

THE ISLAMIC REPUBLIC OF PAKISTAN

REPORT  
ON

PAKISTAN RAILWAYS

LOCOMOTIVES MANUFACTURING FACTORY PROJECT

(FEASIBILITY STUDY)

March, 1983

JAPAN INTERNATIONAL COOPERATION AGENCY  
(JICA)

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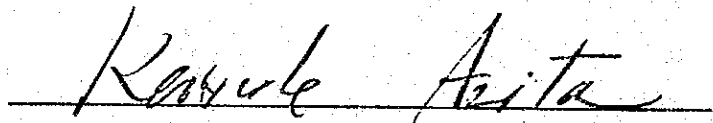
## PREFACE

In response to the request of the Government of the Islamic Republic of Pakistan, the Government of Japan decided to conduct a feasibility study and preliminary design on the Pakistan Railways Locomotives Manufacturing Factory Project, and entrusted the study to the Japan International Cooperation Agency (JICA). The JICA sent to Pakistan in March, 1982 a survey team headed by Mr. Ichiro Nomura, Director of the Japan Railway Technical Service, and another survey team in January, 1983 headed by Mr. Shuichi Sawano, Vice President of the Japan Railway Technical Service. These teams held discussions with officials concerned of the Government of Pakistan over the project and conducted field surveys. After the teams returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Islamic Republic of Pakistan for their close cooperation extended to the team.

March, 1983

A handwritten signature in cursive script, reading "Keisuke Arita", is written over a horizontal line.

Keisuke Arita

President

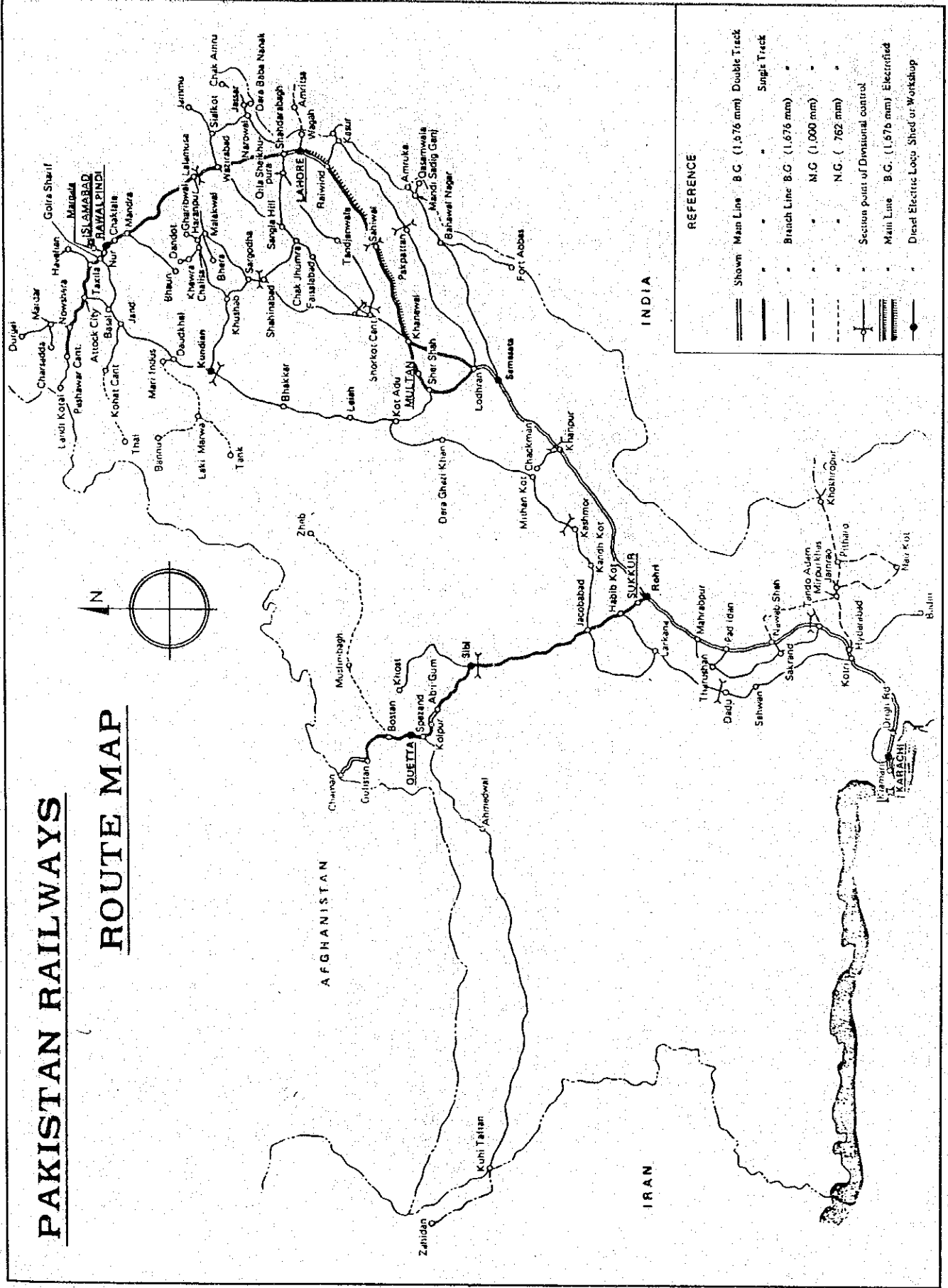
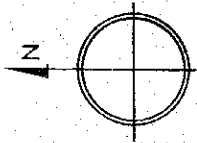
Japan International Cooperation Agency





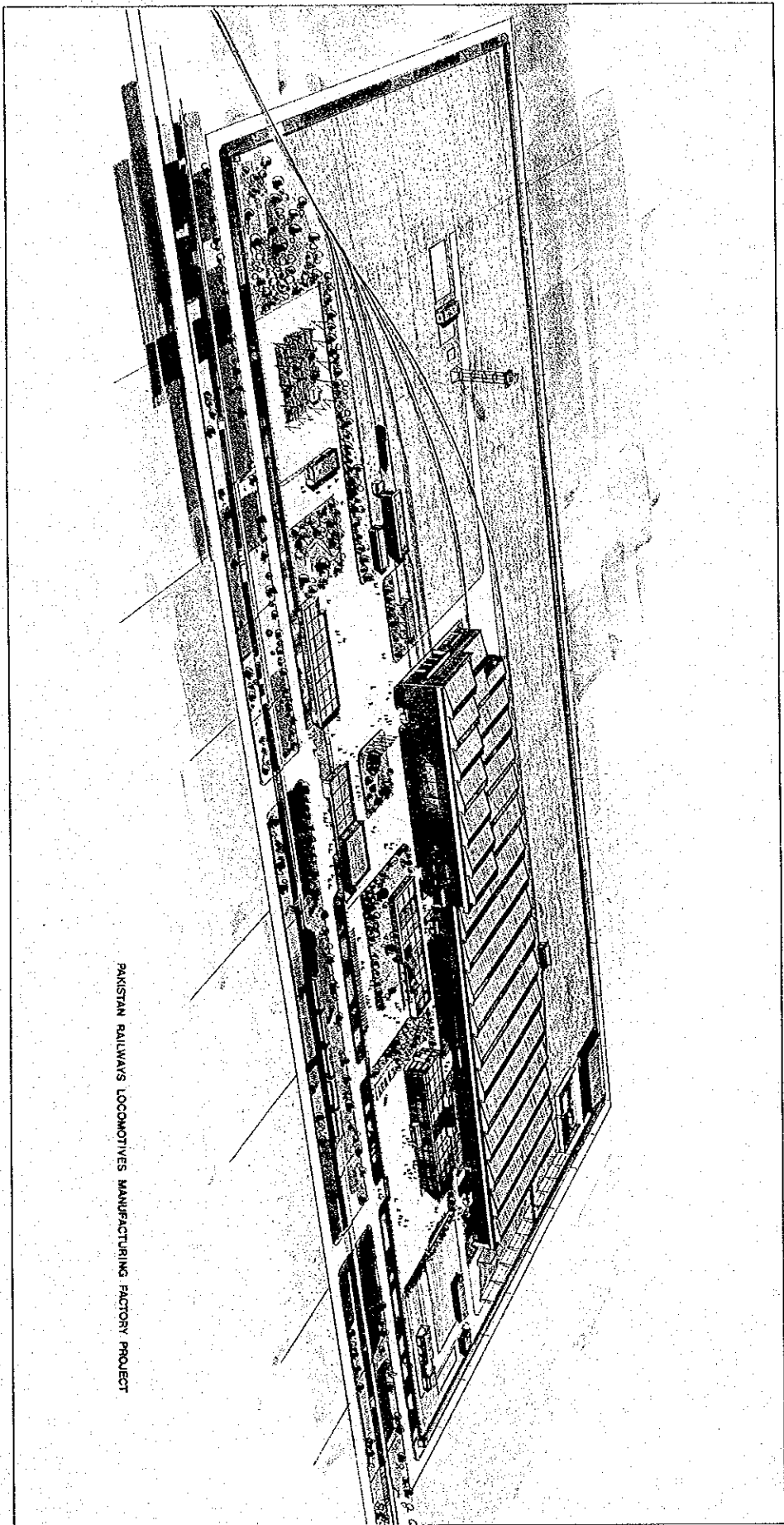
# PAKISTAN RAILWAYS

## ROUTE MAP



**REFERENCE**

	Shown	Main Line	B.G. (1,676 mm)	Double Track
	-	-	-	Single Track
	-	Branch Line	B.G. (1,676 mm)	-
	-	-	N.G. (1,000 mm)	-
	-	-	N.G. ( 762 mm)	-
	-	-	-	Section point of Divisional control
	-	Main Line	B.G. (1,676 mm)	Electrified
	-	-	-	Diesel Electric Loco Shed or Workshop



PAKISTAN RAILWAYS LOCOMOTIVES MANUFACTURING FACTORY PROJECT

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## CONCLUSION AND SUMMARY

### I. CONCLUSION

1. The Pakistan Railways possessed, as of 1981, those locomotives which have passed their service life, 132 out of 471 as to the diesel-electric locomotives (DEL) and 314 out of 381 as to the steam locomotives (SL). In order to replace all those locomotives which are now in use beyond their service life, to make a conversion from SL to DEL, and to meet the possible future increase of traffic demand, it is necessary to introduce 1,265 diesel-electric locomotives during the implementation period of this project.

This Project envisages an annual production of 25 locomotives by single shift basis, as the optimum scale of production for the new factory from the long-range perspective view. However, if necessary to comply with the transitional increase in demand, effort should be made to increase the total number of annual production by converting to two-shift-system in the future.

2. This Project is important in terms of the national interest. The construction works must begin as soon as possible since two and a half years will be required to completion from the commencement of the works.
3. This Project analysis has proven to be feasible from the standpoint of the national economy.
4. According to the financial analysis of the new factory, it is expected that it will turn out a profit in two years. However, funds will be deficient until the fourth year, thus, the working funds will have to be procured.
5. The construction work will be technically feasible from all technical viewpoints including mechanical, electrical, civil engineering, and building construction. The Project aims at minimizing operation expenses since the start up of operations at the new factory thus obtaining the maximum effect with the minimum investment.
6. Consequently, it was decided that the DEL manufacturing factory should not install any manufacturing system of rolling stock parts which are considered not only domestically producible at present but also producible in future, at other existing factories or workshops other than the factory to be newly built. Conclusion has been reached that the optimum site for construction of the new factory is Risalpur and that it should have the capacity for an annual production of 25 locomotives on the daytime regular shift basis.

7. The plan introduced here has sufficient capacity for the future production of electric locomotives (EL) in parallel with and in addition to diesel-electric locomotives.

## II. SUMMARY

This report includes ten chapters with special reference to four aspects:

- (1) The forecast of railway transport demand up to the year 2000, establishment of locomotive introduction programs with due consideration of practical service life of existing locomotives, and determination of required locomotive production capacity;
- (2) The possible items of domestic production and percentage target of domestic production in Pakistan established for the manufacture process of locomotives, and the locomotive manufacturing factory construction plan made on the basis of these prerequisites.

In the setup of construction plan, consideration was paid to make the use of existing public and private facilities.

- (3) Determination of the organization and scale of manpower required for factory operation and preparation of the basic plan of education and training for technical staff;
- (4) The project costs calculated and the economic and financial analyses made on the basis of this calculation. It should be noted that the project costs include the factory construction cost and training cost.

This report is summarized as follows:

### 1. Current state of transport

The Pakistan Railways has about 8,800 route-kilometers. The broad-gage railways, will 381 steam locomotives (SL), 471 diesel locomotives (DEL) and 29 electric locomotives (EL), occupies 88% of the total route-kilometers.

The traffic volume covers 11 million tons (7.9 billion ton-kilometers) and 123 million passengers (16.4 billion passenger-kilometers), as of 1981. Though the passenger traffic shows gradual upward trend, the goods traffic is rather sluggish.

The revenue from goods traffic occupies about 60% of the total revenue of the Pakistan Railways. So the strengthening of goods transport capacity through increase of locomotives and wagons as well as improvement of wagons operation control is considered an important problem the Pakistan Railways is confronted with.

## 2. Forecast of railway traffic volume

The forecast of railway traffic volume on the basis of goods and passenger traffic record (ton-kilometers, passenger-kilometers) for the past three decades, the goods and passenger traffic volumes up to the year 2000 were forecasted from their relationships with GDP and future population growth according to the regression analysis method. The analysis result shows that the traffic volume in the year 2000 is 171% for passengers and 170% for goods as compared with the level as of 1981.

## 3. Locomotive introduction plan

From the above traffic volume forecast, it is estimated that the required number of locomotives in terms of DEL, as of 2012 (the last year of the project life), is 1265. The number of existing locomotives which has passed the normal life, on the other hand, is 132 of the total 471 DEL (normal life 20 years) and 314 of the total 318 SL (normal life 45 years), as of 1981. All of these locomotives must be replaced during the project period. Consequently the total of 1265 locomotives must be introduced during this period.

If these locomotives are to be manufactured in Pakistan, the production of mean 48 units/year is required to meet the demand. Considering the reduction of initial investment cost and future variables in railway traffic volume, it is considered best to construct a factory with annual 25-units capacity on a single shift basis and to switch to a 2-shifts basis system in future if necessary.

## 4. Domestic production plan

The concept as to this plan proceeds to the increased ratio of domestic production by utilizing as much as possible the technologies and facilities of public and private factories in Pakistan. On the basis of this concept, the following progressive programme was set up.

### (a) Stage 1 (Phase I, Part 2; completed in one year after the operation starts)

Partial manufacture and assembling of bodies, underframes, and bogie frames, wiring, piping, and painting of bodies, mounting of mechanical and electrical machines to the body, assembling of traction motors and auxiliary rotating, and import and mounting of completed engines and main alternators.

In this stage, some locomotive parts must be produced domestically prior to the start of locomotive production. The examples of the parts are axle, axle box, traction motor (partial manufacture and assembling), gear case, pinion/gear, window glass fire extinguisher, filter, etc.

From the technical state in Pakistan, it is necessary to take enough time before pre-survey and trial production on these parts are carried out.

- (b) Stage 2 (Phase II, Part 1; completed in two to five years after the operation starts)

Complete manufacture of steel structures of bodies, underframes, and bogie frames, complete work of wiring and piping, and assembling of traction motors and auxiliary rotating machines.

In the Stage 2, the mechanical and electrical items whose domestic production is possible will be gradually manufactured domestically. In this case, considerable preparations for qualitative and performance checks through study on trially manufactured items will be needed.

- (c) Stage 3 (Phase II, Part 2; completed in about ten years after the operation starts)

The target of this stage of domestic production includes the assembling of main alternators, manufacture of electrical and mechanical parts, manufacture or assembling of engines, and manufacture of brake parts. To proceed with the domestic production, it is essential to obtain technological cooperation from foreign countries along with the improvement of technological level of Pakistan.

On the basis of the above fundamental concept, the target of domestic production was set as follows:

	Phase I Part 2	Phase II Part 1		Phase II Part 2
Year of domestic production	1	2	5	10
Ratio of domestic production (%)	20	30	35	50

This ratio of domestic production was determined from the following equation:

Ratio of domestic production (%)

$$= \frac{\text{Price of imported locomotive} - \text{Price of imported parts}}{\text{Price of imported locomotive}} \times 100$$

Note here that the project scope covers only up to Phase II, Part 11.

It was considered practical to start the annual production from a level of five units/year and to increase it gradually, in view of technological skill and manpower programmes.

For actualization of domestic production programme, Pakistan must strive systematically for improvement of technological level and quality as well as for cost reduction through trial manufacture of equipment concerned, researches, facility improvement, technical tie-up with foreign manufacturers, etc.

#### 5. Construction plan of factory

A new factory construction plan was made based on study results of facilities of public and private factories in Pakistan, excluding the manufacturing facilities of rolling stock parts possibly manufactured domestically in future outside the new factory, and this new factory includes the following works:

- (a) Manufacture and painting of bodies and underframes
- (b) Manufacture and painting of bogie frames, assembling and testing of bogies after fitting of traction motors and wheel sets.
- (c) Wiring and piping
- (d) Mounting of engines and main alternators to bodies
- (e) Assembling of auxiliary machines
- (f) Overall assembling, testing, and inspection of locomotives

For the transfer of bodies in the factory, it was decided to recommend a overhead traveling crane system because it can reduce the body transfer distance. The production capacity was set at annual 25 units on a single shift basis, as above described.

The factory scale is as follows:

Land area	154,100 m <sup>2</sup>
Building area	33,040 m <sup>2</sup>
Track	2,940 m

#### 6. Organization and Operation

The new factory is made up of three departments and 11 sections, and they are under the direct control of the General Manager. Namely, the General Manager bears the responsibility of factory operation in terms of both financial and technological aspects.

The required manpower differs depending on the production of locomotives. It was estimated at about 600 employees at an operation start and at about 900 employees or more at a production of annual 25 units.

To ensure smooth production, the Pakistan Railways must take the following preparations:

- (a) Preparation of jigs and tools not included in production facilities
- (b) Securing and training (including training overseas) of staff
- (c) Preparation of parts for five locomotives on the first year
- (d) Preparation of production plan
- (e) Preparation of drawings and manuals

The scope of project includes the production guidance by foreign experts in the field of locomotive manufacture for one year after the production starts. For two to three years thereafter, it is recommended to plan the guidance by two to three foreign experts.

#### 7. Training plan

Training for this project is divided into four parts:

- (a) Training instructors in foreign countries (engineers and technicians)
- (b) Training of technicians in Pakistan
- (c) Improvement of retraining of technician in Pakistan
- (d) Production guidance by foreign engineers at the production start.

Required man-month for training is estimated at 66 for (a) and 114 for (d). Concerning (b) and (c), a planned training using facilities in Pakistan is required for 600 persons necessary for the initial operation.

#### 8. Project enforcement and consulting services

In this report, the important tasks for the project enforcement are chosen and procedure schedule is made accordingly.

By this plan the production will be to start 3 years after the completion of the feasibility study.

In order to promote the construction of the factory as scheduled and as technically specified, it will be noted that the organization which controls the project and technical consulting are indispensable.



## 9. Project cost

Unit: million Rs

	Foreign currency	Domestic currency	Total
Construction cost	270.52	456.34	726.86
Engineering cost	61.16	8.34	69.50
Amount of price rise	33.17	81.58	114.75
Total	364.85	546.26	911.11

## 10. Economic and financial analysis

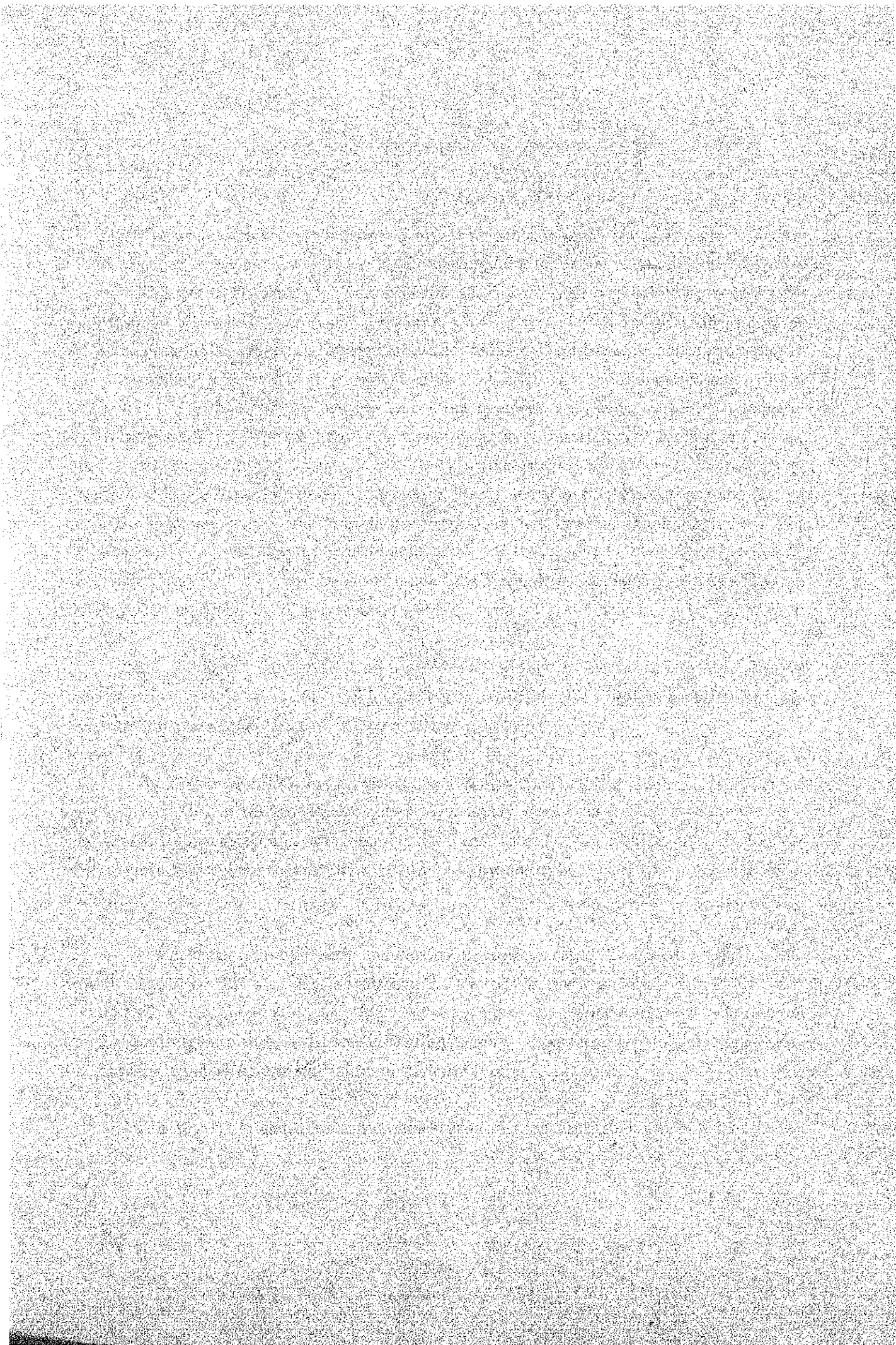
### (a) Economic analysis

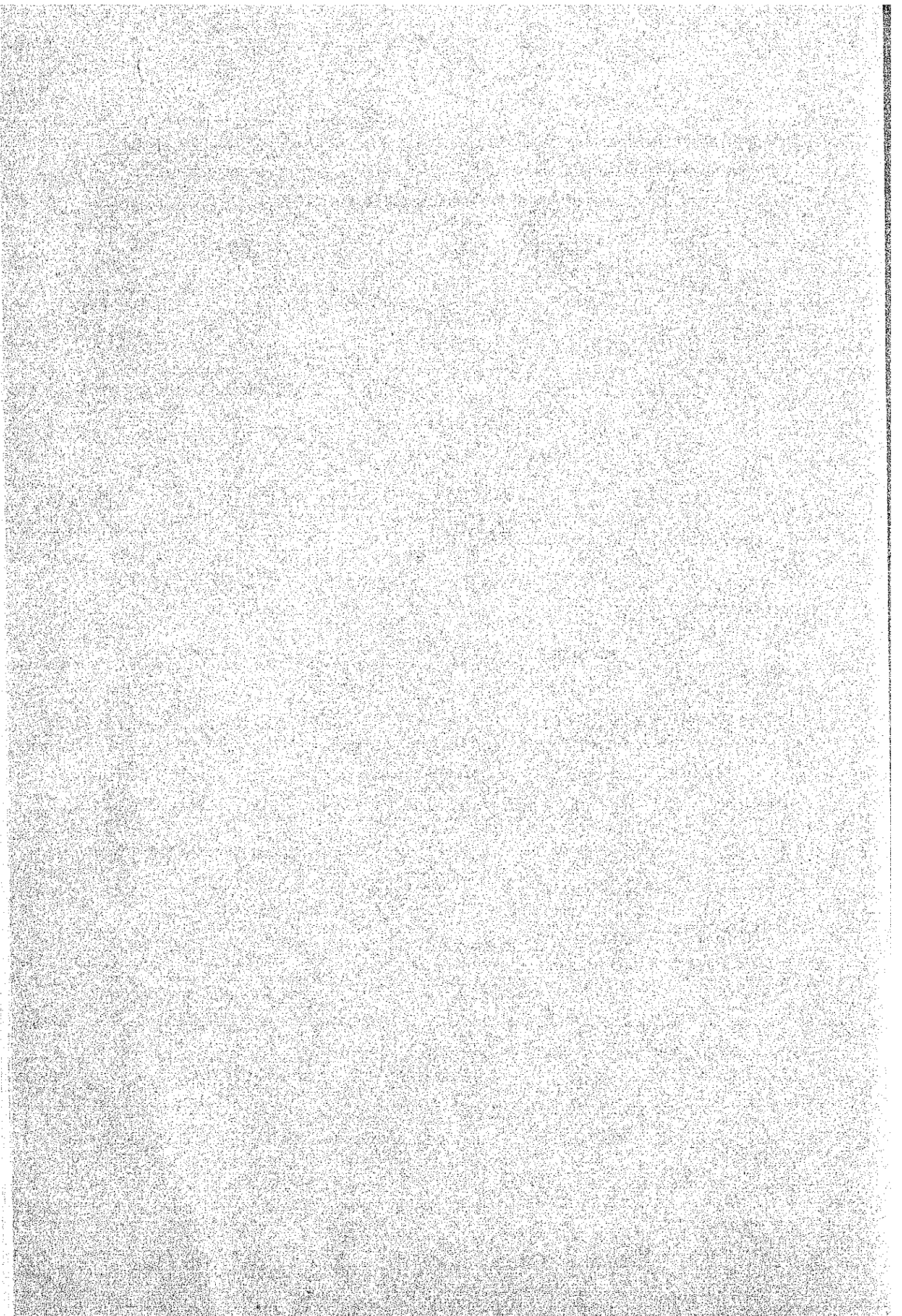
The cost saving benefit of domestic production was determined by comparing the domestic production cost of diesel electric locomotives with the import cost of completed ones. The economic internal rate of return based on the cost saving benefit during the project life is 12.5%. In addition to the quantifiable benefits indicated by this economic analysis, the project is expected to offer other non-quantifiable benefits such as technological transfers, promotion of employment opportunities, foreign currency savings, encouragement of the relative home industries, and promotion of regional development. Consequently, the evaluation of analysis results with due consideration given to these benefits indicate that this project is worthy of implementation in Pakistan.

### (b) Financial analysis

In the financial analysis, the prospective profit and loss statement, cash flow projection, and financial internal rate of return were studied to determine whether it is possible for the factory to conduct profitable operations independently. The financial internal rate of return was calculated at 10%. The profit and loss balance will move into the black in the second year after operation start. In terms of each cash flow projection, however, a considerable amount of working funds will be required for inventory investment to maintain one-year of material stock, possibly resulting in a substantial shortage of funds for four years after operation start. Additionally, this working capital will cause

a decrease in the internal rate of return. Nevertheless, if these working funds for inventory investment can be reduced to an optimum level, then it will still be possible for the factory to conduct profitable operations independently.





## CHAPTER 1 BACKGROUND OF THE PROJECT

Pakistan is a non-oil producing country and depends much on agricultural products as its principal export industry. It has little other products for export and at present is laboring under a negative trade balance. For this reason, the 5th five-year plan is being executed with emphasis on increase in agricultural production for its main industry, and by utilizing its products to promote its agricultural and manufacturing industries to advance its policy for economical improvement and regional development. Due to these factors, the volume of traffic within the country is gradually on the increase, and as this tendency is expected to continue, improvement in transport capacity has become an urgent necessity. Unfortunately, rapid road developments with increase in the volume of road traffic at the expense of the railway are restraining expansions in the latter. At present, the ratio of the volume of traffic between road and railway is 45:55 in ton-kilometers, and 20:80 in passenger kilometers. For this reason, in order to attain a balance between railway and road transportation for the benefit of the national economy, the strengthening of the railway transportation capacity must be carried out to take advantage of its merits in safety, rapidity, punctuality, energy saving, etc., especially in electrified railways.

But the rapid, railway electrification is difficult, and it is necessary to strive toward improvement of existing railway facilities in parallel with the electrification project. Now the current state of Pakistan Railways will be reviewed again below.

The Pakistan Railways has at present 381 steam locomotives (SL's) and 471 diesel electric locomotives (DEL's) for broad-gauge railway, which play a principal role in the transportation. Most of these locomotives have become overaged, and, actually, 82% of SL's and 30% of DEL's have passed the economic service life. They are causing one of bottlenecks for modernization of transport.

The Pakistan Railways is now undertaking the replacement of SL's by DEL's and rehabilitation of existing DEL's by engine replacement. Up to now, it was decided to import 38 Japan-made DEL's, and about 40 locomotives have already been rehabilitated. Also now in progress is the construction plan of a DEL manufacturing factory, whose target is to manufacture domestically DEL's and newly introduce them in service in future.

This plan is intended to solve various problems the Pakistan Railways is now facing,

such as improvement of transport through introduction of new locomotives, rationalization of maintenance, etc. This plan also covers effects such as fostering of domestic industry, standardization of rolling stock, improvement of manufacture and maintenance technologies, and retrenchment of foreign currency, as well as regional development and promotion of employment which accompany the construction and operation of the factory. The fact that an area around Nowshera (about 130 km northwest of the Capital) was selected as a candidate for the factory site reflects the intention of the Pakistani Government. This project is positioned as a national project with substantial nation-wide significance, and its urgent realization is highly anticipated.

## CHAPTER 2. CURRENT STATE OF PAKISTAN RAILWAYS

### 2-1 Organization and System of Pakistan Railways

#### 2-1-1 History

The railway industry in Pakistan dates back to May 13, 1861, when Karachi and Kotri, two stations 169 km apart were linked by rail.

When Pakistan became independent in 1947, the North Western Railways renewed its operation as a national railways with a total length of 8,557 km comprising 8,045 km (11,088 km held before independence minus 3,043 km left in a territory of India) and 512 km (a part of the route of the Jodhpur Railway in the State of Sind).

In February, 1961, the management of the North Western Railways was shifted from the government to the province of Western Pakistan, with the name also modified to the Pakistan Western Railway. During the province-owned period (February, 1961–May, 1974), plant and equipment investment was not made to cope with growing traffic demand. This was counted as one of causes for stagnancy of growth of traffic volume in 1970's. Besides, the chaotic aftermath of the independence of Bangladesh and Indo-Pakistani War in 1971 as well as the disastrous flood in 1973 gave deadly blow to the railway industry in this country. As a result, the railway traffic volume (goods) in 1974 dropped to the level around 1960.

In May, 1974, the railway industry was transformed again into a government-owned entity in view of reconstructing this industry in Pakistan. The name was also changed into Pakistan Railways, and the Ministry of Railways was established as a supervisory body in September of the same year.

In 1977 and subsequent years, Pakistan Railways suffered again the sluggishness in traffic volume growth (in particular, goods), proving itself incompetent in meeting the growth of domestic traffic demand in line with the recent economical development. So, in 1978, the National Logistic Cell was erected to undertake shuttle transportation with large trucks. This organization was to shoulder a part of domestic

transport duty which Pakistan Railways should originally have undertaken.

In view of the above circumstances, the Government of Pakistan set to reconstructing and strengthening Pakistan Railways.

As a first step to this object, the Government carried through the reform of organization and personnel reshuffle of Pakistan Railways on April 5, 1982. According to this reform, the Chairman of Pakistan Railways was to hold also the post of Secretary, and members of PR Board the post of Additional Secretary, of the Ministry of Railways. The PR Board was also moved from Lahore to the Capital, Islamabad. This measure was for the fast decision making of the PR Board because conventionally it was under control of the Ministry of Railways and not empowered to decide the policy by itself and because this fact prevented it from taking quick actions for rebuilding of Pakistan Railways. This reform also introduced the separation of the Operation Wing and the Production Wing. Each Wing was to belong directly to the Chairman of Pakistan Railways via a General Manager.

#### 2-1-2 Organization personnel

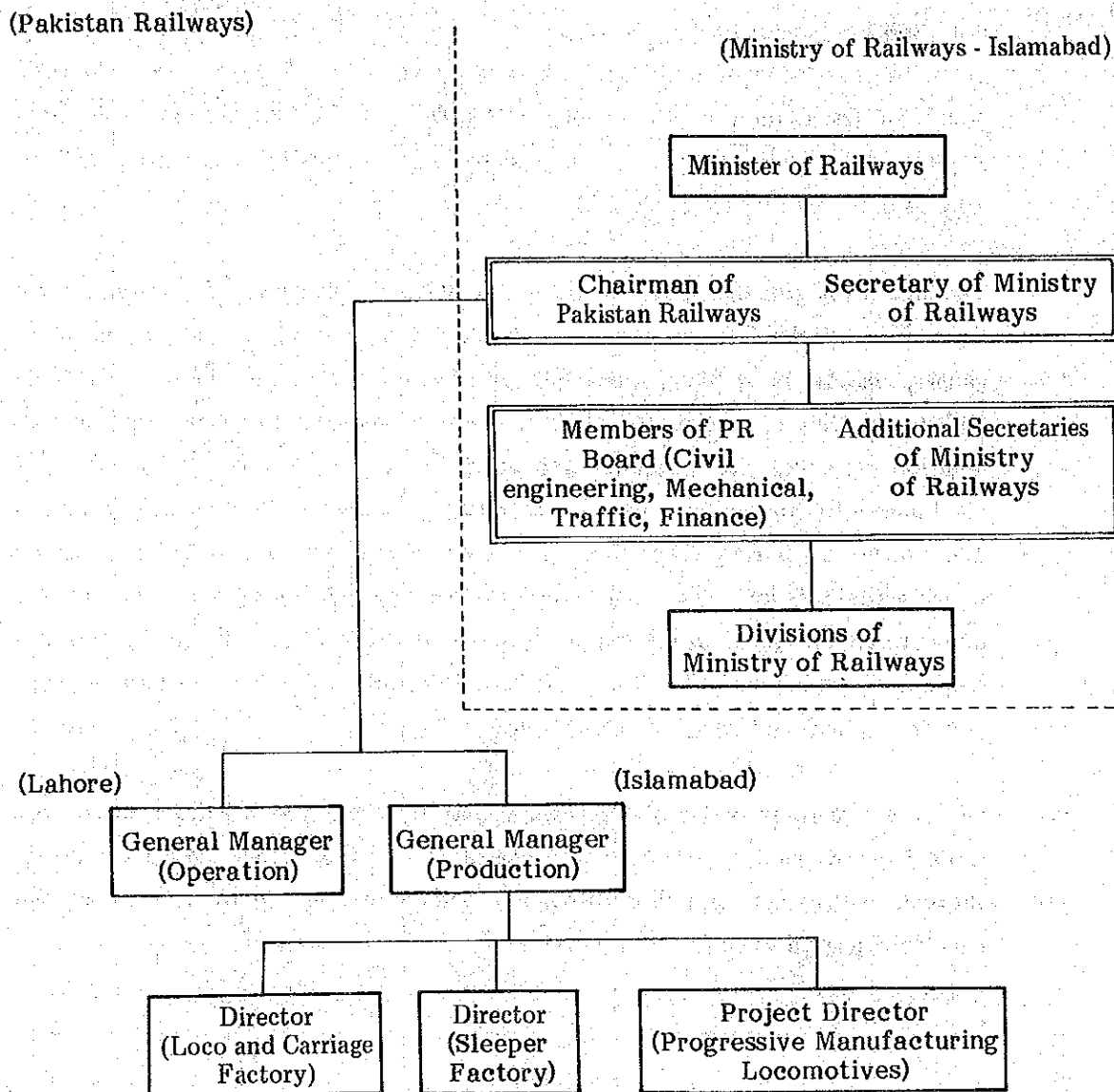
The new organization is as shown in Fig. 1. The Operation Wing is located in Lahore as previously and the Production Wing in Islamabad. For the purpose of speeding up the decision making, the General Manager of both Wings belongs directly to the Chairman, instead of to the each members of the PR Board.

This project will be put to practice under the supervision of the Project Director (Progressive Manufacturing Locomotives) which belongs to the General Manager of Production Wing.

As of 1981, Pakistan Railways has employees amounting to about 130,000, about 10,000 lower than the level (140,000) of 1977. This may be due to the effort for personnel rationalization. Notwithstanding this, Pakistan Railways remains an organization with the largest number of employees per kilometer in the world.



Fig. 2-1 Outline of New Pakistan Railways Organization



## 2-2 Plant and Equipment

### 2-2-1 Route and track

The total length of Pakistan Railways route is 8,823 km as of 1981, meaning that only 266 km is added to the 8,557 km at a time of independence (1947). In particular, the extension of route is as small as 12 km from 1973 to 1981. The total length of track, on the other hand, is 12,607 km, only 623 km longer than the 11,984 km immediately after the independence. Increase in length from 1973 to 1981 is only 107 km (see Table 2-1).

To cope with growing traffic demand, the Pakistan Railways has conventionally depended on rehabilitation of existing track and broadening of narrow and meter gauges, instead of spending positively on construction of new lines or doubling and quadrupling of tracks. At present, the track rehabilitation (rerailing, renewal, addition of ballast, etc.) is under way principally on the key routes from Karachi via Lahore to Rawalpindi, in order to raise the train speed from 96 km/hour to 120 km/hour. During 1981, the rerailing was completed for 152 km and the tie renewal for 175 km. The signal improvement and welding of rail joints are also under way. The gauge broadening has proceeded satisfactorily, with the broad gauge section occupying 88% (7,766 km) of the entire route. The meter or narrow gauge section can be found only in the local route.

Of the entire route of Pakistan Railways, only the section with 285 km of the key route from Khanewal to Lahore was electrified in 1970. Since the electric power shortage will remain prevailing throughout 1980's, it may require substantial time for electrification to be further promoted.

Table 2-1 Route and Track of Pakistan Railways

	Route (km)				Track Length (km)			
	(electrified) Total length	Broad gauge	Meter gauge	Narrow gauge	Total length	Broad gauge	Meter gauge	Narrow gauge
1947	8,557	7,309	512	736	11,984	10,464	628	892
1951	8,557	7,309	512	736	11,984	10,464	628	892
1961	8,572	7,449	512	611	12,094	10,739	628	727
1971	(285) 8,566	(285) 7,510	445	611	12,241	10,962	553	726
1972	(285) 8,795	(285) 7,739	445	611	12,497	11,218	553	726
1973	(285) 8,811	(285) 7,755	445	611	12,500	11,220	553	727
1974	(285) 8,811	(285) 7,755	445	611	12,506	11,224	553	729
1975	(285) 8,811	(285) 7,755	445	611	12,497	11,215	553	729
1976	(285) 8,811	(285) 7,755	445	611	12,498	11,216	553	729
1977	(285) 8,815	(285) 7,758	446	611	12,506	11,224	553	729
1978	(285) 8,815	(285) 7,758	446	611	12,515	11,233	553	729
1979	(285) 8,815	(285) 7,758	446	611	12,515	11,233	553	729
1980	(285) 8,823	(285) 7,766	446	611	12,607	11,325	553	729
1981	(285) 8,823	(285) 7,766	446	611	12,607	11,325	553	729

## 2-2-2 Rolling stock

Locomotives have been gradually dieselized since the latter half of 1950's. As of 1981, Pakistan Railways has 474 diesel locomotives, about one half of total 960 locomotives. In the traffic volume, the diesel locomotives play an important role with a contribution ratio at 86%. Twenty-nine electric locomotives were introduced in 1970, and no more locomotive has been added since then. Traffic by electric locomotive occupies a ratio of 7% of the total. Of total 457 steam locomotives (381 units of broad gauge), most are over 40 years old and overaged. Though the traffic by steam locomotive occupies only 7% of the total, the steam locomotive still plays important role in yards for shunting operation and on local lines. On the other hand, the diesel locomotive and electric locomotive are principally operated on the major lines.

Of 474 diesel locomotives, about one half is already or near the service limit (20 years). So, Pakistan Railways has proceeded with the plan of introducing 68 new diesel locomotives and re-engining 60 units of existing diesel locomotives under the 5th Five-year Plan (1979 to 1982). Due to financial difficulties, however, reengining has practically been executed at a rate of only five to ten units annually. The domestic locomotive manufacture programme has been established in view of this current state.

As regards carriages, the Carriage Factory in Islamabad is well in operation, the number of passenger cars in possession is being increased, and service quality improved. As of 1981, the total number of carriages in possession is 2,268 and air conditioning of carriages is also pushed forward.

For wagons, there exist qualitative and quantitative problems, which, together with shortage of tractive force (locomotives) and PR's defective goods train operation control, are responsible for failure of meeting the domestic traffic demand. The total of 36,248 wagons was in possession in 1981, fewer than 37,337 units in 1971.

The number of overaged cars appear to have increased. In addition, eight-wheel wagons are only 10% (3,601 units) of all wagons in spite of PR's recent efforts to reconstruct four-wheel wagons into eight-wheel wagons. Remaining 32,647 units

of four-wheel wagons not only require speed limit, but also cause burning of axle box with ease, presenting hindrance to smooth operation of wagons. In consideration of the above situation, it appears necessary for Pakistan Railways to set to manufacturing of wagons at early time.

Table 2-2 Locomotives, Carriages and Wagons  
of Pakistan Railways

	Locomotives				Carriages	Other special cars	Wagons
	Total	Diesel	Electric	Steam			
1951	845	14	-	831	1,706	854	23,716
1961	903	206	-	697	1,922	1,133	29,710
1971	1,141	402	29	710	2,154	1,152	37,337
1972	1,015	401	29	585	2,052	1,107	37,624
1973	993	401	29	563	2,057	1,082	37,436
1974	992	401	29	562	2,060	1,116	37,339
1975	992	401	29	562	2,090	1,104	37,239
1976	1,024	468	29	527	2,108	1,003	36,938
1977	978	468	29	481	2,086	816	36,720
1978	978	468	29	481	2,133	806	36,406
1979	979	462	29	488	2,138	788	36,276
1980	1,003	486	29	488	2,222	779	36,235
1981	960	474	29	457	2,268	764	36,248

### 2-2-3 Factories and workshops

The Pakistan Railways has a carriage factory in Islamabad, sleeper factories (two existing factories and four factories under construction), and Central Diesel Locomotive Workshop in Rawalpindi, diesel shop in Karachi, and Moghalpura carriage and wagon shop in Lahore. This time the locomotive factory will be added to the above. Additionally, the locomotive shed for regular maintenance and inspection of diesel locomotives is provided to each major stations in Karachi, Rawalpindi, Samasata, Kundian, Sibi, Rohri, and Quetta.

The carriage factory was constructed with a manufacture capacity of 150 carriages per year under assistance of West Germany in the latter half of 1960's. For a certain period after completion, the growth of manufacture was less than expected because of shortage of materials, etc. In recent times, the plant is working with its near full capacity. In 1981, this factory manufactured 117 carriages including 44 sleeping cars. Of this total production, 22 units were exported contributing to acquisition of foreign currency of Pakistan.

The Central Diesel Locomotive Workshop and the Karachi Diesel Shop have a capacity of overhauling 300 (after expansion) and 120 diesel locomotives respectively. Moghalpura carriage and wagon shop is undertaking the manufacture of carriages and wagons: in 1981, 10 carriages, 8 commuter cars, 2 second class cars with buffet and small compartment, and 75 wagons (hopper cars) were manufactured.

## 2-3 Traffic and Operation

### 2-3-1 Goods traffic

In 1950's and 1960's, goods traffic volume grew at annual 3 — 6 %, far exceeding the economic growth. The growth became sluggish in a period from 1969 to 1974 under heavy blow from the independence of Bagladesh, Indo-Pakistani War (1971), and disastrous flood (1973). From 1975, the rehabilitation of Pakistan Railways was started, with a temporary recovery from 1975 to 1976. The traffic volume slackened again an the goods traffic volume of 1981 is below the level of the latter half of 1960's (1968). On the three-year moving average, the annual mean growth rate of goods traffic in 1970's is 2.7% (see Table 2-3). This slackening in the rate of growth of traffic volume causes the ratio of railway traffic in the domestic good traffic to drop from 60% in 1950's and 1960's to 40 to 30% in 1970's and 1980's.

The recent sluggishness of goods traffic growth is mainly due to progression of motorization in Pakistan. Also important is the failure of Pakistan Railways to strengthen the traffic capacity to cope with growing domestic traffic demand. In the goods traffic of Pakistan, the major goods flow is from Karachi toward the north (Lahore, Rawalpindi, etc.). But the Karachi Station had once to face gigantic congestion of cargo because of shortage of goods trains. And the Pakistan Army was forced to establish the National Logistic Cell in 1978 to handle this gigantic congestion by shuttle transport with large trucks from Karachi. Bottlenecks of goods traffic of Pakistan Railways include: (1) inevitable speed constraint inflicted by overaged wagons, (2) wagons jamming in each station under poor operation control, and (3) insufficient locomotives to make up returning trains of empty wagons from the north to Karachi. These factors contribute to prolonging the wagon rotation cycle, resulting in failure of collecting the required number of wagons in Karachi and of making up the required number of goods trains.

Increasing the wagons and locomotives and improving the operation control are considered indispensable.

Table 2-3 Goods Traffic Volume (1)

	Tons (10 <sup>3</sup> )	Ton-kilometers (10 <sup>6</sup> )	Average Distance (km)
1951	7,812	3,578	460
1961	13,487	6,645	502
1968	14,887	7,930	543
1971	12,342	7,369	600
1972	12,659	7,634	605
1973	12,317	8,227	668
1974	11,316	7,259	645
1975	13,223	8,209	629
1976	15,313	9,097	602
1977	14,368	7,857	553
1978	13,344	8,557	646
1979	11,958	9,375	792
1980	11,853	8,598	733
1981	11,371	7,918	705



Table 2-4 Goods Traffic Volume (2)

	69/70			70/71			71/72			72/73			73/74			74/75		
	T (10 <sup>3</sup> )	TKM (10 <sup>6</sup> )	AD (km)	T (10 <sup>3</sup> )	TKM (10 <sup>6</sup> )	AD (km)	T (10 <sup>3</sup> )	TKM (10 <sup>6</sup> )	AD (km)	T (10 <sup>3</sup> )	TKM (10 <sup>6</sup> )	AD (km)	T (10 <sup>3</sup> )	TKM (10 <sup>6</sup> )	AD (km)	T (10 <sup>3</sup> )	TKM (10 <sup>6</sup> )	AD (km)
Wheat	1,284	713	555	1,187	532	449	1,536	1,180	768	1,689	1,570	929	1,312	958	731	1,402	1,305	932
Rice	695	498	716	803	380	473	843	345	409	850	402	473	729	481	660	860	705	819
Other grains	159	120	752	179	155	777	148	122	826	149	143	959	229	237	1,035	70	53	760
Sugar	98	48	486	108	81	753	137	77	562	264	157	594	250	93	372	191	60	312
Firewood	599	218	364	668	233	349	640	208	327	546	177	323	422	135	320	406	133	327
Coal & coke	968	882	911	1,028	977	951	872	765	877	959	858	895	677	622	919	637	634	996
Oil	747	790	1,057	943	1,005	1,065	1,102	1,184	1,074	1,173	1,263	1,080	1,121	1,228	1,096	1,455	1,590	1,093
Cement	1,095	328	299	1,138	291	256	1,219	250	206	1,230	293	206	1,609	217	203	1,351	353	262
Fertilizer	972	699	719	609	391	641	570	332	581	716	528	739	1,016	712	702	700	445	636
Iron & steel	224	254	1,133	216	251	1,164	176	197	1,117	121	137	1,139	108	112	1,041	107	95	884
Others	3,910	2,213	566	3,677	2,287	623	3,868	2,417	626	3,429	2,216	480	3,185	2,023	636	3,067	2,104	687
Railroad materials	1,572	757	505	1,766	756	462	1,546	557	373	1,202	485	404	1,199	440	385	2,784	785	272
Total	12,323	7,519	615	12,342	7,367	600	12,659	7,634	605	12,317	8,227	668	11,316	7,259	645	13,223	8,269	629
	75/76			76/77			77/78			78/79			79/80			80/81		
Wheat	1,722	1,573	914	1,128	610	541	1,423	1,347	947	2,070	2,376	1,148	1,149	1,012	881	809	583	721
Rice	809	737	912	625	509	815	829	794	958	1,005	997	992	754	722	958	539	529	982
Other grains	61	49	797	54	39	715	20	14	685	15	10	661	11	8	774	11	10	991
Sugar	173	103	595	221	98	444	154	66	429	128	91	710	205	202	986	154	143	928
Firewood	363	117	323	331	110	333	276	99	360	256	97	379	329	122	372	352	126	358
Coal & coke	538	559	1,039	471	486	1,033	390	425	1,090	333	381	1,143	329	381	1,157	361	433	1,199
Oil	1,584	1,653	1,043	1,629	1,687	1,035	1,613	1,785	1,160	1,514	1,753	1,151	1,680	1,871	1,114	1,561	1,675	1,074
Cement	1,073	393	367	958	405	423	920	282	306	473	230	487	793	526	664	784	561	716
Fertilizer	581	398	685	856	633	740	709	597	841	619	573	926	766	621	811	1,081	875	810
Iron & steel	126	118	933	104	36	347	94	84	896	71	54	764	38	43	1,122	34	42	1,224
Others	3,079	2,190	711	3,109	1,881	605	3,000	2,087	696	2,590	1,893	731	2,721	2,047	752	2,644	2,050	775
Railroad materials	5,204	1,207	232	4,882	1,063	218	3,916	977	249	2,884	920	332	3,078	1,043	353	3,041	891	307
Total	15,313	9,097	602	14,368	7,857	553	13,344	8,557	646	11,958	9,375	792	11,853	8,578	733	11,371	7,918	705

Note: T = Long Tons, TKM = Ton-kilometers, AD = Average Distance  
Above figures were supplied by Pakistan Railways

### 2-3-2 Passenger traffic

The passenger traffic volume, on the other hand, shows favourable growth in passenger kilometers, with annual 7% growth rate throughout 1970's. Since the number of passengers itself indicates almost no increase, this growth can be attributed principally to the extension of mean travel distance (see Table 2-5).

Of the total operating expenses of Pakistan Railways, 2/3 is occupied by the passenger sector. However, because of low fares, the ratio of passenger revenue in the total revenue is as low as 1/3 to 2/5, with less contribution. Since the increase in the number of passenger trains will hinder the goods train operation, Pakistan Railways is of the intention of suppressing the growth of passenger traffic.

Table 2-5 Passenger Traffic Volume (1)

	No. of passengers (10 <sup>6</sup> )	Passenger- kilometers (10 <sup>6</sup> )	Average Distance (km)
1951	70	6,248	90
1961	125	9,199	74
1971	127	9,329	74
1972	124	9,515	77
1973	136	11,068	82
1974	141	11,692	84
1975	143	12,354	87
1976	147	12,957	88
1977	143	13,199	93
1978	149	15,375	103
1979	146	16,713	115
1980	144	17,316	121
1981	123	16,387	133

Table 2-6 Passenger Traffic Volume (2)

	69/70			70/71			71/72			72/73			73/74			74/75		
	P (10 <sup>6</sup> )	PKM (10 <sup>6</sup> )	AD (km)	P (10 <sup>6</sup> )	PKM (10 <sup>6</sup> )	AD (km)	P (10 <sup>6</sup> )	PKM (10 <sup>6</sup> )	AD (km)	P (10 <sup>6</sup> )	PKM (10 <sup>6</sup> )	AD (km)	P (10 <sup>6</sup> )	PKM (10 <sup>6</sup> )	AD (km)	P (10 <sup>6</sup> )	PKM (10 <sup>6</sup> )	AD (km)
Special-class car	0.5	184	406	0.4	182	436	0.4	199	444	0.5	237	459	0.5	243	491	0.5	254	509
First-class car	6	827	145	5	762	146	5	786	158	6	1,043	180	6	1,187	187	6	1,291	206
Second-class car	126	8,834	71	121	8,384	69	119	8,529	72	130	9,788	76	134	10,264	77	137	10,808	79
Total	132	9,844	74	127	9,329	74	124	9,515	77	136	11,068	82	141	11,692	84	143	12,359	87

	75/76			76/77			77/78			78/79			79/80			80/81		
	P (10 <sup>6</sup> )	PKM (10 <sup>6</sup> )	AD (km)	P (10 <sup>6</sup> )	PKM (10 <sup>6</sup> )	AD (km)	P (10 <sup>6</sup> )	PKM (10 <sup>6</sup> )	AD (km)	P (10 <sup>6</sup> )	PKM (10 <sup>6</sup> )	AD (km)	P (10 <sup>6</sup> )	PKM (10 <sup>6</sup> )	AD (km)	P (10 <sup>6</sup> )	PKM (10 <sup>6</sup> )	AD (km)
Special-class car	0.5	265	545	0.4	265	602	0.2	122	626	0.2	137	811	0.2	161	797	0.3	209	823
First-class car	6	1,265	206	5	1,137	230	5	1,434	270	5	1,868	349	5	1,748	379	4	1,651	438
Second-class car	140	11,426	81	137	11,797	86	144	13,819	96	140	14,737	105	139	15,408	111	119	14,527	122
Total	147	12,957	88	143	13,199	93	149	15,375	103	146	16,713	115	144	17,316	121	123	16,387	133

Note: P = Numbers of passengers, PKM = Passenger-kilometers, AD = Average Distance  
Above figures were supplied by Pakistan Railways

### 2-3-3 Operation

Statistics showing the operation state of Pakistan Railways are shown in Table 2-7. The number of employees reached a peak at 140,000 in 1977, but was reduced to 130,000 by the personnel cut-down plan. Improvement of labour productivity (traffic volume per employee) is attributed to growth of passenger traffic volume (passenger kilometers) and personnel cut-down. The number of running trains has remained on the same level for the past decade. But the analysis by passenger train and goods train shows that the passenger trains have increased while the goods trains have decreased, indicating rather unfavourable state for the goods traffic.

As regards locomotives, the working efficiency of steam locomotives is decreasing with excessive drop in running distance per day (in particular, of goods trains). This may be due to overaged locomotives and shunting operation. The working efficiency of diesel locomotives has recently increased (85% in 1981) and is considered on a satisfactory level. Decrease in working efficiency of electric locomotives may be attributed to the power supply failures or frequent accidents.

For passenger cars, the number of cars, working efficiency, and running distance per day have been improved.

As regards wagons, the number of cars have been decreasing with the working efficiency lowered, and the hot-box accidents have remarkably increased recently. All of these facts show progressive deterioration. The running distance per day as well as the wagon rotation cycle is far below the level in the latter half of 1950's. The situation concerning the wagons has deteriorated, rather than moving toward improvement.

Table 2-7 Operational Statistics

	58/59	71/72	72/73	73/74	74/75	75/76	76/77	77/78	78/79	79/80	80/81
<b>I. Employees</b>											
a) Number of employees	N.A.	132.3	132.7	133.0	136.1	137.5	140.0	139.6	139.3	132.0	130.3
b) Labour productivity (traffic volume/ employee)	N.A.	129.5	145.2	142.4	151.6	157.6	151.5	174.1	190.3	202.4	192.7
<b>II. Train running</b>											
a) Number of passenger trains/day	N.A.	394	402	422	428	446	450	457	457	448	450
b) Number of goods trains/day	N.A.	233	225	197	207	197	173	184	171	171	171
<b>Total</b>		627	627	619	635	643	623	641	628	619	621
<b>III. Locomotives (only broad gauge)</b>											
<b>1. Steam locomotives</b>											
a) Number of units	N.A.	508	486	485	485	450	404	404	411	411	381
b) Availability (%)	N.A.	90	86	87	85	83	81	85	84	83	81
c) Running distance/day/ unit (mile) (For passenger train) (For goods train)	(N.A.) (N.A.)	(166) (76)	(131) (76)	(132) (78)	(126) (81)	(116) (71)	(112) (69)	(116) (66)	(124) (58)	(115) (52)	(122) (47)
<b>2. Diesel locomotives</b>											
a) Number of units	N.A.	401	401	401	401	468	468	468	462	486	474
b) Availability (%)	N.A.	88	86	87	87	84	83	82	84	85	85
c) Running distance/day/ unit (mile) (For passenger trains) (For goods trains)	233 (N.A.) (N.A.)	N.A. (326) (110)	N.A. (325) (112)	N.A. (299) (106)	200 (320) (122)	N.A. (296) (116)	N.A. (283) (109)	N.A. (291) (124)	N.A. (285) (127)	N.A. (285) (116)	N.A. (289) (123)
d) Hour/day/unit	17	N.A.	N.A.	N.A.	15	15	15	16	16	15	15

	58/59	71/72	72/73	73/74	74/75	75/76	76/77	77/78	78/79	79/80	80/81
3. Electric locomotive											
a) Number of units	N.A.	29	29	29	29	29	29	29	29	29	29
b) Availability (%)	N.A.	82	85	89	92	91	89	88	86	83	83
c) Running distance/day/ unit (mile)	(N.A.)	(346)	(345)	(357)	(368)	(379)	(360)	(362)	(340)	(349)	(374)
(For passenger train)	(N.A.)	(151)	(148)	(132)	(151)	(148)	(164)	(173)	(193)	(193)	(151)
(For goods train)											
IV. Carriages (broad gauge)											
a) Number of units	N.A.	1814	1817	1822	1859	1882	1860	1911	1921	2011	2061
b) Availability (%)	N.A.	88	88	83	83	80	81	78	77	79	79
c) Running distance/day/ unit (mile)	N.A.	184	199	180	199	203	197	203	205	211	213
V. Other box cars (broad gauge)											
a) Number of units	N.A.	1029	1004	1038	1028	927	740	730	715	706	691
b) Availability (%)	N.A.	91	89	89	84	70	55	77	75	76	81
c) Running distance/day/ unit (mile)	N.A.	62	71	56	58	51	64	78	77	70	67
VI. Wagons (broad gauge)											
a) Number of units	N.A.	35987	35803	35721	35622	35361	35143	34846	34757	34725	34740
b) Availability (%)	N.A.	96	96	96	96	95	94	94	95	95	93
c) Running distance/day/ unit (mile)	48	34	35	31	38	38	33	40	43	40	38
d) Hot box accidents/mil. miles	N.A.	1.2	1.8	2.2	1.9	2.7	2.0	1.4	1.7	1.3	2.3
e) Mean loading weight/ unit (ton)	N.A.	17.0	18.0	17.4	17.3	18.9	19.4	19.3	19.3	19.4	19.9
f) Loading tonnage/ goods train	N.A.	542	578	564	546	608	618	599	622	595	572
g) Wagon rotation	7	11.6	13.1	14.8	15.1	16.1	17.2	15.6	15.5	14.9	14.7

## 2-4 Financial Statements

### 2-4-1 Revenue and expenditure (Table 2-8)

The revenue and expenditure of Pakistan Railways went into the red in 1970's. Particularly, the years 1975, 1977, and 1980 and after showed a deficit in the net operating revenue. A temporary improvement of revenue and expenditure was observed in 1978 and 1979, which was attributed to the effect of fare revision (12.5% up for goods and 18 – 20% up for passenger) in July and August, 1977. After the year 1980, this effect of raising the fare was offset by the rise of operation costs including principally the labour and fuel expenses, resulting again in deteriorated revenue and expenditure. In spite of repeated rise of passenger fare (July, 1979 and January, 1980) and further 25% up of goods fare (January, 1980), the operating deficit run up to Rs. 262 million (¥5.7 billion) and the net current deficit to Rs. 457 million (¥9.9 billion) in 1981. Pakistan Railways expects substantial loss for the year 1982 and after. Here the rise of fare is not expected because it is determined not from the managerial needs of Pakistan Railways, but from the viewpoint of national economic policy. Besides, Pakistan Railways expects the cost to rise at annual 10 – 15%.

Table 2-8 Revenue and Expenditure

Unit: Million Rs.

	Actual 1977	Actual 1978	Actual 1979	Actual 1980	Actual 1981	Expected 1982	Expected 1983	Expected 1984
Passenger revenue/PKM (paisa)	3.6	4.2	4.2	5.8	6.7	6.7	6.7	6.7
Goods revenue/TKM (paisa)	14.7	16.9	15.6	18.1	21.5	21.5	21.5	21.5
Passengers	473.6	640.7	697.8	998.0	1,090.6	1,115.0	1,145.7	1,177.2
Other coaching	69.1	80.9	82.3	95.1	104.1	125.0	127.5	136.1
Goods	1,152.7	1,446.0	1,458.0	1,558.0	1,700.0	1,788.0	1,807.9	1,801.7
Sundries	31.5	27.8	32.6	26.5	35.1	30.0	30.0	30.0
Miscellaneous	1.6	2.3	2.9	1.2	1.9	-	-	-
Operating revenue	1,728.5	2,197.7	2,273.6	2,678.8	2,931.7	3,058.0	3,111.1	3,139.0
Fuel	342.4	376.3	457.0	678.7	816.7	799.3	879.2	967.1
Labour	734.7	992.9	1,048.9	1,082.2	1,223.6	1,313.6	1,445.0	1,589.5
Material	342.0	246.1	329.6	454.0	462.4	582.8	670.2	770.7
Others	117.3	133.2	93.6	268.7	270.7	342.8	377.1	414.8
Operating expenses	1,536.4	1,748.5	1,929.1	2,483.6	2,773.4	3,038.5	3,371.5	3,742.1
Depreciation	207.4	263.7	272.8	370.0	420.0	420.0	476.7	541.1
Total operating expenses	1,743.8	2,012.2	2,201.9	2,853.6	3,193.4	3,458.5	3,848.2	4,283.2
Net operating revenue (Loss)	(15.3)	185.5	71.7	(174.8)	(261.7)	(400.5)	(737.1)	(1,144.2)
Interest on loans	143.7	154.6	175.7	305.8	135.5	113.7	145.8	220.3
Improvement fund	25.1	35.2	39.4	54.9	60.0	61.3	63.0	64.7
Dividend paid on capital-at-charge	34.3	154.1	171.9	-	-	-	-	-
Net current surplus (Deficit).	(218.4)	(158.4)	(215.3)	(535.5)	(457.2)	(575.5)	(945.9)	(1,429.2)



#### 2-4-2 Balance sheet and application of funds (Tables 2-9, 2-10)

The fund for the investment in new facilities of Pakistan Railways is accommodated by the governmental capital for domestic currency fund and the foreign currency loan introduced by the Government for foreign currency fund. As regards the latter loan, Pakistan Railways will pay the interest to the Government according to the domestic relending terms. But Pakistan Railways will not have to pay the principal because it is transferred to the governmental capital to Pakistan Railways at a time when it is repaid by the Government. On the other hand, for the investment in replacement, in principle, the domestic currency fund is accommodated by the depreciation reserves of Pakistan Railways and the foreign currency fund accommodated by the foreign loan introduced by Pakistan Railways itself.

For the governmental capital, Pakistan Railways is also obliged to refund a dividend of a certain rate (currently 6.25%) to the national treasury.

However, the profit cannot be expected due to recent excessive deterioration of financial state of Pakistan Railways and the raising of fund for replacement by Pakistan Railways itself is very difficult. And the Government decided to exempt the repayment of dividend of governmental fund for 1980 and after and to grant subsidy to cover the shortage of fund due to deficit in future. The governmental subsidy is also expected in future for the replacement expenditure of Pakistan Railways.

Table 2-9 Balance Sheet

Unit: Million Rs.

	Actual 1977	Actual 1978	Actual 1979	Actual 1980	Actual 1981	Expected 1982	Expected 1983	Expected 1984
<u>Assets</u>								
Fixed assets	4077	4292	5418	6256	7271	8232	9165	10182
Current assets	2803	3042	3274	3642	4210	4881	5428	6118
Inventories	1817	1840	2313	2507	2986	3246	3808	4368
Receivables	570	624	846	936	940	1027	1027	1027
Investment in road transport	1213	1189	1442	1547	2014	2187	2749	3309
Cash balance	14	14	14	14	14	14	14	14
	20	13	11	10	18	18	18	18
<u>(Less) Current liabilities</u>	810	990	873	838	1115	992	998	1004
Current assets less current liabilities	1007	850	1440	1669	1871	2254	2810	3364
Carry forward of past losses to be recovered from future revenue	267	400	704	945	1190	1097	927	700
<u>Finance</u>	4077	4292	5418	6256	7271	8232	9165	10182
Government capital	3508	3807	4472	4935	5388	6096	6643	7334
Cash development loan (Govt.)	95	60	121	161	410	386	250	66
Foreign loans (New investment)	360	358	624	879	1064	1307	1477	1662
Foreign currency loans (Replacement)	112	46	13	63	154	190	490	755
<u>Fund balance</u>	36	41	46	52	58	-	-	-
Railway reserve fund	(-)	36	166	218	261	316	368	426
Improvement fund	2	-	(-)	(-)	(-)	(-)	(-)	(-)
Pension fund			24	52	64	63	63	63

Table 2-10 Application of Funds

Unit: Million Rs.

	Actual 1977	Actual 1978	Actual 1979	Actual 1980	Actual 1981	Expected 1982	Expected 1983	Expected 1984
<b>A. Source of Funds</b>								
1. Net operating revenue	(15.3)	185.5	71.7	(174.8)	(261.7)	(400.5)	(737.1)	(1144.2)
2. i) Depreciation	207.4	263.7	272.8	370.0	420.0	420.0	476.7	541.1
ii) Improvement fund	25.1	35.2	39.4	54.9	60.0	61.3	63.0	64.7
3. Decrease (increase) of accounts receivables	(45.5)	(37.4)	19.4	18.9	723.9	(3.7)	-	-
4. Decrease (increase) of accounts payable	(5.7)	54.0	(52.0)	(62.2)	(10.6)	-	-	-
5. Other decrease (increase) of working capital	60.9	8.3	44.4	(209.4)	(122.8)	(11.6)	-	-
6. Drawn from reserves	19.5	35.0	35.0	63.5	21.3	-	-	-
7. Foreign loans								
New investment	1.2	40.3	312.7	293.1	209.8	271.4	214.0	228.5
Replacement	15.3	0.4	11.9	149.6	186.2	234.0	464.0	441.0
8. Local currency								
Government (New investment)	223.8	258.0	194.2	215.9	392.4	433.2	233.0	462.7
Governmental cash	309.1	24.4	132.0	261.1	174.1	-	-	-
Development loan (Replacement)	-	-	56.0	-	-	-	-	-
Special loan for DEL spare parts	-	-	-	-	-	-	-	-
Non-development loan	-	-	430.0	-	-	-	-	-
subsidy for replacement	-	-	-	-	-	328.0	489.0	567.8
Subsidy for deficit	-	-	-	-	198.5	74.7	559.5	987.5
<b>Total - A</b>	<b>795.8</b>	<b>867.4</b>	<b>1567.5</b>	<b>985.6</b>	<b>1991.1</b>	<b>1406.8</b>	<b>1862.1</b>	<b>2149.1</b>
<b>B. Application of Funds</b>								
1. Debt repayment	193.0	221.4	220.2	405.2	230.6	221.2	309.1	396.1
2. New investment	183.0	298.8	664.3	463.1	453.7	704.6	547.0	691.2
3. Replacement	360.5	284.5	347.9	678.0	484.2	562.0	953.0	1008.8
4. Improvement expenditure	26.7	25.0	21.3	25.3	45.7	53.0	53.0	53.0
5. Return on Government Capital	34.3	154.1	171.9	-	-	-	-	-
<b>Total - B</b>	<b>797.5</b>	<b>983.8</b>	<b>1425.6</b>	<b>1571.6</b>	<b>1214.2</b>	<b>1540.8</b>	<b>1862.1</b>	<b>2149.1</b>
<b>Net increase/decrease of fund</b>	<b>(1.7)</b>	<b>(116.4)</b>	<b>141.9</b>	<b>(586.0)</b>	<b>776.9</b>	<b>(134.0)</b>		