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STAFF APPRAISAL REPORT

MOZAMBIQUE

BEIRA TRANSPORT CORRIDOR PROJECT

JULY 18, 1989

Southern Africa Department
Infrastructure Operations Division

CURRENCY EQUIVALENTS

Currency Unit	-	Metical (plural Meticais)
US$1	=	715 Meticais (Mts) 05/01/89
Mt 100	=	US$0.14

MEASURES AND EQUIVALENTS

1 Meter (m)	=	3.28 Feet
1 Square Meter (m.sq)	=	10.76 Square Feet
1 Hectare	=	2.47 Acres
1 Kilometer	=	0.62 Miles

ABBREVIATIONS AND ACRONYMS

AfDB	=	African Development Bank
BCA	=	Beira Corridor Authority
BTC	=	Beira Transport Corridor
CFM(C)	=	Caminhos de Ferro de Mocambique (Centro)
CFM(N)	=	Caminhos de Ferro de Mocambique (Norte)
CFM(S)	=	Caminhos de Ferro de Mocambique (Sul)
CFM,EE	=	Caminhos de Ferro de Mocambique, Empresa Estatal
CPMZ	=	Companhia Pipeline Mozambique-Zimbabwe
DANIDA	=	Danish International Development Authority
DNPCF	=	Direccao Nacional de Portos e Caminhos de Ferro
EDF	=	European Development Fund
EEC	=	European Economic Community
GDR	=	German Democratic Republic
MBA	=	Machipanda Beira Authority (Zimbabwe)
MIS	=	Management Information System
MT	=	Metric Ton (1,000 kg)
MTC	=	Ministry of Transport and Communications
NORAD	=	Norwegian Directorate for Development Aid
NRZ	=	National Railways of Zimbabwe
RENFE	=	Red Nacional de los Ferrocarriles Espanoles
RITES	=	Rail India Technical and Economic Services
RSA	=	Republic of South Africa
SADCC	=	Southern Africa Development Coordination Conference
SATCC	=	Southern Africa Transport and Communications Commission
SETEP	=	Secretariate of State for Technical and Vocational Training
UEM	=	University Eduardo Mondlane
U.K.ODA	=	United Kingdom Overseas Development Administration
USAID	=	United States Agency for International Development
WFP	=	World Food Program

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This report is based on the findings of an appraisal mission to Mozambique in October - November, 1988 consisting of World Bank staff Messrs D. Graham (Mission Leader), J. Rebelo, K. Kohriko and S. Nayak and consultants Messrs. Bonnin, Le Bussy, Gusmao, de Langen, Morra and Spit. Mrs. L. Iacono was responsible for report processing.

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BEIRA TRANSPORT CORRIDOR PROJECT

CREDIT AND PROJECT SUMMARY

Borrower:	People's Republic of Mozambique
Beneficiaries:	Ministry of Transport and Communications (MTC), National Directorate of Ports and Railways (DNPCF), Beira Corridor Authority (BCA), Central Railway System (CFM(C)), Southern Railway System (CFM(S)), Northern Railway System (CFM(N) and Secretariate of State for Technical and Vocational Training (SETEP).
Amount:	SDR 31 million (US$ 40.0 million equivalent).
Terms:	Standard IDA Terms with 40 years maturity.
Onlending Terms:	The credit will be on-lent to the Mozambique Ports and Railways Administration (DNPCF) for a period of 30 years including five years of grace, at an interest rate of 7.65%. DNPCF will bear the foreign exchange risk.
Project's Description:	The main objective of the Beira Transport Corridor Program is the rehabilitation and upgrading of the Beira Corridor to restore its cost efficient transit functions. The IDA assisted project would contribute to this objective through the provision of technical assistance, manpower development and training and motive power. IDA components will provide for (i) technical assistance to run port and railway operations during the 1989-1995 period; (ii) manpower development and training for all levels of staff in the port and railways; (iii) rehabilitation and acquisition of motive power for main line and shunting operations; and (iv) implementation of a railway/port cost accounting system and a management information system.
Benefits and Risks:	The main benefits are the reduction of transport costs and increased efficiency which will allow Beira to compete with Durban (RSA), providing Zimbabwe and Malawi with cheaper alternatives to the sea and Mozambique with foreign exchange earnings. The main risks are (i) delays in project implementation and consequent inability to provide acceptable levels of service may affect financial and economic viability; and (ii) the security issue: in spite of the presence of armed forces guarding the corridor, possible disruptions may occur.

Estimated Costs:

	Local	Foreign	Total
		US$ Million	
General Projects	3.7	22.1	25.8
Port Projects	6.4	187.4	193.8
Rail Projects	3.4	94.6	98.0
Road Projects	5.0	22.3	27.3
Total	18.5	326.4	344.9

Financing Plan:

	Local	Foreign	Total
		US$ Million	
Mozambique Government	4.3	-	4.3
Proposed IDA Credit		40.0	40.0
Parallel financing	-	29.5	29.5
Sub-total Project	4.3	69.5	73.8
Other Parallel financing of the Program	14.2	256.9	271.1
Total	18.5	326.4	344.9

Estimated Disbursements

	FY90	FY91	FY92	FY93	FY94	FY95	FY96
Annual	4.0	12.0	10.0	6.0	5.0	2.0	1.0
Cumulative	4.0	16.0	26.0	32.0	37.0	39.0	40.0

Economic Rate of Return: 14% for the whole Beira Corridor Program.

34% for the IDA assisted Project

AF6IN
July 1989

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BEIRA TRANSPORT CORRIDOR PROJECT

Documents Available on the Project File

Report and Documents on Beira Transport Corridor

1. Beira Port Transport System, 10-Year Development Plan, SATCC (Southern Africa Transport and Communication Commission, Maputo, January 1986).

2. Comments and suggestions on: Beira Port Transport System, 10-Year Development Plan, World Bank, March 7, 1986.

3. Port of Beira, Pre-Feasibility Study of Channel Improvements, Volumes 1, 2 and 3, Bertlin and Partners, June 1978.

4. Beira Port Study, Phase 3, Master Plan Study, Volumes 2, 3, and 4, NEDECO, 1982.

5. Beira Port Project, Tender Documents, Reconstruction of Quays 2-5, Volume 1-6, NEDECO, March 1985.

6. Zimbabwe National Transport Study, SWECO, 1985.

7. Beira-Machipanda Road, Feasibility Study Report, Gavan McDonel and Company with Snowy Mountains Engineering Corporation and COTOP, Mozambique, April 1985.

8. Rehabilitation Study Beira-Machipanda Line and Maputo-Chicualalcuala Line, Mott, Hay & Anderson International Ltd., June 1982/April 1983.

9. Study of Railway Rolling Stock in the SADCC countries, Kampsax, Swedrail, June 1984.

10. Mozambique, An Introductory Economic Survey, Annex II, Transport Sector, World Bank, June 6, 1985.

11. Southern Africa Regional Transportation Strategy Paper, Louis Berger International Inc., for USAID, March 15, 1985.

12. Southern Africa Regional Transportation Strategy Evaluation, Data Base Update, Louis Berger International, Inc., for USAID, May 1986.

13. Port Staff Training Program Study, SATCC, Norconsult, September 1986.

14. Reconstruction Quays 2-5, Beira, Economic and Financial Feasibility, Netherlands Economic Institute, October 1986.

15. SATCC Project #R-OP-1, Motive Power, Rolling Stock and Operations Plan for CFM Center, Draft Final Report, 2 volumes, SLI Consultants, October 1986.

16. Study on Railway Training Programs, DE Consult, October 1986.

17. Study of Locomotives for DNPCF, Mozambique. Rites, September 1988.

18. Organization and Manpower Development Plan, SOFRERAIL, Norma and BCEOM, February 1989.

19. Needs Study for a Management Information System, SOFRERAIL, Norma and BCEOM, February 1989.

20. Terms of Reference for the Senior Training Instructors, Guiseppe Morra, December 1988.

21. Beira Transport Corridor Program, World Bank, Report number 6698-MOZ, April 24, 1987.

22. Beira Port Transport System, Quarterly Progress Reports, 31 December, 1987 to 31 December, 1988.

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BEIRA TRANSPORT CORRIDOR PROJECT

I. SECTORAL AND SOUTHERN AFRICA REGIONAL CONTEXT

A. Introduction

1.01 The Economic Rehabilitation Program (ERP) implemented by the Government of Mozambique (GOM) since January, 1987 has initiated a major shift in economic policy and, in the two years since its introduction, has achieved considerable progress in the adjustment process and helped to revitalize the economy. Thus, after years of economic decline, GDP is estimated to have grown in real terms by 4.0% in 1987 and 4.1% in 1988 and a growth rate of 5.0% is forecast for 1989. In parallel with the ERP, there has been increased emphasis on rehabilitation of essential economic infrastructure, particularly in the transport and urban sectors, as a means of restoring economic growth and generating foreign exchange earnings. The Beira Transport Corridor Program, which is the subject of this report, is financed by 18 bilateral and multilateral donors and is the largest and most advanced of Mozambique's transport corridor rehabilitation projects.

B. Geographic Setting

1.02. Mozambique has three international ports: Maputo in the south, Beira in the center and Nacala in the north. Maputo has direct rail connections with the Republic of South Africa (RSA), Swaziland and Zimbabwe; Beira with Zimbabwe and Malawi; and Nacala with Malawi (see IBRD Map 20101 and paras 1.11-1.18). Indirectly, there are links with other landlocked countries: Zambia and Botswana.

1.03. As the map and Table 1.1 show, Mozambique's geography makes it eminently suitable as a transit country for the international trade of its neighbors. The rail and road distances to Mozambican ports are considerably shorter than those to alternative ports in RSA.

Table 1.1 - Southern Africa: Rail and Road Distances to Major Ports
(Kilometers)

	Harare	Lusaka	Blantyre	Francistown	Maseru	Lilongwe	Gaboro:
Capetown	2922	3135	3462	1980	1965	3806	1545
Port Elizabeth	2422	3234	2962	2000	830	3306	1565
Durban	2027	2839	2567	1605	666	2911	1170
East London	2362	2959	3174	1940	830	3246	1505
Richards Bay	1828	2640	2368	1855	844	2712	1420
Maputo	1193	2005	2545	1240	1175	2889	1675
Beira	605	2073	649	1308	-	993	1743
Nacala	1354	1888	814	2057	-	1158	-
Dar-es-Salaam	3513	2045	1800	3200	-	1635	3635
Lobito	3758	2290	3374	3445	-	3030	3880

1) Rail distances from Blantyre & Lilongwe to RSA ports are via road between Blantyre and Harare

2) Distances from Zimbabwe to Richards Bay and Durban assume use of rail route through Swaziland.

1.04 These differences in distances, in turn, are reflected in differences in inland transport costs, as illustrated below:

Inland Transport Costs to/from Harare, 1988
(Includes Railway and Port Charges)

	Via Beira (Z$)	Via Durban (Z$)	Difference (%)
Per container			
- import	1413	2191	+ 55
- export	1056	1989	+ 88
General cargo, per ton	53	140	+164

1.05 As a result of the comparative advantage in transit transport costs, in the past, Malawi, Zimbabwe, Swaziland and to a lesser extent Zambia and RSA (Transvaal), relied on Mozambique's port and railway system to handle their overseas trade flows.

C. Role of Transport Corridors in Mozambique's Economy

1.06 The transport sector is an important part of Mozambique's economy. It accounts for over 10% of the national social product and is potentially of vital importance as an earner of foreign exchange and a generator of employment. Prior to independence in 1975, the balance of payments had

consistently shown a considerable deficit on the merchandise account which was mainly financed by a surplus on the services account. Thus in 1973, two years before independence, the deficit on the merchandise account of the balance of payments was US$115 million while the corresponding surplus on the services account was US$122 million. The transport sector accounted for US$109 million or 90% of this surplus. On the other hand, for a more recent year, 1983, the situation was entirely different: the merchandise deficit was US$355 million while the services account (including transport) of the balance of payments showed a deficit of US$16 million. This primarily reflects the steep decline of international transport services (rail and port) provided by Mozambique over the past decade; a decline of some 70% to 80%. The transport sector can and should play a much more important role as a foreign exchange earner than it is playing at present.

D. Southern Africa Regional Context

1.07 Mozambique's neighbors too have a vital interest in Mozambique's transport system. They are very much interested in having the traditionally cheapest transport options to the sea restored. Moreover, this would simultaneously help to meet one of the primary objectives of the Southern Africa Development Coordination Conference (SADCC), the grouping of nine Southern African countries (Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe): reduction of the current dependency on RSA for their international transport needs.

1.08 Table 1.2 summarizes trade flows for each SADCC country through SADCC and RSA ports for 1987. As could be expected, all of Angola's import and export traffic moved via Angolan ports, while Mozambique and Tanzania also relied primarily on their own ports. Botswana and Lesotho, on the other hand, used South African ports exclusively, while Swaziland shipped almost half of its overseas traffic via South Africa. The BLS countries (Botswana, Lesotho, Swaziland) all participate in the Southern Africa Customs Union, which facilitates their use of South African ports and surface transport. From a distance perspective Botswana could, if all lines were in operation, make use either of Maputo or Durban ports, which are 1,030 and 1,170 km from Gaborone, respectively. Lesotho has no choice by virtue of its location but to use South African Transport System (SATS). However, for Swaziland, there is a clear distance advantage of using Maputo port over Durban, as the former is 275 km from Matsapa and the latter 540. Malawi shipped approximately three-fourths of its overseas goods via Durban but also made use of Beira, Dar es Salaam, and minimal use of Nacala port. For Malawi, the distance penalty of being forced to ship via Durban is significant, as most routes to Durban are in the order of 3,500 km in length versus 1,770 to Dar es Salaam, 640 to Beira, and 815 to Nacala. Zambia shipped most of its goods via Dar es Salaam. Zimbabwe made significant use of both Beira (mainly for petroleum products) and Durban ports, with a small amount of traffic via Maputo. It is clear that significant savings could be made, particularly by Malawi, Zimbabwe and Swaziland, through greater use of SADCC ports, particularly those in Mozambique.

DISTRIBUTION OF OVERSEAS TRADE THROUGH SADCC PORTS, 1987

(1000 Tonnes)

PORT / COUNTRY	DAR ES SALAAM	NACALA	BEIRA 1/	MAPUTO/ MATOLO	LOBITO 2/	TOTAL SADCC	RSA PORTS 4/
ANGOLA					273.6 3/	273.6	
BOTSWANA							133
LESOTHO							51
MALAWI	21.0	1.5	67.7			90.2	319
MOZAMBIQUE		134.5 3/	332.1 3/	841.4 3/		1308.0	
SWAZILAND				585.0		585.0	464
TANZANIA	1684.0 1/					1684.0	
ZAMBIA	1269.0 1/					1269.0	15
ZIMBABWE			1203.5	396.6		1600.1	925
SOUTH AFRICA				479.7		479.7	
OTHER	427.0 1/		89.3	0.4		516.7	
TOTAL:	3601.0	136.0	1692.6	2303.1	273.6	8006.3	

1/ Includes Petroleum Products
2/ 1986 Figures
3/ Excludes Cabotage
4/ Preliminary Base Year Estimates for Revised SATCC Forecast.

Source: SATCC

Table 1.2

E. Government Strategy

1.09 As shown in Table 1.3, since independence in 1975, the transit function of Mozambique has steadily declined, until recently, from a peak of 18.26 million tons handled by the system in 1973, of which 95% was transit traffic, to 4.25 million tons by 1986, of which 3.6 million were transit. The improvement observed in 1987 is the result of initial rehabilitation activities (see paras 2.03 - 2.16 below).

1.10 The principal reasons for the dramatic decline in Mozambique's transit function are:

(i) the departure of most Portuguese personnel at the time of independence and the lack of an adequate training program, leaving the transport system with a severe shortage of competent personnel to manage and operate the system;

(ii) the steady deterioration of port and rail physical facilities since the early 1970s because of lack of maintenance and rehabilitation;

(iii) the loss of much of the RSA (Transvaal) and Swaziland traffic since independence;

(iv) the closure by Mozambique of the border with Rhodesia [1] from 1976 to 1980, and;

(v) the activities of armed bandits, since 1980, in Mozambique.

1.11 As a result of the bandit activities, the rail connections between Malawi and the ports of Nacala and Beira as well as the rail link between Zimbabwe and Maputo are closed at present. The rail and pipeline connections between Zimbabwe and Beira are guarded by Mozambican and Zimbabwean troops and are open to traffic, although rail and port capacities are limited.

1.12 Given the importance of the transport corridors to Mozambique's economy, their rehabilitation has become a key element in the Government's strategy of structural adjustment, which seeks to revitalise the economy and reverse the economic decline of previous years. Thus, in parallel with the ERP launched in 1987, is a major program of investment in the rehabilitation of urban and transport infrastructure facilities as a means of rapidly restoring economic growth and generating foreign exchange earnings. Implementation of the strategy, with the help of bilateral and multilateral donors, has been quite successful. The following paragraphs describe the current status of the three corridors.

1/Zimbabwe since independence in 1980. Throughout this report, Rhodesia is used in reference to the period before independence.

Table 1.3

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Beira Transport Corridor Project

Rail Transport and Port Throughput - Freight, 1973 - 1987
(million)

A. Rail Transport
(million)

Year	South System (Maputo) # Ton	South System (Maputo) Ton Km	Central System (Beira) # Ton	Central System (Beira) Ton Km	North System (Nacala) # Ton	North System (Nacala) Ton Km	Total 3 Systems 1/ # Ton	Total 3 Systems 1/ Ton Km
1973	14.13	1828	5.93	1534	.53	202	20.70 (85%)	3644 (93%)
1975	9.94	1324	2.93	915	.47	167	13.41 (84%)	2414 (79%)
1979	6.85	542	1.52	459	.48	214	8.88 (77%)	1220 (68%)
1983	3.47	458	.48	131	.39	176	4.37 (77%)	767 (77%)
1984	3.17	375	.30	70	.21	90	3.68 (67%)	535 (71%)
1985	2.52	188	.31	90	.05	10	2.90 (84%)	2.90 (83%)
1986	2.54	194.4	.368	98.7	.03	7.7	2.95 (78%)	301 (87%)
1987	2.06	159.4	.482	135.3	.05	11.9	2.60 (72%)	307 (81.1%)

B. Port Throughput
(million ton)

	Maputo	Beira	Nacala	Total 2/
1973	14.17	2.98	.79	18.26 (95%)
1975	10.92	3.01	.75	14.88 (93%)
1979	8.22	1.72	.78	10.94 (89%)
1983	4.08	1.61	.63	6.56 (80%)
1984	3.07	1.39	.50	5.18 (76%)
1985	2.75	1.39	.20	4.54 (87%)
1986	2.48	1.33	.22	4.25 (85%)
1987	2.57	1.95	.30	5.08 (83%)

1/ Total also includes the minor volumes of freight moved by the Zambezia Railways; figures in parenthesis indicate percentage of international traffic.
2/ Total includes also the throughput of some minor ports; figures in parenthesis indicate percentage of international transit traffic.

Source: Ministry of Transport and Communications, 1987.

(a) The Nacala Corridor

1.13 The Nacala system, operated by CFM(Norte), consists of the port of Nacala and a single line track between Nacala and Malawi, through northern Mozambique. The system used to serve Malawi's foreign trade and Mozambican exports of tea, cotton and cashews from the provinces of Nampula and Niassa. For a period, between 1973 and 1976 after the Zambian-Rhodesian border closure, the line also carried some Zambian cargo. The 814 km line (from Blantyre) was closed in 1984 because of bandit activities, and despite current multi-donor assistance to rebuild the track and the port, which commenced in 1984, the line remains closed to Malawi's traffic. The port is being improved with donor support from Finland: container facilities are being provided and staff trained, while the rail link with Malawi is being improved with Canadian, Italian, French, Portuguese and EEC assistance. Subject to security considerations, the rehabilitation program is expected to be completed by 1991/2.

(b) Maputo Corridor

1.14 The Maputo port transport system, operated by CFM(Sul), is considered SADCC's premier alternative to South African routes for overseas trade. It serves southern Mozambique, Swaziland and southern and western parts of Zimbabwe, as well as the north-eastern Transvaal (RSA). There are three rail connections with Maputo port. The link between Zimbabwe and Maputo that follows the river border (known as the Limpopo line) is 534 kms long. Although the line is longer than the Beira Corridor, it has a higher capacity both up and down since it traverses flat, open terrain. Closed to commercial traffic since 1984, this line is currently being rehabilitated with assistance from the United Kingdom (U.K.), the EEC, Portugal and Canada with completion expected in 1990/1.

1.15 The Ressano Garcia line, 88 kms long in Mozambique, links Maputo with RSA. This route has been completely rehabilitated and currently carries over 1.5 million tons of cargo per year. Principal commodities include coal, sugar, citrus and steel from South Africa and Zimbabwe. In 1986, approximately 500,000 tons of Zimbabwe's external trade passed through Maputo. Zimbabwean traffic destined for Maputo currently passes via South Africa, transversing the border at Beitbridge and connecting with the Mozambican system at Ressano Garcia. The third rail link, the Goba line, connects Maputo port with Swaziland (68 km in Mozambique). The line is in poor condition and is frequently closed because of security problems. Nonetheless, the line carried approximately 500,000 tons of cargo in 1986. The Government of Italy has made a commitment to rehabilitate the entire length of the line inside the Mozambique border.

1.16 Maputo port is currently handling approximately 2.5 million tons of cargo from landlocked countries per year. The theoretical design capacity of the port is 14.0 million tons per year and it is capable of handling 7.0 million tons in its current condition.

(c) Beira Corridor

1.17 This corridor, operated by CFM(Centro), is made up of railways, roads and a pipeline that connect Zimbabwe and other interior countries with the port of Beira. The pipeline, connecting Beira with Mutare (just

inside the Zimbabwe border), currently pumps nearly a million tons of oil products annually to Zimbabwe, representing 100% of Zimbabwe's total oil import requirements. The National Railways of Zimbabwe (NRZ) and Mozambique Railways - Caminhos de Ferro de Mozambique (CFM) - have completed the upgrading of the rail line between Dondo (28 km from Beira) and Mutare, Zimbabwe. Theoretical capacity on the line is 2.0 million tons per year.

1.18 The Beira Corridor System saw a dramatic increase in the level of traffic in 1987 and 1988. About 40,000 tons per year of Malawi's sugar goes through Tete by road to be transhipped by rail from Harare to Beira. The use of the Beira port for Zambian copper increased in 1987 due to a major shift from the South African port of East London. Zambia now ships about 60% of its copper exports via Dar es Salaam and 40% (about 80,000 tons per annum) through Beira. In addition, as Beira corridor facilities improve, Zimbabwe is expected to divert much of its overseas trade to that port.

(d) CFM,EE

1.19 An important part of the Government's strategy is the transfer of the responsibility for the three main corridors from the Direccao Nacional de Portos e Caminhos de Ferro (DNPCF), which is a directorate of the Ministry of Transport and Communications (MTC - see Annex 8), to a new autonomous parastatal, Caminhos de Ferro de Mozambique, Empresa Estatal (CFM,EE). The draft statutes and operational guidelines, which are acceptable to IDA, were approved by the Council of Ministers on April 26, 1989, while the financial statements of the new entity are being finalised with the help of technical assistance provided by the Government of France. The intention is that the new entity should become financially viable as soon as possible and in any event not later than 1995, eliminating the need for Government subsidies. Agreement to this effect was obtained during negotiations (para 6.01).

F. IDA's Role

1.20 IDA assistance to Mozambique to date has focussed primarily on supporting the implementation of the country's ERP. In June 1985, a first IDA Credit of SDR 45.5 million (Rehabilitation Program - Credit 1610-MOZ) was approved to help meet Mozambique's priority needs in the industrial, transport and agricultural sectors. Performance under the Credit has been satisfactory, with about US$41.5 million disbursed by end-February, 1989. The Credit has provided the Ministry of Trade (MOT) with an improved procurement capability, and has allowed enterprises benefitting from the financing to produce more efficiently through provision of spare parts, raw materials, and technical assistance at the managerial level. The Governments of the Kingdom of Norway and Italy provided an additional US$22 million of co-financing with the Credit. A second IDA credit (Credit 1806-MOZ), of SDR 15.6 million to support the Energy Technical Assistance and Rehabilitation Project, designed to bring about quickly a substantial improvement in the supply and distribution of electricity and petroleum products to the main trade and processing areas, was approved by the Executive Directors in May, 1987. US$1.9 million of this Credit had been disbursed as of February 28, 1989. This was followed by a third IDA credit

(Credit 1841-MOZ) of SDR 54.5 million (Second Rehabilitation Project) approved in August, 1987, in conjunction with an Africa Facility Credit of SDR 14.5 million and a Swiss Special Joint Financing Grant of SWF 16.9 million. Disbursements totalled US$68.0 million as of February 28, 1989 out of a total of US$110.0 million (including cofinancing). An Education and Manpower Development Credit of SDR 11.7 million (Credit 1907-MOZ) was approved in May, 1988, an Urban Rehabilitation Credit of SDR 44 million (Credit 1949-MOZ) in August, 1988 and a Health and Nutrition Credit of SDR 21 million (Credit 1989-MOZ) in May 1989. As of February 28, 1989 US$1.51 million has been disbursed from Credit 1907 and US$1.85 million from Credit 1949.

1.21 IDA'S role in the transport sector has so far mainly been to help coordinate donors on the Beira Corridor Program, the largest of Mozambique's transport rehabilitation programs, through bringing together economically synergistic components and by doing the overall economic and financial analysis. Thus when, early in 1986, SADCC presented for consideration by donors a detailed, 10-year, US$660 million program, IDA suggested a phased program which would restore the transport capacity of the Corridor, largely through rehabilitation of facilities and technical assistance. At a donors meeting in Beira in April 1986, a revised program spanning a period of five years was presented for donors' review and was approved by Mozambique and SADCC with some adjustments. The approved program included rehabilitation of the infrastructure services (roads, water, sewerage, erosion control, etc) and housing for the city of Beira. To make the implementation of the program more manageable and to ease the housing shortage and improve urban services during construction activities of the corridor itself, IDA included assistance for rehabilitation of the cities of Beira and Maputo in the SDR 44 million IDA Credit for Urban Rehabilitation approved in August 1988 (Report No. 7279-MOZ, July 1, 1988). IDA worked closely with the European Development Fund (EDF) to draw up the terms of reference for a manpower development and training study for CFM(C) which was financed by the EEC and the recommendations of which are incorporated in the proposed project. The IDA Project Preparation Facility (PPF) has been used to fund a locomotive study for Mozambique and a management information system needs assessment for CFM(C), both of which have served as the basis for components in the proposed project. PPF funds are also being used to finance a technical assistance and training needs study for the whole of Mozambique's transport sector. IDA is currently undertaking a Transport Sector Review for Mozambique with the assistance of the U.K. Overseas Development Administration (ODA) and is also undertaking a study of the financial viability of all of the transport corridors in the SADCC region with funding from the Netherlands, USAID, Denmark and Canada.

II. THE BEIRA TRANSPORT CORRIDOR

A. Physical and Institutional Framework

2.01 The Beira Transport Corridor, located in central Mozambique (see Maps Nos. 20101 and 20102), consists of (i) Beira Port; (ii) the single track 315 km rail link from Beira to Machipanda on the Zimbabwe border, midway between Beira and Harare; (iii) a 282 km two-lane highway from Beira to Machipanda; and (iv) a 300 km oil pipeline from Beira to Mutare, just across the border in Zimbabwe.

2.02 CFM(C) is responsible for the operation and maintenance of Beira port and the central rail system which, in addition to the Beira-Machipanda link, includes the Sena line linking Beira with Malawi. The Sena line has been closed for a number of years because of the security situation and only the Beira-Machipanda line is operating regularly. The pipeline is a joint state-private enterprise, operated by CPMZ (Companhia Pipeline Mozambique Zimbabwe). The road falls under the responsibility of the Ministry of Construction and Water. International freight forwarding companies are well represented in the port and, to encourage private enterprise, agreement was reached at negotiations that BCA will submit proposals to IDA by December 31, 1990 for plans to expand private sector participation in port and railway related activities such as warehousing and container freight stations (para 6.01).

B. Beira Port

(a) Basic Facilities

2.03 The port is situated on the left bank of the Pungue River at latitude 19°.50 and longitude 34°.51 east. Map 3 (IBRD Map No. 21356) shows the layout of the port. The first section of the existing wharves was built immediately after World War I with major extensions undertaken after 1930. In 1969, a pipeline was constructed to link the port with Zimbabwe. Currently, facilities for the working of vessels and handling and storage area amount to 350,000 sq.m. and covered areas to approximately 59,000 sq.m., of which approximately 34,500 sq.m. are used for transit storage. Specialized facilities include a cold store with a capacity of 1,000 tons for fruits and 500 tons for frozen meat, a coal yard with a holding capacity of 150,000 sq.m. and a loading capacity at the wharf of 700 tons per hour, seven tallow tanks with a storage capacity of 2,630 tons and three molasses tanks with a total capacity of 26,000 tons. The handling rate for tallow and molasses is approximately 120 tons per hour. Depth alongside is 8 m at Berths 2-5 and 8-9 m at Berths 6-11.

2.04 During the past decade the condition of the port, particularly of the wharves and loading equipment, has deteriorated. This led to initiation of a rehabilitation of the port (financed by the Netherlands) in 1982 which included the paving of the operational area, upgrading of the coal loading facilities to a capacity of 1.2 million tons per annum (t.p.a.), new cargo handling equipment, improvement to communications, lighting and navigation systems and, since 1987, technical assistance in port operations and training. The rehabilitation program has also provided a paved storage of 21,000 sq.m. behind Berths 9 and 10 to serve as a temporary container terminal and enable the working of ro-ro vessels at the berths. Reconstruction of Berths 2-5 started in January 1988 under EEC financing.

(b) Navigation

2.05 The port is situated some 20 km from the open sea. The channel for shipping currently has an average depth of 6 m. below chart datum; however, there are some shallow spots due to siltation, with a depth of only 4.60m below chart datum. There are considerable variations in the frequency of high waters (over 6 m) and low waters (less than 1 m). Due to the tidal

range, at the channel depth of 6 m., vessels with a draft of 9.7 m, corresponding to a fully laden 20,000 dead weight ton (DWT) vessel, can transit the channel during 60% of the high water. The number of ship days of delay due to waiting for tide and for daylight were recorded at 200 in 1980.

(c) Organization and Management

2.06 The port is administered by CFM (C) which also has responsibility for the railway system from Beira to the borders with Zimbabwe and Malawi. An organization chart of CFM (C) is shown in Annex 8, Chart 3. CFM (C) is headed by a director-general. Reporting to him are the director in charge of port operations and maintenance and his counterpart for the railways. The port and the railways share planning, financial and marketing services with each having specialist operating and engineering services. Full time port employees total 2,519; with casuals (part time) numbering 3,317. A breakdown of the personnel establishment is given in Annex 2.

2.07 The port works three shifts, totalling 24 hours: 0700 to 1500 hours; 1500 to 2300 hours; 2300 to 0700 hours. The organization of labor for cargo handling operations generally follows conventionally accepted practice. A gang working at hatch consists of one foreman, one tally man, one winchman, one forklift driver and, depending on the nature of the cargo, nine (general cargo) to 17 (bagged cargo) stevedores of whom four are normally deployed at the wharf and the rest in the hold. At the shed/storage area receiving cargo is a complementary storage gang made up of one foreman and 9 to 17 men. Considering the type of cargo that is being handled at the port and the labor intensive nature of the operation, labor is not excessive.

(d) Traffic

2.08 Port throughput, after reaching a peak of 3.0 million tons in 1975, had been steadily declining (see Table 1.3) until recently due mainly to the loss of transit traffic to South African ports. The trough was reached in 1986 when the port handled 1.33 million tons of which 0.84 million were petroleum products (over 90% of which was for Zimbabwe). 1987 witnessed an increase of 47% to a total of 1.95 million tons of which 1.01 million were petroleum products. Total traffic increased by a further 13% in 1988 to 2.20 million tons. The total number of containers (TEU's) handled in 1987 were 10,072, up from 4,907 in 1986, an increase of 105%. Of the 10,072 containers handled in 1987, 6,989 were transit traffic (4,997 export and 1,992 import). Container traffic rose by a further 50% in 1988 to 15,279 containers. The port is, therefore, experiencing a traffic increase as a result of improved management and improved efficiency.

(e) Cargo Handling Equipment

2.09 Cargo handling equipment currently consists of 51 electric quay cranes, 74 fork lift trucks, 4 heavy duty (lifting capacity 22 tons) fork lift trucks, 9 shunting tractors, 10 mobile cranes, 10 tug masters and 30 trailers. Equipment availability in 1987 was:

Electric quay cranes	70%
Forklift trucks	59% - 87%
Heavy duty forklift trucks	61%
Shunting tractors	33%
Mobile cranes	40%
Tug masters	56%
Trailers	64%

Source: CFM(C)

(f) Port Operations

2.10 Annex 5 presents a summary of past performance of port operations and envisaged targets with improvements under the project. After a long decline, port operations have significantly improved in 1987-1988, partly due to the very effective technical assistance programs initiated by Port of Amsterdam Consultants (financed by Netherlands) and Plantrans (financed by Finland and Sweden) and partly due to better equipment availability. Handling rates for all categories of cargo increased, with container handling in particular reaching a peak loading/unloading rate of 250 tons equivalent per hour. This is the more important since container ships are amongst the most costly vessels and without these improvements in handling times shipowners might be reluctant to call at Beira. However, further improvements are needed in the handling of non-containerized cargo, where progress has been limited due to the systematic procedure of direct unloading: trains are loaded alongside ships, with ships spending much of their time in port waiting for wagons. The situation has been exacerbated by the shortage of shunters, the lack of coordination of shunting operations, the limited use of pallets for bagged commodities and the lack of bulk unloading/loading facilities for commodities such as corn, sugar fertilizers, etc. These constraints are being addressed under the project, together with provision of spares to improve availability of handling equipment and training for port employees, and are expected to result in improvements in handling rates as summarised in Annex 5.

(g) Transit Facilitation

2.11 The transit of goods to Zimbabwe via the Beira Corridor is not affected by customs delays. Customs clearance is unusually fast at Beira for international transit goods. Facilitation documents were simplified in 1986, and a new unified document (Combined Port and Customs release document) has come into use. This document, filed in 7 copies, is used for Customs, the port and the railways. Shipping agencies must attach to it the bill of lading and manifest, and, in case of breakbulk cargo, invoices to assess the value of goods. Customs clearance time for import transit goods are generally several hours to one day, and rarely exceed two days. For export transit goods, the necessary documents include the bill of lading and shipping instructions, and in case of breakbulk, the bill of

entry, stamped by the Government of Zimbabwe, to assess the value of the goods. Customs clearance is in no way a bottleneck at the present time, as it is on other links to landlocked countries in Africa.

2.12 A specific and important example of Mozambique/Zimbabwe coordination is the joint preparation by the Mozambican Beira Corridor Authority (BCA) and the Zimbabwean Machipanda Beira Authority (MBA) of a transit agreement to expedite operations, prevent problems, and in case of disagreements, provide for mutually acceptable arbitration. A draft agreement is currently under discussion between the two governments. It is a dated covenant that the agreement be finalized, by June 1990 (para 6.01).

C. Beira-Machipanda Railway

(a) Basic Facilities

2.13 The 315 km Beira-Machipanda line is single track with 38 passing loops. After the section Beira-Inhamitanda (see Map 2), the route rises till Gondola (Mozambique) with steep gradients and sharp curves. From Gondola to Almada the line goes through rather level terrain but from Almada to the Zimbabwe border the line once again has sharp curves and steep gradients. From the border to Dondo, the track has been reconditioned by the National Railways of Zimbabwe (NRZ) over the last two years, including the replacement of defective sleepers with steel sleepers, the replacement of old 30 kg/m rail by 18 m lengths of fished 40 kg/m rail and rebalasting.

(b) Motive Power

2.14 CFM(C) has 7 mainline diesel locomotives on the Beira-Machipanda line, of which 3 were operational in December 1988, 4 being out of service due to accidents and attacks by armed bandits. A further 13 mainline diesels have been inaccessable at Inhaminga on the Sena line since 1983 due to bandit activity. These locomotives are considered to be beyond economic repair. CFM(C) also has 12 garratt steam locomotives which are mainly used for domestic traffic, but occasionally haul international freight trains. At present, much of the motive power on CFM(C) is leased from Zimbabwe Railways (1800 loco-days per year at a cost of Z$4,682 per day or about US$2,500 equivalent). Shunting operations in Beira port are handled by only one steam shunter, which is clearly insufficient.

(c) Rolling Stock

2.15 The CFM(C) freight fleet totals 3,237 wagons of which 2,424 are currently operational (See Table 2.1 below). Most international traffic is carried in NRZ wagons for which CFM(C) pays a substantial rental. DANIDA will finance a component of the program for the repair and rehabilitation of wagons, which was appraised in September, 1988 and is expected to begin in 1989 and last for approximately three years.

Table 2.1 - CFM(C): Locomotives and Rolling Stock

Main Line Locomotives	Total	Operational in 1988	Availability
Diesel	7	3	60%
steam	12	12	50%
Total:	19	15	
Wagons/Type			
Tank	149	90	60%
Covered	662	542	82%
High Sided	1486	976	65%
Low Sided	888	776	87%
Flat	52	40	77%
Total:	3237	2424	75%

Source: CFM(C)

(d) Workshop

2.16 CFM(C) has a steam locomotive workshop in Beira but virtually no spares and materials. Part of this workshop was converted under a component financed by USAID and is to be equipped and stocked to undertake diesel repairs as part of a USAID Regional Rail Systems Support Project. This project, which is to start in 1989, will provide a total of US$34.5 million in grant aid to Mozambique, mainly to CFM(S). In Beira, US$1.7 million of tools and equipment would be provided for the workshop.

(e) Staffing

2.17 CFM(C) currently employs 3,000 railway staff on the Machipanda-Beira line out of a total railway staff (including Sena line) of some 5,300. Given the low traffic volume currently being handled this reflects some overstaffing, but recent studies by CFM(C) indicate that, with the expected increases in traffic in the near future, there will be no overstaffing.

(f) Traffic

2.18 In 1987 CFM(C) handled 481,500 tons of freight of which 397,000 tons were transit traffic on the Beira-Machipanda line. This is only 10% of what it handled a decade earlier, but compares with 368,100 tonnes in 1986 of which 286,100 were transit traffic, an increase in transit traffic of 39% from 1986 to 1987. Preliminary results for 1988, however, show no further growth over 1987, largely due to shortage of locomotive power.

D. Beira-Machipanda Road

2.19 The 282 km road is to be rehabilitated with financing from the African Development Bank (AfDB), the EEC, Sweden and Japan. At present, traffic on the road is very light partly because of its poor condition caused by lack of maintenance over the last decade and inadequate original design of certain sections. When rehabilitated, it will have a carrying capacity of about one million tons annually.

E. Pipeline Beira-Mutare

2.20 This pipeline carries finished products from the port to Zimbabwe and transports 100% of Zimbabwe's imported liquid fuel. In 1987 it carried some 930,000 tons, up from 772,700 in 1986 (preliminary estimate for 1988, 920,000 tons). The pipeline is in good condition and has a capacity of upward of 1 million tons, enough to cater to Zimbabwe's needs for the foreseeable future.

F. Training

2.21 Since the mid-1970s, CFM(C) has suffered from an acute shortage of skilled labor and, most importantly, a lack of qualified and experienced technical supervisory and management staff. This problem is further compounded by the country's low levels of education and literacy. Currently, DNPCF is responsible at the national level for the planning, implementation, supervision, coordination, and evaluation of all CFM training activities. DNPCF carries out this responsibility with the assistance of consultants through the National Railway Training School in Inhambane and three Regional Training Centers (CFM(S) Maputo, CFM(C) Beira and CFM(N) Nacala/Nampula. Although considerable training activities have been carried out by the Inhambane School and the Regional Centers since the early 1980s, the overall results have been somewhat limited due to a variety of problems including (i) weak training capacity at national and regional levels; (ii) lack of a sound national training program which would clearly delineate DNPCF's and regional centers' responsibilities and resources (financial, human, and physical) required to carry out these responsibilities; (iii) low levels of education and literacy of most trainees; (iv) the odd location of the Inhambane School; [2] (v) shortages of (a) effective training courses; (b) relevant training equipment and materials; (c) adequate physical training facilities; (d) experienced instructors with good knowledge of the language(s) spoken by trainees; (vi) shortages of trainees because of lack of incentives and other organizational constraints; and most importantly, (vii) a weak personnel management system which does not provide the right kind of motivation through competitive salaries and career development opportunities.

2.22 In collaboration with technical assistance provided by donor countries and EEC, DNPCF has been taking remedial actions to strengthen and expand CFM training capacity at both national and regional levels.

2/Inhambane is hundreds of kilometers from any of the main railway systems, with which it has very poor communications. This makes it difficult to attract candidates to the school.

Consultants financed by EEC have completed on behalf of BCA a comprehensive organization and manpower development plan for CFM(C). The plan identifies training needs and the resources required to prepare and implement training programs for port and railways personnel. Based on the consultants' recommendations and data collected during appraisal, the project includes funds for the preparation and implementation of two parallel four-year programs for the training, retraining, and upgrading of some 4,500 port and railways personnel.

Technical Education and Vocational Training

2.23 The responsibility for developing policies and programs of technical vocational education and training rests with the Secretary of State for Technical and Vocational Training (SETEP). Up to the late seventies, over two-thirds of the population was illiterate. Considerable progress has been made since then in school enrollment and adult literacy schemes. However, the country's educational and literacy levels are still low. It is now estimated that only about 5% of the school age population attend secondary school.

2.24 The University Eduardo Mondlane (UEM) in Maputo offers only five major basic programs, including engineering. The UEM was negatively affected by post-independence events which caused a sharp decline in enrollment until 1978. Although enrollment increased in subsequent years, recent statistics indicate that only a few hundred students graduate per year, and less than forty from the faculty of engineering. Of the several institutions responsible for technical/professional training, four in Beira run by SETEP are expected to make a useful contribution to certain aspects of CFM(C)'s training programs, with assistance to be provided under the project (see Annex 2).

III. THE PROJECT

A. Program Objectives

3.01 The primary objective of the program is the rehabilitation and upgrading of the Beira Corridor in order to restore its cost efficient transit functions which are vital to Malawi and Zimbabwe and constitute an important source of foreign exchange and employment for Mozambique. The secondary objectives of the program are as follows:

(i) to help the Government achieve its objective of providing cheap transport for the agricultural, productive areas along the Beira Corridor; and

(ii) to facilitate capacity building by developing skilled, semi-skilled and managerial local staff to gradually replace the technical assistance program, and introduce effective financial management, particularly in the CFM(C).

B. The Beira Corridor Authority

3.02 In December 1985, the Government of Mozambique (GOM) established the Beira Corridor Authority (BCA) and appointed the Deputy National Director of Ports and Railways to be the BCA Director. The objective of BCA is to "direct, plan, coordinate, mobilize and supervise the entire process leading to implementation of the rehabilitation of the Corridor's system of transportation and communications, including projects of a complementary nature, specifically those for infrastructure for the city of Beira" (Bulletin of the Republic, Resolution Establishing Beira Corridor Authority, Series 1, Number 1, January 1, 1986). To strengthen BCA, Sweden, Denmark, Norway and Finland, in 1986 provided BCA with an advisory team, stationed in Europe and available on a part time basis. In 1987 this team, with some overlap, was replaced by a 9-man, full time team of which eight are presently stationed in Beira. This team, also financed by the Nordic counties, has considerably strengthened the capacity of the BCA to coordinate and speed up implementation and freed the BCA Executive Director to focus on the strategic aspects of the Beira Corridor System and the liaison with Mozambique's partner countries in SADCC as well as the donor community providing financing for the rehabilitation. Donor coordination meetings are held on an "ad hoc" basis as necessary. The performance of BCA has been fully satisfactory.

C. The Beira Transport Corridor Program

3.03 BCA is undertaking the first phase of a 10-year development program, with an estimated cost of around US$345 million and with funding largely lined up from 18 bilateral and multilateral agencies (see Tables 3.1 and 3.2). The program consists of rehabilitation and upgrading of the port, rail, and road facilities and provision of technical assistance and training. The overall Beira Transport Corridor program includes four categories of sub-projects: railway, port, road and general sub-projects, the last being mainly for the upgrading of the city of Beira, where present infrastructure and services are seriously deteriorated (the bulk of these are being addressed under the IDA-assisted Urban Rehabilitation Project, Cr.19490-MOZ). The criteria on which investments are planned give priority to rehabilitation of existing infrastructure and manpower development (see Annex 9). A summary description of each category of sub-projects is given below (cost estimates shown include contingencies).

3.04 The main port sub-projects are:

(a) Dredging the entrance channel to deepen it from the current depth of 6 meters to 8 meters. This will enable larger vessels of PANAMAX size, third generation ro-ro vessels and up to 60,000 DWT product tankers to use the port and will result in considerable cost savings. The contract for this component has been awarded and work started in February, 1989 and will be completed by the end of 1990 (cost US$18.9 million, financed by The Netherlands); thereafter, maintenance dredging will be necessary to maintain the depth of the channel. Equipment for maintenance dredging is proposed for EEC financing (cost US$12 million);

(b) Multipurpose and container handling terminal, with a capacity of up to 100,000 containers p.a. year including reconstruction of berths 2-5 and new buildings. The quay foundations of berths 2-5 (645 meters) had deteriorated to such an extent during their 60 year life that the structure might have collapsed at any time; reconstruction was therefore necessary and started in June, 1988 (cost US$67.5 million financed by EEC 48.0 million ECU, Netherlands 4.7 million Guilders and FINNIDA US$4.3 million);

(c) New oil terminal to make it possible to handle oil product tankers of a size up to 60,000 DWT, as against the existing 20,000 DWT limitation and thus reduce the cost of shipping oil products. The final design is underway with call for tenders expected in March 1989 (cost US$13.9 million, financed by NORAD);

(d) Reconstruction of the port railways. Beira port was designed as a railway port, with cargo being loaded and unloaded directly to and from rail wagons. With the development of multi-purpose and container terminals and the handling of ro-ro and container vessels, direct loading and unloading of rail wagons at berths becomes inefficient. Hence the port rail network needs to be redesigned. Detailed design has started, implementation expected to start in 1989 (cost US$13.1 million financed by Italy);

(e) Equipment for multi-purpose and container handling terminal. The first phase of rehabilitating existing equipment (cranes) is completed. The second phase of providing 4 forklift trucks (two 42 tonnes and two 28 tonnes) plus four new tugmasters is also complete. This enables the port to handle 40 ft. containers, an important step in its ability to compete with RSA ports. A third phase includes new ship to shore cranes (out to tender) to be implemented in 1989/90 (cost US$18.2 million financed by AfDB) and other equipment and technical assistance to be financed by FINNIDA/SIDA (US$24 million) and the Netherlands (US$6 million);

(f) Tug and pilot boats - procurement of two harbour tugs, two pilot boats and two work and line boats to provide the port with modern service vessels and so reduce the turnaround time of vessels in port. The pilot boats are in service and the other boats are to be delivered in 1989; (cost US$10.6 million financed by DANIDA); and

(g) Technical Assistance to Manage the Port, currently being undertaken by Dutch and Finnish/Swedish experts, needs supplementing with a training component, proposed for IDA financing (cost US$5.9 million financed by Netherlands, Finland and Sweden, additional TA and training are included in the IDA component and described in paras 3.10 to 3.17).

3.05 The main rail sub-projects are:

(a) Rehabilitation of the Beira-Machipanda line. This work which consists of resleepering and rebalasting, has been completed, except for a 25 km stretch between Dondo and Beira (cost US$9 million, implemented by NRZ and financed by NORAD, SIDA, Austria, Canada and USAID);

(b) Track maintenance equipment - tender documents being prepared (cost US$3.5 million financed by Austria);

(c) New radio telecommunications and train control systems are intended to improve communications and train control to increase efficiency and line utilization (cost US$8.4 million, financed by Italy);

(d) Acquisition of locomotives to replace leased Zimbabwean locomotives and provide additional capacity to cope with increased traffic and shunting (see paras 3.18-3.25 for details). IDA financing is proposed for the shunting component, while bilateral financing from Canada and untied financing from Japan are proposed for the main-line diesel locomotives.

(e) Manpower development and training. Technical assistance in line positions to reinforce CFM(C) with respect to general management, supervisors and key personnel in technical departments and to establish training programs for Mozambican personnel. Programs are already in place for the port funded by the Netherlands, Finland and Sweden and a recently completed organization and manpower development study financed by the EEC has determined the remaining needs for the port and for the railway which are proposed for financing by Spain and IDA (see paras 3.10 - 3.17 for details).

3.06 Road sub-projects include mainly the upgrading of the road between Beira and Machipanda (US$27.0 million, EEC, Sweden, AfDB).

3.07 General sub-Projects, apart from the rehabilitation of the infrastructure and services and housing provision for the city of Beira, include the development of a cost-based tariff system (US1.3 million) and a management information system (US$1.0 million) both of which are proposed for IDA financing (see para 3.26 for details).

D. Overall Program Cost and Financing

3.08 Overall program cost and financing are shown in Tables 3.1 and 3.2.

MOZAMBIQUE

Beira Transport Corridor Project

TABLE 3.1 PROGRAM COST ESTIMATES

COMPONENT	(US$ Million) LOCAL	FOREIGN	TOTAL
A. PORT SUB-PROJECTS			
(I) Channel dredging	0.34	25.00	25.34
(ii) Multipurpose and container terminal	3.50	61.00	64.50
(iii) Oil terminal	0.22	11.60	11.82
(iv) Port railways	0.13	11.00	11.13
(v) Handling equipment	0.00	20.02	20.02
(vi) Tug and pilot boats	0.00	10.60	10.60
(vii) Technical assistance and training	1.00	17.64	18.64
(vii) Other	0.50	9.19	9.69
SUB- TOTAL	5.69	166.05	171.74
B. RAIL SUB-PROJECTS			
(1) Beira-Machipanda line rehabilitation	0.50	8.50	9.00
(ii) Track maintenance equpment	0.00	2.80	2.80
(iii) Radio telecoms/train control systems	0.00	8.96	8.96
(iv) Rehab/aquisition of new locos	0.50	33.60	34.10
(v) Management and training	1.00	18.60	19.60
(vi) Other	1.13	8.63	9.76
SUB- TOTAL	3.13	81.09	84.22
C. ROAD SUB-PROJECTS			
(I) Beira-Machipanda road upgrading	4.43	18.93	23.36
D. GENERAL SUB-PROJECTS			
(I) M.I.S. and costing systems	0.00	2.20	2.20
(ii) Housing for TA and emergency power	3.02	12.08	15.10
(iii) Other	0.24	7.22	7.46
SUB- TOTAL	3.26	21.50	24.76
TOTAL BASE COST	16.51	287.57	304.08
Physical contingencies	1.13	23.48	24.61
Price contingencies	0.91	15.32	16.23
TOTAL COST	18.55	326.37	344.92

Table 3.2 - Financing Plan
US$ Million

Source of Finance	General	Port	Rail	Road	Total
EEC	1.0	67.1	-	5.1	73.2
NORAD	2.4	13.9	1.0	-	17.3
SIDA	12.4	8.2	1.1	3.5	25.2
FINNIDA	4.2	16.1	-	-	20.3
DANIDA	2.6	16.5	4.1	-	23.2
FEDERAL REPUB GERMANY	-	-	1.8	-	1.8
THE NETH ERLAN DS	1.4	24.8	0.2	-	26.4
BELGIUM	-	2.3	-	-	2.3
ITALY	-	13.1	8.5	1.2	22.8
U.K.	-	-	1.8	-	1.8
AUSTRIA	-	-	4.8	-	4.8
SPAIN	-	-	5.0	-	5.0
AfDB	-	19.8	-	17.5	37.3
JAPAN	-	-	8.0	-	8.0
USAID	-	-	10.0	-	10.0
CANADA	-	-	21.7	-	21.7
IDA	1.8	12.0	25.2	-	39.0
GOM	-	-	4.3	-	4.3
UNDP	-	-	0.5	-	0.5
TOTAL	25.8	193.8	98.0	27.3	344.9

E. IDA Assisted Program Components

3.09 Program components included in the IDA-assisted project are:

(i) technical assistance to run port and railways operations in the Beira Transport Corridor during the 1989-95 period;

(ii) manpower development and training at all levels of CFM(C);

(iii) rehabilitation and acquisition of motive power for main line and shunting operations;

(iv) technical assistance for the study and implementation of a railway/port cost accounting system and a management information system in CFM(C); and

(v) studies and technical assistance for future investments.

(i) Technical Assistance to CFM(C)

3.10 Beira port and the crucial rail line between Beira and Machipanda are managed by CFM(C) under the general authority of Beira Corridor Authority (BCA). At present, there is considerable concern over the technical and managerial effectiveness of CFM(C). The major constraint on the efficiency of the organization has been identified as being the lack of

managerial and technical, skilled and semi-skilled personnel due to the abrupt loss of skilled manpower at the time of Mozambique's independence. The efficient functioning of CFM(C) is crucial to the success of BCA's plan for the development and expansion of the Beira Corridor transport system. A study financed by the EEC, the terms of reference of which were agreed with IDA, has prepared a comprehensive Organization and Manpower Development Plan for CFM(C), which forms the basis of the TA and training included in the project. Manpower training targets for CFM(C) were established during the study and a plan of organizational development was agreed to enable CFM(C) to perform efficiently in the context of both today's restricted traffic flows and the predicted expansion of traffic over the next few years. The study also identifies the technical assistance required in the short to medium term while Mozambique staff is being trained. The TA component of the project provides the financing required to implement the manpower development and training proposed. Additional financing will be provided by bilateral donors for their ongoing technical assistance teams in Beira, including container terminal operations (Finland and Sweden), port operations (Holland) and railway operations (Spain). Details of the training and technical assistance programs are shown in Annexes 2 and 3. Agreement was reached during negotiations on the terms and duration of contracts for the key management posts for CFM(C) (para 6.01).

3.11 Additional technical assistance needs in the port are quite limited due to the fact that the very effective TA programs being financed by the Netherlands, Finland and Sweden cover most areas of port operations. The effectiveness of these programs, which involve twenty experts over a four year period up to 1991, is not only due to the experience of the individuals involved but also to the fact that they work in line management positions with operational responsibilities. The existing positions cover port traffic, the container terminal, workshops, general cargo operations, maintenance, marketing and manpower development. The donors concerned have indicated their readiness to extend these contracts up to 1995. The additional positions needed and which IDA would finance are in the general service areas:

(i) cost accounting specialist (48 months); and
(ii) procurement expert (48 months)

3.12 Unlike the port, the railway has received only limited technical assistance in the last few years, from India and the German Democratic Republic (GDR), and has only now received the first 11 members of a team from Red Nacional de los Ferrocarriles Espanoles (RENFE) financed by Spain. The positions to be filled by Spanish TA (400 man-months) are described in Annex 3 together with the additional positions to be financed by IDA (a further 400 man-months). To help provide a unified and motivated team, RENFE staff would focus on operational and technical positions, with IDA funding general manpower development, marketing and accounting positions for CFM(C) as a whole and railway maintenace positions. Building on the success of the technical assistance in the port, the positions in the railway would also be for line management with operational responsibilities. To ensure the effectiveness of the technical assistance effort, specific achievement goals will be set and performance monitored through the Project coordinator (see para 3.13 below).

3.13 A Project Coordinator has been selected who will be responsible for coordinating and monitoring the effectiveness of the technical assistance in the railway and training throughout CFM(C). His position will be funded by UNDP with the Bank as executing agency. The terms of reference for this position have been agreed with GOM and CFM(C) and are included in Annex 10.

(ii) Capacity Building for CFM(C)

3.14 Two parallel programs for the training, retraining and upgrading of port and railways personnel at all levels will be administered by CFM(C) with technical assistance. Capacity building is a long-term process which requires continuing monitoring and sustained investment. Accordingly, the project would finance the first five years of a long-term manpower development program (15 year horizon) which would provide training courses for some 4,500 port (2,500) and railways (2,000) personnel from managers and middle level technicians to equipment operators, mechanics and administrative staff. Because of the low level of education and literacy of most personnel, it is expected that during the first five years substantial training technical assistance will be required to initiate the programs and to train Mozambican counterparts who would be gradually assigned to expatriate personnel. It is also expected that in addition to relevant technical subjects, many trainees will have to undertake more general subjects such as English, Portuguese, mathematics and chemistry in order to strengthen their basic education.

3.15 Financing would be provided under the proposed credit for (a) strengthening and expanding CFM(C) training capacity and its training center; (b) providing housing for instructors; (c) purchasing textbooks, training equipment and materials, audio-visual training aids and developing relevant courses; (d) recruiting suitable instructors; (e) training abroad (fellowships) for selected middle and high level port and railways management staff as well as training officers and senior Mozambican instructors; (f) strengthening four technical/vocational schools which will assist with the training effort; (g) implementation of an incentive scheme for CFM(C)'s trainees; (h) a transportation sector survey of manpower requirements and related training needs; and (i) a mid- and end-project training evaluation, including the preparation of the next phase follow-up of the proposed training program. Annex 2 and attachments provide details of the training programs, including their objectives, elements and cost estimates. In order to carry out additional courses for CFM(C) staff, four technical/vocational schools in Beira would receive funds under the proposed credit for additional instructors and training equipment and materials.

3.16 A training section, with technical assistance, has been established and its chief appointed to be responsible for the planning, budgeting, implementation, supervision, and evaluation of all CFM(C) training activities. The section includes a port and a railways unit, and adequate staff to carry out its responsibilities including the supervision of the CFM(C) training center. After an adequate period of training abroad and in-service, as counterparts to the Chief of the Training Section and the training managers, CFM(C) training staff would become gradually more responsible for supervising the implementation of all training activities. CFM(C) has also established a Training Steering Committee within CFM(C)

whose main responsibility is to provide policy guidelines, determine priorities, and periodically evaluate the training programs. The project will provide training technical assistance for a total of 552 man-months to help CFM(C) manage the execution of all training activities. Because of the substantial amount of technical assistance and training inputs expected to be provided by other agencies/donors, a close coordination is essential among all those involved with training to prevent costly duplication of efforts. Draft terms of reference for training technical assistance financed under the project are available in the Project File. Financing has also been provided under the project for an independent mid and end-project training evaluation, including the preparation of follow up training program. A transportation sector survey of manpower and training needs to guide further actions in the sector on a country-wide basis, is currently underway, financed out of PPF funds. Because of the nature of training, the Association would finance 100% of all local and foreign costs.

3.17 Remuneration of CFM(C) Workers. To increase the productivity of CFM(C) workers, it is proposed that a study be undertaken of means to improve worker incentives. During negotiations, assurances were obtained that BCA will undertake such a study using PPF funds and, by December 31, 1990, will prepare a detailed program for the implementation of the study recommendations, exchange views with the Association and circulate it to donors for comment.

(iii) Acquisition of Locomotives and Shunters

3.18 In view of a continuing shortage of motive power for mainline and shunting services, DNPCF commissioned a study in 1988 by RITES of India financed out of PPF, to determine the needs of locomotives for the whole of its network and analyse the economics of rehabilitation versus new purchases. From this study it became apparent that much of the locomotive fleet was old and in need of replacement or rehabilitation. The current locomotive position of DNPCF is shown in Table 3.3 below:

Table 3.3 - DNPCF Locomotive Fleet

TYPE OF LOCO	Number in Fleet					No.to be Scrapped	Under/ Awaiting Major Repairs	Effective Fleet
	10 Yrs or Less	10-25 Years	25-30 Years	Over 30 Years	Total			
GE - U-20C Diesel-electric mainline locos	49	34	-	-	83	19	18	46
AEI-Sulzer Diesel-electric mainline locos	-	-	10	-	10	8	--	2(in Mal
Romanian Diese'-hydraulic Shunting locos	31	-	-	-	31	1	22	8
Garratt Steam Locos (CFM(C))	-	-	-	14	14	--	6	8
Shunting Steam Locos (CFM(C))	-	-	-	10	10	2	5	3
Simple Steam Locos (CFM(C))	-	-	-	6	6	--	2	4
Simple Steam Locos (CFM(N))	-	-	-	5	5	2	2	1

3.19 The requirements of locomotives on the Mozambican Railway Systems were studied on the basis that all three railway corridors (excluding the Sena Line) will be open for international and domestic traffic from 1991 onwards. Based on 24 hour working of all the three lines and excluding the future possible requirements of the Sena line, the number of additional main-line locomotives to be acquired has been estimated up to 1995 as follows:

1991	-	9
1992	-	4
1993	-	2
1994	-	4
1995	-	6
		25

3.20 If however, security conditions permit only 12 hour working in 1991, the number of additional locos to move the traffic demand in 1991 would be 36, as opposed to 9 with 24-hour operations. In so far as the Beira Corridor is concerned, the number of additional locos required to compensate for 12 hour working in 1991 is 9. Since the Beira port is expected to develop the full capacity to meet the full traffic demand in 1991, it is crucial that locomotive capacity will be available to ensure that materialisation of returns on the large capital investments in the port is not delayed. It is, therefore, proposed to acquire 15 locomotives in 1991 itself, instead of 9 in 1991, 4 in 1992, and 2 in 1993. When discounted to 1991, the cost of reasonably insuring against the risk of the security problem not being fully solved in 1991, by purchase of the 6 locomotives in advance, works out to 0.711 times the cost of a new locomotive or US$1.21 million. As against this, the possible loss of benefit caused by insufficient motive power capacity to move the traffic forecast would be considerably greater (about US$9.4 million annually). The acquisition of the 15 locomotives is also a safeguard against any possible slippages in the ongoing rehabilitation program.

3.21 As regards shunters, the existing steam locos will continue to be used at outstations, with the acquisition of diesel shunters for the Beira complex, where 6 are required.

3.22 The proposed USAID-funded Regional Rail Systems Support Project (para 2.16) covers the needs of rehabilitation and major overhaul arrears of diesel mainline locomotives, and parts for maintenance for a three year period. It also provides funds for tools, equipment and facilities, as well as technical assistance to maintenance workshops. Funds for major overhauls and rehabilitation works during the project period, (estimated at US$1.5 million), however, are not covered under the USAID project and are included in the IDA assisted project.

3.23 A rehabilitation program for the comparatively new diesel shunters (Romanian) is currently under way, and is expected to be completed in 1990. Funding of an additional $1.5 million for spares and technical assistance to complete the rehabilitation program is included in the IDA financing.

3.24 The proposed locomotive allocation policy on the CFM(C) is as follows:

(i) Passenger services, service trains, and shunting services at outstations (other than Beira) are to be met by steam locomotives, which would not be economical for mainline freight services.

(ii) Mainline diesel locomotives will be used to operate freight services.

(iii) Shunting services in the Beira complex are to be provided with diesel shunters.

(iv) The steam locomotives, which are of vintages ranging from 1946 to 1955, will have to be phased out, in due course, on an age-cum-condition basis.

3.25 The railways in Mozambique, in contrast to most other Sub-Saharan African railways have the advantage of a standardized main-line diesel locomotive fleet. In view of the imperative need to limit the variety of locomotives to one or two not very dissimilar types, in order to maintain the benefits of standardization, the acquisition of the new locomotives is proposed to be done with appropriate bilateral assistance (5 locomotives with untied Japanese assistance and 10 locomotives with Canadian assistance). As regards the six shunters, it is proposed to acquire them out of IDA funds under ICB. These locos would be confined to working on the Beira Corridor, where, the necessary expertise and inventory would be developed. The allocation of these locomotives will be as stated in para 3.24 (ii) and (iii) above, which was confirmed at negotiations (para. 6.01).

(iv) Cost Accounting and Management Information Systems

3.26 CFM(C)'s accounting system, although better than in other DNPCF branches, is incapable of providing management with the elements required for day-to-day and long-term management. Not only is there lack of qualified personnel, but also the system is not geared towards cost accounting which would provide adequate information on a cost/profit center basis. Furthermore, CFM(C) does not have a management information system to facilitate and expedite the accounting functions. The purpose of this component is, therefore, to contribute to the strengthening of financial management of the CFM(C) railways and Beira Port. The cost estimates included in Table 3.3 are based on the recommendation of the M.I.S. needs study financed by the PPF.

(v) Studies and Technical Assistance for Future Investments

3.27 To assist in the ongoing rehabilitation of the Limpopo line (para 1.14), 100 man-months of IDA funded assistance is proposed for the management team of the Brigada de Melhoramentos do Sul (BMS), the

development and construction arm of CFM(S). The U.K.ODA-funded study of the rehabilitation of the Limpopo line [3] identified a critical shortage of management in BMS and recommended expatriate technical assistance to fill the gap during the rehabilitation period 1989-91. IDA commented on the study, generally accepting its findings but urging restraint on the size of the investment program. The IDA-funded technical assistance, terms of reference for which are available in the Project File, would identify future technical assistance and training needs after the line becomes operational in 1991, which might form part of a future IDA-assisted project. The IDA credit would also fund a review of the technical assistance needs of DNPCF as well as the preparation of future projects in the transport sector.

F. Rationale for IDA Components

3.28 IDA's role in the project has been to assist in ensuring the viability of the whole investment pr gram through (a) analysis of the costs and benefits of each component and of the overall program; (b) acting as a catalyst for other investors in the project, as in the case of locomotives; and (c) as a lender of last resort in the capacity building program to complement investments made by others. IDA's investments in the project are thus ones which IDA is uniquely equipped to finance and are directed towards the self-sufficiency and financial viability of the Beira Corridor and other elements of the DNPCF within the framework of the ERP.

G. Project Cost Estimates

3.29 Total estimated cost of the IDA assisted project is US$73.75 million (see Table 3.4). The costs have been estimated net of taxes.

3/Study for the Total Rehabilitation, Operation and Maintenance of the Limpopo Railway Line; Mott Hay and Anderson International Ltd., June, 1988.

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Table 3.4 - Project Cost Estimates FY89-95
(US$ Million)

	Local	Foreign	Total
A. Technical Assistance to Manage:			
(i) the Railway	1.17	8.36	9.53
(ii) the Port	0.15	1.00	1.15
B. Training for:			
(i) the Railway	0.58	3.88	4.46
(ii) the Port	0.55	3.66	4.21
C. Aquisition of Locomotives:			
(i) Main-line	-	25.00	25.00
(ii) Shunters	-	6.00	6.00
D. Rehabilitation of Locomotives	.45	2.55	3.00
E. M.I.S. and Cost Accounting Systems	0.20	4.00	4.20
F. Locomotive and MIS Studies (PPF)	-	0.20	0.20
G. Studies and TA for Future Investments	.35	3.15	3.50
Total Base Cost	3.45	57.80	61.25
Contingencies:			
Physical	0.36	5.35	5.71
Price	0.44	6.35	6.79
Total Cost	4.25	69.50	73.75

Financing:

GOM	4.25	Local Costs
Japan	8.00	Item C. (i)
Spain	3.50	Item A. (i)
Portugal	1.00	Item G.
Canada	17.00	Item C. (i)
IDA	40.00	The Rest

H. Financing

3.30 In view of the continuing severe domestic resource constraints, the Government's financial contribution will not exceed local costs of US$4.25 million or 5.8% of total project cost. Hence, full financing of foreign costs (US$69.50 million, net of taxes) will be necessary. IDA funds of US$40 million have been allocated to the project in FY90 and untied financing from Japan (US$8.0 million) and parallel financing from

Spain (US$3.5 million) and Portugal (US$1.0 million) have been assured. Parallel cofinancing of US$17.0 million for locomotives is being secured from CIDA. It is not envisaged that any of the donors will request the World Bank to administer their funds, either through Trust Fund arrangements or through other cofinancing arrangements involving review of withdrawal applications.

I. Implementation

3.31 The IDA-assisted components will be implemented over a period of six years and be completed by December 31, 1995, with a closing date of June 30, 1996. DNPCF and its successor CFM,EE through its subsidiary CFM(C), will be responsible for the implementation of the project. Conditions of effectiveness would be (a) a signed legal agreement (Beira Corridor Implementation Agreement) specifying the mutual obligations of all agencies involved in implementation of the project and, (b) a signed subsidiary loan agreement between the borrower and DNPCF (para 6.01). A Project Coordinator has been appointed to supervise the implementation of the Project (see para 3.13). In addition, expatriate staff will be employed to assist CFM(C) in implementation. The implementation schedule is shown in Annex 1. To measure progress in meeting anticipated improvements in CFM(C) efficiency and productivity, CFM(C) has agreed to a comprehensive set of operational targets for the project period (Annex 5). These targets will be reviewed by IDA at annual implementation reviews each September.

J. Procurement

3.32 Procurement arrangements for the IDA-assisted project are summarized in Table 3.5 below:

Table 3.5 - Procurement Arrangements (US$ Million)

	IDA FINANCED				FINANCED BY	
PROJECT ELEMENT	ICB	IS/LS	DIRECT CONTRACTING	OTHER PROCEDURES	OTHER DONORS/GOM	TOTAL
A. Goods:						
1. Shunting locomotives	6.0					6.0
2. Main line diesel locomotives					25.0	25.0
3. Spare parts, tools, vehicles, computers and office equipment		2.0	2.0			4.0
B. Technical Assistance and Training:						
1. Railway/Port TA & Training				25.8	8.6	34.4
2. Cost accounting and MIS				4.0	.2	4.2
3. PPF studies				0.2		0.2
Total:	6.0	2.0	2.0	30.0	33.8	73.8

3.33 Goods: Equipment and goods are expected to be financed both under the proposed credit and by co-financiers. Such equipment and goods, financed under the proposed credit, would be procured by ICB in accordance with the Association's Procurement Guidelines. Eligible domestic manufacturers would be afforded a preference of 15 percent or applicable duty, whichever is lower, under ICB procurement. A margin of 7.5% preference to domestic contractors would also apply. In cases where the borrower can show to the Association's satisfaction that the items required are clearly established manufacturers' parts, in which case they may be obtained directly from the original suppliers through negotiated direct contracts up to a maximum of US$2.0 million in total. Where small orders are under US$100,000 each, up to a maximum of US$2.0 million in total for which international or local shopping through obtaining at least three price quotations will be applied. Goods estimated at US$25 million and consultancy services estimated at US$6 million parallel-financed by co-donors will be procured in accordance with the procedures of the respective agencies. All documentation for procurement of goods financed by IDA in excess of the US$100,000 will be subject to IDA review prior to issuance of tenders and award of contracts.

3.34 Technical Assistance: Technical Assistance and training funded by IDA will be provided by specialist consultant firm(s) who will be appointed in accordance with the World Bank Guidelines for the use of consultants.

K. Disbursements

3.35 Disbursements from the IDA Credit will be made on the following basis:

(i) 100% of foreign expenditures and 70% of local expenditures for (a) acquisition of shunting locomotives and (b) materials, equipment, furniture and supplies for provision of housing for expatriate specialists and instructors;

(ii) 100% of foreign expenditures for vehicles, spare parts, computers, office equipment, materials and supplies; and

(iii) 100% of the total cost in the case of consultants' services, training, studies and external audit services. assistance for transport planning; and (iii) training;

Disbursements would be made against full documentation, except for payments against contracts of less than US$50,000 for goods and US$20,000 for consultants services which would be disbursed against certified statements of expenditure. Supporting documents would be retained by CFM(C), and made available for review by visiting Bank missions and by auditors.

3.36 To facilitate project implementation, a U.S. Dollar Special Account would be opened in a commercial bank, and operated and maintained on terms and conditions acceptable to IDA. The authorized allocation for

the Special Account would be US$4.0 million, representing anticipated eligible expenditures for a period of about four months (excluding anticipated large payments which would be handled through letters of credit or direct payment). The Special Account would be replenished on receipt of properly documented withdrawal applications prepared by the BCA on a regular monthly basis promptly after receipt and reconciliation of bank statements from the commercial bank.

3.37 The estimated schedule of disbursements from the IDA Credit based on the assumption of effectiveness by January 31, 1990, is as follows:

	Disbursement During the Year (US$million)	Disbursement at the End of the Year (US$million)	Percentage
FY90	4.0	4.0	1
FY91	12.0	16.0	40
FY92	10.0	26.0	65
FY93	6.0	32.0	80
FY94	5.0	37.0	93
FY95	2.0	39.0	98
FY96	1.0	40.0	100

L. Project Monitoring

3.38 DNPCF (and its successor CFM,EE) and CFM(C) will, with the assistance of the Project Coordinator, submit quarterly progress reports as per an agreed format covering, inter alia, the following aspects:

(i) Progress of the project work with cost data;

(ii) Training and technical assistance;

(iii) DNPCF/CFM(C) financial performance; and

(iv) CFM(C) performance in meeting the agreed operational targets.

M. Budget, Accounts, Audit and Evaluation

3.39 DNPCF prepares annual operating and capital budgets before the beginning of eacn fiscal year which are submitted to the Ministry of Transport and Communications (MTC) and subsequently to the Ministry of Finance. DNPCF was assisted by consultants (RITES) in the preparation of their consolidated financial statements for 1986 and 1987. The accounts are audited by the Ministry of Finance rather than by external auditors and it was a pre-condition of the appraisal of this Credit that the consolidated financial statements audited by the Ministry of Finance be available. During project implementation, CFM(C) will provide the Association with audits of the annual financial statements prepared by independent auditors acceptable to the Association within 6 months of the completion of each financial year. At the same time, CFM,EE will also

provide audits of its annual consolidated financial statements prepared by the Government Audit Department The auditors would also review records of amounts withdrawn on the basis of SOEs and their opinion would include a separate paragraph covering these withdrawals. No later than six months after Closing Date (June 30, 1996), DNPCF will provide the Association with a Completion Report which evaluates the operations, execution, costs and benefits of the project; the performance of CFM(C) and the Bank Group, and lessons learned.

N. Environment

3.40 Since most of the IDA assisted components relate to rehabilitation of existing assets and provision of technical assistance, it is not considered that they will have an adverse effect on the environment. In the city of Beira, IDA is already contributing to improvement of the environment through the Urban Rehabilitation Project, which includes rehabilitation of the sewerage system, solid waste management and erosion control measures to return the coastline to its natural habitat. For the Beira Transport Corridor Program as a whole, BCA has provided assurances at negotiations that environmental aspects have been taken into account. In the port, the Program will lessen the risk of accidents and subsequent pollution through improved navigational aids and deepening of the access channel. In the railway, the diesel workshop modernization will improve safety and the rehabilitation and acquisition of locomotives will have a beneficial effect through the consequential phasing out of atmosphere-polluting steam locomotives.

IV. ECONOMIC EVALUATION

A. Introduction

4.01 The economic evaluation of the Beira Transport Corridor Program is based on an updated version of the traffic forecasting and allocation models developed by the Netherlands Economic Institute (NEI) for IDA's earlier study of the Beira Corridor (para 1.20), and the latest (1988) Southern Africa Transport and Communications Commission (SATCC) commodity-wise traffic forecasts by country. This combination provides commodity-wise traffic flows for the Beira Corridor and competing routes and gives the best estimates of the project's rate of return. The NEI methodology also forms the basis of a wider study being undertaken to review all of the Southern Africa Transport Corridors. This study, which is being undertaken by the Bank under the sponsorship of SATCC with funding from the Netherlands, USAID, Denmark and Canada, reviews the financial and economic viability of all of the transport corridors in the SADCC region with a view to increasing their effectiveness through enhanced cooperation within the region. It is expected to be completed by the end of 1989.

B. Traffic Forecast

4.02 The traffic forecast for the Beira corridor for the period 1989 to 2005 is summarised in Table 4.1. It considers future traffic for three scenarios: a) the entire Beira Corridor program, including the IDA

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Table 4.1: Beira Corridor Traffic Forecast (000's Metric Tons)

		A project case	B without IDA assisted Components	C without all projects
1989	Mozambique	484	484	468
	Zimbabwe (excl. POL)	274	274	0
	Zimbabwe (POL)	770	770	770
	Malawi	50	50	0
	Zambia	100	100	0
	Total	1678	1678	1238
1992	Mozambique	579	579	497
	Zimbabwe (excl. POL)	829	437	0
	Zimbabwe (POL)	836	836	836
	Malawi	0	0	0
	Zambia	120	0	0
	Total	2364	1852	1333
1995	Mozambique	727	727	572
	Zimbabwe (excl. POL)	937	490	0
	Zimbabwe (POL)	908	908	908
	Malawi	377	0	0
	Zambia	170	0	0
	Total	3119	2125	1480
2000	Mozambique	892	892	724
	Zimbabwe (excl. POL)	1048	454	0
	Zimbabwe (POL)	1041	1041	1041
	Malawi	411	0	0
	Zambia	170	0	0
	Total	3562	2387	1765
2005	Mozambique	1159	1159	902
	Zimbabwe (excl. POL)	1162	521	0
	Zimbabwe (POL)	1196	1196	1196
	Malawi	468	0	0
	Zambia	170	0	0
	Total	4155	2876	2098

Source: SATCC, September 1988, Commodity-wise forecasts per country, WB 1988 mission, analysis of traffic allocation per corridor

assisted projects (the project case); b) the Beira corridor program but without the IDA assisted projects (the without IDA projects case); and c) without any program (the without all projects case). This last scenario is hypothetical, since many Beira corridor projects are already under execution and many others are already financed by bilateral agencies. However, this scenario represents the base case against which (a) and (b) will be evaluated and allows, therefore, an assessment of the overall economic viability of the corridor project with and without the rail project components which are included in the proposed IDA assisted project. The traffic forecasts include traffic generated by Mozambique, Zimbabwe, Malawi and Zambia, by all modes in the corridor, i.e., rail, road and pipeline.

4.03 In the project case the total volume of traffic through Beira, in 1992, is estimated at 2.36 million MT (metric tonnes), including 0.96 million MT of petroleum oil lubricants (POL). This includes all Zimbabwe's POL imports plus approximately 50% of the remaining overseas trade from Zimbabwe (0.8 million MT, the other 50% going through Maputo), and approximately 120,000 MT of Zambia's forecast copper exports. Overseas trade of Malawi only starts using Beira again at a significant level after the Sena line reopens (in this analysis it is assumed that the Sena line will reopen in 1995). To compare the forecasts in Table 4.1 with the Beira port statistics it is necessary to convert the latter into MT. The 1987 throughput in Beira was 1.5 million MT (including POL), which are roughly 1.9 million port tons.

4.04 Without the railway project components included in the IDA assisted project, the total capacity of the railway system linking Beira with its hinterland is assumed to remain at the present (1938) level, i.e., around 400 to 500,000 MT per year. This assumes locomotive power availability through the present lease arrangements with NRZ or variations which will guarantee the minimum power required to transport those tonnages. Without both port and railway projects (i.e. the without all projects case), no international rail traffic could be expected, since the quality of service would be so poor as to divert any international traffic to alternative routes. Also, the traffic originated in Mozambique's central region would grow less rapidly, as reasonable inland railway connections are necessary if the growth rate forecast for Mozambique's export traffic in the project case is to be attained.

4.05 The traffic forecast has been prepared in four steps starting with total traffic generation followed by traffic distribution, modal split and traffic assignment to the several routes and modes. To follow this method it was necessary to: a) estimate the total external trade of Zimbabwe, Malawi and Zambia by commodity, which was done on the basis of SATCC forecasts; b) estimate the total overseas trade of these same countries by commodity; and c) estimate the total generalized transport costs per commodity by different routes (Beira, Maputo, Durban, Nacala). The generalized cost applied in this study includes railway cost, road cost, handling in ports, time cost of cargo, insurance, pilferage, and differences in ocean freight costs between the ports of exit. The allocation of traffic to routes took into account points of origin of the

cargo within the hinterland, total generalized cost and availability of specific handling equipment in ports, specific agreed transport contracts and port capacity constraints (Beira, up to 1991). All Zambian traffic, except part of Zambian copper exports, have been allocated to the Dar-es-Salaam route. Insofar as national traffic is concerned the forecasts include a commodity-wise forecast of overseas import and export traffic from the central region of Mozambique and of the national coastal shipping traffic (cabotage). Details are given in Annex 6.

4.06 The most important factor in the allocation of traffic between the competing routes is the generalized cost of transport incurred in using them. This includes not only inland costs but also the differences in ocean freight rates between the ports of Beira, Maputo and Durban. Table 4.2 shows the difference in generalized costs between the Beira corridor and the other routes for containerized cargo. Detailed transport costs are given in Annex 6.

Table 4.2 - Generalized Transport Cost: Beira vs. Other Routes (US$/MT) for Containerized Cargo at 12 MT/TEU

From/To	Beira		Durban	Maputo (via RSA)	Maputo (via Limpopo)
	present	1992	Present & 1992	Present & 1992	1992
To Harare	121	81	115	179	89
From Harare	100	61	105	138	73

Cost level in 1988 includes railway/road, handling in port, time cost, insurance, pilferage, difference in ocean freight.

4.07 The generalized cost approach produces a traffic allocation between the Beira and Durban routes which is quite close to the tonnages transported in 1987 (Table 4.3). Indeed, while direct out-of-pocket costs through Beira are cheaper than via Durban, the present generalized costs by the latter are lower and this explains why only 17% of Zimbabwean traffic (other than POL) goes via Beira while 55% goes via Durban.

Table 4.3 - Actual and Estimated Cargo Flows 1987, Zimbabwean Overseas Traffic (exc. pol)

	Total (in 1000's of port tons)	Actual Distribution			Estimate Based on the Generalized Cost Allocation		
		Beira	Maputo*	Durban	Beira	Maputo*	Durban
EXPORTS} + IMPORTS}	1595 100%	273 17%	397 25%	925 58%	17%	28%	55%

*via RSA

4.08 Traffic allocation to the Beira corridor becomes more complicated when the interdependence between the Beira line and the Limpopo line (Zimbabwe to Maputo) is taken into account. Given the recent donor support to the rehabilitation of this line it has been assumed that it will be fully operational in 1991, which is a conservative assumption from the point of view of the Beira corridor. If the Limpopo line is available, more Zimbabwean traffic will go through Maputo than in the present situation, since in 1988 the only route from Zimbabwe to Maputo is via the RSA. Table 4.4 shows the influence of the opening of the Limpopo corridor on the traffic forecast for the Beira corridor. The Limpopo line, if fully operational, would attract in 1992 some 230,000 MT (14% of total Zimbabwean traffic), which otherwise would take the Beira route. Most of the containerized cargo to/from Zimbabwe will go through Beira, most of the bulk (especially exports of minerals, steel and sugar) goes through Maputo.

Table 4.4 - Traffic Allocation of International Traffic from Zimbabwe between the Beira Corridor and the Limpopo Line

	Both corridors open		Beira corridor open, Limpopo closed		
1992	Beira	Maputo	Beira	Maputo via RSA	Durban
EXPORTS	40%	60%	51%	20%	21%
IMPORTS	76%	24%	95%	5%	0%
TOTAL	49%	51%	63%	22%	15%

4.09 The impact of the opening of the Limpopo line on the economic rate of return of the Beira corridor is significant. An important part of the benefits generated by the development of the Beira corridor consists in the savings in inland transport costs as compared to the least cost alternative "without the project". If the least cost alternative is the Limpopo line instead of the route to Maputo via RSA or to Durban, the inland transport savings are much lower (see Table 4.2). By developing both routes (Beira and Limpopo) at the same time, part of the potential benefits of the Beira corridor are attributed to the Limpopo route. Paras 4.13 - 4.19 below give the distribution of benefits by line and the economic rate of return of the program, for each of the scenarios.

4.10 The assumption that the Nacala line opens in 1991, and the Sena line only in 1995 is also disadvantageous to the Beira corridor, implying that no Malawi cargo will transit through the port of Beira between 1991 and 1995. From 1995 onwards, however, it can be assumed that the traffic on the Sena line will be considerably higher than on the Nacala line. If only the inland transport costs were taken into account, the Malawi traffic would be split approximately 50/50 between Beira and Nacala. However, the expected level of shipping services in Nacala is substantially lower than in Beira (no major Conference services) causing considerably higher ocean freight cost and time costs in Nacala for moving on liner vessels to North West Europe. Allocation of traffic between Beira and Nacala is presented in Annex 6.

4.11 As mentioned above the present and future level of shipping services in the ports involved is a decisive factor for the development of the corridors. At present, although the official tariff for the North Western Europe conference line vessels is equal for Durban, Maputo and Beira, the level of service in these ports is quite different; special tariffs can be negotiated in case of large shipments, such as the tariff negotiated by the Zimbabwe Tobacco Ass. for containerized tobacco exports through Durban. Also, "outsiders", i.e. vessels which do not belong to conferences, charge different tariffs for Beira, Maputo and Durban. Moreover, eastbound connections (Far East, Australia) and South/North America connections would, at present, require transhipment (at considerable extra cost) at Durban, if Beira is used. Discussions with shipping line managers suggest that when Beira port becomes fully operational with the expected handling rates and a minimum flow of about 6000 MT or 500 TEUs/week, the major differences in level of service between Beira and Durban will disappear. The same holds true for Maputo, if the minimum cargo flows are met. Nacala cannot be expected to reach a comparable level of shipping services for liner trade, irrespective of the port facilities available, because the overall level of traffic will remain rather low and the port lies outside the main shipping routes.

4.12 The distances between Zimbabwe and the port of Beira (Harare-Beira 605 km; Mutare-Beira 280 km) are such that a significant amount of road traffic might be expected when rehabilitation of the road between Machipanda and Beira is completed in the early 1990s. This prompted an analysis of the modal split in the Beira corridor, to forecast the traffic which might be diverted from rail to road. On the basis of generalized transport costs which include a two-week advantage for road transport, an

empty return for trucks (50% load factor) and a US$10/MT road toll to reflect infrastructure costs, road traffic appears to be interesting for only a small proportion of the high value international cargo. This is partly due to the high cost of fuel in Zimbabwe, which weighs heavily in the tariff charged for heavy trucks. Another factor in favor of rail is that existing transport infrastructure in Zimbabwe is strongly based on transport by rail. Also, the Mozambique government has indicated that, in the short run (up to 1995), it will continue to regulate international traffic in the corridor until the railway manpower is developed and the present operational constraints are removed, allowing only selected cargoes to use the road. In the long term, when traffic is deregulated, road transport may become more attractive for cargoes originating in Zimbabwe and even in the Lusaka region (Zambia), because the Beira road route will be cheaper than the present Dar-es-Salaam road route. Without the project (i.e. with very poor rail and port service), it is forecast that the road would carry roughly 70,000 MT/year of international traffic, in 1995. In the situation with the project (i.e. with greatly improved rail and port service), the volume handled by road will be 40,000 MT/year of international traffic plus 120,000 MT/year of local traffic. The latter has average haul distances of 200 km, over which road is cheaper than rail. To assess the impact of increased efficiency of road transport and eventual deregulation of traffic on future modal split, a drop of 30% in road tariffs was tested. The results show that road traffic would, in this case, increase to 225,000 MT in 1995 and 280,000 MT in 2005. The rail/road modal split on the Beira Machipanda route (i.e. without the traffic from the Sena line), changes from 96%:4% to 79%:21% in 1995, if the traffic is deregulated and truck tariffs drop by 30%. These modal shifts do not affect the overall rate of return of the corridor. However, they affect the financial rate of return of the railway which, when setting its new tariff schedule, will need to take account of the effects of eventual international traffic deregulation on the modal split.

C. Economic Evaluation

4.13 The economic evaluation takes into account all the costs of the Beira corridor program (investment, technical assistance, training, operating and maintenance costs). Details are given in Annex 6. Four types of benefits have been considered: a) inland transport benefits for diverted traffic, i.e. using the Beira corridor instead of other corridors; these benefits are calculated as the difference between total generalized transport costs for Malawi and Zimbabwe overseas trade in the "without the program" and in the "with the program" situations; b) waiting and service time benefits for normal traffic at the port: waiting time benefits resulting from reduced waiting time and costs in the Port of Beira for normal cargo, i.e. the total volume of cargo forecast in the "without the program" situation. The difference in waiting costs per ton between the "with" and "without" project situation is multiplied by the amount of "normal" traffic to derive the waiting time benefits. Service time benefits have been calculated using the NEI port simulation model, including the queuing model, for the port of Beira; c) waiting and service benefits for generated traffic; d) freight cost benefits for normal traffic due to the use of larger vessels or a better level of service (containerized cargo). No waiting time benefits or service time benefits

are taken into account for diverted traffic, because it is reasonable to assume that port capacity in Maputo and Nacala is large enough to handle the additional traffic without longer waiting times than in Beira and handling rates at the three ports are the same. Costs and benefits are in November 1988 prices, including physical contingency and using the exchange rates at that time.

4.14 The Beira corridor program cannot be evaluated in isolation from other ongoing efforts to open the Limpopo and Nacala lines and, although somewhat later, the project to reopen the Sena/Moatize line, which links Malawi to Beira. In the "without project" situation such as it exists today (and assuming the Beira corridor program had not started), all Malawi and Zimbabwe traffic would have to use RSA ports (Durban) or Maputo via RSA railways, at high inland transport cost. Such a base case definition for the Beira corridor project, would imply large inland transport benefits to the traffic diverted from Durban and Maputo (via RSA) to Beira. If, however, the Limpopo line to Maputo opens in 1991, the least cost alternative to the Beira corridor will then be the Limpopo corridor. The remaining inland transport benefits of using the Beira corridor instead of the Limpopo corridor (diversion of traffic from Beira to Maputo) are much lower than the inland transport benefits of a Durban - Beira traffic diversion. The same is true for the Nacala-Beira diversion versus the Durban-Beira diversion for Malawi traffic. In calculating the ERR of the overall Beira corridor project, only benefits of the Maputo - Beira diversion and Nacala - Beira diversion have been attributed to the Beira corridor project. By doing so, in the present project base case, the majority of the inland transport benefits derived from Zimbabwe and Malawi overseas traffic are attributed to the Limpopo and Nacala corridors much earlier (1991 rather than 1995), which makes this evaluation quite conservative. Table 4.5 quantifies the impact of the base project case (case 4 in Table 4.5).

Table 4.5 - Total Inland Transport Cost
(US$ million)* for Zimbabwe and Malawi Overseas Trade

Availability of routes	1995 traffic forecast, excl. POL Zimbabwe	Malawi
0 Only Durban (D) and Maputo via RSA	148.7	72.0
1 D, Maputo (via Limpopo) only	90.0	72.0 (Durban)
2 D, Beira (via Machipanda+Sena) only	79.6**	18.4
3 D, Maputo (L) + Nacala, no Beira corridor	90.0	24.5
4 D, Maputo (L) + Beira (M + S) + Nacala	82.4	18.4

*Cost includes inland transport cost + time cost + insurance & pilferage + difference in ocean freight

**Assuming steel, sugar and minerals could be handled in Beira

4.15 In the present evaluation, comparison is made of case 4 (all corridors, situation with the project) with case 3 (no Beira corridor, i.e. situation without project). In this case US$ 13.7 million are the cost savings attributable to the Beira corridor (11%) and US$106.2 million are the savings attributable to the Limpopo and Nacala corridors (89%). Table 4.5 also shows that, if case 2 is compared to case 4 no significant additional benefits would be produced, assuming that the port of Beira could handle all the traffic without capacity constraints. This, however, is not the case because Beira would not be able to handle all cargo without major new investments, whereas Maputo and Nacala can.

4.16 The proposed project has an economic rate of return of 14.1% and a net present value of US$ 55.3 million at a 10% discount rate. Annex 6 presents the detailed cashflow calculation. Given that the project was evaluated in a very conservative fashion by attributing the majority of inland transport benefits to the Limpopo and Nacala lines, it can be safely concluded that the project is economically sound. If the opening of the Limpopo and Nacala lines is assumed for 1993 instead of 1991, the ERR of the project is 16.7%. In this case, in 1992, with the alternative lines closed, the inland transport benefits of the corridor are as much as US$47 million (with the Sena line still closed). The conclusion is, therefore: 1) if the Limpopo and Nacala lines are open to traffic as scheduled (1991), which is questionable given the security situation, the Beira corridor project is economically sound with a reasonable and conservatively estimated ERR for a project of this magnitude. It carries an important share of Zimbabwe traffic and (after 1995) Malawi overseas traffic; 2) if, for any reason the Limpopo and/or Nacala lines would remain closed, an efficiently managed Beira corridor project shows a very good rate of return, which increases dramatically for each year of postponement of the opening of the two other corridors. There is also the vital strategic role in the transportation of goods of Zimbabwe and Malawi which will be able to decrease their dependency on the RSA and this was not quantified because of the subjectivities involved.

4.17 A sensitivity test was performed in order to analyse the vulnerability of the project to substantially lower traffic volumes than presently expected (-25% international traffic than in the base case). This led to an ERR for the overall Beira corridor project of 12.5% instead of the original 14.1%. Therefore, even under those circumstances the project remains acceptable.

4.18 In order to evaluate the proposed IDA-assisted components it was assumed that railway traffic in the corridor would remain at present levels (400 to 500,000 MT/year) without these components. This is a somewhat optimistic assumption because traffic would probably decrease from present levels if the additional motive power proposed is not available. However, the assumption is again justified on the grounds of obtaining a conservative estimate. Comparing the situation "with the IDA-assisted railway projects" with the situation "without railway projects" produces an ERR of 34.7% which is quite attractive for a project of this type. This result also shows how vital for the Beira corridor is the provision of motive power and technical assistance. A sensitivity analysis was performed to evaluate the impact of a 25% reduction in international traffic, to the base case. The ERR decreases from 34.7% to 28.3%.

4.19 The overall effect of a more aggressive road competition may cause a shift of traffic from rail to road and although the overall ERR for the corridor will be the same, the ERR of the railway projects will be lower. To test this scenario the effect of a further decrease of 25% in rail traffic was evaluated. The ERR obtained was 25% which is still very healthy for such a project. Table 4.6 summarizes the results of the economic evaluation and sensitivity analyses.

Table 4.6 - Beira Corridor - Economic Evaluation

CASE TESTED	ERR	NPV @ 10% (US$ MILLION)
1. Overall program with Limpopo and Nacala open in 1991	14.1%	55.36
2. Same as (1) with 25% drop in international traffic	12.5%	33.29
3. Same as (1) but Limpopo and Nacala open in 1993	16.7%	85.27
4. IDA assisted project	34.7%	84.72
5. Same as (4) with 25% drop in international traffic	28.3%	59.98
6. Same as (5) with 25% further reduction of rail traffic	25.9%	50.02

V. FINANCIAL EVALUATION

A. CFM(C)

(a) Accounting System

5.01 CFM(C) maintains an accounting system on an accrual basis in sufficient detail to adequately present the financial operations of the railway and the port. Revenues earned by each operation are clearly identified. Working expenses which apply directly to each operation are so charged with joint or common costs being accumulated separately. The accounting system is, however, primarily oriented towards the preparation of the annual accounts rather than the accumulation of financial data for management purposes on a timely basis. The system is computer-based but the data processing center is currently not operational. CFM(C) has retained a team from Rail India Technical and Economic Services (RITES) to assist in the preparation of financial accounts.

5.02 CFM(C) does not maintain a traffic costing system. As a result, there are no clear data on which to base a tariff policy. During project preparation, BCA obtained financing from the EEC for a Railway/Port Cost Based Tariff Study, the Terms of Reference of which were agreed with the Bank. The proposed project will provide funding for the technical assistance team needed to install the traffic costing system and train staff.

5.03 At present, CFM(C) has no Management Information System (MIS). During project preparation a needs study for a management information system was undertaken financed by PPF. The proposed project would provide funding for the technical assistance to install the MIS and train staff and for the necessary hardware/software. The action plan and the timetable to implement the recommendations of the PPF-financed study were reviewed and agreed at negotiations (para 6.01).

(b) Past Performance

5.04 The combined Profit and Loss statements for port and railway operations are summarized in Table 5.1 below and shown in detail in Annex 7. For FY87 port operations resulted in a net profit while railway operations just about broke even with a combined profit for the two operations of US$7.2 millions.

Table 5.1 - CFM(C) Profit and Loss

	1987		
	Railway	Port	Total
		(US$ Million)	
Revenues	7.43	10.69	18.12
Working Expenses	7.70	2.33	10.03
Operating Surplus (Deficit)	(0.27)	8.36	8.09
Depreciation	0.54	0.11	0.65
Other	0.10	0.11	0.21
Profit/(Loss)	(0.91)	8.14	7.23

5.05 Prior to 1987, (CFM(C) had made a loss each year, partly due to the articially low official exchange rate of US$1 = Mt. 40 which prevailed prior to 1987 and which converted CFM(C)'s revenues, mainly foreign exchange earnings, into a relatively small amount of Meticais (or conversely, if the accounts are expressed in U.S. Dollars, inflated the main item of expenses, wages and salaries, out of proportion); but also due to the dramatic decline in traffic which occured in the late 70s and early 80s and is only now beginning to recover.

5.06 Port throughput declined from a high of 3.5 million tons in 1964 to 1.33 million tons in 1986 and then increased to 1.95 in 1987. However, port costs are generally quite variable as 60% of port personnel are stevedores who are mostly employed only when needed. Tonnage carried by rail also declined steadily from 5.9 million tons in 1973 to 0.3 million tons in 1984 but has gradually increased since then to 0.48 million tons in 1987. Unlike the port, the railway's costs remain relatively fixed in the short run with labor accounting for approximately 66% of the working expenses.

5.07 CFM(C) does not maintain a traffic costing system so it is not possible to determine which commodities are carried profitably, or which commodities contribute the most to the loss. However, using average figures, and assuming labor costs remain constant, the operating breakeven point for the Beira-Machipanda line is approximately 500,000 tons, which is considerably less than the forecast traffic of some 1.15 million tons for 1995.

(c) Financial Forecasts

5.08 The financial projections assume that the IDA component of the investment plan will be on-lent by the Government to DNPCF/ CFM(C) at a rate of 7.65% over a period of 30 years including a grace period of 5 years. The projected operating statements for the years 1990-2005 are set out in Annex 7 . The financial assumptions used in the projections are shown in the annex.

(d) Tariffs

5.09 On completion of the first phase of the program in 1991, it is expected that the capacity of the port and railway, handling speeds, transit times and reliability will improve to such an extent to permit selective increases in tariffs on the Beira corridor while remaining competitive with alternative routes. The current cost-based tariff study will help to determine the precise amount of tariff increases that are reasonable and it was agreed at negotiations that the first phase of adjustments would take place not later than December 1991 and would enable CFM(C) to achieve a 75% working ratio in FY1992, which would be sufficient to meet debt servicing requirements. In view of the established transport pattern for Zimbabwean traffic via RSA and the unsure timing within which this traffic can be attracted back to the Beira Transport Corridor, improvements in the working ratio in subsequent years will be agreed between BCA and IDA in the annual project implementation reviews. For the purposes of financial projections, an average increase of 20% has been assumed, which is well within the cost differential for the alternative Durban route (see para 1.04). On this basis the incremental financial rate of return is 12%.

(e) Foreign Exchange Retention

5.10 Foreign Exchange for CFM-C. Lack of foreign exchange is a major handicap for the Beira Corridor operation despite the fact that CFM(C) is an important net earner of foreign exchange. This is due to the fact that all foreign exchange is kept by the Bank of Mozambique. CFM(C) needs

foreign exchange to (i) purchase required fuel, spare parts, materials, replacement tools/small equipment, and (ii) consumption goods for workers so that for part of their wages they would have access to imported goods. In fact CFM(C) lacks personnel with the specialized experience to obtain foreign exchange rapidly from the Bank of Mozambique. To resolve this problem, a qualified member of CFM(C)'s staff has been appointed to the position of Procurement/Disbursement Officer to expedite foreign exchange withdrawals, for which specialised training will be provided during the period preceding Credit effectiveness (see Annex 10 for terms of reference).

B. DNPCF

5.11 The financial statements for the three main elements of DNPCF, consisting of the transport corridors of CFM Norte, Centro and Sul, have been consolidated with the help of French Government-funded technical assistance provided by SOFRERAIL and are shown in Annex 7. It is estimated that DNPCF generated a surplus of some US$7.2 million in 1987, which is expected to rise substantially in future, as also are debt service payments. However, there are problems of non-compatibility of accounting methods between the three railway groups and differences in the basis of calculating interest expenses. The ongoing French technical assistance program will help improve the accounting base and advise on the establishment of CFM,EE (see para 1.19). During negotiations assurances were obtained that CFM,EE will adopt policies that will lead to its financial viability, including achieving a working ratio of 75% in FY 1995, the financial target in subsequent years to be determined in agreement with IDA in the light of progress on the Nacala and Maputo Transport Corridors (para 6.01).

VI. AGREEMENTS, CONDITIONS AND RECOMMENDATIONS

A. Agreements and Conditions

6.01 During negotiations, agreement was reached with the Government of Mozambique (GOM) and BCA, on the following items:

(i) The terms and duration of contracts for the key management posts, including a Project Coordinator, which are crucial to the successful operation of CFM(C) (paras 3.10 - 3.12, Annexes 3 and 10);

(ii) A manpower development program for CFM(C) and an action plan to implement it (para 3.10);

(iii) An action plan and timetable to design and implement an incentive scheme for CFM(C) workers not later than December 31, 1990, this scheme to be developed with technical assistance financed by IDA (para 3.17);

(iv) An action plan and timetable to implement the recommendations of the MIS study (para 5.03);

(v) Operational targets for port and railway (Annex 5);

(vi) Utilization of locomotives by CFM(C) (para 3.25);

(vii) Criteria for future investment proposals and the current composition and phasing of the investment program in the Beira Corridor (para 3.03).

(viii) Selective adjustment of rail/port tariffs in CFM(C) as improved services become operational, the first phase of adjustments to take place not later than December 1991 to enable CFM(C) to achieve a working ratio of 75% in FY1992, (para 5.09);

(ix) Promulgation of the necessary administrative and legislative measures establishing a legally and financially autonomous entity (CFM,EE) to succeed DNPCF and transforming the CFM South, Central and North systems as separate sub-entities with independent costing, financial, accounting and management units by December 31, 1989. (para 1.19);

(x) DNPCF (and its proposed successor CFM,EE) to adopt policies that will lead to financial viability, including a working ratio of 75% in FY1995, the financial target in each of the subsequent years to be determined in agreement with IDA (para 5.11);

(xi) Finalization of a transit agreement with Zimbabwe, by June 1990, for the Beira Corridor (para 2.12);

(xii) Proposals to IDA, by December 31, 1990, to formulate feasible ways to increase private sector participation in port and railway related activities such as warehousing and container freight stations (para 2.02); and

(xiii) Annual Project implementation reviews to be jointly conducted with IDA by September 30 of each year during the execution of the Project (para 3.31).

6.02 Conditions of Effectiveness are:

(i) A signed legal agreement (The Beira Corridor Implementation Agreement) specifying the mutual obligations of all agencies involved in implementation of the IDA assisted project components (para 3.33); and

(ii) A signed subsidiary loan agreement between the borrower and DNPCF (para 3.33)

B. Recommendation

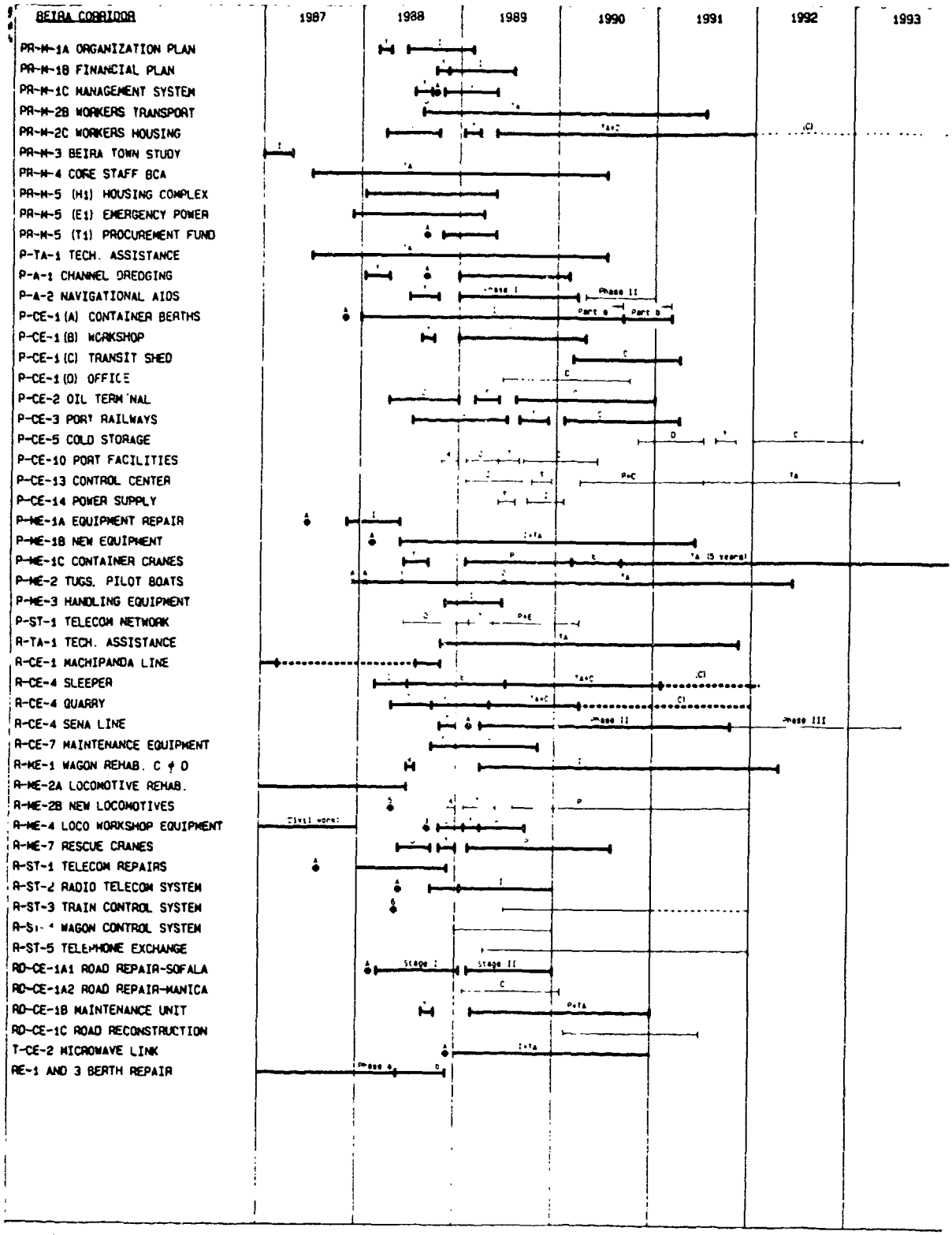
6.03 Subject to the above assurances, the proposed project forms a suitable basis for granting an IDA Credit of SDR 31 million (US$40 million) to the Peoples republic of Mozambique.

AF6IN
July, 1989

MOZAMBIQUE

BEIRA TRANSPORT CORRIDOR PROJECT

ANNEX 1



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The Training Component

I. General

1. The transport sector is an important part of Mozambique's economy, especially the ports and railways sub-sectors which until recently provided important direct links with Malawi, Swaziland and Zimbabwe and indirectly with Botswana and Zambia. However, since independence in 1975, the country has suffered from a dramatic decline of international transit services. The main reasons include: (a) the steady deterioration of port and rail facilities due to lack of maintenance and rehabilitation; (b) the departure of most Portuguese personnel leaving the transportation sector with an acute shortage of competent personnel; and (c) the lack of an adequate manpower planning and staff development system.

II. Objectives

2. A permanent Training Section has been set up within CFM(C) with the objective of establishing an institution-wide mechanism for expanded and continuous training activities. The Section, with consultant assistance, will be responsible for the preparation, implementation, supervision, and evaluation of two parallel five-year programs for the training retraining, and upgrading of some 4,500 CFM(C) port and railways staff at all levels.

III. Institutional Capacity

3. Consultants financed by EEC have prepared, on behalf of BCA, a comprehensive Organization and Manpower Development Plan for CFM(C), including manpower requirements, identification of training needs, and resources required to prepare and implement training programs for port and railways personnel. As part of the CFM(C) proposed reorganization and staffing, a Training Section has been established within CFM(C). The Section, which will initially be headed by a consultant to be financed under the project, will include a port and railway unit with appropriate staffing expected to be built up gradually. An organizational structure for the new Section is included in Attachment 1 and was finalized and agreed upon during negotiations. Responsibility of the Training Section will be to ensure the management and coordination of all CFM(C) training activities. More specifically the Training Section will (a) coordinate and monitor the preparation and implementation of the two training programs; (b) plan and supervise training courses expected to be carried out by the CFM(C) Training Center; (c) negotiate and make arrangements with local technical/professional schools for external training; (d) administer training abroad (fellowships); and (e) evaluate the results of the training programs, and prepare a follow-up on the proposed training programs. The terms of reference for the Chief of Training Section are in the Project File. In order to provide policy guidelines, determine priorities, and periodically evaluate the training programs, a Training Steering Committee has been established; its key members include the Executive Director of BCA and the heads of CFM(C) operations, maintenance, technical and administrative departments. The chief of the training section will act as executive secretary of the Committee.

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While the strengthening and expansion of the training activities is an important undertaking, every effort should be made at the same time to improve CFM(C) institutional capacity. Training of a large number of personnel at all levels may have some influence upon some of the institutional deficiencies. However, training is not an alternative to other specific remedial measures needed to improve CFM(C)'s overall institutional capacity and will not, on its own, provide improved performance.

IV. Training Needs

4. CFM(C) is severely handicapped by an acute shortage of skilled and semi-skilled workers and, most importantly, a lack of qualified and experienced technical, supervisory, and management staff. This problem is further compounded by the country's low levels of education and literacy, the large number of personnel over the age of 55, and low salary scales. It is essential, therefore, that while supervisory positions be entrusted initially to expatriate personnel, the majority of CFM(C) staff should attend seminars and training courses varying from one week to six months including basic educational subjects as needed. Since many illiterate staff such as mechanics, dock workers, trackmen and stevedores perform valuable tasks, they too would attend short crash and/or reorientation courses by adopting an appropriate training methodology - audio-visual aids and "training by doing". With the forthcoming introduction of policy, organizational and administrative changes in port and railways activities, training becomes a critical element in initially transferring to the staff sufficient skills to perform at an acceptable level. Training courses would be repeated as often as necessary so that a high percentage of the staff would be trained or retrained more than once in the next 10 to 15 years. The programs are expected to involve a net total of about 4,500 CFM(C) personnel - (port 2,500 and railways 2,000) in ten main areas of activities as detailed in Attachments 2 and 3 of this Annex. However, since many trainees would attend more than one training course, the gross number of personnel to be trained would be considerably higher than 4,500.

V. Elements of the Port and Railways Training Programs

5. The two training programs contain approximately the same elements and training methodology, but different numbers and categories of instructors and costing. Both port and railways will share the CFM(C) Training Center facilities, training equipment and materials. The main elements of each program are:

(a) Civil Works (Housing);
(b) Training Equipment and Materials;
(c) Training Manager, Instructors, National Schools and Regional Training Institutes;
(d) Transportation (for Instructors and Trainees);
(e) Training Abroad (Fellowships); and
(f) Per Diem

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(i) Training Methodology

6. The training of CFM(C) personnel will be carried out in various forms. The type of training and the content of the courses would be defined through the analysis of the specific requirements of the particular function and occupational job category within the port and railways, based on the consultant's study. There will be courses through external training schools [1] as well as specially designed courses for professional staff. Mechanical personnel would participate in specifically designed training-through-production courses or "training-by- doing". In addition to some general theoretical courses (20%) to be conducted at the Center, training of mechanical personnel (including illiterates) would be carried out in an agreed area of the port and railways workshops and would focus (80%) on the repair of broken equipment under the supervision of experienced mechanical instructors, thus enhancing CFM(C) equipment maintenance capabilities and raising its level of equipment availability. Training or upgrading of forklift drivers as well as other mobile equipment would include familiarization with equipment in the mechanical workshops and practical experience in driving and operating it in a purpose-built training area in which driving hazards and obstacles encountered in the work area can be safely simulated. Such training creates confidence in the trainee, especially when learning to drive the more complex and expensive equipment, thereby reducing the likelihood of accidents or damages in the work area. CFM(C) would be required to provide adequate spare parts and specific materials for the training of mechanical personnel throughout the duration of the program. All contracts with equipment suppliers/manufacturers would include provision of the services of technicians to train selected equipment operators and mechanics on operation and maintenance of new equipment. Provision has been made in the project for technical assistance staff to (a) train their counterpart, as they are gradually assigned to them; (b) conduct short courses or seminars in selected fields; and (c) collaborate with full-time training managers and instructors on the content of agreed training courses. The programs also include training abroad (fellowships) for CFM(C) staff. This would provide opportunity for high and mid-level managers in the engineering, operations and maintenance fields, training officers and senior permanent instructors of the Training Section to participate in short-term study tours/courses in countries such as Brazil, Portugal and Spain and/or English, French-speaking countries for those staff fluent ir English and/or French. Because of the low level of education and literacy, it is expected that in addition to relevant technical subjects, many trainees would also need to take more general subjects such as Portuguese, English, mathematics and science in order to strengthen their basic educational backgrcund.

(ii) Training Managers and Instructors

7. Under existing circumstances, it is expected that during the first four-to-five years, substantial expatriate staff would be engaged to initiate the programs and to train Mozambican counterparts, as they are gradually assigned to them. Accordingly, senior training managers and instructors fluent in Portuguese would be engaged to assist CFM(C) in the planning and

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1/ External to BCA but within Mozambique

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implementation of a two-phased training programs. Activities related to the preparation of the programs would be carried out under Phase I and would include: (a) review of the consultants' recommendations on training targets and human, financial and physical resources required for the program's implementation; (b) selection of priority areas for training; (c) definition of training methodologies and preparation of appropriate training courses; (d) assessment of permanent staff requirements for the organizational structure of the new Training Section; (e) determination of specific physical facilities and training equipment and materials requirements; and (f) development of a methodology for monitoring the effectiveness of training activities and evaluating the overall achievements of the training programs. Under Phase II, the training managers and instructors would assist CFM(C) with the implementation, supervision and evaluation of the programs.

8. The expatriate staff will be selected from short-listed firms having adequate experience in the various disciplines of port and railways engineering, operation, maintenance, finance and administration as well as in-training. The two teams will include:

Port

Expatriates

1 Training manager with overall staff training and institutional management experience x 48 m/m.
1 Traffic instructor x 24 m/m.
1 Pilot instructor x 24 m/m.
2 Cargo instructors x 24x2 m/m.
1 Senior mechanical instructor x 24 m/m.
2 One electric and one mechanic instructors x 24x2 m/m.
1 Civil works maintenance instructor x 24 m/m.

CFM(C) Counterparts

1 Counterpart to senior training manager
8 Counterpart to expatriate instructors.
3 Training officers.

Railway

Expatriates

1 Training manager with overall staff training and institutional management experience x 48 m/m.

Directorate Staff

Training will be carried out on-the-job by technical assistance, and abroad by fellowships.

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BEIRA TRANSPORT CORRIDOR PROJECT

Maintenance

Track and Works

2 Instructors permanent way x 24 x 2 m/m
1 Instructor chief mechanics (heavy track machinery x 24 m/m

Workshop

1 Instructor machines and tools x 24 m/m
1 Instructor diesel electric x 24 m/m
1 Instructor diesel mechanical x 24 m/m
1 Instructor electric section x 24 m/m
1 Instructor stores/supply x 12 m/m

Signalization (Telecommunication)

1 Instructor signalization x 24 m/m

Operations

Traffic

2 Instructors traffic x 36 m/m

Traction

1 Instructor diesel driver x 24 m/m

CFM(C) Counterparts:

1 Director of CFM(C) Regional Training Center
1 Counterpart to training manager
12 Counterparts to expatriate instructors.

The draft terms of reference for the training managers services are available in the Project File.

(iii) Training Facilities

9. The CFM(C) Regional Training Center will be rehabilitated and refurbished with funds provided by EEC who will also finance pre-fabricated houses for its technical assistance and instructors and some training equipment and materials. Financing is also provided under the project for audio-visual training aids, cut-sections of mechanical components for model and workshop rooms, tools, manuals, and technical books and publications. In addition the project would finance 22 low cost unit houses for the port training manager and instructors (9) and railways training manager and instructors (13).

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BEIRA TRANSPORT CORRIDOR PROJECT

VI. Miscellaneous

10. The project provides financing for an independent evaluation of the training programs to be conducted at the end of the second year (mid-1992) and the end of the programs (mid-1994), including recommendations for further training activities.

VII. Technical Education and Vocational Training

11. The responsibility for developing policies and programs of technical/vocational education and training rests with the Secretariate of State for Technical and Vocational Training (SETEP). While considerable progress has been made since the late seventies in school enrollment and adult literacy, the country's educational and literacy levels are still low. Currently, it is estimated that about 5% of the school age population attends secondary school. There are several technical/vocational schools in Mozambique financed either by the Government or international aid (or both), most of which require more recurrent funds, additional training equipment and materials, relevant training courses, and more experienced instructors. Unfortunately, coordination of training activities between SETEP and beneficiary agencies is weak. Three schools have been tentatively selected in Beira to assist with certain aspects of the training programs: Instituto Commercial e Industrial, Escola Industrial 25 de Juhno, and Escola Commercial "Amilcar Cabral". With a relatively small IDA investment (US$670,000) for training equipment, materials, and local instructors, the schools could provide a useful input in certain disciplines not covered by technical assistance or expatriate instructors.

12. The University Eduardo Mondlane (UEM) in Maputo offers only five major basic programs, including engineering. The UEM has been negatively affected by events of post-independence which caused a sharp decline in enrollment until 1978. Although enrollment increased in subsequent years reaching 1,442 students in 1985, recent statistics indicate that only a few hundred students graduate per year, and less than 40 from the faculty of engineering. Currently, out of 450 engineers in Mozambique, 300 are expatriates and 150 are Mozambican. In the past two years one university engineering graduate has been employed by CFM.

VIII. Cost Estimates

13. The total cost of the two parallel training programs is estimated at US$8.7 million equivalent as detailed in Attachments 4 and 5 of this Annex.

G. Morra:lmi
July, 1989

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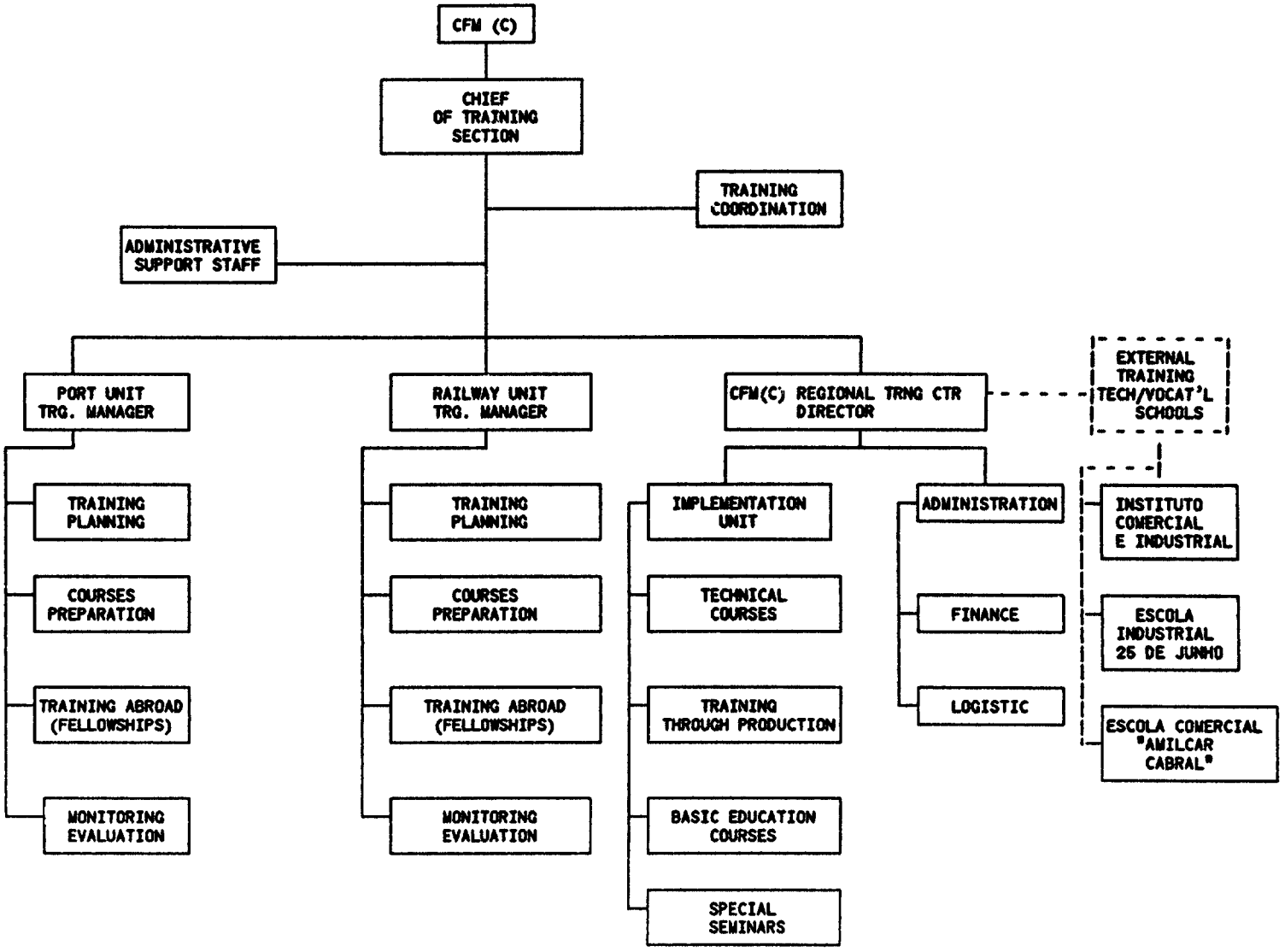
BEIRA TRANSPORT CORRIDOR PROJECT

Draft Organizational Chart of CFM(C) Training Section



ANNEX 2
Attachment 2

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BEIRA TRANSPORT CORRIDOR PROJECT

Estimated Number and Category of CFM(C)

Port Personnel to be Trained

Category	Existing Staff Level	Staff No.	Number of Staff to be Trained	Remarks
A. Port Operation				
1. Supervisory Staff	4-9	49	30	
2. Skilled/Semi-Skilled Workers	0-9	857	796	
3. Temporary Stevedores	-	3,600	1,000	
Sub-Total:		4,506	1,980	
B. Port Maintenance				
1. Supervisory Staff	1-8	23	5	
2. Skilled/Semi-Skilled Workers	0-9	680	639	
Sub-Total:		703	644	
C. Port Administrative Staff				
1. Supervisory Staff	3-9	6	4	
2. Support Staff	2-6	30	14	
3. CFM(C) Regional Training Center	0-3	10	12	
Sub-Total:		46	30	
TOTAL:		5,255	2,500 1/	

1/ This number may increase if additional staff is recruited by 1990 and if a larger number of stevadores will be trained.

SOURCE: CFM(C) and IDA.

G. Morra:lmi
December, 1988

ANNEX 2
Attachment 3

MOZAMBIQUE

BEIRA TRANSPORT CORRIDOR PROJECT

Escimated Number and Category of CFM(C)

Railway Personnel to be Trained

Category	Existing Staff Level	Existing Staff No.	Number of Staff to be Trained	Remarks
A. Directorate				
1. Head Office	1-14	38	10	
2. Finance	1-12	144	70	
3. Commercial	1-14	46	15	
4. Human Resources	1-12	64	13	
5. CFM(C) Regional Training Center	1-12	50	18	
6. Stores & Supply	1-7	96	9	
Sub-Total:		38	135	
B. Maintenance				
1. Track and Works	1-13	1,546	294	
2. Workshop	1-15	1,383	683	
3. Signalization	3-14	110	55	
Sub-Total:		3,039	1,032	
C. Operations				
1. Traffic	1-13	834	345	
2. Traction	1-12	636	221	
3. Shunting	1-12	438	267	
Sub-Total:		1,908	833	
TOTAL:		5,385	2,000 1/	

1/ This number includes repeat courses and training of new staff in selected skills.

SOURCE: CFM(C) and IDA.

G. Morra:lmi
December, 1988

MOZAMBIQUE

BEIRA TRANSPORT CORRIDOR PROJECT

BEIRA PORT CFM(C)

Estimated Cost of a Four-Year Training Program
(1990-1994)

DESCRIPTION	Cost Estimates (Approx.) In US$ Equivalent (US$1.00 = MT 620) US DOLLARS	FOREIGN
1. Accomodation		
a. Rental of houses for training manager/instructors at US$ 1,300 per month x 248 months		315,000
2. Training Equipment and Materials		
- CFM(C) Regional Training Center		
a. 2 Forklift trucks at US$25,000 each	50,000	
b. 1-3 ton mobile cranes	50,000	
c. 1 Tractor & trailer	125,000	
d. Audio-visual training aids, slides demonstration panels, models	30,000	
e. Marine motors and cut sections of mech. components	50,000	
f. Technical publications/books	20,000	
g. Protective clothing (uniforms, shoes, helmets, glasses)	125,000	450,000 1/
3. Training Manager and Instructors		
A. CFM(C) Regional Training Center		
(a) Expatriates		
(i) 1 training manager x 48 months at US$10,000 x month	480,000	
(ii) 1 Traffic instructor x 24 months, at US$8,000 x month	192,000	
(iii) 1 Pilot instructor x 24 months, at US$8,000 x month	192,000	

1/ Other equipment/materials to be financed by EEC.

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BEIRA TRANSPORT CORRIDOR PROJECT

BEIRA PORT CFM(C)

Estimated Cost of a Four-Year Training Program
(1990-1994)

DESCRIPTION	Cost Estimates (Approx.) In US$ Equivalent (US$1.00 = MT 620) US DOLLARS	FOREIGN
(iv) 2 Cargo instructors x 24 months each at US$8,000 x month	384,000	
(v) 1 Senior mechanical instructor x 24 months at US$9,000 x month	216,000	
(vi) 2 Instructors - one electric and one mechanic x 24 months at US$8,000 x month	384,000	
(vii) 1 Civil works maintenance instructor x 24 months, at US$9,000 x month	216,000	
	2,064,000	
b. CFM(C) Counterparts		
(viii) 1 Senior training manager, 8 instructors and 3 training officers	N.C.	
B. Beira Technical/Vocational Schools		
(ix) Instituto Commercial e Industrial	(350,000)	
(x) Escola Industrial 25 de Junho	(190,000)	
(xi) Escola Comercial "Amilcar Cabral"	(126,000)	
(All three schools need training equipment, instructors and courses)	(666,000) 2/	
C. Eastern & Southern African Management Institute (ESAMI), Arusha, Tanzania		
Short-term courses for 5 middle-level managers at US$20,000	100,000	2,164,000

2/ This amount has been included in the railway training program.

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BEIRA TRANSPORT CORRIDOR PROJECT

BEIRA PORT CFM(C)

Estimated Cost of a Four-Year Training Program
(1990-1994)

DESCRIPTION	Cost Estimates (Approx.) In US$ Equivalent (US$1.00 = MT 620) US DOLLARS	FOREIGN
4. Transportation - Training Manager/Instructors/ Trainees		
a. Training Section		
1 Vehicle	15,000	
b. CFM(C) Regional Training Center		
3 Vehicles	45,000	
2 Mini-buses	40,000	100,000
5. Training Abroad (Fellowships)		
a. Special short courses for CFM(C) instructors and training officers (10) at US$16,000 x person	160,000	
b. Short-term executive seminars for 10 high-level managers x US$20,000	200,000	
c. International conferences, visits, etc.	50,000	410,000
6. Per Diem		
- Per Diem for trainees, local instructors and staff of the Training Division (when on travel status).		
- 2,000 Trainees x (an average course of) 90 days at US$1.00 x day x person		225,000

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BEIRA TRANSPORT CORRIDOR PROJECT

BEIRA PORT CFM(C)

Estimated Cost of a Four-Year Training Program
(1990-1994)

DESCRIPTION	Cost Estimates (Approx.) In US$ Equivalent (US$1.00 = MT 620) US DOLLARS	FOREIGN
7. Training Studies		
a. Independent mid and end-training program evaluation (Port & Railways), including the preparation of a follow up of the ongoing training program.	70,000	70,000
TOTAL:		3,734,000
8. The Chief of the CFM(C) new Training Section (x 48 m/m at US$10,000 x month)		480,000
GRAND TOTAL:		4,214,000

G. Morra:lmi
December, 1988

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BEIRA TRANSPORT CORRIDOR PROJECT

BEIRA RAILWAY - CFM(C)

Estimated Cost of a Four-Year Training Program
(1990-1994)

DESCRIPTION	Cost Estimates (Approx.) In US$ Equivalent (US$1.00 = MT 620) US DOLLARS	FOREIGN
1. Accomodation		
a. Rental of housing for training manager/instructors at US$1300 per month x 348 months	455,000	
b. Rehabilitation of CFM(C) Regional Training Center 1/	N.C.	455,000
2. Training Equipment and Materials 2/		
- CFM(C) Regional Training Center		
a. Audio-visual training aids and courses	30,000	
b. Hand tools	10,000	
c. Technical Books/Publications	20,000	
d. Model room with (i) cut sections diesel locos components; trouble-shooting boards; (ii) small working models of diesel engines, generators and motors;	50,000	
e. small demonstration yard for track and signalization maintenance staff.		110,000

1/ To be financed by EEC.

2/ Other equipment/materials to be financed by EEC.

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BEIRA TRANSPORT CORRIDOR PROJECT

BEIRA RAILWAY - CFM(C)

Estimated Cost of a Four-Year Training Program
(1990-1994)

DESCRIPTION	Cost Estimates (Approx.) In US$ Equivalent (US$1.00 = MT 620) US DOLLARS	FOREIGN
3. Training Manager & Instructors		
A. CFM(C) Regional Training Center		
a. Expatriates		
(i) 1 Training Manager for 48 months at us$10,000 x month	480,000	
Workshop		
(ii) 1 Instructor machines and tools x 24 months at US$8,000 x month	192,000	
(iii) 1 Instructor electric diesel x 24 months at US$8,000 x month	192,000	
(iv) 1 Instructor diesel mechanic x 24 months at US$8,000 x month	192,000	
(v) 1 Instructor electric section x 24 months at US$8,000 x month	192,000	
(vi) 1 Instructor, stores/supply x 12 months at US$8,000 x month	96,000	
Traction		
(vii) 1 Instructor, diesel drivers x 24 months at US$8,000 x month	192,000	
Operation & Shunting		
(viii) 2 Instructors, traffic x a total of 36 months at US$8,000 x month	288,000	

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BEIRA TRANSPORT CORRIDOR PROJECT

BEIRA RAILWAY - CFM(C)

Estimated Cost of a Four-Year Training Program
(1990-1994)

DESCRIPTION		Cost Estimates (Approx.) In US$ Equivalent (US$1.00 = MT 620) US DOLLARS	FOREIGN
	Track & Works		
(ix)	1 Instructor, Permanent way (9 sections) x 24 months, at US$8,000 x month	192,000	
(x)	1 Instructor, permanent way (20 districts) x 24 months at US$8,000 x month	192,000	
(xi)	1 Instructor chief mechanic (aut.tamp. level. mach.) x 6 months at US$8,000 x month	48,000	
(xii)	1 Instructor, Telcom. x 24 months at US$8,000 x month	192,000	
		2,338,000	
b.	CFM(C) Counterparts		
(xiii)	1 Director of CFM(C) Training Center		N.C. 3/
(xiv)	1 Counterpart to training manager		N.C. 3/
(xv)	13 Counterparts to expatriate instructors		N.C. 3/
(xvi)	3 Training Officers		N.C.

3/ EEC will finance expatriate director for the first 14 months.

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BEIRA TRANSPORT CORRIDOR PROJECT

BEIRA RAILWAY - CFM(C)

Estimated Cost of a Four-Year Training Program
(1990-1994)

DESCRIPTION	Cost Estimates (Approx.) In US$ Equivalent (US$1.00 = MT 620) US DOLLARS	FOREIGN
B. Beira Technical/Vocational Schools		
a. Instituto Comercial e Industrial 21 instructors x 36 months at US$400 x month and equipment	350,000	
b. Escola Industrial 25 de Junho 13 instructors x 36 months at US$400 x month	190,000	
c. Escola Comercial "Amilcar Cabral" (i) 7 Instructors x 36 months at US$400 x month	101,000	
(ii) Equipment, calculators etc	25,000	
C. Eastern & Southern African Management Institute (ESAMI), Arusha, Tanzania	666,000	
- Short-term management seminars for selected senior staff	125,000	3,239.00
4. Transportation/Training Manager/Instructors/Trainees		
a. Training Section 1 vehicle	15,000	
b. CFM(C) Regional Training Center		
-2 Vehicles	45,000	
-2 Mini-buses	40,000	
		100,000 4/

4/ EEC may finance initially 3 pick-up

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BEIRA TRANSPORT CORRIDOR PROJECT

BEIRA RAILWAY - CFM(C)

Estimated Cost of a Four-Year Training Program
(1990-1994)

DESCRIPTION	Cost Estimates (Approx.) In US$ Equivalent (US$1.00 = MT 620) US DOLLARS	FOREIGN
5. Training Abroad (Fellowships)		
a. Special course at ILO International Training Center, Turin, Italy, for 8 selected CFM(C) instructors and training officers at US$16,000 x person	128,000	
b. Short-term executive seminars for 10 high level managers x approx. 6 months at an average of US$20,000 x person	200,000	
c. International conferences, visits	50,000	378,000
6. Per Diem		
- Per Diem for trainees, local instructors and staff of the Training Section (when on travel status).		
- 2,000 Trainees x (an average course of) 90 days at US$1.00 x day x person		180,000
Total		4,462,000

G. Morra:lmi
December, 1988

MOZAMBIQUE
BEIRA CORRIDOR PROJECT

CFM(C)

TERMS OF REFERENCE FOR TECHNICAL ASSISTANCE

	TITLE	QTY POSITION	QTY MAN-MONTH	OUTLINE OF JOB DESCRIPTION
1.	GENERAL MANAGEMENT			
1.1	DEPUTY GENERAL MANAGER	1	36	To advise the General Manager on technical/operational aspect of the programme and establish more effective management of operations and transport services. To help CFM become more commercially and financially oriented.
1.2	MARKETING SPECIALIST (IDA)	1	24	To collect information and data regarding expected variations in traffic flows, in accordance with agricultural and industrial developments and with competition of other transportation routes. To negotiate special fares with customers for goods which can be carried in special quantities and by means of block trains. To advise general management on action to be taken from a commercial point of view.
1.3	MANPOWER SPECIALIST (IDA)	1	48	To advise and assist the Personnel Department on manpower management. To improve identification of needs and deficiencies in terms of quality and quantity. To make recommendations on manpower re-deployment, recruitment and training programmes.
2.	FINANCE AND COSTING GENERAL MANAGEMENT)			
2.1	SENIOR ECONOMIST (IDA)	1	48	To advise the top management on setting up accounting information/ evaluation systems and familiarize general and departemental managers with their usage for budgetary control and performance measurement. To establish medium and long-term investment plans and carry out related studies for their economic and financial justification.
2.2	FINANCIAL ANALYST (COST ACCOUNTING). (IDA)	1	48	To develop costing methods and procedures for operation and maintenance cost analysis. Assist in determining appropriate tariffs in accordance with actual costs and compensation levels for unremunerative services imposed by government.

CFM(C)

TERMS OF REFERENCE FOR TECHNICAL ASSISTANCE

	TITLE	QTY POSITION	QTY MAN-MONTH	OUTLINE OF JOB DESCRIPTION
3.	RAILWAYS STORES AND SUPPLIES			
3.1	SUPPLIES SENIOR SPECIALIST	1	36	To prepare and implement stock management computerization. To impose organization and procedures to reduce the duration of the supply cycle and the quantity of shortages.
4.	MECHANICAL DEPARTMENT AND WORKSHOP			
4.1	SENIOR MECHAN. ENG. (ROLLING STOCK)	1	36	To manage all electro-mechanical engineering aspects of the projects with supervision on rolling stock maintenance, workshop organization and procedures, spare parts needs and manpower requirements.
4.2	MECHANICAL ENG.	2	34	To organize and monitor overhaul and repair programmes for steam locos, wagons and carriages. To make sure that schedules and working methods are adhered to and that spare parts and supplies will be delivered in time.
4.3	METHODS AND PLANNING SPECIALIST	1	30	To assist workers and foremen in manufacturing and repairs by developing better working methods, planning and execution and designing special tools when necessary. To make sure that appropriate tools, materials and spare parts will be available to meet working programmes.
4.4	MECHANICAL TECHNICIAN	1	30	To assist workshop supervisors in local manufacturing of spare parts sub-components. To improve the quality of manufactured parts and components by training and coaching machines operators. To set up and supervise a quality control section to be implemented.

CFM(C)

TERMS OF REFERENCE FOR TECHNICAL ASSISTANCE

	TITLE	QTY POSITION	QTY MAN-MONTH	OUTLINE OF JOB DESCRIPTION
4.5	MAINTENANCE TECHNICIAN	1	24	To manage utilization and maintain machinery and plant equipment in the main workshop, depots and pumping stations along the line.
4.6	FOUNDRY TECHNICIAN	1	12	To prepare manufacturing programmes, improve working methods, provide "on-the-job" training and control the quality of products before delivery. To supervise supply and selection of raw materials and maintenance of workshop equipment.
4.7	MECHANICAL ENGINEER DIESEL LOCOS	1	36	Same description as 4.2 but for diesel locomotives with electric and hydraulic transmission.
4.8	DIESEL ENGINE SPECIALIST (TECHNICIAN)	1	30	To supervise general overhaul and major repairs of diesel engines and related sub-components (governors, blowers, etc.) for locomotives and electric generators as well as large compressors/exhausters. To tune up diesel locos after overhaul and repair and carry out running tests and trials before delivery to operational services.
4.9	ELECTRICAL TECHNICIAN	1	30	Same description as 4.7 but for electrical rotating machines and control devices of diesel locos and electric generators.
4.10	BOGIES AND BRAKES SPECIALIST	1	24	For both diesel locos and hauled rolling stock. To supervise general overhaul and repairs of bogies and wheel sets and to organize working stands and supervise repairs of braking devices (vacuum and air compressed), including quality control.
4.11	WAGON WORKSHOP SPECIALIST	1	24	To supervise general overhaul and major repairs of wagons and carriages, including manufacture of components prefabricated in the metal sheet and welding shop. To carry out quality control before delivery of rolling stock to operational services.

CFM(C)

TERMS OF REFERENCE FOR TECHNICAL ASSISTANCE

	TITLE	QTY POSITION	QTY MAN-MONTH	OUTLINE OF JOB DESCRIPTION
4.12	MAINTENANCE ELECTRICAL ENGINEER	1	30	To manage utilization and maintain electrical components of workshop machinery, plant equipment, pumping stations etc. To assist and train local staff in charge of CFM(C) electrical transformers, control cabinets and distribution network in Beira and along the railroad.
4.13	TELECOMMUNICATION ENGINEER	1	30	To implement preventive maintenance methods and develop trouble shooting procedures and failures detection in the telecommunication system. To supervise repqirs of electronic component in workshop and laboratory, first for telecommunication equipment but also for electronic equipment in general.
5.	TRAFFIC AND TRACTION			
5.1	TRAFFIC MANAGER	1	36	To coordinate railway traffic operations with port operations and foreign railway systems in order to speed up transportation and reduce stay of foreign wagons on CFM(C). To define the outlines of the operation and commercial policy to attract new customers and improve railway revenues.
5.2	TRAFFIC OFFICER (BEIRA COMPLEX)	1	24	To assist the traffic supervisor of the Beira complex in the improvements of the working methods, to streamline marshalling operation and liaison with the Port operators.
5.3	TRAFFIC OFFICER (MAIN LINE)	1	30	To improve day-to-day traffic coordination with NRZ and intermediate stations along the line. To streamline loading/unloading and forwarding operations in order to improve wagon turnover.

CFM(C)

TERMS OF REFERENCE FOR TECHNICAL ASSISTANCE

	TITLE	QTY POSITION	QTY MAN-MONTH	OUTLINE OF JOB DESCRIPTION
5.4	TRAFFIC INSPECTOR	1	24	To make sure that operation procedures and security rules are correctly adhered to, by train and station personnel along the line. To assist CFM(C) staff during investigations to be conducted after collisions/derailments.
5.5	TRACTION INSPECTOR	2	36	One inspector for diesel locos (24 months) and one for steam and shunting locos (12 months). To train and watch the crews for a better locomotive utilization make sure that the security rules are correctly adhered to. To supervise supply, operation and maintenance of delivery stations for fuel, coal and water.
	TRACTION INSPECTOR			To assist CFM(C) during investigation to be conducted after collision or derailments.
6.	PERMANENT WAY			
6.1	CIVIL ENGINEER	1	24	To improve the general organization of the permanent way department and develop a systematic track maintenance programme. To set up a track upgrading programme and develop better utilization of mechanized equipment. To make sure that tools and materials are supplied in due time. To supervise contractors in charge of bridge rehabilitation.
6.2	PERMANENT WAY INSPECTOR	1	24	To carry out track inspection surveys and make sure that working methods are correctly adhered to. To supervise utilization of mechanized track-ballast maintenance equipment and make sure that spare parts, duel and lubricants are satisfactorily supplied. To conduct on-the-job training when necessary.

CFM(C)

TERMS OF REFERENCE FOR TECHNICAL ASSISTANCE

	TITLE	QTY POSITION	QTY MAN-MONTH	OUTLINE OF JOB DESCRIPTION
6.3	BRIDGE ENGINEER	1	3	To carry out a detailed inspection of the bridges and established TOR for bridge rehabilitation works to be carried out by civil engineering contractors under the supervision and control of CFM(C) staff.
	TOTAL	29	801	

AF6IN
January 1989

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BEIRA TRANSPORT CORRIDOR PROJECT

CFM (C)

LOCOMOTIVE REQUIREMENTS

1. FREIGHT SERVICES

1.1 Traffic Forecasts:

Type of Traffic	1991 (Tonnes)	1995 (Tonnes)
International:		
UP	341,000 (A)	340,000 (A)
DOWN	608,000 (A)	727,000 (A)
Domestic:		
UP	96,000	40,000
DOWN	121,000	50,000

Note: (A) - Forecast by Netherlands Economic Institute (NEI) (Nov. 1988).

1.2 System of Working:

Block Trains will be run between Beira (BA) and Machipanda (MP) with change of traction at Inhamitanga (NTA). The section BA-NTA will be worked with single diesels in closed circuit, and the NTA-MP section will be worked with double diesels in closed circuit.

1.3 Tractive Capacity:

1500T both on the BA-NTA section with single locomotive and the NTA-MP section with double locomotives. Limiting capacity will be in the "UP" direction.

1.4 **Loop Capacity**: 28 Wagons plus brake-van.

1.5 Seasonal Traffic:

International: cotton, tobacco, coffee and tea, forming 33% of total traffic, with a peaking factor of 1.7 (seven months movement). Peaking factor for all international traffic in "DOWN" direction (which is the ruling direction, i.e. the direction of heavier traffic) = 1 + (0.33 x 0.7) = 1.23.

Domestic: 20% of traffic is seasonal with a peaking factor of 1.5 (8 months movement).
Peaking factor for all domestic traffic = 1 + (0.20 x 0.5) = 1.10.

Total Traffic: Ratio of international to domestic traffic in the ruling direction is 0.74:0.26.

Overall peaking factor = (0.74 x 1.23) + (0.26 x 1.10) = 1.20.

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BEIRA TRANSPORT CORRIDOR PROJECT

1.6 **Loadability Factor:**

Cotton, tobacco and tea, constituting about 30% of down international traffic--loadability is 12T per container, as against payload capacity of 18%. Loadability factor to be applied to net carrying capacity of a train would be (1-0.30 x 6/18) = 0.90.

1.7 **Surplus Loop Capacity:**

As against 25 fully loaded wagons limited by traction capacity, with the loadability factor, 28 wagons, limited by loop capacity can be carried on a train. A factor of 28/25 = 1.12 can be applied to average train loads, under ideal operating conditions.

1.8 **Operational Allowance:**

For not being able to run trains with ideal compositions to suit (6) and (7) above--assumed at 20%.

1.9 **Constrained empty movement:**

The traffic mix does not call for regular movement of empties in the heavier "DOWN" direction to meet the needs of "UP" traffic, except for domestic petroleum products, which forms only 3.75% of down traffic. Hence, neglected.

1.10 **Net Adjustment Factor:**

To train load would be 0.90 (from (6)) x 1.12 (from (7)) x 0.80 (from (8)) = 0.81.

1.11 **Average ratio Payload/Gross Load:** 1:1.48.

1.12 **Average net carrying capacity per train:** 1500 x 0.81/1.48 = 821 Tonnes

1.13 **Annual throughput per train per day with 330 working days:**
821 x 330 = 0.271×10^6 Tonnes.

1.14 **No. of trains to be provided for:**

Year	Number of Trains Per Day	
	Average	Adjusted for Seasonality
1991	0.729/0.271 = 2.69	x 1.20 = 3.20
1995	0.777/0.271 = 2.87	x 1.20 = 3.44

1.15 **Locomotive Availability -- 75%**

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BEIRA TRANSPORT CORRIDOR PROJECT

1.16 LOCOMOTIVE REQUIREMENT (FREIGHT SERVICES)

BA - NTA Section (98 km):

	1991		1995	
	12 Hr Working	24 Hr Working	24 Hr Working	Remarks
Average speed (kph)	23	23	25	(presently, 22)
Round Trip Running Time (Hrs.)	8.52	8.52	7.84	
Total Terminal Detention (Hrs.)	(*)	5.00	5.00	(*)(included in night lie-over)
Fuelling & Servicing (Hrs.)	(*)	2.00	2.00	(*)(included in night lie-over)
Turn-round (Hrs.)	24.00	15.52	14.84	
Turn-round (Days)	1.00	0.65	0.62	
No. of trains/day	3.20	3.20	3.44	(from (14))
Loco Reqt. (bare)	3.20	2.08	2.13	
Loco Reqt (total)	4.26 (= 4)	2.77 (= 3)	2.83 (= 3)	

NTA-MP Section (216 km):
(Double-headed)

	1991		1995	
	12 Hr Working	24 Hr Working	24 Hr Working	Remarks
Average speed (kph)	24	24	25	(presently, 23)
Round Trip Running Time (Hrs.)	18.00	18.00	17.30	
Total Terminal Detention (Hrs.)	(*)	5.00	5.00	(*)(included in night lie-over)
Fuelling & Servicing (Hrs.)	(*)	3.00	3.00	(*)(Extra for double locos)
Turn-round (Hrs.)	48.00	25.00	25.30	
Turn-round (Days)	2.00	1.08	1.05	
No. of trains/day	3.20	3.20	3.44	
Loco Reqt (bare)	12.80	6.91	7.22	
Loco Reqt (total)	17.02 (= 17)	9.19 (= 9)	9.60 (= 10)	
Total Freight Loco Requirements	21	12	12	

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2. **LOCOMOTIVE REQUIREMENT (PASSENGER SERVICES):**

BA - NTA	-	2 locos
NTA- MP	-	1 loco
		3
Spare		1
TOTAL		4

3. **LOCOMOTIVE REQUIREMENT - (SERVICE TRAINS & MINOR SERVICES):**

Bare	-- 6
Spare	-- 2
	8

4. **LOCOMOTIVE REQUIREMENT - (SHUNTING SERVICES):**

Beira Complex:	Port	- 2
	Rly Yard	- 2
	Transfer	- 0.5
		4.5
	Spare	1.5
	TOTAL	6.0
Outstations:	NTA	- 1
	Gondola	- 1
	MP	- 1
		3
	Spare	1
	TOTAL	4

5. **CURRENT FLEET STATUS:**

Dsl Elec. Locos (GE)	20	(16 (1966/69) + 4 (1981/84))
Accessible	8	(of which 2 to be scrapped (collision))
Not Accessible	12	(of which 8 presumed scrapped)
	20	(of which 10 are to be scrapped)
Dsl Elec Locos (AEI)	10	(1964)
In Malawi	2	
Accessible	2	(out of service, to be scrapped)
Not Accessible	6	(to be scrapped)
	10	

(This AEI fleet of 1964 vintage is to be treated as scrapped.)

Steam Locos:		
Garratts	12	(current availability 6)
Singles	6	(current availability 3)
Shunting	8	(current availability 3)

(The fleet status and age of all the three systems--S,C, & N--are at Attachment 2.)

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BEIRA TRANSPORT CORRIDOR PROJECT

6. **RECOMMENDED POLICY:**

6.1 Passenger services, service trains, and shunting services at outstations to be met by steam locomotives, which would not be productive enough for freight services.

6.2 Shunting services in the Beira complex to be provided by diesel shunting locomotives.

6.3 Freight services to be operated with main-line diesels.

7. **LOCOMOTIVE ACQUISITIONS:**

7.1 The three systems (S, C, & N) have been considered in a pooled manner for the purpose of assessing additional locomotive requirements. The RITES traffic forecasts for CFM(S) and CFM(N) with the Limpopo and Nacala lines open have been used as the basis: ('000 Tonnes)

	1991			1995		
SYSTEM	UP	DOWN	TOTAL	UP	DOWN	TOTAL
CFM(S)	1438	3703	5141	1743	4861	6604
CFM(N)	258	218	476	516	424	940

7.2 Based on an exercise similar to that done for CFM(C)--(vide earlier paragraphs), the main-line locomotive requirements for CFM(S) and CFM(N) work out as follows:

CFM(S):	1991 (12 hr. Working)	1991 (24 hr. Working)	1995 (24 hr. Working)	
Freight Services				
Goba Line	4.89	2.69	3.55	(ATT.1/1)
R. Garcia Line	10.03	6.01	7.02	(ATT.1/2)
Limpopo Line	25.20	14.27	16.56	(ATT.1/3)
Total (Freight)	40.12	22.97	27.13	
Passenger Services	8.00	8.00	8.00	}(RITES
Other Services	10.64	10.64	10.64	} Report)
GRAND TOTAL	58.76	41.61	45.77	
	=====	=====	=====	
	(= 59)	(= 42)	(= 46)	

CFM(N):	1991 (12 hr. Working)	1991 (24 hr. Working)	1995 (24 hr. Working)	
Freight Services				
Nacala-Nampula	3.06	3.06	6.09	(ATT.1/4)
Nampula - Cuamba	6.12	5.20	10.36	(ATT.1/5)
Cuamba-Entrelagos	0.67	0.67	0.67	
Cuamba-Lichinga	1.33	1.33	1.33	
Total (Freight)	11.18	10.26	18.45	
Passenger Services	4.66	4.66	4.66	} (RITES
Other Services	4.00	4.00	7.32	} Report)
GRAND TOTAL	19.84	18.92	30.48	
	=====	=====	=====	
	(= 20)	(= 19)	(= 30)	

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7.3 The requirement of diesel main-line locomotives for the three systems is summarized below:

	------1991------ (12 hr. Working)	------1991------ (24 hr. Working)	-------1995------ (24 hr. Working)
Southern System	59	42	46
Central System	21	12	12
Northern System	20	19	30
	100	73	88

7.4 The year-wise requirement and the no serviceable is detailed below, for all three systems together, assuming an approximate linear progression from 1991 to 1995:

	1991 (12 Hr. Working)	1991 (24 Hr. Working)	1992	1993	1994	1995
Requirement:	100	73	77	81	84	88
Serviceable Locos:						
Southern System	44	44	44	43@	43	42@
Central System	6	6	6	10*	9@	8@
Northern System	14	14	14	13@	13	13
Total	64	64	64	66	65	63
Shortfall	36	9	13	15	19	25

(Note: @ = Attrition due to scrapping
* = Retrieval of 4 Locos from Nhamitanda)

7.5 With the security conditions settling down, the purchase programme to suit the above requirements would be:

1991	-	9
1992	-	4
1993	-	2
1994	-	4
1995	-	6
		25

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7.6 The crucial question is: Will security be improved by 1991, so that 24 hour working can be introduced? The date is crucial because Beira port is expected to develop the capacity to meet the traffic forecasts by 1991. If the required locomotive power is not available at that stage, the returns on the major port investments will have to wait. Acquisition of 15 locomotives (on the basis of 12 hour working on the Central Line) in the first lot will ensure that the capacity of the port is adequately utilized, even if the security problem is not fully solved by 1991. The possible risk of the constraint in utilization of port capacity has to be weighed against the economic penalty as under:

Value of Alternative (a)--phased purchase as per para. 5 above (discounted to 1991):

1991 Purchases--9 locos @ $9 x C	= 9.000 C	(C = cost/loco)
1992 Purchases--4 locos @ $4 x C/1.1	= 3.636 C	(10% rate of discount)
1993 Purchases--2 locos @ $2 x C/1.21	= 1.653 C	(10% rate of discount)
TOTAL	= 14.289 C	

Value of alternative (b) -- first lot purchase of 15 locos (discounted to 1991): **1991 Purchases** **15.000 C**

Therefore, the cost of insuring against the risk of the security problem not being solved by 1991 is 0.711 C or roughly $1.21 million with a probable cost of $1.7 million per loco. If, on the other hand, provision is made for having only 12 locos on the Central Line, corresponding to 24 hour working, as against the requirement of 21 required for 12 hour working (para. 1.16), the loss of benefit (on the basis of a benefit of $22 million by moving all the traffic forecast) would be considerably greater--i.e. (9/21 x 22) = $9.4 million annually. A favorable security situation would not, de facto, lead to a redundancy in locos, which could easily be rented to other SADCC countries.

7.7 If action is initiated "now" to purchase the 15 locos, they are likely to be in position sometime in 1990. The earliest possible acquisition will be very productive in supplementing the railways fleet when the rehabilitation process is underway and the availability target of 75% (expected to be reached by the end of 1992) has not yet been reached-- (40%, 55%, 65%,and 70% in 1989, 1990, 1991, 1992 respectively).

7.8 **Recommendation**: It is, therefore, recommended that 15 main-line locos be acquired in the first instance, as early as possible.

7.9 **Diesel Shunters**: The requirement of diesel shunters is as follows:

Southern Region	-	12
Central Region	-	9
Northern Region	-	8
Total (bare)	-	29
Spare	-	10
TOTAL	-	39
		==

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BEIRA TRANSPORT CORRIDOR PROJECT

The number of diesel shunters in the fleet is 30. It is recommended that 6 diesel shunters be acquired for the Beira Complex and that the shortfall of 4 is met by continuing to use the aged steam locos (1947 and 1955 vintage) until 1994, when they can be replaced by 4 diesels.

7.10 **Future Acquisition Program 1992-1995:**

(a) If 15 locomotives are acquired now, the projections of future acquisitions until 1995 for traffic growth would be as follows (from para. 22.5 above):

1994 - 4
1995 - 6
10 -- This covers needs for traffic growth, as well as to cover scrapping of 5 diesels of 1968-69 vintage in 1994-95.

(b) To cover the steam locomotive scrapping program--the 14 Garratt steam locomotives are of 1952 vintage, and would have to be planned to be scrapped between 1992 and 1995. The same is the case with the 8 shunting steam locos (1946, 1950 and 1955 vintages) and 6 simple steam locos (1947 and 1955 vintages). The requirements in terms of diesel for replacement would be:

Diesel main-line	-	12 (paras. 17 & 18)
Diesel shunters	-	4 (para. 19)

(c) The following provisional acquisition program is, therefore, recommended, subject to a mid-term review:

	1994	1995
Diesel main-liners	11	11
Diesel shunters	4	--

8. **SENA LINE:**

The SENA Line (now closed) has been excluded from consideration in the discussion above. If and when it is to be opened for traffic, the locomotive requirements for the line will need to be assessed.

Attachments:
1/1 - Calculation of Loco. Requirements - Goba Line
1/2 - Calculation of Loco. Requirements - R. Garcia Line
1/3 - Calculation of Loco. Requirements - Limpopo Line
1/4 - Calculation of Loco. Requirements - Nacala - Nampula
1/5 - Calculation of Loco. Requirements - Nampula - Cuamba
2 - Locomotive Fleet - Ages and Status
3 - Projections of Freight Locomotive Utilization

Data Sources: (i) RITES Report; (ii) Discussions with CFM(C),CFM(S) and RITES TEAM.

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ANNEX 4
Attachment - 1/1

MOZAMBIQUE
BEIRA TRANSPORT CORRIDOR PROJECT

CALCULATION OF LOCO REQUIREMENTS FOR GOBA LINE: (68.5 KM)

Coefficients:

1. Seasonality factor -- 1.0
2. Loadability factor -- 0.9
3. Surplus Loop Capacity factor -- 1.0
4. Operating allowance -- 20%
5. Constrained empty movement -- negligible
6. Adjustment factor for train load = (2) x (3) x (1-(4)) = 0.72
7. Maximum trailing load = 1650 T
8. Gross load/payload of wagons = 1.48
9. Average net load per down train = 1650 x 0.72/1.48 = 803T
10. Annual net throughput per train per day = 330 x 803 = 265,000T

PARTICULARS:

	1991 (12 Hr Wkg)	1991 (24 Hr Wkg)	1995 (24 Hr Wkg)
Traffic - up ('000 T)	303	303	432
Traffic - down ('000 T)	974	974	1360
Running time (up & down-hrs.)	7.22	7.22	6.52
Terminal detn. (both ends-hrs.)	*	5.00	5.00
Fuelling & servicing (hrs.)	*	1.00	1.00
Turn-round (hrs)	24.00	13.22	12.52
Turn-round (days)	1.00	0.55	0.52
No. of trains per day (with season. factor 1.0)	3.68	3.68	5.13
Loco. Reqt. (bare)	3.68	2.02	2.67
Loco. Reqt. (total)	4.89	2.69	3.55 (avl. 75%)

* included in night halt.

ANNEX 4
Attachment - 1/2

MOZAMBIQUE
BEIRA TRANSPORT CORRIDOR PROJECT

CALCULATION OF LOCO REQUIREMENTS FOR R. GARCIA LINE: (88 KM)

Coefficients:

1. Seasonality factor -- 1.0
2. Loadability factor -- 0.9
3. Surplus Loop Capacity factor -- 1.0
4. Operating allowance -- 20%
5. Constrained empty movement -- negligible
6. Adjustment factor for train load = (2) x (3) x (1-(4)) = 0.72
7. Maximum trailing load = 1800 T
8. Gross load/payload of wagons = 1.48
9. Average net load per down train = 1800 x 0.72/1.48 = 876T
10. Annual net throughput per train per day = 330 x 876 = 289,000T

PARTICULARS:

	1991 (12 Hr Wkg)	1991 (24 Hr Wkg)	1995 (24 Hr Wkg)
Traffic - up ('000 T)	817	817	873
Traffic - down ('000 T)	1816	1816	2353
Running time (up & down-hrs.)	8.38	8.38	7.04
Terminal detn. (both ends-hrs.)	*	5.00	5.00
Fuelling & servicing (hrs.)	*	1.00	1.00
Turn-round (hrs)	24.00	14.38	13.04
Turn-round (days)	1.00	0.60	0.54
No. of trains per day (with season. factor 1.0)	7.54	7.54	9.77
Loco. Reqt. (bare)	7.54	4.52	5.28
Loco. Reqt. (total)	10.03	6.01	7.02 (avl. 75%)

* included in night halt.

ANNEX 4
Attachment - 1/3

MOZAMBIQUE
BEIRA TRANSPORT CORRIDOR PROJECT

CALCULATION OF LOCO REQUIREMENTS FOR LIMPOPO LINE: (522 KM)

Coefficients:

1. Seasonality factor -- 1.0
2. Loadability factor -- 0.9
3. Surplus Loop Capacity factor -- 1.0
4. Operating allowance -- 20%
5. Constrained empty movement -- negligible
6. Adjustment factor for train load = (2) x (3) x (1-(4)) = 0.72
7. Maximum trailing load = 1800 T
8. Gross load/payload of wagons = 1.48
9. Average net load per down train = 1800 x 0.72/1.48 = 876T
10. Annual net throughput per train per day = 330 x 876 = 289,000T

PARTICULARS:

	1991 (12 Hr Wkg)	1991 (24 Hr Wkg)	1995 (24 Hr Wkg)
Traffic - up ('000 T)	318	318	438
Traffic - down ('000 T)	913	913	1148
Running time (up & down-hrs.)	54.95	54.95	49.70
Terminal detn. (both ends-hrs.)	*	5.00	5.00
Fuelling & servicing (hrs.)	*	8.00	8.00
Turn-round (hrs)	120.00	67.95	62.70
Turn-round (days)	5.00	2.83	2.61
No. of trains per day (with season. factor 1.0)	3.79	3.79	4.77
Loco. Reqt. (bare)	18.95	10.73	12.45
Loco. Reqt. (total)	25.20	14.27	16.56 (avl. 75%)

* included in night halt.

ANNEX 4
Attachment - 1/4

MOZAMBIQUE
BEIRA TRANSPORT CORRIDOR PROJECT

CALCULATION OF LOCO REQUIREMENTS FOR NACALA - NAMPULA: (192 KM)

Coefficients:

1. Seasonality factor -- 1.2
2. Loadability factor -- 0.9
3. Surplus Loop Capacity factor -- 1.12
4. Operating allowance -- 20%
5. Constrained empty movement -- negligible
6. Adjustment factor for train load = (2) x (3) x (1-(4)) = 0.81
7. Maximum trailing load (up) = 1500T (double-headed)
8. Gross load/payload of wagons = 1.48
9. Average net load per down train = 1500 x 0.81/1.48 = 821T (double-headed)
10. Annual net throughput per train per day = 330 x 821 = 271,000T

PARTICULARS:

	1991 (12 Hr Wkg)	1991 (24 Hr Wkg)	1995 (24 Hr Wkg)
Traffic - up ('000 T)	259	259	517
Traffic - down ('000 T)	218	218	423
Running time (up & down-hrs.)	15.36	15.36	15.36
Terminal detn. (both ends-hrs.)	*	5.00	5.00
Fuelling & servicing (hrs.)	*	4.00	4.00
Turn-round (hrs)	24.00	24.00	24.00
Turn-round (days)	1.00	1.00	1.00
No. of trains per day (with season. factor 1.0)	1.15	1.15	2.29
Loco. Reqt. (bare)	2.30	2.30	4.58 (double-hd)
Loco. Reqt. (total)	3.06	3.06	6.09 (avl. 75%)

* included in night halt.

ANNEX 4
Attachment - 1/5

MOZAMBIQUE
BEIRA TRANSPORT CORRIDOR PROJECT

CALCULATION OF LOCO REQUIREMENTS FOR NAMPULA - CUAMBA: (346 KM)

Coefficients:

1. Seasonality factor -- 1.2
2. Loadability factor -- 0.9
3. Surplus Loop Capacity factor -- 1.12
4. Operating allowance -- 20%
5. Constrained empty movement -- negligible
6. Adjustment factor for train load = (2) x (3) x (1-(4)) = 0.81
7. Maximum trailing load (up) = 1500T (double-headed)
8. Gross load/payload of wagons = 1.48
9. Average net load per down train = 1500 x 0.81/1.48 = 821T (double-headed)
10. Annual net throughput per train per day = 330 x 821 = 271,000T

PARTICULARS:

	----1991----------		---1995----
	(12 Hr Wkg)	(24 Hr Wkg)	(24 Hr Wkg)
Traffic - up ('000 T)	259	259	517
Traffic - down ('000 T)	218	218	423
Running time (up & down-hrs.)	27.68	27.68	27.68
Terminal detn. (both ends-hrs.)	*	5.00	5.00
Fuelling & servicing (hrs.)	*	8.00	8.00
Turn-round (hrs)	48.00	40.68	40.68
Turn-round (days)	2.00	1.70	1.70
No. of trains per day } (with season. factor 1.0) }	1.15	1.15	2.29
Loco. Reqt. (bare)	4.60	3.91	7.79 (double-hd)
Loco. Reqt. (total)	6.12	5.20	10.36 (avl. 75%)

* included in night halt.

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ANNEX 4
Attachment 2

MOZAMBIQUE
BEIRA TRANSPORT CORRIDOR PROJECT

DNPCF

AGE STATEMENT OF LOCOMOTIVES

Purchase Year			Scrapped/ to be scrapped	Under/ awaiting major repairs	Serviceable
GEs -	1966 - 3		3	-	-
	1966 - 8	-	6	2	-
	1968 - 2	-	1	-	1
	1969 - 5	-	1	2	2
	1974 - 16	-	1	4	11
	1979 - 24	-	7	5	12
	1981 - 16		-	3	13
	1984 - 9		-	2	7
	83		19	18	46
AEI -	1964 - 10		8	-	2(Malawi)
D/Hydraulic	1981 - 31		1	22	8
Garratts	1952 - 14		-	6	8
Shunting steam	1946 - 4		-	2	2
	1950 - 4		2	1	1
	1955 - 2		-	2	-
	10		2	5	3
Simple steam (CFM(C)					
	1947 - 2		-	1	1
	1955 - 4		-	1	3
	6		-	2	4
Simple steam (CFM(N)					
	1923 - 1		-	-	1
	1936 - 2		1	1	-
	1950 - 1		1	-	-
	1955 - 1		-	1	-
	5		2	2	1

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BEIRA TRANSPORT CORRIDOR PROJECT

PROJECTIONS OF FREIGHT LOCOMOTIVE UTILIZATION

CFM (C):

	1991 (12 Hr. Wkg)	1991 (24 Hr. Wkg)	1995 (24 Hr Wkg)
BA - NTA (98 km)			
Av. No. of trains each way/day	2.69	2.69	2.87
Eng. km/day	527	527	563
Eng. km/yr (330 days)	173,910	173,910	185,790
No. of locos in use	3.20	2.08	2.13
NTA - MP (216 km)			
Av. No. of trains each way/day	2.69	2.69	2.87
Eng. km/day (double-headed)	2,324	2,324	2,480
Eng. km/yr (330 days)	766,920	766,920	818,400
No. of locos in use	12.80	6.91	7.22
Total Eng. km/year (BA - MP)	940,830	940,830	1,004,190
Total No. of locos in use	16.0	8.99	9.35
Eng. km/year/loco in use	58,802	104,653	107,400
Eng. km/year/loco on line	44,102	78,490	80,550

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BEIRA TRANSPORT CORRIDOR PROJECT

CFM (S)

	1991 (12 Hr. Wkg)	1991 (24 Hr. Wkg)	1995 (24 Hr Wkg)
Goba Line (68.5 km)			
Av. No. of trains each way/day	3.68	3.68	5.13
Eng. km/day	504	504	703
Eng. km/year (330 days)	166,320	166,320	231,990
No. of locos in use	3.68	2.02	2.67
R. Garcia Line (88 km)			
Av. No. of trains each way/day	6.28	6.28	8.14
Eng. km/day	1,105	1,105	1,433
Eng. km/year (330 days)	364,650	364,650	472,890
No. of locos in use	7.54	4.52	5.28
Limpopo Line (522 km)			
Av. No. of trains each way/day	3.16	3.16	3.98
Eng. km/day	3,299	3,299	4,155
Eng. km/year (330 days)	1,088,670	1,088,670	1,371,150
No. of locos. in use	18.95	10.73	12.45
Total Eng. km/year	1,619,640	1,619,640	2,076,030
Total loco in use	30.17	17.27	20.40
Eng. km/year/loco in use	53,684	93,783	101,766
Eng. km/year/loco on line	40,263	70,262	76,325

ANNEX 4
Attachment 3
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BEIRA TRANSPORT CORRIDOR PROJECT

CFM (N)

	1991 (12 Hr. Wkg)	1991 (24 Hr. Wkg)	1995 (24 Hr Wkg)
NAC-CUA (538 km)			
Av. No. of trains each way/day	0.96	0.96	1.91
Eng. km/day (double-headed)	2,066	2,066	4,110
Eng. km/year (330 days)	681,780	681,780	1,356,300
No. of locos in use	6.90	6.21	12.37
CUA-EL (77 km)			
Av. No. of trains each way/day	1.0	1.0	1.5
Eng. km/day	154	154	231
Eng. km/year (300 days-RITE)	46,200	46,200	69,300
No. of locos in service	0.5	0.5	0.5
CUA-LIC (262 km)			
Av. No. of trains each way/day	0.5	0.5	0.5
Eng. km/day	262	262	262
Eng. km/yr (300 days-RITES)	78,600	78,600	78,600
No. of locos in use	1.0	1.0	1.0
Total Eng. km/yr	806,580	806,580	1,504,200
Total loco in use	8.40	7.71	13.87
Eng. km/yr/loco in use	96,021	104,615	108,450
Eng. km/yr/loco on line	72,016	78,461	81,338

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ANNEX 5
Page 1 of 2

BEIRA TRANSPORT CORRIDOR PROJECT

1.HANDLING RATES

	PAST PERFORMANCE (TONS/HOUR)								TARGET VALUES (TONS/HOUR OR CONTAINERS/HOUR)					
	81	82	83	84	85	86	87	88 ESTIM	89	90	91	92	93	COMMENTS
CABOTAGE	13.3	12.7	11.9	8.2	5.8	4.1	7.8	12	12	13.3	15	20	25	1981 LEVEL REACHED AGAIN IN 90,THEN IMPROVEMENTS DUE TO PALLETIZATION (SHIPPERS CONTROL NEEDED)
GENERAL CARGO CONTAINERS EXCLUDED	28.8	20.7	19.8	14.5	15.7	10.5	17.3	20	22	28.8	30	32	35	1981 LEVEL REACHED BACK IN 90,THEN IMPROVEMENTS DUE TO PALLETIZATION
GRAINS & FERTILISERS	24.7	26.4	28.5	26.9	19.7	18.8	27.7	35	35	100	100	100	100	PNEUMATIC DISCHARGING EQUIPMENT IN 90
OIL PRODUCTS	112.5	181.1	166.8	150.5	130.7	158.6	158.6	160	160	160	900	900	900	FOR LARGE VESSELS
											100	100	100	FOR SMALL VESSELS (LESS THAN 4500T)
RO-RO	98.8	74.7	68.1	93	87.4	90.6	81.6	250	200	200	200	200	200	
CONTAINER TERMINAL	--	--	--	--	--	--	--	--	--	--	20	22	25	NUMBER OF CONTAINERS PER HOUR,NOT T/H
COPPER							40	70	70	70	70	70	70	ON MULTIPURPOSE TERMINAL

2.EQUIPMENT AVAILABILITY

	PAST PERFORMANCE							TARGETS					
	81	82	83	84	85	86	87	89	90	91	92	93	COMMENTS
ELECTRIC CRANES)=20T	100%	80%	100%	100%	100%	92%	100%	90%	90%	90%	90%	90%	AVAILABILITY IS CALCULATED ON AN AVERAGE ON THE WHOLE YEAR;SYSTEMATIC AS WELL AS
ELECTRIC CRANES <20T	85%	80%	78%	77%	78%	68%	70%	90%	90%	90%	90%	90%	NON-SYSTEMATIC MAINTENANCE TIMES ARE NON-AVAILABILITY TIME
FORKLIFTTS >20T	100%	80%	53%	50%	57%	34%	61%	75%	75%	75%	75%	75%	IDEM
FORKLIFTS<20T	70%	78%	55%	53%	67%	82%	87%	75%	75%	75%	75%	75%	IDEM
TRACTORS	65%	50%	7%	9%	14%	23%	33%	75%	75%	75%	75%	75%	IDEM
TRAILERS	100%			53%	40%	66%	63%	80%	80%	80%	80%	80%	IDEM
RO-RO TRACTORS	100%	75%	50%	80%	71%	77%	56%	75%	75%	75%	75%	75%	IDEM
MOBILE CRANES	20%	24%	29%	14%	14%	30%	40%	60%	70%	70%	70%	70%	IDEM
TUG BOATS	50%	50%	50%	25%	24%	31%	20%	75%	75%	75%	75%	75%	IDEM

ANNEX 5
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MOZAMBIQUE

BEIRA TRANSPORT CORRIDOR PROJECT

RAILWAY OPERATIONAL TARGETS

A. FREIGHT OPERATIONS	1988	1989	1990	1991	1992	1993
1. annual traffic up tonnes(1000)	152	150	170	373	380	390
down tonnes(1000)	320	340	380	729	740	750
TOTAL tonnes(1000)	472	490	550	1102	1120	1140
2.						
freight train						
Beira-Nta km/h	22	23	23	23	24	25
Nta-Machipanda km/h	25	26	26	26	27	27
3. average detention of NRZ wagons on CFM (days)	19.5	17	15	12	9	9
4. average holding of NRZ wagons on CFM	453	395	350	550	410	410
B. LOCOMOTIVES						
5. Diesel Locomotives Availability(%)						
main line	60	65	70	75	75	75
shunting	n.a.		80	75	75	75
6. Steam Locomotives Availability(%)						
(garrats)	45	55	60	60	60	60
7. Loco Kms/loco/year						
diesel main line(000's)	35	40	45	72	125	132
8. Failures/100000 kms						
diesel main line(000's)	2.5	2.4	2.3	1.8	1.8	1.8
C. WAGONS						
9. Availability of each type of wagon(%)						
low side open	87	88	89	90	90	90
high side open	65	70	75	80	80	80
covered	82	85	88	90	90	90
flat	77	79	83	85	85	85
tank	60	66	73	80	80	80
D. TRACK						
10. Speed Restriction						
20km/h	10	8	6	5	5	5
30km/h	45	40	30	20	15	12
40km/h	20	18	15	10	10	8

MOZAMBIQUE

BEIRA TRANSPORT CORRIDOR PROJECT

Table 6.1 Economic evaluation of the Beira Corridor ('000s US dollars)
Total programme (Limpopo, Nacala open in 1991)

YEAR	PROJECT COSTS	BASE CASE INVEST	PORT BENEFITS	INLAND TRANS. BENEFITS	FREIGHT BENEFITS	NET BENEFITS
1988	-27166					-27166
1989	-68692	0	6749	4070		-57873
1990	-84920	13940	5261	4344		-61375
1991	-54530	3230	19444	-450	3252	-29054
1992	-18617	2890	20817	6524	4857	16271
1993	-17047	2210	23815	8349	4838	22165
1994	-20073	2040	27275	10685	5028	24955
1995	-8914	1105	31279	13675	5227	42372
1996	-7885	1105	30277	13681	5424	42802
1997	-8072	9605	29317	14089	5630	50569
1998	-10435	1530	28400	14301	5844	39640
1999	-7885	1530	27523	14516	6069	41753
2000	-8072	1530	26685	14734	6303	41160
2001	-11906	1530	26606	15224	6547	38001
2002	-7885	10030	26527	15731	6804	51207
2003	-8072	1955	26450	16254	7076	43663
2004	-7885	1955	26372	16795	7362	44599
2005	-10435	1955	26296	17354	7668	42835
2006	67839	-15534				52305
NPV @ 10%	-255468	26785	173167	76920	33956	55360
Internal Rate of Return			14.1%			

Table 6.2 Economic evaluation of the Beira Corridor ('000s US dollars)
Total programme (Limpopo, Nacala delayed until 1993)

YEAR	PROJECT COSTS	BASE CASE INVEST	PORT BENEFITS	INLAND TRANS. BENEFITS	FREIGHT BENEFITS	NET BENEFITS
1988	-27166					-27166
1989	-68692	0	6749	4070		-57873
1990	-84920	13940	5261	4344		-61375
1991	-54530	3230	15076	10308	3252	-22664
1992	-18617	2890	17859	47215	4470	53817
1993	-17047	2210	25607	6524	4683	22177
1994	-20073	2040	29375	9445	4914	24701
1995	-8914	1105	31279	13675	5167	42312
1996	-7885	1105	30277	13881	5348	42726
1997	-8072	9605	29317	14089	5536	50475
1998	-10435	1530	28400	14301	5731	3952'
1999	-7885	1530	27523	14516	5935	41619
2000	-8072	1530	26685	14734	6146	41023
2001	-11906	1530	26606	15224	6401	37855
2002	-7885	10030	26527	15731	6670	51073
2003	-8072	1955	26450	16254	6955	43542
2004	-7885	1955	26372	16795	7256	44493
2005	-10435	1955	26296	17354	7574	42744
2006	67839	-15534				52305
NPV @ 10%	-255468	26785	169723	110962	33273	85275
Internal Rate of Return			16.7%			

Table 6.3 Economic evaluation of the IDA assisted projects ('000s US dollars)
Beira Corridor (Limpopo, Nacala open in 1991)

YEAR	PROJECT COSTS	LEASE COST TO CFM-C	PORT BENEFITS	INLAND TRANS BENEFITS	FREIGHT BENEFITS	NET BENEFITS
1988	-1807					-1807
1989	-11484	0	0	0		-11484
1990	-7922	2000	8617	1018		3713
1991	-36529	2100	3423	-196	3252	-27950
1992	-8388	2200	3566	2454	4657	4489
1993	-9112	22300	4361	3878	4838	26265
1994	-4212	2400	5333	6127	5028	14676
1995	-4212	2400	6522	9682	5427	19819
1996	-4212	2400	6523	9927	5424	20062
1997	-4212	2400	6525	10177	5630	20520
1998	-4212	2400	6526	10434	5844	20992
1999	-4212	2400	6527	10698	6069	21482
2000	-4212	2400	6529	10968	6303	21988
2001	-4212	2400	7852	11366	6547	23953
2002	-4212	2400	9444	11777	6804	26213
2003	-4212	2400	11358	12204	7076	28826
2004	-4212	2400	13661	12647	7362	31858
2005	-4212	2400	16430	13105	7665	35388
2006	10000	0				10000
NPV @ 10%	-73647	28734	47592	48079	33956	84714
Internal Rate of Return			34.7%			

Table 6.4 Economic evaluation of the IDA assisted projects ('000s US dollars)
Beira Corridor (Limpopo, Nacala open in 1991) 25% drop in int. traffic

YEAR	PROJECT COSTS	LEASE COST TO CFM-C	PORT BENEFITS	INLAND TRANS. BENEFITS	FREIGHT BENEFITS	NET BENEFITS
1988	-1807					-1807
1989	-11484	0	0	0		-11484
1990	-7922	2000	8617	1018		3713
1991	-36529	2100	3423	-196	2439	-28763
1992	-8388	2200	3566	823	3353	1554
1993	-9112	22300	4361	1619	3512	22680
1994	-4212	2400	5333	3184	3686	10391
1995	-4212	2400	6522	6263	3875	14848
1996	-4212	2400	6523	6609	4011	15331
1997	-4212	2400	6525	6974	4152	15839
1998	-4212	2400	6526	7359	4298	16371
1999	-4212	2400	6527	7765	4451	16931
2000	-4212	2400	6529	8194	4610	17521
2001	-4212	2400	7852	8469	4801	19310
2002	-4212	2400	9444	8754	5003	21389
2003	-4212	2400	11358	9048	5216	23810
2004	-4212	2400	13661	9352	5442	26643
2005	-4212	2400	16430	9666	5681	29965
2006	10000	0				10000
NPV @ 10%	-73647	28734	47592	32355	24955	59989
Internal Rate of Return			28.3%			

MOZAMBIQUE
BEIRA TRANSPORT CORRIDOR PROJECT

Base case: Traffic projection for Beira Port (1000 metric tons):

	1989	1990	1991	1992	1995	2000	2005
Mozambique:							
Cabotage	156	160	160	160	180	180	220
Gen. Cargo	21	22	23	25	30	45	53
Containers	25	27	29	31	39	53	62
Bags	51	58	65	73	105	166	197
Metal	4	5	6	7	12	19	23
Liq. bulk	2	3	4	5	11	25	34
Dry bulk	0	0	0	0	0	0	0
Foodgr. bulk	94	83	73	65	45	57	73
P.O.L.	115	120	125	131	150	180	240
	468	477	486	497	572	724	902
Zimbabwe:							
P.O.L.	769	791	813	836	908	1041	1196
Total	1237	1268	1299	1333	1480	1765	2098

TABLE 6.5.1

Traffic Projection, Overseas trade of Mozambique (Centro), 1990-2005 (1000 metric tons)

Commodity	1990	1995	2000	2005
EXPORTS:				
COAL	..	..	..	..
CEMENT	0	0	0	0
MOLASSES	7	17	30	53
SUGAR	15	45	75	125
CITRUS	8	10	14	20
COTTON	5	10	13	17
TIMBER	8	10	13	17
OTHER EXPORTS	27	34	50	74
TOTAL	70	126	195	305
IMPORTS:				
CEREALS	40	60	60	60
FERTILIZER	20	50	61	74
IRON & STEEL	15	25	30	36
OTHER IMPORTS	85	116	146	184
TOTAL	160	251	297	354
CABOTAGE	160	200	220	260
PETROLEUM PROD	120	150	180	240
TOTAL TRADE	510	727	892	1159

TRAFFIC PROJECTION, OVERSEAS TRADE OF ZIMBABWE (1000 METRIC TONS)

COMMODITY	1989	1990	1991	1992	1995	2000	2005
EXPORTS							
MAIZE (b)	20	20	20	20	20	20	20
COTTON	68	72	76	81	96	130	130
TOBACCO	79	83	87	92	108	123	140
SUGAR	78	75	60	45	0	0	0
COFFEE & TEA	21	22	23	24	27	30	33
FERRO-ALLOYS	230	240	251	262	300	320	341
ASBESTOS	180	180	180	180	180	180	180
COPPER	20	20	20	20	20	40	40
OTHER MINERALS	20	20	20	20	20	20	20
IRON/STEEL	316	328	340	353	395	380	380
OTHER EXPORTS	126	139	155	172	236	321	437
TOTAL	1158	1199	1233	1269	1402	1564	1721
IMPORTS							
P.O.L. (a)	770	791	813	836	908	1041	1196
IRON & STEEL	20	20	20	20	20	20	20
FERTILIZ/DRY	30	30	30	30	30	30	30
FERTILIZ/LIQ	0	0	0	0	0	0	0
WHEAT (b)	100	100	100	100	100	80	80
TALLOW	0	0	0	0	0	0	0
OTHER IMPORTS	265	268	271	274	283	278	273
TOTAL	1185	1209	1234	1260	1341	1449	1599
TOTAL TRADE	2342	2408	2467	2529	2743	3013	3320

SOURCE: SATCC, NORCONSULT(a), NEI (b).

TABLE 6.5.3

TRAFFIC PROJECTION, OVERSEAS TRADE OF MALAWI (1000 METRIC TONS)

COMMODITY	1989	1990	1991	1992	1995	2000	2005
EXPORTS:							
TOBACCO	75	78	81	84	93	98	103
TEA	39	40	41	41	43	46	49
SUGAR	75	75	75	75	75	75	75
MOLASSES	0	0	0	0	0	0	0
COTTON	6	6	6	7	8	10	13
GROUNDNUTS	10	11	12	12	14	17	21
PULSES	11	11	11	11	11	11	11
OTHER EXPORTS	7	7	7	8	9	12	16
TOTAL	224	228	233	237	253	269	288
IMPORTS:							
P.O.L. (a)	124	128	132	137	152	181	215
WHEAT	17	18	19	20	23	27	32
FERTILISER	55	60	66	72	96	72	72
OTHER IMPORTS	96	96	97	98	101	129	165
TOTAL	290	302	314	327	372	409	483
TOTAL TRADE	514	530	547	565	625	678	771

SOURCE: SATCC, NORCONSULT (a).

MOZAMBIQUE
BEIRA TRANSPORT CORRIDOR PROJECT

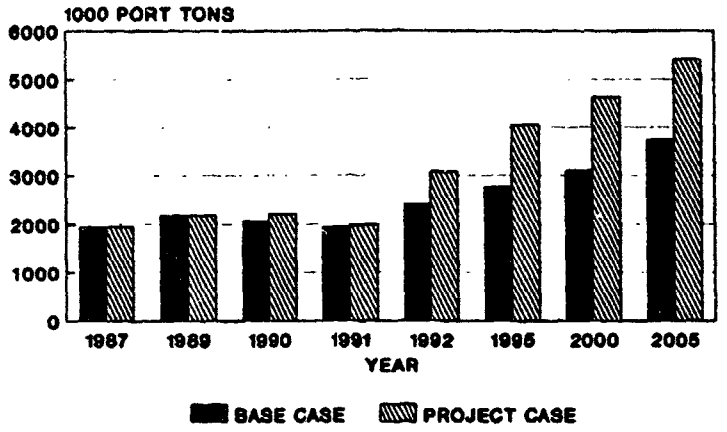
Project Case: Traffic Forecast for Beira Port and Corridor (in 1000 metric tons)

	1987 actual	1989	1990	1991	1992	1995	2000	2005
Mozambique:	402	484	510	537	579	727	892	1159
Exports	24	64	70	77	86	126	195	305
Imports	158	146	160	176	193	251	297	354
Cabotage	159	160	160	160	170	200	220	260
P.O.L.	61	115	120	125	131	150	180	240
Zimbabwe:	943	1044	1109	880	1665	1845	2089	2358
Exports	114	205	225	67	508	594	729	846
Imports	86	69	93	0	321	343	319	316
P.O.L.	744	770	791	813	836	908	1041	1196
Malawi:	68	50	15	0	0	377	411	468
Exports	63	50	15	0	0	216	232	251
Imports	5	0	0	0	0	161	179	217
Zambia:	89	100	60	100	120	170	170	170
Exports	89	100	60	100	100	140	140	140
Imports	0	0	0	0	20	30	30	30
GRAND TOTAL	1502	1678	1694	1517	2364	3119	3562	4155
Loaded	290	419	370	244	693	1076	1298	1542
Unloaded	248	214	253	175	534	785	825	917
Cabotage	159	160	160	160	170	200	220	260
P.O.L.	805	885	911	938	967	1058	1221	1436
PORT TONS (APPR.)	1948	2181	2202	1972	3073	4055	4631	5402
RAIL TRANSIT TRAFFIC:								
Beira-Machipanda:								
UP	95	69	93	0	341	340	316	314
DOWN	302	355	300	167	608	727	861	977
Beira-Vila Nova Frontaira (Sena-line):								
UP	0	0	0	0	0	161	179	217
DOWN	0	0	0	0	0	216	232	251
ROAD TRAFFIC:								
Beira-Machipanda:								
UP	n.a.	0	0	0	0	33	33	32
DOWN	n.a.	0	0	0	0	7	8	9

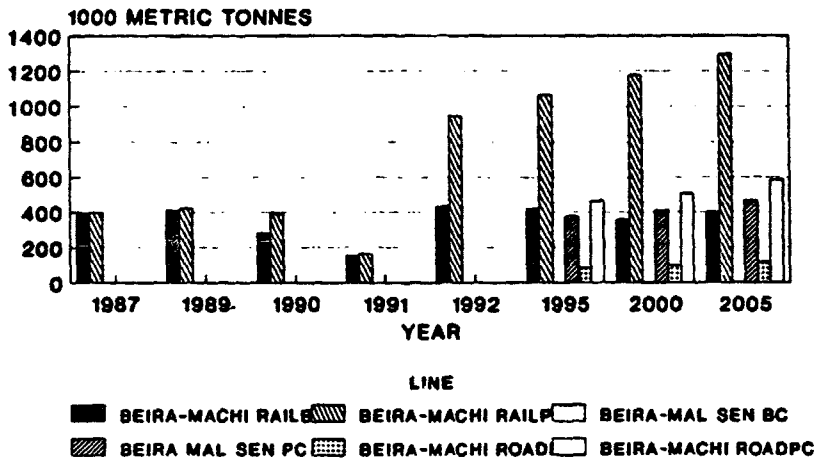
Base Case : Traffic Forecast for Beira Port and Corridor (in 1000 metric tons)

	1987 actual	1989	1990	1991	1992	1995	2000	2005
Mozambique:	402	484	510	537	579	727	892	1159
Exports	24	64	70	77	85	126	195	305
Imports	158	145	160	175	193	251	297	354
Cabotage	159	160	160	160	170	200	220	260
P.O.L.	61	115	120	125	131	150	180	240
Zimbabwe:	943	1044	1001	886	1278	1398	1495	1717
Exports	114	205	166	53	297	370	345	411
Imports	85	69	44	0	140	120	109	110
P.O.L.	744	770	791	813	836	908	1041	1196
Malawi:	68	50	15	0	0	0	0	0
Exports	63	50	15	0	0	0	0	0
Imports	5	0	0	0	0	0	0	0
Zambia:	89	100	60	100	0	0	0	0
Exports	89	100	60	100	0	0	0	0
Imports	0	0	0	0	0	0	0	0
GRAND TOTAL	1502	1678	1586	1503	1852	2125	2387	2876
Loaded	290	419	311	230	382	496	540	716
Unloaded	248	214	204	175	333	371	406	464
Cabotage	159	160	160	160	170	200	220	260
P.O.L.	805	885	911	938	967	1058	1221	1436
PORT TONS (APPR.)	1948	2181	2062	1954	2408	2763	3103	3739
RAIL TRANSIT TRAFFIC:								
Beira-Machipanda:								
UP	95	69	44	0	140	74	65	67
DOWN	302	355	241	153	297	348	293	334
Beira-Vila Nova Fronteira (Sena-line):								
UP	0	0	0	0	0	0	0	0
DOWN	0	0	0	0	0	0	0	0
ROAD TRAFFIC:								
Beira-Machipanda:								
UP	n.a.	0	0	0	0	46	44	43
DOWN	n.a.	0	0	0	0	22	52	77

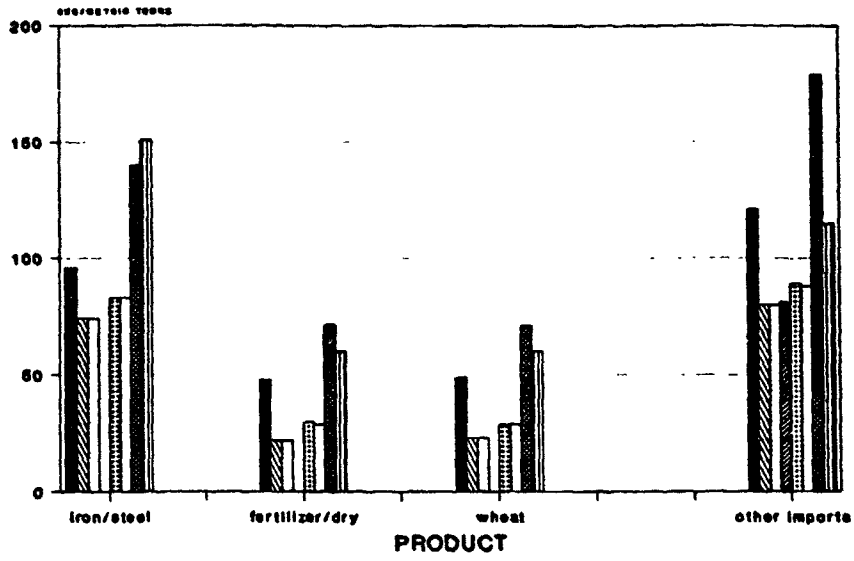
BEIRA PORT TRAFFIC
(1000 PORT TONS)
PROJECT VS BASE CASE



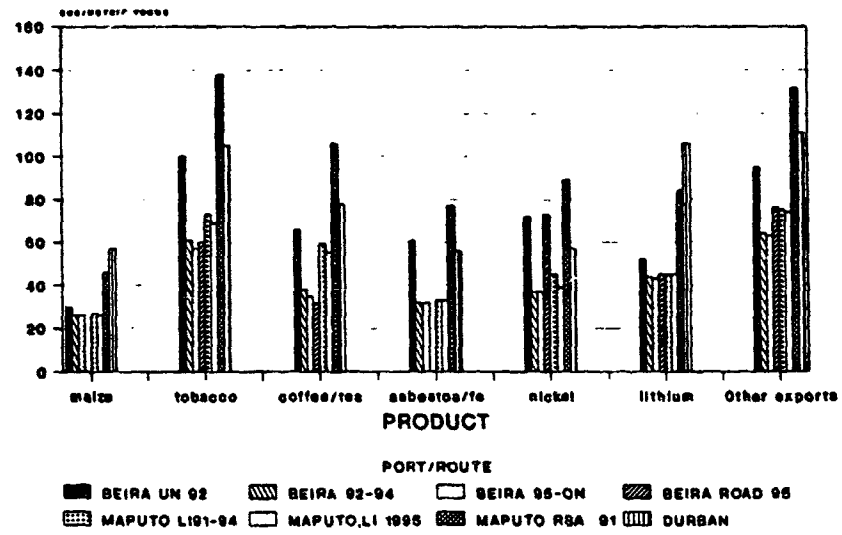
RAIL & ROAD TRANSIT TRAFFIC
BEIRA CORRIDOR
PROJECT VS BASE CASE



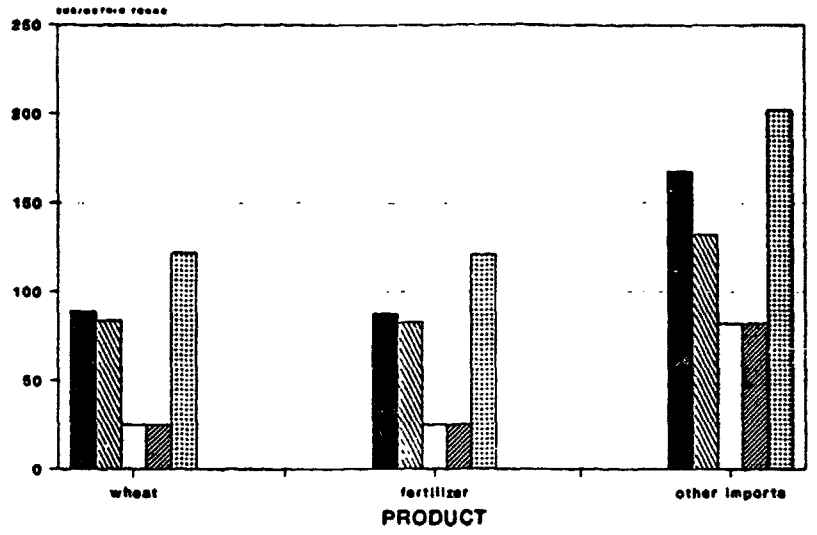
GENERALIZED TRANSPORT COSTS FOR SELECTED ZIMBABWE IMPORTS



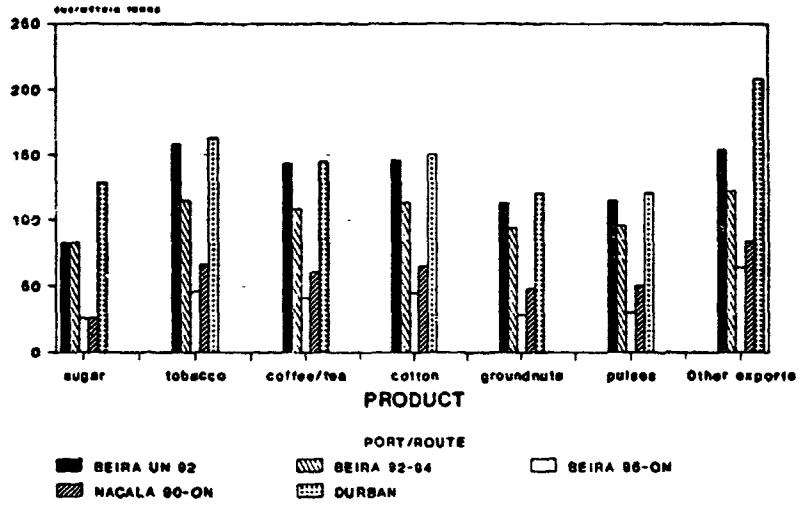
GENERALIZED TRANSPORT COSTS FOR SELECTED ZIMBABWE EXPORTS



GENERALIZED TRANSPORT COSTS
FOR SELECTED MALAWI IMPORTS



GENERALIZED TRANSPORT COSTS
FOR SELECTED MALAWI EXPORTS



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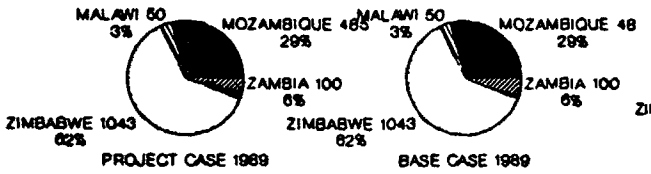
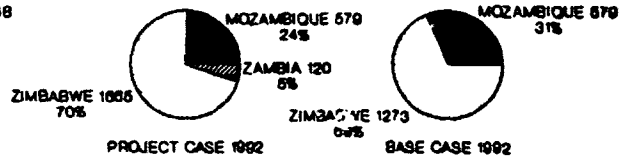
REIRA TRANSPORT CORRIDOR PROJECT

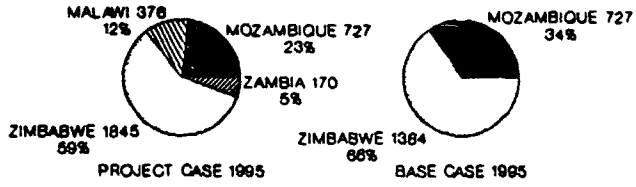
PORT TRAFFIC BY ORIGIN
(1000 METRIC TONNES)



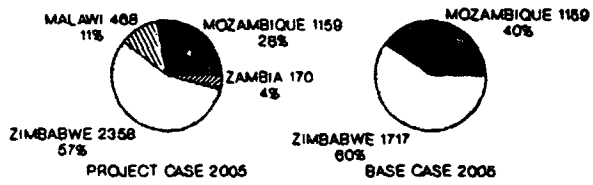
PORT TRAFFIC BY ORIGIN
(1000 METRIC TONNES)



PORT TRAFFIC BY ORIGIN
(1000 METRIC TONNES)



PORT TRAFFIC BY ORIGIN
(1000 METRIC TONNES)



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BEIRA TRANSPORT CORRIDOR PROJECT

FINANCIAL ANALYSIS

Projected Operating Statements - CFM(C)

1. CFM(C)'s operating financial statements for the past five years are shown in Table FA.01. while projections for the period 1988 to 2005 are presented in Table FA.02. The underlying assumptions behind the projections are:

(a) Revenues. These are projected for railways in accordance with the average tariffs by revenue category, namely, number of travellers and tons carried, distinguished between local and international traffic, and for port are based on tons loaded, unloaded, average days of ship stay, container volumes and bulk liquids in accordance with the traffic forecasts. After 1990 the tariffs related to commodities carried (railway and port) are assumed to increase by 20%, which would be justified by the improvements in the quality of service resulting from the ongoing major investment program.

(b) Expenses. These are projected under the main headings of expenses, namely:

- Materials, which consist mainly of fuel, are assumed to vary directly in relation to railway and port traffic. Also included are estimates for locomotive maintenance, amounting to US$30,000 per locomotive per year, and dredging costs, amounting to US$4,000,000 per year for channel maintenance.

- Wages and salaries are projected in accordance with forecast numbers of personnel for both railway and port. After 1990 numbers are assumed constant due to productivity improvements.

- General Expenses, are mainly those incurred by the railway relating to the rent of locomotives and wagons, for which it is assumed that after 1990, with the acquisition of locomotives and rehabilitation of wagons, a 66% reduction of costs will occur.

- Depreciation projections were based on existing assets and planned investments on a straight line basis for railway and port, according to the life of the assets.

- Interest expenses are projected on the basis of known interest rates and repayment terms for present and future loans.

ANNEX 7
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BEIRA TRANSPORT CORRIDOR PROJECT

(PMIC)

Profit and Loss Statement

Usd'000

	1983	1984	1985	1986	1987	1987 %	1987 %
Revenues							
railway	4,515	5,986	5,609	6,315	7,333	41	41
port	12,029	10,940	11,010	9,140	10,560	58	58
general	1,034	785	2,349	843	226	1	1
	17,579	17,710	18,969	16,299	18,118	100	100
Working Expenses							
Material & Supplies							
railway	1,074	1,242	1,350	1,143	711	7	4
port	350	540	866	512	176	2	1
general	597	537	247	314	152	2	1
	2,021	2,318	2,463	1,969	1,039	10	6
Wages & Salaries							
railway	11,133	12,077	10,342	10,828	2,006	20	11
port	8,286	8,400	7,585	6,703	1,016	10	6
general	3,718	1,389	2,334	1,609	361	4	2
	23,136	21,874	20,261	19,140	3,382	34	19
General							
railway	2,378	3,497	2,654	3,023	4,231	42	23
port	348	456	817	528	392	4	2
general	758	1,914	3,243	1,148	984	10	5
	3,484	5,867	6,713	4,698	5,607	56	31
Working Expenses	28,642	30,059	29,437	25,807	10,028	100	55
Gross Operating Profit	(11,063)	(12,350)	(10,468)	(9,509)	8,090		45
Depreciation	1,526	1,822	1,800	1,949	652		4
Net Operating Revenue	(12,589)	(14,171)	(12,269)	(11,457)	7,438		41
Interest expenses	0	0	0	0	0		0
Exchange differences	0	0	0	11	869		5
Other	0	0	(19,939)	5,397	(1,075)		(6)
Net Profit / (Loss)	(12,589)	(14,171)	(32,208)	(6,049)	7,232		40
Working ratio	163	170	155	158	55		
n. tons'000							
port	1,606	1,378	1,385	1,329	1,948		
railway	485	296	307	368	482		
n.passengers '000	1,353	1,357	3,218	3,078	1,354		

MOZAMBIQUE
BEIRA TRANSPORT CORRIDOR PROJECT
CFM(C)

Projected Profit & Loss Statement

Usd '000

	1988	1989	1990	1995	2000
Revenues					
Railway	7,496	7,790	7,975	18,199	17,433
Port	9,280	10,689	12,603	27,687	30,471
General	200	200	200	200	200
	16,976	18,679	20,777	46,086	48,104
Working Expenses					
Materials & Supplies					
Railway	1,433	1,590	2,420	2,940	3,440
Port	4,410	4,444	4,686	5,392	5,832
General	509	560	623	1,383	1,443
	6,352	6,594	7,729	9,714	10,715
Wages & Salaries					
Railway	2,320	2,600	2,816	2,816	2,816
Port	1,360	2,160	2,952	2,952	2,952
General	360	360	360	360	360
	4,040	5,120	6,128	6,128	6,128
General					
Railway	4,275	4,275	2,600	1,750	1,750
Port	170	187	200	461	481
General	904	1,923	2,133	4,664	4,865
	5,349	6,385	4,940	6,874	7,096
Working expenses	15,740	18,099	18,797	22,716	23,939
Gross Operating Profit/(loss)	1,236	581	1,980	23,369	24,165
Depreciation	1,682	4,166	4,840	17,464	16,156
Net Operating Revenue/(Loss)	(446)	(3,585)	(2,860)	5,905	8,009
Interest Expenses	2,529	3,493	3,868	3,744	2,859
Exchange Differences	0	0	0	0	0
Net Profit / (Loss)	(2,975)	(7,078)	(6,728)	2,161	5,150
Working ratio	93	97	90	49	50
Throughput					
Railway					
n.tons '000	458	452	438	923	844
n.passengers '000	3,077	3,218	3,033	3,762	4,286
Port					
tons '000	711	724	737	1,833	1,854
tons oil '000	845	895	911	1 850	1 721

MOZAMBIQUE
BEIRA TRANSPORT CORRIDOR PROJECT
CFM(C)
Balance Sheet
Usd '000

	Actual		Projected				
	1986	1987	1988	1989	1990	1995	2000
ASSETS							
Cash	412	669	3,507	4,443	6,135	7,366	9,431
Receivables	2,071	4,067	4,186	4,686	5,123	11,364	11,861
Stocks	1,077	810	932	1,071	1,112	1,344	1,417
Total Current Assets	3,560	5,546	8,625	10,119	12,370	20,074	22,709
Fixed Assets at Cost	13,947	6,745	72,395	174,190	283,960	283,960	283,960
Accumulated Depreciation	(5,745)	(3,095)	(4,777)	(8,943)	(13,783)	(31,247)	(47,403)
	8,202	3,650	67,618	165,247	270,177	252,713	236,557
Work in Progress	665	574	574	574	574	574	574
Total Fixed Assets	8,867	4,224	68,192	165,821	270,751	253,287	237,131
TOTAL ASSETS	12,427	9,770	76,817	175,940	283,121	273,361	259,840
LIABILITIES							
Creditors	7,021	3,453	5,175	5,950	6,180	7,468	7,870
	0	0	0	0	0	0	0
Total Current Liabilities	7,021	3,453	5,175	5,950	6,180	7,468	7,870
Long Term - Loans							
National	0	0	77	4,077	4,077	4,077	4,077
International	0	0	18,865	43,806	75,117	78,861	81,720
Total Long-Term Liabilities	0	0	18,942	47,883	79,194	82,938	85,797
	0	0	0	0	0	0	0
TOTAL LIABILITIES	7,021	3,453	24,117	53,834	85,374	90,406	93,667
EQUITY							
Capital	15,383	7,645	7,645	7,645	7,645	7,645	7,645
Grants	0	0	49,238	125,584	207,911	207,911	207,911
Investment Reserve	1,536	743	743	743	743	743	743
	16,919	8,388	57,626	133,972	216,299	216,299	216,299
Results Broughtforward	(10,706)	(5,571)	(1,949)	(4,786)	(11,824)	(35,587)	(55,277)
Results for the YEAR	(807)	3,500	(2,976)	(7,079)	(6,728)	2,162	5,150
	(11,513)	(2,071)	(4,925)	(11,865)	(18,552)	(33,345)	(50,127)
TOTAL EQUITY	5,406	6,317	52,700	122,107	197,748	182,955	166,172
TOTAL LIABILITIES + EQUITY	12,427	9,770	76,817	175,940	283,121	273,361	259,840
Current Ratio (%)	0.51	1.61	1.67	1.70	2.00	2.69	2.89
Long Term Debt to Equity	0.00	0.00	0.26	0.30	0.40	0.45	0.50

MOZAMBIQUE
BEIRA TRANSPORT CORRIDOR PROJECT

CFM (C)

Projected Cash Flow

Usd'000

	1988	1989	1990	1995	2000
Sources of Funds					
Grants	49,238	76,346	82,327	0	0
Long Term Liabilities	18,942	28,941	31,311	3,744	2,859
Depreciation	1,682	4,166	4,840	17,464	16,156
Net Profit - profit	0	0	0	2,162	5,150
Equity	122	139	41	0	3,913
	69,984	109,592	118,519	23,370	28,078
Use of Funds					
Fixed Assets	65,650	101,795	109,770	0	0
Equity	0	0	0	16,955	25,845
Net Profit - (Loss)	2,976	7,079	6,728	0	0
	68,626	108,874	116,498	16,955	25,845
Surplus / (Deficit)	1,358	718	2,021	6,415	2,233

MOZAMBIQUE
BEIRA TRANSPORT CORRIDOR PROJECT

CFM(C)
Usd '000

Year	Investments	Operating Results: With Project	Operating Results: Without Project	Increase	Net
1988	65,650	1,236	(12,100)	13,336	(52,314)
1989	101,795	581	(12,100)	12,681	(89,114)
1990	109,770	1,900	(12,100)	14,000	(95,690)
1991	0	11,636	(12,100)	23,736	23,736
1992	0	15,245	(12,100)	27,345	27,345
1993	0	18,654	(12,100)	30,754	30,754
1994	0	22,114	(12,100)	34,214	34,214
1995	0	23,369	(12,100)	35,469	35,469
1996	0	24,335	(12,100)	36,435	36,435
1997	0	26,101	(12,100)	38,201	38,201
1998	0	26,996	(12,100)	39,096	39,096
1999	0	28,372	(12,100)	40,472	40,472
2000	0	24,165	(12,100)	36,265	36,265
2001	0	34,317	(12,100)	46,417	46,417
2002	0	34,386	(11,500)	45,886	45,886
2003	0	34,295	(11,500)	45,795	45,795
2004	0	34,288	(11,500)	45,788	45,788
2005	0	34,274	(11,500)	45,774	45,774
2006	0	34,263	(11,500)	45,763	45,763
2007	0	27,268	(11,500)	38,768	38,768
2008	0	18,141	(11,500)	29,641	29,641
2009	0	18,130	(11,500)	29,630	29,630
2010	0	18,120	(11,500)	29,620	29,620
	277,215				

Internal rate of return(%) 12.01

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BEIRA TRANSPORT CORRIDOR PROJECT

DNPCF

Profit and Loss Statement

Usd '000

	--Actual-- 1987	---- Projected ---- 1990	1995
Revenue			
Railway	10,487	54,298	79,223
port	12,106	19,850	25,205
general	889	0	0
	23,482	74,148	104,427
Working Expenses			
Materials & Supplies	3,868	10,100	13,000
Wages & Salaries	6,194	6,194	6,194
General	5,156	9,771	10,998
	15,218	26,065	30,200
Gross Operating Profit	8,264	48,084	74,227
Depreciation	953	14,350	31,068
Net Operating Revenue	7,311	33,734	43,160
Interest Expenses	150	17,937	11,152
Net Profit/ (Loss)	7,161	15,797	32,008

Source: Sofrerail

MOZAMBIQUE
BEIRA TRANSPORT CORRIDOR PROJECT

DNPCF

Balance Sheet

Usd '000

	--Actual-- 1987	------Projected------ 1990	1995
ASSETS			
Cash	2,571	12,063	793
Receivables	17,458	18,283	25,749
Stocks	2,126	1,542	1,787
Total Current Assets	22,155	31,889	28,329
Fixed Assets at Cost	81,960	571,342	571,342
Accumulated Depreciation	(4,063)	(18,413)	(49,481)
	77,897	552,929	521,861
Work in Progress	1,781	(0)	(0)
Total Fixed Assets	79,677	552,928	521,860
TOTAL ASSETS	101,832	584,817	550,189
LIABILITIES			
Creditors	10,145	8,569	9,928
	0	0	0
Total Current Liabilities	10,145	8,569	9,928
Long Term - Loans			
National	0	69,876	69,876
International	0	69,961	4,100
Total Long-Term Liabilities	0	139,837	73,976
TOTAL LIABILITIES	10,145	148,406	83,904
EQUITY			
Capital	81,447	81,447	81,447
Grants	0	365,701	365,701
Investment Reserve	2,889	2,889	2,889
	84,335	450,036	450,036
Results Broughtforward	190	(29,422)	(15,759)
Results for the YEAR	7,161	15,797	32,008
	7,351	(13,625)	16,249
TOTAL EQUITY	91,687	436,411	466,286
TOTAL LIABILITIES + EQUITY	101,832	584,817	550,190
Current Ratio (%)	2.18	3.72	2.85
Long Term Debt to Equity	0.00	0.32	0.16

MOZAMBIQUE

Beira Transport Corridor Program

ORGANISATION OF THE MINISTRY OF TRANSPORT AND COMMUNICATIONS

	Minister						
	2 Vice Ministers						
NATIONAL DIRECTORATES	Ports and Railways	Maritime and River Transport	Regional Cooperation Investment	Post and Telecommu-nication	Maritime Administration and Security	Civil Aviation	Road Transport
DIRECTORATES	Planning	Finance, Administration and Supplies	Human Resources				
DEPARTMENTS/ SERVICES	The Minister's Office	Documentation and Information	Inter-national Relations	Legal	Consultants and Projects		
SCHOOLS	Nautical	Railways	Ports	Telecomm. School		Civil Aviation School	

SECTIONS	CFM Sul	CFM Centro	CFM Norte	Navique Anfrena	TDM	Emodraga	LAM
IMPROVEMENT UNITS BRIGADAS DE MELHORAMENTO	Sul Ports and Railways	Centro *) Ports and Railways	Norte Ports and Railways		CDM	Marinha	TTA

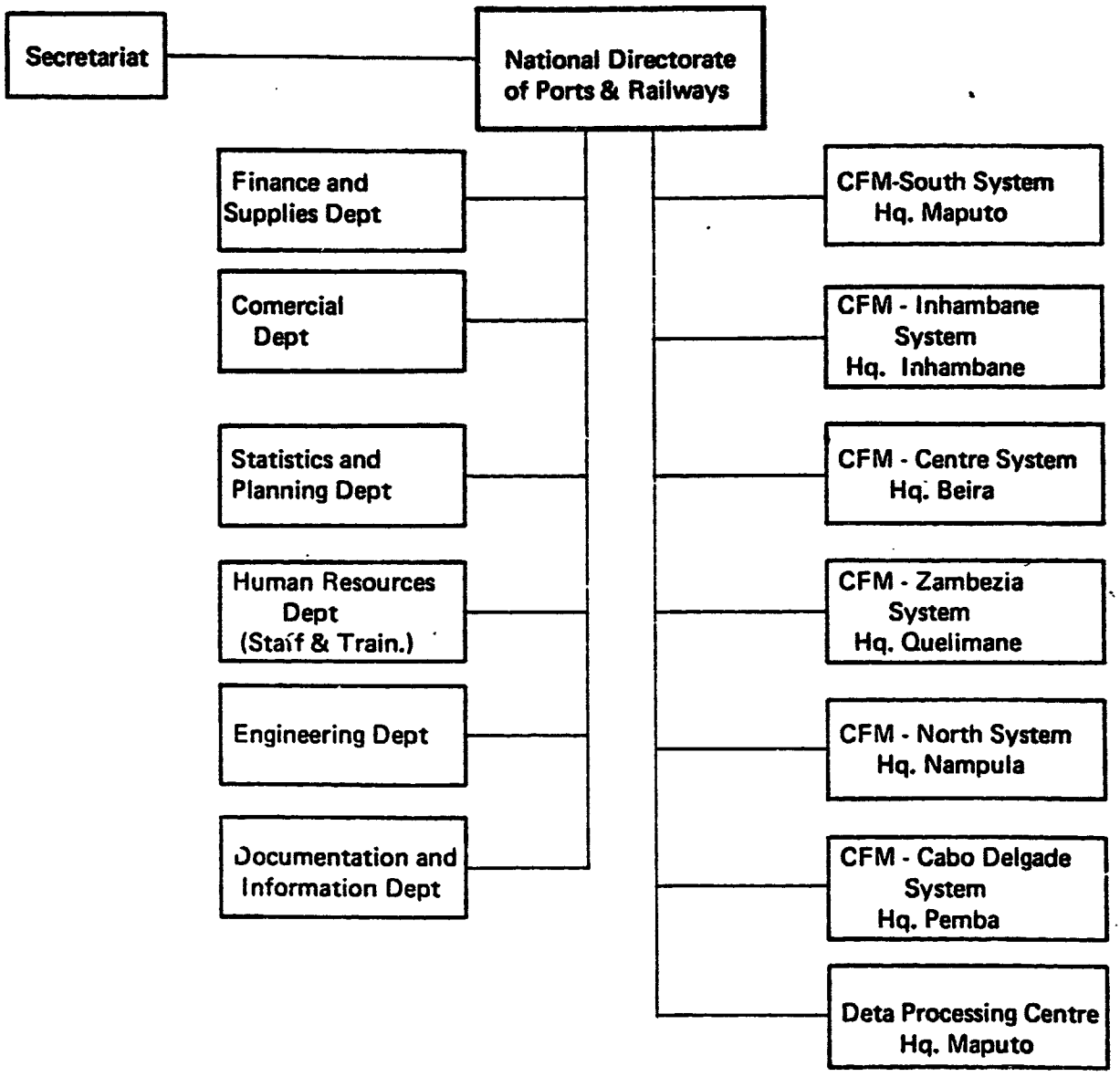
*) Not yet established

ANNEX 8
Chart 2

MOZAMBIQUE

Beira Transport Corridor Program

NATIONAL DIRECTORATE OF PORTS AND RAILWAYS



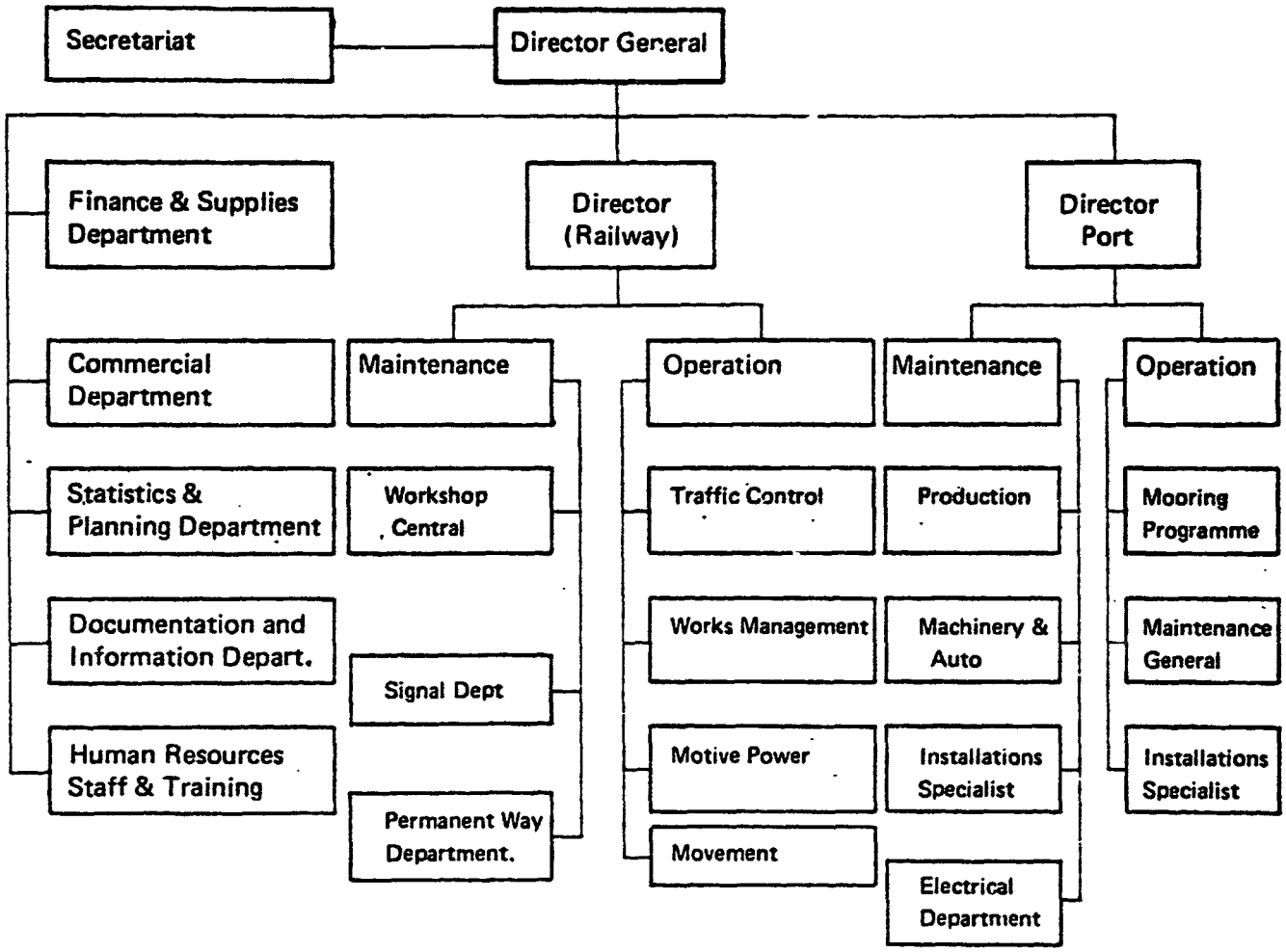
ANNEX 8
Chart 3

MOZAMBIQUE

Beira Transport Corridor Program

CFM (Centro)

(Central Ports and Railways System)



MOZAMBIQUE

BEIRA TRANSPORT CORRIDOR PROJECT

CRITERIA FOR INVESTMENT IN THE BEIRA TRANSPORT CORRIDOR

Background

When the People's Republic of Mozambique at the end of 1985 decided to revitalize the transport system through the Beira Corridor more than a decade had elapsed since independence.

The transport infrastructure -- already partly worn out and outdated in 1975 -- had then further deteriorated, mainly due to the absence of funds for repair and maintenance and due to lack of skilled labour.

Because of its location, Beira is a natural main outlet to the sea for landlocked countries such as Zimbabwe, Malawi and (partly) Zambia and thus inherently a major foreign exchange earner for the Mozambican economy.

Objectives

Consequently, the aim of the Government has been to restore the Beira Corridor taking into consideration:

(i) the trends in overall transport demand from its hinterland and its division between different commodities;

(ii) the development of cargo handling procedures and shipping modes on the international market; and

(iii) the interaction between the different elements in the transport chain.

Criteria for Investment

Given the above background and with the above objectives, the Government has fixed the following criteria for investments in the Beira Corridor, listed in order of priority

(i) Rehabilitation of existing infrastructure, of which the major projects (now under execution) are the following:

  (a) rehabilitation of permanent way and track on the Beira-Machipanda railway;

  (b) rehabilitation of locomotives and other rolling stock;

  (c) rehabilitation of the transit highway;

  (d) rehabitation of maintenance facilities through acquisition of new tools and spareparts; and

  (e) rehabilitation of port roads, port cranes and other existing cargo handling equipment. (This latter rehabilitation project actually started before the initiation of the development programme).

(ii) Improvement of skills and quality of workforce; development of managerial skills.

(a) upgrading of skills and proficiency of the whole staff through comprehensive manpower training programmes;

(b) introduction of modern management principles;

(c) improvement in organization to achieve cost effectiveness, precision, punctuality, quality of service and operational flexibility.

(iii) New capital investments.

(a) Investment in new infrastructure or new equipment either to replace worn out or obsolete material or to cater for substantial traffic increases, resulting from the measures taken under (i) and (ii).

Examples: Reconstruction of quays 2-5 and procurement of new locomotives.

(b) Finally, new capital investments will have to be made in some areas, where developments in transport technology so demand. The main area in this respect is containerization of cargo handling which implies acquisition of new container handling equipment. Furthermore, the customers' higher demand for punctuality and limitation of delays have led to derived investments in, for instance, dredging to CD -8 meters of entrance channel, installation of new radio telecommunications for the railway and modern rail repair and maintenance equipment.

The general rule of thumb for new capital investments has been an internal rate of return of not less than 10-11%.

The main concern, however, has been to secure an overall profitability of the Corridor programme as a whole. Some of the projects in the first phase of the development programme have been retained when they were considered to contribute to (or to be a major pre-requisite for) the successful implementation of the programme as a whole, or when the geo-strategic feature of the investment has been considered highly beneficial to the regional and strategic environment.

MOZAMBIQUE

BEIRA TRANSPORT CORRIDOR PROJECT

Terms of Reference for the Project Coordinator and

Procurement/Disbursement Officer

1. Project Coordinator

(a) A Project Coordinator with qualifications and managerial experience acceptable to the Association has been appointed within CFM(C) to coordinate the execution of the project.

(b) The Project Coordinator shall report to the Executive Director of CFM(C).

(c) The Project Coordinator shall be responsible, inter alia for the following:

(i) coordination of the different teams of consultants and experts working on the CFM(C) railway system and training programs;

(ii) definition of time-based targets of performance to fit in with project objectives, and monitoring thereof;

(iii) overall coordination among the CFM(C) departments receiving technical assistance, ensuring building-up of institutional systems;

(iv) monitoring of effective transfer of technology from consultants and experts to Mozambican counterparts;

(v) working closely with a Mozambican counterparts, and ensuring transfer of project coordination and management expertise; and

(vi) acting as Executive Secretary to the CFM(C)'s Main Steering Committee.

(d) In discharging these responsibilities, the Project Coordinator shall be assisted by a qualified local counterpart.

2. Procurement/Disbursement Officer

(a) A Procurement/Disbursement Officer with qualifications and experience acceptable to the Association, appointed within BCA, shall carry out all procurement and disbursement procedures necessary for the execution of the parts of the project to be implemented by BCA, ensuring that they conform to World Bank guidelines.

(b) The Procurement/Disbursement Officer shall be responsible, inter alia, for the following:

(i) liaising with the competent departments of the Bank of Mozambique, ensuring timely disbursement of the proceeds of the Credit allocated to BCA to finance the foreign exchange component of the parts of the project to be implemented by BCA;

(ii) keeping appropriate project accounts and records;

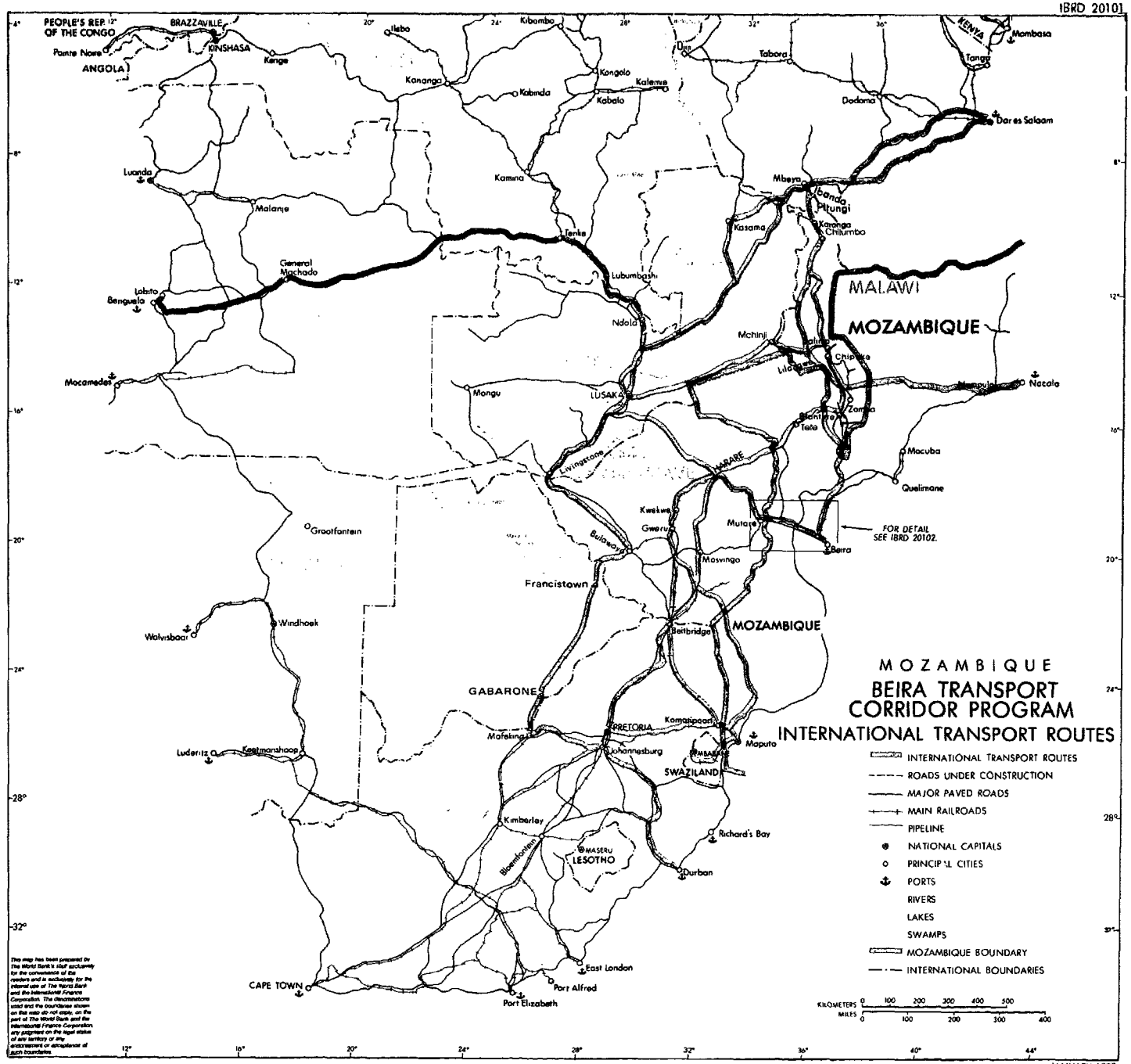
(iii) preparing withdrawal applications and reconciling Special Account bank statements in accordance with the Association's disbursement instructions;

(iv) monitoring and supervising the status of commitments and disbursements of Credit funds allocated to BCA through the Beira Corridor Implement Agreement;

(v) reviewing procurement arrangements for project implementation by BCA; and

(vi) preparing accounts for audit.

IBRD 20101


PEOPLE'S REP. OF THE CONGO
BRAZZAVILLE
KINSHASA
Pointe Noire
Kenge
ANGOLA
Ilebo
Kananga
Kabinda
Kongolo
Kalemie
Kabalo
Kibombo
Uvira
Tabora
KENYA
Mombasa
Tanga
Dodoma
Dar es Salaam
Luanda
Malanje
Kamina
Tenke
Kasama
Mbeya
Ubanda
Mpungi
Karonga
Chilumbo
General Machado
Lubumbashi
Lobito
Benguela
Ndola
MALAWI
MOZAMBIQUE
Mchinji
Lilongwe
Chipata
Nacala
Mocamedes
Mongu
LUSAKA
Zambia
Tete
Beira
Macuba
Quelimane
Livingstone
HARARE
Kwekwe
Gweru
Mutare
FOR DETAIL SEE IBRD 20102.
Grootfontein
Bulawayo
Masvingo
Francistown
Windhoek
Walvisbaai
Beitbridge
MOZAMBIQUE
GABARONE
PRETORIA
Komatipoort
Mafeking
Maputo
Johannesburg
Luderitz
Keetmanshoop
SWAZILAND
Kimberley
Richard's Bay
Bloemfontein
MASERU
LESOTHO
Durban
CAPE TOWN
East London
Port Alfred
Port Elizabeth
MOZAMBIQUE
BEIRA TRANSPORT CORRIDOR PROGRAM
INTERNATIONAL TRANSPORT ROUTES
INTERNATIONAL TRANSPORT ROUTES
ROADS UNDER CONSTRUCTION
MAJOR PAVED ROADS
MAIN RAILROADS
PIPELINE
NATIONAL CAPITALS
PRINCIPAL CITIES
PORTS
RIVERS
LAKES
SWAMPS
MOZAMBIQUE BOUNDARY
INTERNATIONAL BOUNDARIES
KILOMETERS 0 100 200 300 400 500
MILES 0 100 200 300 400
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JANUARY 1987

MOZAMBIQUE
BEIRA TRANSPORT CORRIDOR PROGRAM
BEIRA TRANSPORT CORRIDOR

RAILROADS
ROADS
PIPELINE
RIVERS
PORT
SELECTED TOWNS
NATIONAL CAPITAL
INTERNATIONAL BOUNDARIES

TYPE OF TRACK/TERRAIN

0 Km 97 5 Km / FLAT
97 5 Km 179 Km / GRADES AND CURVES
179 Km 226.5 Km / SMALL GRADES
226 5 Km 314 Km / STEEP GRADES AND SHARP CURVES