariably it is the time base which is used, as the locomotives average 50,000 km per annum. This leads to much more maintenance being carried out than is necessary.

Maintenance procedures are undertaken at the various depots as follows :

	E	D	ER	TO1	TO2	TO3	TR1	TR2	TR3	KR
Baku	*	-	*	*	*	*	*	*	*	-
Balajari	*	*	-	*	*	*	*	*	*	-
Gyanja	*	*	*	*	*	*	*	*		
Salyany	-	*	-	*	*	*	*			
Imishli	*	*	-	*	*	*	*	*	*	
Djulfa	*	*	-	*	*	*	*			

TR3 overhauls to all 2TE10 mainline locomotives are carried out at Imishili depot, which is in reasonably good condition and equipped with some lifting facilities. However a 30 t crane is required.

The main centre for the TR3 overhauls to all electric locomotives is Baku depot. The full facilities for TR3 overhaul at the depot are not available and this must be addressed. New shops have been constructed to provide facilities for major repair (KR) in Azerbaijan for electrical equipment on all locomotives, but no funds are available for the purchase of machinery.
The main centre for the overhaul of diesel shunting locomotives is Balajari depot, but again the full facilities are not available for the TR3 overhaul.

Major Overhauls

ADDY does not undertake any major overhauls KR1 (5 years) or KR2 (10 years) to locomotives themselves in Azerbaijan.

Locomotives are sent to Ukraine or Russia for major overhauls. A KR1 for a 2TE10 diesel is reported to cost $200,000 per loco section in Uzum, Ukraine., an electric VL8 section $200,000 in Yaroslavl, Russia, and a shunting TEM2 loco $170-200,000 in Astrakhan, Russia.
All repairs abroad must be paid in hard currency.

MAJOR OVERHAUL RECORD

	Electric	locos	Diesel	locos	Shunting	locos	Railcars	
	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual
1993	10	0	14	0	18	0	12	8
1994	10	0	10	0	18	0	0	0
1995	-	0	10	2	0	0	0	0
1996	-	0	10	0	0	0	6	6
1997	-	0	10	0	0	0	0	0
1998	10	0	10	0	0	0	0	0

The four 2TE10 locomotive sections sent for KR in 1996 are still in Ukraine, as the necessary payment of US $ 450,000 has not been made available.

Major Overhauls (KR) are well behind schedule, but locomotives are kept going by additional intermediate repairs.

This project is financed by the European Union's Tacis Programme, which provides grant finance for know-how to foster the development of market economies and democratic societies in the New Independent States and Mongolia.

Over 85% of the operational main line electric locomotives, and 45% of the entire main line diesel locomotives, are currently behind schedule for KR overhaul.

In addition there are 91 shunting locomotives currently overdue KR.

No funds have been allocated for this work, and any progress on major repairs (KR) depends entirely on ADDY being able to set up their own facilities in Baku Depot to carry out the main part of the work themselves.

5.4.2 Passenger Coach Depot

The maintenance of all passenger coaches on ADDY is carried out as an integral part of the Passenger Unit. All maintenance on passenger stock is carried out at a central depot in Baku, except for maintenance on electric commuter railcars which is carried out by the Locomotive Unit at Baku Locomotive Depot.

The Baku Passenger Coach Depot carries out the annual DR overhaul of all ADDY passenger coaches, and carries out TO2 and TO3 running maintenance examinations.

There is a separate location which prepares and makes up train sets for operation, and washes trains, at which the train conductors are based. From October 1998 this will become part of the Passenger Coach Depot.

TO1 examinations are carried out prior to the commencement of a journey and at turn round points.

Until last year, coaches were sent to plants in Ukraine or Uzbekistan for major overhauls (KR1 - 5 years) and capital repairs (KR2 - 20 years). There are no coaches abroad at present - last time was 1997 to Tashkent and Kharkhov . Costs were $ 35/40,000 in Tashkent for the Russian TSMO sleeping cars (plats cart), and $ 60,000 in Nepro for the German coaches.

Since August 1997, a programme of major (KR1) and capital (KR2) repairs has been started at the Baku Works. at a rate of 4 coaches per month. Most of the KR repair is carried out, but there is a shortage of equipment, particularly for electrical repairs. A KR repair can be carried out in Baku for $ 15,000.

A proposal has been drawn up to provide facilities which would enable the full KR repair to be undertaken. The existing shop would be lengthened to provide 4 additional bays, and additional ancillary shops would be built alongside.

According to the passenger depot, 60% of the 700 coaches available require major overhaul.

Passenger Coach Maintenance

Maintenance procedures of ADDY 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. ADDY must adhere to the agreed standards, as coaches travel over international

borders. Unlike the freight wagons, there are no special arrangements with Georgia permitting inter-working between the two countries outside the CIS agreement.

Maintenance is purely time based. There is no alternative of kilometre based maintenance.

5.4.3 Freight Wagon Depots

Depots

The ADDY freight wagon fleet is maintained by four depots, each depot being responsible for running maintenance of wagons in a section of the line, as well as on other lines in their area:-

Location	Year of construction/ improvement	Staff	Capacity/ year	Condition Type of work
Balajari	1934/1965	367	4500 DR	Poor condition - rehabilitate later. DR of tank wagons
Gyanja	1978	310	4500 DR	Satisfactory DR of covered wagons
Aliat	1982	1200	2400 DR	Satisfactory DR of refrigerated wagons
Kazi-Magomed	1968	296	1600 DR	Rehabilitation required DR of semi and hopper wagons

Each depot has facilities for Depot Repair (DR), and planned output for 1998 is 12,500, made up as follows :

Covered	Platforms	Open semi	Tank	Refrigerated	Others
3500 Gyanja Alyat	1700 Gyanja	2300 Gyanja	3300 Balajari	1500 Alyat	200

In addition there are operating depots at Shirvan, Imishili, and Djulfa for running maintenance only. Shirvan is a new depot (staff 222) and was built in 1996 to serve Sumgait Terminal. There is also a depot at Kishli (Baku) for container repair.

There is a main Tank Wagon workshop at Baku (see below), with no running maintenance responsibilities, for the Major overhaul (KR) of oil and gas tank wagons.
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.

No freight wagons have been sent to other countries for major overhaul (KR). Since 1992 there have been no major repairs (KR) to any freight wagons, except for tank wagons, until late 1997.

This project is financed by the European Union's Tacis Programme, which provides grant finance for know-how to foster the development of market economies and democratic societies in the New Independent States and Mongolia.

MAJOR OVERHAUL (KR) RECORD

		1993	1994	1995	1996	1997	1998*
KR	Covered	-	-	-	-		382
PL	Platforms	-	-	-	-	-	38
PV	Open semi	-	-	-	-	-	20
TS	Tank	280	223	361	457	374	500
RF	Refrigerated	-	-	-	-	-	60
	Others	-	-	-	-	-	-
	Total	280	223	361	457	374	1000

KR of covered, platform and open semi wagons has started at both Gyanja and Alyat, and KR of refrigerated wagons at Aliat.

Baku Tank Wagon Works

The Baku Tank Wagon Repair Workshop occupies an area of 3.4 ha. close to the centre of Baku. The works were built in 1891, and until 1919 was mainly engaged in manufacturing components for oil refineries. It was adapted in 1932 as a works for the capital repair of railway tank wagons, repair of wheel sets, and manufacture of wagon spare parts.

The works consists of three main areas:

- the main part of the works is the tank wagon repair shop. This consists of three transverse bays of masonry/brick columns and walls through which apertures have been made to allow wagons to be moved on tracks; additional bricks have been removed to allow larger wagons through. The roof consists of timber trusses with timber/iron cladding which is open in places and leaking badly. The exterior consists of 2 metre high block walls with glazing bars above. The floor is cracked and very uneven. The electrical system is in a dangerous condition. Heating and ventilation is almost non existent. The shop is divided by a central traverser to allow wagons to be positioned in the shop from a single track at the side. There are 10/12 positions for wagon repair, with jacks to lift the wagons so that the bogies can be removed. Many of the jacks are worn out. The rest of the floor space is taken up with the disassembly, repair and assembly of bogies. Wheel sets are taken to a separate wheel shop for wheel, axle and bearing examination and repair. The shop does not lead to efficient wagon repair, with deplorable and unsafe working conditions, restricted workspace around the wagons, and a structure and facilities which are life expired.

- blacksmith's shop: this is in fact a manufacturing facility consisting of 4 forges and hydraulic hammers (two defunct), a press shop for hot and cold stamping with a 250 tonne hot press, a 150t cold stamping press, and 4 100t press brakes, and a spring manufacturing and testing shop which also manufactures to order for other organisations in Azerbaijan. There is an associated machine shop on a separate site. The facility is the only source of many wagon components for Azerbaijan Railways. Between 200 - 300 different parts are manufactured and held in a store. The structure and conditions are similar to that of the Tank Wagon Shop, with a roof and cladding in poor condition, uneven floors, and services in a poor or non existent condition.

- wheel shop: wheelsets are removed from the bogies in the tank wagon shop, and sent to the wheel shop for axle crack detection, wheel turning or replacement, and bearing overhaul. in an adjoining bearing shop. In addition, wheelsets are overhauled for all other freight depots, and for locomotives.

There are associated steel-working. timber, painting, and tank testing shops.

This project is financed by the European Union's Tacis Programme, which provides grant finance for know-how to foster the development of market economies and democratic societies in the New Independent States and Mongolia.

There has been negligible investment in the works for at least the last 15 years. Most of the buildings are in poor condition, particularly the main wagon repair shop, with badly leaking roofs, missing glazing and cladding, and uneven floors. Heating boilers and air supply compressors are worn out. The electrical supply is in a dangerous condition. Throughout the works the services are outdated and in poor condition, and have generated complaints from outside inspection authorities.

A full report on the works is available in the CIE Project Identification Report for the EBRD dated June 1998.

Balajari Tank Wagon Washing Plant

The plant is designed to wash both interior and exterior washing of the tank wagons. It uses steam generated from a variety of sources and the effluent is treated before being recycled or, when no longer suitable for use, being discharged from the plant. All elements of the plant are old and requiring maintenance, if they are functioning at all.

Interior Wash Plant

The interior wash plant consists of three tracks holding fifteen wagons each, with two platforms each 175 m. long running alongside at tank top level for operator access.. Tanks are cleaned out with steam lances and residues then rinsed out with hot water. Heavy oils require a pre-spray of diesel oil to the interiors. Lighter oils require fumes to be extracted.

All waste oil / water is emptied onto a concrete area beneath the tracks contained by a bund wall. There are drainage channels at each side where the emulsified oil is collected and pumped to a mechanical separation plant where the oil is skimmed off for resale (1996 - 4000 tonnes, 1997 - 1500 tonnes, and 1000 tonnes to end may 1998). The sludge on the apron is collected periodically, together with processing sludge which is collected in a concrete lined pond, and taken to a designated dumping area.

Staff are required to go inside tanks both during depot repairs (DR) for inspection and major overhaul (KR) for possible repair. The Baku Wagon Works claims that 20% of the wagons are not properly cleaned and must be returned to Balajari. Balajari Maintenance Depot also have to return some wagons for further cleaning. This is due mainly to insufficient steam being available to clean each wagon..

The plant capacity, when fully functional, was reported as 455 wagons per 24 hours (summer) and 350 wagons per 24 hours (winter). Currently up to 90 - 100 wagons per day can be washed, of which 20 are for Balajari Depot. A rake of 15 wagons can be cleaned, with normal steam supply, in around 2.5-3 hours in winter, and 1.25-2.3 hours in summer, depending on product. Throughput in 1997 was 25,000 wagons, and forecast at 28,000 wagons in 1998.

Each wagon requires around 2 tonnes of steam per wagon for all operations - steaming, heating of recirculating hot water, and oil separation.

TRACECA forecasts show that up to 100,000 tank wagons will be required to be cleaned annually by 2000. The existing installed steam capacity of 384 tonnes / day could not meet this demand, as around 550 tonnes / day would be required. Two additional boilers of 10 tonnes / hour would meet this demand, giving a total installed capacity of 864 tonnes / day, and providing sufficient reserve when the plant is fully re-instated.

Water Treatment Plant

Prior to 1990, mechanical separation only of oil and water was considered sufficient. Following pressure from the State Ecological Committee of Azerbaijan in 1992, ADDY installed some chemical treatment equipment at the cleaning plant, as effluent from the plant was being discharged into Beyuk Shor Lake, and the discharge levels were much higher than permitted

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levels, understood to be 20 mg / litre. The chemical plant, supplied by Kary of Bremen, Germany, consists of four units in series for sedimentation, balancing, flotation, and regeneration, but is only capable of treating 120 m^3 of effluent in 24 hours, compared to the daily output of 500-600 m^3. The equipment was supplied as a barter deal in exchange for recovered oil from the plant.

In 1995, as part of the pollution reduction programme for the lake, the discharge was piped through a new water treatment plant at Hovsany. ADDY cannot meet the requirements for effluent discharges, which are currently being made illegally.

Oil concentration is 200-400 mg / litre after mechanical treatment, compared to 0.2 - 0.4 mg /litre after full chemical treatment. After partial chemical treatment concentration is 50-100 mg / litre. The chemical treatment also improves the operatives health and safety conditions, as most of the effluent is re-cycled, as well as for eventual discharge.

There are also the following disused plants, which do not operate any longer, among other reasons because of the non-availability of steam.

Bitumen Wagon Cleaning Plant

There is also an adjoining plant for the interior cleaning of liquid bitumen tanks. The plant has not been used since 1995 due to lack of steam, and worn our pumping equipment. When it was used, bitumen was heated and discharged into an adjacent pond within the site, about 8-10 metres deep. Wagons took 5 hours in summer and 2 days in winter to clean, and needed to be heated with steam coils. 305 wagons were cleaned in 1995.

One part of the pond is provided with heating elements so that when sufficient bitumen had accumulated, it could be heated and pumped into rail wagons and sold. It is reported that the pond currently contains about 2000 tonnes of bitumen.

Exterior Washing Plant

There was also a plant at Balajari for washing the outside of tank wagons before repair, one tank at a time, but this has not been operating for over thirty years due to slippage of the foundations, and it is now derelict. Until 1985 tank exteriors were washed at a plant at Baku Tank Wagon Works before repair, but this plant ceased to operate and no funds were available for reinstatement. Since then tank car exterior have not been cleaned except for some hand scraping at Baku Works before overhaul. For environmental reasons it is better that future exterior cleaning facilities are away from the Baku city centre area.

The current proposal is to re-instate the exterior washing plant on the original site at Balajari. The plant would be physically separate from the interior cleaning plant but share the same steam supply. As the cleaning mix contains caustic soda, separate effluent treatment will be required, and the tank cleaning must be under cover.

Hot water at 80 C was generated through heat exchangers from boiler steam, and applied at very high pressure to the wagon exteriors, together with a caustic solution.

Boilers

The five original 10 tonne per hour steam boilers which powered the above plants ceased operating in 1995, due to age and lack of spare parts. From that time until early 1998, the only source of steam was provided from an old (1954) steam locomotive, which can provide a maximum of 2 tonnes steam per hour. This considerably restricted the output of the plant, and reduced the quality of the cleaning.

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Two new boilers of 8 tonnes steam per hour capacity each at 10 bar, have been installed and are operating, but are not yet fully commissioned. There is a problem with the gas supply pipeline, but proposals are in hand for this to be replaced.

The boilers are used sparingly due to the cost of diesel fuel, and the old steam locomotive has been kept in use. Around 20 tonnes of steam per hour are required for full functioning of the interior cleaning plant alone in winter.

Diesel oil is reported to be 10 times more expensive than heavy fuel oil. (3.6 times the price, and 2.9 times the consumption).

It is planned that the plant would operate on diesel oil for at least one month per year. With the monthly consumption of diesel estimated at 320 tonnes, additional costs of US $ 40,000 per month are arising because the current boilers do not have the capacity to burn heavy fuel oil. This operational time on diesel is much greater at present due to the unreliability of the gas supply.

A full report on the washing plant is available in the CIE Project Identification Report for the EBRD dated June 1998.

Wagon Maintenance

Maintenance is carried out as follows:

TO	Inspection in traffic.
TR1	Unscheduled running repair.
TR2	Unscheduled running repair in Depot
DR	Depot Repair (every year-tanks and open top; 2 years others)
KR1	Major Overhaul every 8-12 years, depending on wagon type. (Refrigerators only - every 5 years)

The above is the new maintenance procedure adopted by the CIS Council of Railway Administration in Moscow. The interval for DR repairs has been extended from 12 to 14 months help to reduce costs.

ADDY must adhere to the agreed standards, but if wagons for internal traffic are segregated, they may be exceeded. In addition there is a bi-lateral agreement with Georgia which enables non CIS compliant wagons to operate in each other's territory.

Maintenance appears to be excessive, as it is based on elapsed time, with no provision for maintenance based either on condition or on kilometres covered.

There is a proposal by the CIS Commission of Wagon Service Specialists to further 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). This is still under consideration by the CIS Council, and is likely to be adopted by 2001.

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 frames and cross members 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. Input from several locations is incomplete. 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.

5.5 Rolling Stock Procurement/Refurbishment

5.5.1 Locomotives

Main Line Electric Locomotives

There is no requirement in the plan period to replace electric locomotives.

Even though the VL8 locomotives are beyond their book life, ADDY calculate with the provision of additional electrical overhaul equipment, the locomotives can be kept operational for another 10-15 years. (see below).

Provision should be made as far as practicable for the major overhaul (KR) of mainline electric locomotives to be carried out within Azerbaijan at Baku Depot. However it is critical that funds are made available for
the required machinery for this work, as well as provision of spare parts.

The only alternative is to send locomotives abroad for KR, which has been deferred up to now due to the much higher cost.

There are sufficient locomotives to meet the short term TRACECA Rolling Stock Maintenance Report fleet recommendation of 105 locomotives (210 units). This figure is in line with the consultants' proposed revised operating requirements for main line locomotives.

It is recommended that the fleet size, including operational and maintenance spares, should be as follows:

MAIN LINE ELECTRIC LOCOMOTIVES

YEAR	1	2	3	4	5
Passenger	40	40	40	40	40
Freight	42	42	41	40	38
Civil	14	14	14	14	14
Spare	20	20	20	20	20
TOTAL	116	116	115	114	112

Provision will have to be made within 10 years for the replacement of around 70 electric locomotives.

Main line Diesel Locomotives

There are sufficient modern diesel main line locomotives to meet the requirements of ADDY.

There is no justification for setting up the facilities in Azerbaijan for the major overhaul (KR) of main line diesel locomotives.

Provision will however have to be made for finance for reducing the backlog of major overhauls (KR) , which should continue to be carried out abroad. Around US $ 500,000 per annum. should be allowed.

Consideration should also be given in the longer term to the replacement of the existing fuel inefficient, high maintenance, and high polluting engines in the TE10 locomotives with the new Kolomna D49 engine with a modern control system.

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The experimental General Electric re-engining being carried out in Khazakstan on 2 TE10 locomotives should also be evaluated.

The introduction of world market technology could considerably reduce operating costs, both by the use of re-engining in existing locomotives, and by the purchase of new locomotives.

The consultants proposed revised operating requirements for main line locomotives are as follows:

MAIN LINE DIESEL LOCOMOTIVES

YEAR	1	2	3	4	5
Passenger	4	4	4	4	4
Freight	3	3	3	3	3
Civil	1	1	1	1	1
Spares	2	2	2	2	2
TOTAL	10	10	10	10	10

Shunting Locomotives

The age profile shows that no investment in new shunting locomotives is required within the next ten years.

The proposed revised operational requirements of the business units are as follows:

SHUNTING LOCOMOTIVES

YEAR	1	2	3	4	5
Passenger	not allocated	not allocated	not allocated	not allocated	not allocated
Freight	70	70	70	70	70
Civil	6	6	6	6	6
Spares	16	16	16	16	16
TOTAL	92	92	92	92	92

Facilities should be provided to undertake the KR1 overhaul of TEM2 shunting locomotives at Balajari Depot, with electrical components being sent to Baku depot. Initially the Chech ChME3 shunting locomotives should be overhauled abroad, but this should be reviewed in the future.

With the known unreliability of the ChME3 units the opportunity should be taken to re-introduce a programme of major overhauls.

Electric Multiple Units

The entire fleet of multiple units is approaching the end of its working life, and it is difficult to see how many of the vehicles can be kept serviceable for more than 8-10 years as a maximum.

The effective fleet is now 72 vehicles (motor units), with 48 rostered on a daily basis.

Unless steps are taken to obtain more modern second hand vehicles, it is likely that it will be necessary to reduce suburban services.

5.5.2 Passenger Coaches

There is a surplus of passenger coaches. The working fleet composition is shown below. Outdated surplus vehicles should be scrapped.

YEAR	1	2	3	4	5

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TSMO	Open - 54 seat/36 sleeper	122 (132[a])	117 (127)	113(123)	108 (118)	104 (114)
TSMK	Compartment - 36 sleeper	111 (115)	107 (110)	103 (106)	99 (102)	95 (98)
SV	Ritz 18 seats and sleeper	13 (5)	12 (5)	11 (5)	11 (5)	11 (5)
TSMR	Restaurant cars	10	10	10	10	10
TSMB	Postal/Luggage([b])	10	10	10	10	10
	Open - 81 sent	10(0)	10(0)	10(0)	10(0)	10(0)
	TOTAL	276 (272)	266 (262)	257 (254)	248 (245)	240 (237)

Service, Technical and Special Coaches not included

(a) Figures in parenthesis are following re-classification of rolling stock.
(b) Not required if postal/luggage service no longer exists (See Passenger Business Report)

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.

There is little likelihood of ADDY investing in new coaches in the immediate future.

It is recommended that coaches should have their passenger amenities upgraded by additional work on interior surfaces, floor coverings, fabrics and fittings during KR.
Materials will be required for this and around $30,000 per coach should be allowed.

The new Passenger Business Unit should give consideration to the conversion of sleeping coaches to seated coaches, which would increase capacity, particularly with average journeys ADDY around 300 km.

Consideration should be given to a joint agreement with Georgia, similar to the agreement for freight wagons, to enable joint operation of coaches outside the limits imposed by the CIS agreement.
Facilities should be provided to undertake the major overhaul (KR1) of all passenger coaches in Azerbaijan. The present rate of partial KR of 4 per month should be increased to 10.

5.5.3 Freight Wagons

The current size of the freight wagon fleet is far in excess of the current requirements and all anticipated growth of traffic.

It is recommended that the future fleet size should be as follows:

YEAR	1	2	3	4	5
Covered KR	601	637	643	643	638
Platforms PL	522	550	555	554	550
Open semi PV	658	692	698	697	693
Tank TS	2438	2485	2431	2353	2265
Refrigerated RF	99	104	105	105	104
Others	1040	1095	1105	1103	1096
TOTAL	5358	5563	5537	5435	5346

Surplus wagons should be scrapped. However there is little requirement within Azerbaijan for scrap steel at present, and the government has a ban on the export of steel.

Assuming a price to the seller between $ 25-30, ADDY would be able to raise between US $ 3-4 m. by the scrapping of 5000 surplus wagons.

The age profile of the wagon fleet is such that a replacement programme should be started. However the wagon condition is such that it is considered that there is no need to commence a replacement programme at present if the life of the wagons can be extended.

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The condition of the wagon bears more of a relationship to its use in service, which in recent years has been considerably less, than to its age.

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. Every effort should be made to have the regulations changed so that suitable wagons can be repaired and kept in service.

It is understood that, as long as all relevant examinations and safety checks have been carried out, informally, over-age wagons will be accepted by other CIS administrations

it is recommended that facilities should be provided to carry out the major overhaul (KR) of all freight wagons within Azerbaijan.

5.6 Staff Productivity Skills

5.6.1 Staff Levels

The considerable reduction in both the freight and passenger traffic since 1990 has not been reflected by a corresponding reduction in staff numbers, although some effort has been made to reduce numbers by natural means.

The age profile of the shop floor staff is high. The people are old, there are too many, and young people of any ability have left for better paid work.

Staff productivity is very low, and a considerable increase in productivity, as well as a considerable increase in wage levels, can only be achieved by a reduction in numbers.

It is recommended that in setting up Business Divisions with accountability, there will be considerable scope for staff reductions in the Rolling Stock Unit.

It should at least be possible to obtain staff reductions as follows, with no adverse effect on operations, based on an initial 3% the first year during reorganisation, then 7% then following year, and subsequently 8% reduction per annum along the following lines :

ROLLING STOCK MAINTENANCE STAFF

YEAR	1	2	3	4	5
Locomotive Department	1081	1016	945	879	817
Pass. and Fgt. Wagon Dept.	2281*	2144	1994	1854	1725
Allocated staff	15	14	13	12	10
TOTAL	3480	3147	2952	2745	2552

*This figure includes Technical Examination Unit staff, most of whom will have to be transferred to Freight.

It is assumed that all locomotive drivers, assistants and train crew are assigned to either the Freight or Passenger Business Units, but still undertake TO1 examinations and report back to the Rolling Stock Unit :

	Electric	Locos	Diesel	Locos	EMU	
	Drivers	Assistants	Drivers	Assistants	Drivers	Assistants
Baku	5	5	4	4	125	97
Baladjari	250	227	206	128	6	6

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Gyanja	201	114	100	49	11	12
Salyany	-	-	54	54	-	-
Imishli	42	39	73	42	-	-
Djulfa	23	30	56	42		
TOTAL	521	415	493	319	142	115

The drivers and assistant drivers have been removed from the above numbers. Other locomotive department staff such as shunters, fuellers etc to be transferred to the Business Units will have to be agreed.

The depot at Alyat employs 900 refrigerator train attendants who travel with the vehicles. It is assumed that they will be transferred to the Freight Business Unit, and they have also been taken out of the above figures.

In addition there are Wagon Technical Examination Units throughout the country, for shunting, examination etc. Their numbers are still included in the above Wagon Dept. staff, and the allocation must be agreed between the Rolling Stock Unit and the Freight Business Unit.

It is also assumed that staff will be allocated to the Rolling Stock Unit as follows:
ex Railway Department 15

5.6.2 Maintenance Procedures

The reorganisation of ADDY into business units should include a revision of maintenance procedures. The old system, where everything was decided centrally and detailed instructions sent, out meant that by sticking to "the plan" there was no taking of individual responsibility. Maintenance procedures were laid out at a time when the objective was to provide employment for everyone. Part of the introduction of Business Units should be educating management in accepting responsibility for change, and in the delegation of authority.

For example, there is too much inspection of vehicles in service. However there seem to be no easily available records of what is found, and it will be very difficult for anyone to accept responsibility to increase intervals because of the perceived reduction in safety. It is an identifiable area for staff reductions.

5.6.3 Training

The main training needs of the ADDY Rolling Stock Unit will not be technical, but in relation to modern management skills, and western accounting and costing systems, and the creation of a commercially driven work ethos.

Western costing systems should be introduced, where costs are based on actual time taken for jobs, instead of costs derived from predetermined FSU "norms" giving standard times.

Materials management and stores stockholding is an area where training could be of great benefit. The old system was producer driven and has for example created considerable quantities of used spare units lying around all depots, when what was required was a system of unit exchange with the producer. There is no central system of control of spare parts, and even within depots control and housekeeping of parts leaves a lot to be desired.

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. This may be an area where the EC could

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provide assistance in formulating better buyer / seller relationships by providing training in purchasing techniques.

Training in modern production control would also be required. Main control systems at present are based on hand written notebooks kept by individuals.

There would be considerable benefit in exposing ADDY staff to training with European railways for periods of, say, three to six months.

5.7 Improvement of Workshops

5.7.1 Locomotive Depots and Workshops

All major overhauls (KR) to electric main line locomotives and shunting locomotives, formerly carried out in other CIS countries, should be undertaken in Azerbaijan.

No provision should be made for the major overhauls (KR) of diesel main line locomotives which should to be sent abroad.

Baku Depot should be developed and re-designated as a Works for TR3 and KR, with the EMU running maintenance as a separate unit, and provide units to other depots on an exchange basis.

Baku Depot has the skilled staff capable of undertaking KR overhauls, and an investment should be made for machinery for the undertaking of electrical repairs.

The new Rolling Stock Business Unit should review the need for the present number of Locomotive Depots. It is unlikely however that without political settlement, and further electrification, that further reductions could be made.

Other locations outside Baku are required mainly for operational reasons. Running maintenance depots should be kept purely to suit operational requirements, with running maintenance transferred accordingly. This would retain depots at Balajari, Gyanja, Salyany, and Impishli, as bases for drivers, locomotives and running maintenance up to TR1, TR2. The latter two are required mainly because of the non-electrified sections of line. The Djulfa depot is currently isolated

The Rolling Stock Unit and the Freight and Passenger Business Units should review the need for outlying sub-depots, which should be transferred to the business units.. Any maintenance work above TO2 carried out at the sub-depots should be transferred to main depots or done by Rolling Stock Unit staff based at the depot The need to retain sub-depots should be determined by the Business Units.

Inspections (TO1 drivers daily inspection, TO2 three day inspection over pit, TO3 seventeen day or 12,000 km inspection and component check) and running maintenance (TR1 - 25,000 km servicing of electrical machines, brakes etc.) should all be carried out wherever the locomotive is relocated.

The Rolling Stock Unit should centralise the overhaul of components, with most maintenance being carried out by exchange of unit on the locomotive.

Centralised specialised units for component overhaul for the whole of ADDY should be set up in one depot, and exchange components supplied to other depots.

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New workshops have already been constructed at Baku Depot for the overhaul of electrical machines.

An investment should be made in the proposed machinery required, estimated at US $ 3.5m.

The main principle should be to have the capability for the complete assembly/disassembly of locomotives, with stocks held of re-conditioned components for unit exchange.

There is no need to have the capability to completely overhaul every part in house. Specialised repairs such as overhaul of generators,. would still need to be undertaken abroad.

The work should only be undertaken if a satisfactory stock of spare parts is held, and stock levels are kept high enough to avoid any interruption to the work flow. A stockholding of around US $ 3 m of components parts and materials will be required.

Facilities to be incorporated in the new shops for KR1 are as follows:

Traction motor removal
Bogie washing plant
Bogie overhaul
Disassembly of electrical machines
Electrical component repairs
Varnishing section
Assembly of electrical machines
Testing station
Armature repair section
Coil repair section

Hydraulic press for wheel-sets
Axle lathe
Vertical boring mill
Tyre shrinking equipment
Jigs and stands for engine overhaul
Jigs and stands for engine component overhaul
Machine tool replacement programme

Of the $ 10m annually required to be spent abroad for say 25 major overhauls (KR), but deferred (not including the current backlog), mark-ups of 100% are mentioned because of lack of competition. If ADDY could reduce the cost of major overhauls by $ 5m by being able to carry out the work themselves, the above expenditure could be easily justified.

Baku Locomotive Depot should be set up as a separate locomotive repair business unit within the Rolling Stock Business Unit, separately from the running maintenance of locomotives.

All TR3 overhauls of main line electric locomotives should be centred on the depot. Specialised units should be set up and exchange components supplied to all depots.

Balajari Locomotive Depot should be set up for the overhaul of diesel shunting locomotives, with electrical components sent to Baku, and abroad in the case of generators.

There is a proposal to upgrade Gyanja Depot costing US $ 2-3 m. Columns have been cast for an extension to the depot which was started in 1988, but deferred. This should be reviewed by the Rolling Stock Unit in the light of the centralisation of heavier repairs in Baku.

Generally depots are structurally in reasonable condition, but annually $0.2 m should be allowed for general maintenance, structural repairs, power and lighting improvements.

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5.7.2 Passenger Coach Depot

The passenger depot at Baku should be upgraded to give the full facilities for undertaking KR1 Major Repairs. Additional space may required by lengthening the existing shop, and widening it to provide additional subsidiary shops. There is sufficient space available to set up the additional facilities if required. The staff have the necessary skills.

Improvements are required in facilities for overhaul of electrical and electronic components.

The current number of 4 partial KR per month will have to be increased to 10 per month for a fleet of 500 coaches.

A feasibility study should be carried out on whether the planned extension should go ahead, or whether with the reduced fleet, the necessary equipment can be accommodated within the existing workshops

The proposed planned extension is estimated US $ 3 / 3.5 m.
Machinery is estimated at US $ 2 m.

Consideration should also be given in the upgrading to the provision of a separate paint shop

To ensure that the work is carried out efficiently, 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 $ 1.0 m will be required to be held at all times. Parts requirements should be forecast in detail 12 months in advance, and the forecast reviewed at 3 monthly intervals.

The present expenditure level of US $ 1 m. p. a. on parts is insufficient to bring the fleet up to a reasonable condition. This should be at least doubled.

Maintenance procedures for passenger coaches 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 coach condition at border crossings. However, the possible move to kilometre based passenger coach maintenance from time based maintenance should be perused.

5.7.3 Wagon Depots

All DR depot repairs should be concentrated on Gyanja, Aliat, and Balajari Depots. The need to retain the depot at Kazi-Magomed should be reviewed.

The other depots should be reduced to concentrate on the running aspects of wagons, with in service failures dealt with by unit exchange, including wheel-sets, and sent to the above depots for repair.

The specialised parts of the above depots for repairs of air brake components, wheel-sets and bearings, couplers and draft gear, should be set up as separate units. This is in line with the TRACECA Rolling Stock Report recommendation for component reconditioning to be carried out by 4th level independent units.

The major repair (KR) of all freight wagons should be concentrated at Baku, and the works expanded to provide the specialised facilities (see below)

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,

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the possible move to km. based wagon maintenance from time based maintenance should be perused.

In addition changes in the present centrally applied CIS rules are essential if major investment in new wagons by ADDY is to be deferred. The life assigned to both wagons and bogie frames is conservative and could be extended by 5-10 years. This should be perused.

The need to have wagons examined at frequent intervals should be reviewed. ADDY stop and examine wagons every 150 km, whereas European practice is to examine wagons only as the commencement of the journey.

5.7.4 Baku Wagon Works

At a late stage in this reporting process the Railway has decided to relocate wagon repairs to a new site. Further details are being sought.

Baku Wagon Works should be considered as a separate entity providing services under contract to the railways. Consideration should be given to converting it to a Joint Stock Company. This entity is dealt with in the Ancillary Business section.

5.7.5 Balajari Wagon Washing Plant

Technical specifications have been prepared for the refurbishment of Balajari Wagon Washing Plant and are bound separately.

5.7.6 Scrap Materials

There are considerable quantities of scrap materials lying around in all depots, amounting to several tens of thousands of tonnes. The sidings of all depots are filled with complete and partially dismantled vehicles which will clearly never operate again, including steam engines.

As well as this, depots have what is clearly scrap heaps, both in areas outside the shops, and in many instances actually within the shops. In addition, due to the abundant over supply of the former system, there are vast supplies of spare units lying around, such as traction motors, which are either beyond their economic life or in need of repair.

The problem apparently is that the State will not permit the export of scrap, and there is a negligible market for it within Azerbaijan.

It is essential, if the Rolling Stock Business is to make any semblance of efficiency, that if the problem of sale of scrap is not solved that the material is cut up and taken away to a storage site away from the depots. As well as making the use of depots more efficient, it will have a considerable effect on morale.

The Government should be lobbied to permit the sale of this scrap, which would provide a considerable source of income for the Business Units. Any units which are serviceable should be documented and considered for factory unit exchange before investing in new equipment.

5.7.7 Targets

In setting targets for the future it is important to be able to measure if progress is being made in the various areas of the business. Targets should be challenging but achievable and offer a great opportunity to staff to accomplish.

The following list of targets should be considered by the business unit. It is based from the time approval is given for the restructuring.

1. Introduce new organisation-within 3 months
2. Introduce Project Implementation Units-4 months
3. Prepare contacts for Freight and Passenger Business Units-12 months
4. Agree allocation of offices and maintenance facilities-6months
5. Introduce International Safety Rating System or equivalent –18 months
6. Achieve Level 4 of International Safety Rating System or equivalent within 5 years
7. Produce rolling 5 year Business Plan within 12 months
8. Plan for introduction of MIS including coding system-4 years
9. Improve locomotive availability to 85% within 5 years
10. Reduce cost of maintenance by 30% within 4 years
11. Improve locomotive reliability by 10% within 2 years
12. Introduce through working of locomotives –1 year
13. Dispose of surplus rolling stock 10% per year
14. Improve availability of freight wagons 10% per year
15. Improve availability of passenger coaches 10% per year.
16. Introduce World Class Manufacturing techniques within 3 years

5.8 Investment Plan

There are no proposals in the current EBRD plan for investment in rolling stock.

The only proposals for investment in depot facilities are Baku Wagon Works and Balajari Tank Washing Plant. The Balajari Tank Washing Plant details are included in the Draft Technical Specification.

However, the following should be considered for future investment :

At the time of the EBRD Project Identification Report, the potential investment in the Baku Locomotive Depot was not included. ADDY were understood to be in negotiation with both Mitsubishi and General Electric about financing the plant. This has not progressed, but ADDY urgently need the facility to keep their ageing fleet of electric locomotives in operation.

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6 ANCILLARIES

The main entity to be included in this ancillary business will be the Baku Wagon Works. Estimates had previously been made by the Railways of the annual output of overhauled wagons which would be required to maintain the oil traffic and other freight traffic and a scheme was drawn up for the remodelling of the Works to provide this output

The Baku Tank Wagon Repair Workshop occupies an area of 3.4 ha. close to the centre of Baku. The works were built in 1891, and until 1919 was mainly engaged in manufacturing components for oil refineries. It was adapted in 1932 as a works for the capital repair of railway tank wagons, repair of wheel sets, and manufacture of wagon spare parts.

The works consists of three main areas:

- the main part of the works is the tank wagon repair shop. This consists of three transverse bays of masonry/brick columns and walls through which apertures have been made to allow wagons to be moved on tracks; additional bricks have been removed to allow larger wagons through. The roof consists of timber trusses with timber/iron cladding which is open in places and leaking badly. The exterior consists of 2 metre high block walls with glazing bars above. The floor is cracked and very uneven. The electrical system is in a dangerous condition. Heating and ventilation is almost non existent. The shop is divided by a central traverser to allow wagons to be positioned in the shop from a single track at the side. There are 10/12 positions for wagon repair, with jacks to lift the wagons so that the bogies can be removed. Many of the jacks are worn out. The rest of the floor space is taken up with the disassembly, repair and assembly of bogies. Wheel sets are taken to a separate wheel shop for wheel, axle and bearing examination and repair. The shop does not lead to efficient wagon repair, with deplorable and unsafe working conditions, restricted workspace around the wagons, and a structure and facilities which are life expired.

- blacksmith's shop: this is in fact a manufacturing facility consisting of 4 forges and hydraulic hammers (two defunct), a press shop for hot and cold stamping with a 250 tonne hot press, a 150t cold stamping press, and 4 100t press brakes, and a spring manufacturing and testing shop which also manufactures to order for other organisations in Azerbaijan. There is an associated machine shop on a separate site. The facility is the only source of many wagon components for Azerbaijan Railways. Between 200 - 300 different parts are manufactured and held in a store. The structure and conditions are similar to that of the Tank Wagon Shop, with a roof and cladding in poor condition, uneven floors, and services in a poor or non existent condition.

- wheel shop: wheelsets are removed from the bogies in the tank wagon shop, and sent to the wheel shop for axle crack detection, wheel turning or replacement, and bearing overhaul. in an adjoining bearing shop. In addition, wheelsets are overhauled for all other freight depots, and for locomotives.

There are associated steel-working. timber, painting, and tank testing shops.

There has been negligible investment in the works for at least the last 15 years. Most of the buildings are in poor condition, particularly the main wagon repair shop, with badly leaking roofs, missing glazing and cladding, and uneven floors. Heating boilers and air supply compressors are worn out. The electrical supply is in a dangerous condition. Throughout the works the services are outdated and in poor condition, and have generated complaints from outside inspection authorities.

A full report on the works is available in the CIE Project Identification Report for the EBRD dated June 1998..

It has now been decided that the Works is to be re-located out of its present site in Baku city to the site of an existing factory. At the same time the rolling stock review has projected a lower estimate of wagon usage (see Section 8 above). In the circumstances the future of the Works must be reviewed, to identify the facility to be provided at the new site, the cost of providing this and the arrangements to be made for changeover of production between sites. All of these factors will influence the Business Plan for the Works. Accordingly the Business Plan for the Works cannot be drawn up at this time and has been omitted from this report.

Technical Specifications for the upgrading of the Baku Works have been prepared in detail but are now not relevant.

Tacis

Реструктуризация Грузинской железной дороги

Заключительный отчет, том 2 Комментарии экспертов

Февраль 1999 г.