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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

APPRAISAL OF
THE BELGRADE-BAR RAILWAY PROJECT
YUGOSLAVIA

March 6, 1968

Projects Department

CURRENCY EQUIVALENTS

Currency Unit	-	Dinar ^{1/}
US\$ 1	=	Dinars 12.50
1 Dinar	=	US\$ 0.08
Dinars 1,000,000	=	US\$ 80,000

1/ Throughout the report the denotation "New Dinar" or "N. Din" has been used, which is usual in Yugoslavia, to distinguish from the "Old Dinar" (New Dinar 1.00 = Old Dinar 100).

WEIGHT AND MEASURES

1 m	=	3.28 ft
1 km	=	0.62 mi
1 km ^{2/}	=	0.386 sq mi
1 m ton	=	0.98 lg ton
	=	1.1 U. S. sh ton

Fiscal Year

January 1 - December 31

Totals may not add up because of rounding.

YUGOSLAVIA

APPRAISAL OF THE BELGRADE BAR RAILWAY PROJECT

Table of Contents

	<u>Pages</u>
<u>SUMMARY</u>	i - ii
1. <u>INTRODUCTION</u>	1
2. <u>BACKGROUND</u>	2 - 4
General	2
Transportation in Yugoslavia	2
Transport Co-ordination	3
3. <u>THE RAILWAYS</u>	5 - 9
Organization, Management and Staff	5
The Network	6
Physical Properties	6
Traffic	8
Operations	9
4. <u>THE 1964-1970 & 1971-1975 RAILWAY INVESTMENT PROGRAMS</u>	10
5. <u>THE PROJECT</u>	11 - 15
Description	11
Estimated Cost	12
Financing of the Project	13
Administration and Execution	14
6. <u>ECONOMIC JUSTIFICATION</u>	16 - 22
Economic Geography of the Belgrade-Bar Line's Zone of Influence	16
Traffic on the Belgrade-Bar Railway	19
Benefits	20
7. <u>FINANCIAL ASPECTS</u>	23 - 29
Rates and Fares	23
Budgets, Accounting and Auditing	24
Earnings	25
Finances	27
8. <u>CONCLUSIONS AND RECOMMENDATIONS</u>	29

This Appraisal Report is based on the findings of an appraisal mission in October 1966, consisting of Messrs. Lubbeke, McCunniff and Hughes, and a further mission in July 1967 consisting of Messrs. Lipkowitz, Hughes, von Gontard and Spears (FAO).

Table of Contents (Cont'd.)

- Table 1 - Freight Transport by Mode of Transport 1956-1966
(millions of net-ton-km)
- Table 2 - Freight Traffic by Mode of Transport 1956-1966 (million of tons)
- Table 3 - Passenger Traffic by Mode of Transport 1956-1966
(million of pass-km)
- Table 4 - Passenger Traffic by Mode of Transport 1956-1966
(millions of passengers)
- Table 5 - Expenditure on Investments in Fixed Assets of the Socialized Sector, by Sector, Percentage of Total, Selected Years 1960-1965
- Table 6 - Selected Operating Statistics 1961-1966
- Table 7 - Railway Network and Traffic Density 1925-1966
- Table 8 - Motive Power and Rolling Stock, Yearly Averages 1961-1966
- Table 9 - Age of Motive Power and Rolling Stock
- Table 10 - Principal Commodities carried by Yugoslav Railways, 1952 and 1962-1966
- Table 11 - Yugoslav Railway System, Freight Traffic Projection, 1966-1975
- Table 12 - Yugoslav Railway System, Passenger Traffic Projection, 1966-1975
- Table 13 - Yugoslav Railways, Original and Revised Railway Investment Program 1964-1970 and Preliminary Program 1971-1975
- Table 14 - Belgrade-Bar Railway Project, Cost Estimate and Schedule of Expenditure
- Table 15 - Belgrade-Bar Railway Project, Scope of International Competitive Bidding 1966-1972
- Table 16 - Belgrade-Bar Railway Project, Estimated Schedule of Foreign Exchange Expenditure 1968-1972
- Table 17 - Belgrade-Bar Railway Project, Estimated Disbursement Schedules 1968-72
- Table 18 - Community of Yugoslav Railways, Railway Transport Enterprises, Revenue, Expense and Net Income 1961-1966, and First 6 months of 1967 (millions of New Dinars)
- Table 19 - Yugoslavia, Railway Transport Enterprises, Revenues, Expenses and Net Income Actual 1966 and Six Months 1967, Estimated Six Months 1967 and Subsequent Years (millions of New Dinars)
- Table 20 - Community of Yugoslav Railways, Railway Transport Enterprises, Balance Sheet Data, 1964, 1965 and 1966 (millions of New Dinars)
- Table 21 - Community of Yugoslav Railways, Railway Transport Enterprises, Estimated Balance Sheet Data, 1967-1975 (millions of New Dinars)
- Table 22 - Community of Yugoslav Railways, Railway Transport Enterprises, Cash Flow Data, Actual 1966, Estimated 1967-1975 (millions of New Dinars)

Annex A - Calculation of Benefits - Methodology

Annex B - Agricultural Prospects of Zone of Influence

Maps

1. Yugoslavia: Railway System (IBRD 2136R)
2. Yugoslavia: Belgrade-Bar Railway, Forestry Areas (IBRD 2137)
3. Yugoslavia: Belgrade-Bar Railway, Main Transport Routes in Zone of Influence (IBRD 2143R)

YUGOSLAVIA

APPRAISAL OF THE BELGRADE BAR RAILWAY PROJECT

SUMMARY

- i. The Federal Government of Yugoslavia, through the Yugoslav Investment Bank, has asked the Bank to assist in financing the completion of the 476 km railway from Belgrade to the port of Bar on the Adriatic Coast. The project, which would be the third Bank-financed railway project for Yugoslavia, consists of the construction of the line, and the procurement and installation of signalling, telecommunication and electric traction equipment. The project also includes the supply of motive power and rolling stock although Bank financing is not required for this part of the project, nor for any expenditure prior to 1968. The Federal Government has undertaken to expand the port facilities at Bar to the extent required to handle efficiently all traffic including that of the new railway line.
- ii The estimated cost of the project for which the Bank's help in financing has been requested is US\$211 million equivalent, including contingencies, over the period from January 1, 1968 until completion, scheduled for the end of 1972. The foreign exchange component is estimated to be between 11 and 33 percent depending on the results of international bidding. The cost estimate is based on final engineering, except for bridges, and actual unit costs experienced on similar projects in Yugoslavia. The loan amount of US\$50 million equivalent, which would be 23.7 percent of the expenditure from 1968 to 1972, has been selected as the appropriate Bank contribution to the financing of the project.
- iii. Contracts to be let after January 1, 1968 would be awarded on the basis of international competitive bidding with the exception of track laying and buildings which, by their nature, are suitable only for local procurement. Execution of the project, which is located in the Republics of Montenegro and Serbia, would be the responsibility of the two Republics through authority delegated by the Federal Government. Engineering and construction supervision are within the capability of the Yugoslav Railways' Organization, which has been entrusted with the work. In addition, the Railways intend to employ foreign consultants for design and supervision of certain civil engineering works such as tunnelling and bridge construction.
- iv. The line will use about 14 Km of an existing line south of Belgrade; and a total of 90 Km of the line on two sections at each end has been constructed and is in operation. The remaining 371 km of line has still to be constructed, though some major works have been started. The completion of the line will provide an important transportation link between the developed central region and the coast and also help in the advancement of the underdeveloped zone of influence; the economic rate of return is estimated to be about 8-1/2 percent on the investment from January 1968 until completion.

v. The Railways' earning position has not been satisfactory. The disappointing results for 1964 and 1965 were due in the main to delays by Government in permitting rate adjustments to offset cost increases. The necessary increases were finally made effective during the course of 1965. Since then, wages and prices have been rising but no further increases in rates have been made. It has been agreed that the Government will in the future take all such action as may be required to enable the Railways to adjust their rates and fares promptly in relation to costs and promptly to make them effective; that the Railways will introduce an increase in rates and fares during the course of 1968 so as to produce additional gross operating revenues of N. Din 111 million in 1969 based on agreed estimates of traffic for that year; and that the Railways will take whatever additional measures may be required, whether increases in rates or reductions in expenses or both, to earn a return of at least 3.5 percent in 1970 and at least 6.0 percent in 1972 and thereafter. This would be satisfactory progress toward reaching a sound financial position.

vi. The project provides a suitable basis for a Bank loan of US\$50.0 million to the Yugoslav Investment Bank for a term of 25 years, including a six year period of grace which corresponds to the construction period and the first year of operation.

YUGOSLAVIA

APPRAISAL OF THE BELGRADE BAR RAILWAY PROJECT

1. INTRODUCTION

1.01 The Yugoslav Government, through the Yugoslav Investment Bank, has requested a Bank loan to help finance the completion of a railway from Belgrade to Bar, a port on the Adriatic Sea. The amount of the proposed loan has been set at US\$ 50 million equivalent. The Yugoslav Investment Bank was established in 1956 as the chief instrument of the Federal Government for providing investment funds for development and as the main channel for foreign loans. All Bank loans with the exception of those of 1951 and 1953 have been made to the Yugoslav Investment Bank, and in this case the proposed loan would cover part of the Federal Government's contribution to the cost of the project.

1.02 This would be the third railway loan from the Bank to Yugoslavia and the fifth in the transportation field. The first railway loan, US\$35 million (361-YU of October 28, 1963) was for the construction of an electrified standard gauge line from Sarajevo to Ploce to replace a narrow gauge line generally on the same alignment. The new line is now in operation with diesel traction. The completion of the project was originally scheduled for the end of 1966 but, due to planning changes, electrification and signalling works are not yet completed. The new schedule calls for completion by the end of 1968, which is feasible. The second railway loan, of US\$70 million (395-YU of December 11, 1965) was for the railway modernization program. The execution of works for this project is not proceeding on the original schedule due to protracted tendering procedures and design modifications. Work is now proceeding satisfactorily according to an amended schedule which calls for completion by the end of 1970.

1.03 There have been two highway projects financed by the Bank in Yugoslavia. The first project, of US\$35 million, (344-YU of June 21, 1963) was to complete the Adriatic Highway and parts of the Central Highway. The works have been satisfactorily completed and the loan fully disbursed. The second project, financed by a loan of US\$10 million (485-YU of February 24, 1967), was to complete and improve to modern standards the highway between Zupanja and Opuzen, linking the Central Highway with the Adriatic. Contracts for the work were recently awarded.

1.04 This report has been prepared by Messrs. Lubbeke, McCunniff, and Hughes, members of an appraisal mission in October 1966, and Messrs. Lipkowitz, Hughes, Spears (FAO), and Von Gontard, who appraised development prospects in the zone of influence in July 1967.

2. BACKGROUND

General

2.01 Yugoslavia is about the same size as the Federal Republic of Germany or the United Kingdom with an area of 255,804 km². The population is much smaller however, some 19.5 million, and is growing at an annual rate of 1 percent.

2.02 The Gross Social Product^{1/} in 1966 was N.Din 98.5 billion or about US\$7.9 billion equivalent; the rate of growth averaged 8.6 percent per year from 1953 to 1964. The rapid growth during this period was due mainly to the expansion of manufacturing industry, while agricultural output rose much more slowly. The low growth rate of 2.3 percent in 1965 was due to a poor harvest and dislocations resulting from economic reforms. In 1966 the growth was again 8.6 percent, due mostly to an 18 percent rise in agriculture, the result of unusually favorable weather and application of additional inputs. GNP per capita, on the basis of the customary national accounting concept, is estimated to be about US\$500.

2.03 Yugoslavia has a federal constitution under which regional and local governments (republics and communes) have considerable authority. The organization of the economy is based on workers' self-management rather than state management of the various enterprises. There has been a substantial move towards decentralization and the economic reform of 1965 is shifting the main responsibility for investment decisions even further from the central to local governments and enterprises.

Transportation in Yugoslavia

2.04 Yugoslavia's main communication routes have been determined by topography and follow a longitudinal axis along the Danube, Sava and Morava valleys. Mountain barriers have hindered communications between the central plains and the coast. The recently completed standard gauge railway between Ploce and Sarajevo, and the projected railway from Belgrade to Bar, will substantially complete the railway network. The completion of the road from Zupanja to Opuzen in 1969 and the extension of the Adriatic Highway to Skopje will add to the highway network.

2.05 The railways are the most important transport mode in Yugoslavia, accounting for 55 percent of the freight ton-km in 1966 (Table 1), which was a decline from 68 percent in 1963. In terms of tons carried, there was an increase from 72 million tons in 1963 to 76 million in 1964, falling again to 72 million tons in 1966 (Table 2). The causes of this decline are discussed in paragraph 3.13. Railways are also important in passenger

^{1/} The Gross Social Product in Yugoslavia is not comparable with the customary measure of Gross National Product in that Government administration and many consumer services are excluded, such as housing. GSP would be about 70 percent of the GNP if measured by Western Standards.

transport, accounting for 62 percent of the passenger-km in 1964 and probably about 55 percent today (Table 3). Although the railways percentage share of the number of passengers by all modes of transport decreased between 1963 and 1966 the numbers actually travelling by rail increased in this period by 6% (Table 4). Passenger air transport has been growing rapidly in recent years but is still insignificant (Table 3). Scheduled air transport is provided by JAT, the national carrier, which not only serves domestic needs but also most of Europe and points in North Africa. Air freight is insignificant.

2.06 All forms of transport, particularly highways, have increased their share of traffic at the expense of the railways, as is common in many countries. Truck transport has been increasing in recent years by an average annual rate of over 20 percent, while river transport is becoming even more important than in the past. Even so, the railways will remain for many years a vital part of the transport network of Yugoslavia and will provide the most economical means of conveying many goods, particularly bulk commodities in full carloads over relatively long distances.

2.07 Investment in transportation has been heavy over the last five years, accounting for 13 percent of expenditures on fixed assets in 1962 and nearly 12 percent in 1965 (Table 5). The main investments during the past five years have been the construction of the Central Highway, linking Austria and Greece, the Adriatic Highway from Rijeka to Bar, the conversion of the Sarajevo-Floce line to standard gauge, as well as continuing progress on railway modernization and electrification of main lines. The Belgrade-Bar railway and continued work on electrification and modernization of stationary installations and of motive power, and the continuation of the Adriatic Highway to Skopje will account for most of the investment in land transport in the next period 1967-1970. Investment in sea transport will also be larger and is planned to account for 13.4 percent of transport capital expenditure in the period. As a result, Yugoslavia's merchant fleet will increase from about 1 million to at least 1.4 million gross registered tons.

Transport Co-ordination

2.08 Yugoslavia has made deliberate efforts towards the co-ordination of policies with respect to transportation rates, taxation and investment in its recent move towards a market oriented economy.

2.09 The Railway Law stipulates that railway rates must be based on the operating costs of moving traffic, and with minor exceptions previously subsidized rates, such as for lignite, fertilizers and passengers, have been abolished. Road transport firms set their own rates and the conditions of entry to the industry are liberal. There is a high degree of competition in transport among public carriers, who also face competition from businesses carrying their own goods. Danube and Sava river traffic is also competitive and rates cover ship and port operating costs.

2.10 The policy of the government is to tax road and rail on the same bases per ton-km. Railways pay taxes related to the value of motive power, rolling stock and fixed installations (except tunnels and substructures), while road transport enterprises pay a similar tax on vehicles and equipment, but not on land occupied for terminals. Road vehicle license fees are collected, and fuel taxes are paid by all users of fuel. The end result is that both road and rail enterprises pay taxes approximating N.Din 0.03 per ton-km.

2.11 Coordination of investment in transport is primarily the concern of the Federal Government in the course of preparation of economic development plans. These take into account the rationalization of the economic structure and major transport investments are planned accordingly. The main criterion is to provide for transportation needs at the lowest cost to the economy.

2.12 In spite of these efforts toward coordination there remain some imperfections. In order to alleviate the effects of the economic reform subsidies to railways are provided during a transitional period ending December 31, 1970. If, for example, costs are higher than freight rates in 1967, the Federal Government will reimburse 80 per cent of the difference. The percentage of the subsidy will decline each year until it is eliminated in 1971. At the present time only the railway enterprises at Skopje and Titograd are being subsidized in this way and the total sum disbursed is small for the railway as a whole, but amounted to 63 per cent and 113 per cent of earned freight revenues for these enterprises, respectively.

2.13 Other subsidies are given to rail and road transport in the provision of new lines and roads. For example, the major part of the cost of new railway lines is financed by the Federal Government by outright grants; no repayment or interest being required, while the Republics finance the rest. Depreciation is in turn recovered by the enterprises in their rates and fares but the funds are then used for rehabilitation of other lines and equipment. New national highways are financed in a similar manner but the investment is not recovered from road users. When the basic highway network is completed in 1971 the responsibility for financing will pass to the Republics. At the present time road users do not fully cover the costs of road maintenance but the Government increased fuel taxes in 1967 and is considering an increase in the road tax for heavy vehicles so that maintenance costs will be fully recovered from users by 1970.

2.14 In spite of the imperfections noted above the Government is aware of the need for transport coordination, and though highway and railway construction will probably remain subsidized at the Federal and Republic levels, the situation is generally improving.

3. THE RAILWAYS

Organization, Management and Staff

3.01 The organization of the Yugoslav Railways is based on the Yugoslav concept of the workers participating in the management and sharing in profits. The organization has changed several times in recent years; the latest change, by the Law on the Organization of the Yugoslav Railways, became effective on January 1, 1966. This Law established six Railway Transport Enterprises, each with responsibilities generally co-extensive with the republics served: five are consolidated, one each at Belgrade, Zagreb, Sarajevo, Skopje and Titograd, and one is an association at Ljubljana, consisting of three regional enterprises in Slovenia. The Railway Transport Enterprises operate the fixed assets in their area and the motive power and rolling stock. Rates and fares are established for each enterprise separately as explained in detail in paragraph 7.04.

3.02 Each Enterprise is managed by a Workers' Council of 20 to 50 members, depending on the size of the Enterprise, a Management Board of 5 to 12 members, and a Director, as Manager, who is a member of the Board, but cannot be its Chairman. The Workers' Council meets every two months, the Board more frequently, as necessary. The Director is nominated and dismissed by the Republican Executive Council. Only professionally qualified people are eligible for nomination.

3.03 The Railway Enterprises form the Community of Yugoslav Railways, which has an Assembly, a Board of Directors, and a General Manager who is appointed by the Federal Executive Council. The main functions of the Community are to ensure uniformity of operating standards, to coordinate train schedules, to set rates for inter-enterprise and international traffic, to ensure adequate car distribution and to collect statistics. There are several auxiliary enterprises directly attached to the Community of Yugoslav Railways.

3.04 The Railways staff is competent. The management is capable and the handling of traffic, operations and technical matters is efficient.

3.05 The number of staff has fluctuated during the last ten years, because some maintenance and workshop enterprises (now working units) at one time separated themselves from the Railways, but some of them later merged again. The performance of the staff in terms of traffic-units and gross ton-km per employee has improved in recent years (Table 6). The number of employees per route-km increased slightly, due mainly to extensive work carried out under the Railway Modernization Program. All performance figures compare reasonably well with the railways in other European countries with similar traffic and operating conditions. The Railways intend that, even with traffic increases as estimated, the labor force will be reduced progressively from 140,951 at the end of 1966 to 121,000 by the end of 1975. This reduction will result from modernization of signalling, marshalling yards and traction; from the abandonment of some 2,000 km of low traffic un-economic lines; and from mechanization and general increases in productivity. The results would be achieved largely through normal wastage and the laying off of unskilled and semi-skilled workers.

The various stages in the reduction of the total force between 1968 and 1975 are show below:

<u>End of Year</u>	<u>Employment</u>
1968	132,300
1970	128,800
1971	124,000
1975	121,000

The Network

3.06 The Railway system is the main artery connecting the northwest with the southeast. The network is not extensive compared with other European countries, Yugoslavia having only 3.6 km of standard gauge line per 100 km², compared with Austria 6.5, France 6.9, Hungary 9.3 and Poland 7.6. The density of the railway system varies from 6.2 km of standard gauge lines per 100 km² in Slovenia to 2.8 km in Southern Serbia, and 0.4 km in Montenegro.

3.07 In 1966 the Railways operated 9,437 route km of standard gauge and 2,143 route km of narrow gauge (see Table 7); 733 route km of standard gauge are double track and 483 route km are electrified with 3,000 V, D.C. The standard gauge system has expanded continuously since the establishment of the Railways after the First World War; the total increase is about 2,700 km. The narrow gauge system grew by about 1,000 km between World War I and 1950, but since then decreased by 969 km due to conversion to standard gauge and abandonment of unremunerative lines. About another 300 km will be discontinued as a result of the construction of the Belgrade-Bar line, and studies on closing more lines are under way.

Physical Properties

3.08 Track, structures and buildings are well maintained. About 40 per cent of the standard gauge tracks are laid with rails heavier than 45 kg per m; the main line Jesenice-Ljubljana-Belgrade-Skopje has been relaid with 49 kg rails. Track relaying of other lines with heavy traffic is progressing. Ballast, ties, points and crossings on mainlines are in satisfactory condition.

3.09 Most of the station yards were about 40 years old at the beginning of the Railway Modernization Program in 1964, which includes the construction or remodeling of four major marshalling yards at Ljubljana, Zagreb, Belgrade and Skopje and of two medium size yards at Doboje and Nis. Progress of construction is satisfactory after initial delays due to changes in planning. The marshalling yards will be put into operation during 1970 and substantially improve the efficiency of freight transport. Improvement of other yards and mainline junctions is under way.

3.10 The signalling system on most lines also remained unchanged for about 40 years; however, substantial modernization has been made in recent years. About 150 km of automatic block with color light signals was installed from 1961 to 1963. The installation of modern signalling and automatic block equipment on a further 1,800 km of mainlines is part of the Modernization Program.

3.11 The composition of motive power and rolling stock from 1961 to 1966 is shown in Table 8 and data for 1966 are summarized below.

	Number of Units	
	Average of 1966	
	Standard Gauge	Narrow Gauge
Locomotives, Steam	1,573	468
Diesel	243	-
Electric	55	-
Railcar sets, Diesel	248	4
Electric	22	-
Passenger Car Stock	4,624	849
Freight Car Stock	63,532	7,706

The motive power and rolling stock is generally well maintained, but a substantial portion is far beyond its useful economic life. The 1965 percentage of steam locomotives and rolling stock in excess of 35 years is shown below:

	Standard Gauge	Narrow Gauge
Steam locomotives	55%	77%
Passenger cars	31%	88%
Freight cars	56%	95%

A breakdown by age groups is shown in Table 9. The number of steam locomotives will be reduced during the Railways' 1964-1970 investment program and the preliminary program 1971-1975 by progressive dieselization and electrification, and the passenger car position will be improved by the planned procurement of an adequate number of cars. The number of freight cars to be procured by 1975 seems sufficient to meet the requirements of increasing traffic and replacement of overage stock. However, it has been agreed during negotiations that the Railways will undertake a study of future freight car requirements, considering (i) the need to replace obsolete stock, (ii) traffic increases, (iii) improved utilization of rolling stock due to electrification, new marshalling yards, and increased efficiency of operations, and (iv) changes in the length of hauls related to the Sarajevo-Ploce and the Belgrade-Bar lines. The procurement program for the years 1971-1975 will be adjusted if this is shown to be necessary, to ensure that an adequate number of serviceable freight cars will be available to carry the expected traffic of the Belgrade-Bar line as well as for traffic increases throughout the system.

3.12 Maintenance and repair facilities are adequate. Most of the facilities for maintenance and running repairs of steam locomotives and some for rolling stock are old and obsolete; they are to be phased out of service or modernized.

Traffic

3.13 The freight traffic of the railways increased by 22 percent between 1962 and 1964 but then declined in the following two years by 6.5 percent in spite of a greater volume of traffic being moved by all forms of transport in Yugoslavia (Tables 2 and 10). The decline in tonnage continued into 1967, the railways experiencing a 4.1 percent decline in the first nine months of the year compared with the same period in 1966. The greatest decreases were in coal, building materials, cement and wood. This trend reflected the economic reform of mid-1965 when the principle was established that all prices should be based on costs. As a result, the prices of industrial products were increased by an average of about 13 percent and of raw materials by about 20 percent. As inventories were run down the railways were affected more than any other form of transport. However, during the fourth quarter of 1967 industrial production as a whole in Yugoslavia had generally recovered: major railway traffics such as ores, metals and chemicals were back to earlier, higher levels, while the production of building materials and cement surged well ahead of levels set in any previous year. By September, coal production was only slightly lower than in the same month of the previous two years and its rate of growth was rapidly accelerating. The outlook for the year 1968 is that overall traffic will be higher than that of 1967 as an upturn in industrial production has begun and is expected to continue for some time.

3.14 The traffic forecast (Table 11) indicates that coal is expected to continue as the most important commodity for the railways. Its forecast growth is based on the general expansion of heavy industry in Yugoslavia, rather than on domestic use. Particularly important in this respect are the lignite requirements for the production of cement, fertilizers, refined ores and chemicals. The new railway line will help to lower transport costs for lignite, which will remain a very important input for basic industry for many years to come. Other major commodities in the traffic forecasts are cement and building materials. At the present time most cement plants are unfavorably located in relation to the centers of demand. In the future it is expected that new construction of industrial plants, power, and other infrastructure projects and housing will be major economic activities, which, combined with relocation of plants, will increase demand for building materials. The production and refining of ores is also expected to be of continuing importance in Yugoslavia. All these activities are reflected in the traffic forecasts. Coal, ores, building materials, wood and other basic traffic as forecast in Table 11 cannot economically be shifted to highways. Traffic has been forecast by commodity at moderate rates of growth, averaging 3.1 percent per year from 1967 to 1973 when the line will be opened. From 1973 to 1975 growth will be higher reflecting the opening of the new line before again settling down to more normal rates.

3.15 It is expected that the average length of haul will increase from 238 km in 1966 to 241 km in 1967. This is a continuation of a trend established some years ago when highway transport made inroads into short haul traffic. The decline in 1967 was temporary, due to the draw down of local inventory stocks, mainly coal. From 1971 the average haul will fall slightly due to new oil and cement plants (Table 11).

Although the Belgrade-Bar line will result in shorter hauls for part of the traffic served, average railway hauls will then increase until 1975, reflecting increased long haul international traffic, the continued abandonment of short narrow gauge lines, expansion of long distance agricultural traffic and phosphate rock moving from the ports to inland plants.

3.16 Passenger traffic has grown considerably over the last ten years (Tables 3 and 4). A decline was experienced in 1966, continuing into 1967, reflecting the fare increases of late 1965 when general subsidies ceased. While passenger traffic is not expected to grow substantially some recovery is expected in 1968 and later years and there will be traffic promoted by the new line in 1973 (Table 12).

3.17 The traffic forecasts supplied by the Yugoslav Railways have been carefully reviewed and are reasonable.

Operations

3.18 The Railways are well operated although they have difficulties during peak periods in meeting the traffic demands. The main deficiencies which limit the system's capacity are: (i) the still predominant steam traction; (ii) the largely outmoded mechanical signalling and interlocking installations; and (iii) the obsolescence and insufficient capacity of the marshalling yards at major traffic centers. Conditions will improve substantially after completion of the Railway Modernization Program (paras 3.09 and 3.10).

3.19 Table 6 gives a summary of operating statistics from 1961 to 1966. It shows that the operating efficiency improved from 1961 to 1965, but declined slightly in 1966 due to a decline in traffic.

3.20 Average availability of motive power declined slightly in 1966 but is still satisfactory, making allowance for the existence of electric locomotives and railcars which are more than 30 years old and the unsatisfactory design of some of the older diesel locomotives. Availability of passenger and freight cars is satisfactory.

3.21 The utilization of diesel and electric locomotives fluctuates but is in general satisfactory (Table 6). The average performance of diesel locomotives dropped from a high of 428 engine km per engine-day to a still satisfactory 370 engine km per engine-day in 1966, due to 120 diesel shunting locomotives with lower daily mileage being put into operation since 1964. The utilization of steam locomotives is decreasing as the system is dieselized and electrified. The utilization of passenger and freight cars is satisfactory.

4. THE 1964-1970 AND 1971-1975 RAILWAY INVESTMENT PROGRAMS

4.01 . At the time of the appraisal of the Second Railway Project in 1964, the Railways had prepared an Investment Program 1964-1970 of which the Modernization Plan of Mainlines, partly financed from Loan 395-YU, was a part. The program was under consideration by the Federal Executive Council in 1964, but it was not approved due to the devaluation of the Dinar, related price increases, and shortage of funds. Investments in 1964 and 1965 were carried out mainly with the Railways' own funds, and from budget appropriations authorized by the Government.

4.02 A revised Investment Program, 1964-1970, including the Modernization Plan, has now been approved by the Government. The actual expenditures 1964-1966, the estimated expenditures 1967-1970, and the original and revised Investment Program 1964-1970, are shown in Table 13. The physical size of the program has been curtailed to cover price increases. The combined effect of price increases and the devaluation of the Dinar has been that the reduced program increased in Dinar cost by 9 per cent while its approximate US\$ equivalent decreased by 30 per cent. The Modernization Plan and the provisions for track renewal have not been curtailed but major reductions have been made particularly in the procurement of motive power and rolling stock(as shown in Table 13). The Railways intend to offset the effect of these reductions by (i) improving utilization of existing stock and (ii) keeping obsolete stock in service.

4.03 The Railways have drafted a preliminary Program 1971-1975 under which they intend to procure rolling stock at a higher and more satisfactory rate. The matter is further discussed in para. 7.22. The original and the revised program 1964-1970 and the preliminary program 1971-1975 are shown in Table 13 and summarized below:

Item	Original Program 1964-1970	Revised Program 1964-1970	Preliminary Program 1971-1975
Track renewal, km	3,021	3,021	2,350
Electric locomotives, units	250	215	125
Diesel locomotives, units	328	218	260
Passenger carrying stock (coaches, vans, motor cars, and trailers) units	2,029	1,531	790
Freight cars	22,000	10,117	29,500

5. THE PROJECT

Description

5.01 The Project is the completion of the standard gauge, single track electrified line between Belgrade and Bar (Map 1) comprising construction works, and the procurement and installation of signalling, telecommunication and electric traction equipment during the period from January 1, 1966 to completion, scheduled for the end of 1972. Included in the Project, but excluded from the cost estimates and Bank financing is the supply of motive power and rolling stock. Responsibility for supplying this equipment is dealt with in paragraph 5.15.

5.02 The project will connect the main railway junction, Belgrade, with the Adriatic Port of Bar and provide a more direct standard gauge connection with South Western Serbia and Montenegro, replacing the present circuitous, high cost, narrow gauge lines.

5.03 The Belgrade-Bar line will have a junction at Pozega with the line to Kraljevo-Nis and Skopje, a rail link to South Eastern Serbia and Macedonia which will carry considerable traffic to and from the Belgrade-Bar line. The 32 km section Pozega-Cacak of this link is being converted from narrow to standard gauge. There will be a junction at Priboj with the narrow gauge line to Sarajevo which is to be retained for some time. At Titograd there is a branch line to Niksic, recently converted from narrow to standard gauge, that extends with narrow gauge to Capljina on the recently completed Sarajevo-Ploce line.

5.04 The total distance from Belgrade to Bar is 476.1 km. The new line branches from an existing line at Resnik, 14.2 km south of Belgrade. Thus, from Resnik to Bar is 461.9 km of which the sections Resnik-Vreoci (37.3 km) and Titograd-Bar (53.0 km) have been in operation since 1959. This leaves 371.4 km of line from Vreoci to Titograd to be constructed, including some sections which have been under construction since 1964. The project includes the final signalling and telecommunication, and the electric traction installations of the otherwise complete sections from Resnik to Vreoci and from Titograd to Bar. The project also includes the extension of the telecommunication installation on the Belgrade-Resnik section, as needed for the Belgrade-Bar line.

5.05 The alignment has been determined by studies and geological surveys carried out by the Railways' Engineering Organization. The final engineering is almost complete and is satisfactory. The line is largely in mountainous terrain, part of which is very rugged and difficult of access, resulting in the need for 353 tunnels, of which 12 are from 2 to 6 km long, and numerous bridges and viaducts. An outstanding civil engineering work will be the Mala Rijeka viaduct which is to span a gorge, 450 m wide and 195 m deep.

5.06 Design standards are adapted to the mountainous terrain. The maximum gradient is 2.5 percent on the descent from Kolasin to Titograd over a distance of 59 km. Between Valjevo and Kolasin the maximum gradient is 1.8 percent, and 1.2 percent between Belgrade and Valjevo; minimum radius will be 300 m, and maximum speed 80 km/h on mountainous sections and 120 km/h on sections with easier conditions.

5.07 The line will have electric traction with 25,000 V., A.C. of 50 cycles, the same system as is being installed on the Sarajevo-Ploce line and the lines Dobova-Zagreb-Belgrade-Skopje and Vrpolje-Sarajevo. The electrification of the Belgrade-Bar line is justified in view of (i) the high traffic density in gross ton-km per route-km per day, (ii) the heavy power consumption in kwh per route km per year and (iii) the availability of low cost electric power from nearby hydroelectric plants.

5.08 Completion of the Belgrade-Bar line will lead in the regions served to the gradual dismantling of about 300 km of narrow gauge lines.

5.09 Completion of the project and beginning of operations is scheduled in the following stages:

- (i) Vreoci-Valjevo (40.2 km) without electric traction and final signalling by the end of 1968;
- (ii) Resnik-Vreoci-Valjevo-Titovo Uzice (163.8 km) without electric traction, but with final signalling by the end of 1970;
- (iii) Electric traction between Resnik and Titovo Uzice by the end of 1972; and
- (iv) Titovo Uzice-Titograd-Bar (298.1 km) with electric traction and final signalling, i.e., the completion of the whole project, by the end of 1972.

Estimated Cost

5.10 From 1952 to the end of 1965 N. Din 300 million was expended on the Belgrade-Bar line which would represent US\$ 24 million at the present exchange rate, or a considerably larger amount if converted at the exchange rates prevailing at the time. From January 1, 1966 to completion at the end of 1972 the total estimated costs are N. Din 2,818.5 million (US\$ 225.5 million equivalent). Estimated expenditure from January 1968 to completion is N. Din 2,637.1 million (US\$ 211.0 million equivalent). A detailed cost estimate and a schedule of expenditures is given in Table 14. The estimate includes a N. Din 462.6 million (US\$ 37.0 million equivalent) contingencies provision, consisting of 10 percent for possible increases in quantities and unforeseen items, and 3 percent per annum for price increases during the period 1968 to 1972.

5.11 The estimate has been prepared by the Railways' Engineering Organization and is based on final engineering except for some bridges for which only preliminary designs have been prepared. Unit prices correspond to those actually paid for construction of the Sarajevo-Ploce line and other similar projects since early 1966. The estimate is considered realistic.

5.12 The foreign exchange component will depend on the results of international competitive bidding. The scope of international competitive bidding for construction works and for supply and installation of equipment is shown in Table 15. The range of the minimum and maximum foreign exchange components under various assumptions and a schedule of foreign exchange expenditure (1968-1972) is shown in Table 16. The minimum foreign exchange component represents the cost of equipment which has to be imported in any case and the cost of the services of foreign consultants. The maximum foreign exchange component includes in addition to the minimum component the foreign exchange cost of contracts subject to international competitive bidding, assuming that foreign contractors would be successful in bidding (see note in Table 16).

5.13 Estimated expenditures on the project from January 1, 1968 to completion in 1972 are N.Din 2,637 million, or US\$211 million equivalent (see Table 14), of which the proposed loan of US\$50 million would cover 23.7 percent. An estimated disbursement schedule is given in Table 17. Of the total of US\$211 million, US\$37.5 million is for works not suitable for international competitive bidding and US\$31.3 million is for works for which contracts have already been awarded after domestic competitive bidding (paras 5.20 and 5.21). This leaves a total of US\$142.2 million available for international competitive bidding (see Table 15). Of this amount, the estimated minimum and maximum foreign exchange components would be US\$23.8 million and US\$70.5 million (Table 16), or 47 percent and 141 percent, respectively, of the proposed loan.

Financing of the Project

5.14 According to the Law on Participation of the Federal Government in Financing the Investment Works for the Completion of the Belgrade-Bar Railway line, dated July 1966, 85 percent of the total cost of the Project (without motive power and rolling stock and the extension of the port of Bar) will be provided by the Federal Government, 8 percent by the Republic of Serbia and 7 percent by the Republic of Montenegro, the latter two for investments in their territories. The proposed Bank loan to the Yugoslav Investment Bank would cover part of the Federal Government's contribution to the cost of the project. Agreement has been reached during negotiations that the Federal Government specifically undertakes to make arrangements satisfactory to the Bank to provide the Investors (see para 5.18) with any funds that might be needed to meet overruns of the estimated costs.

5.15 The procurement of motive power and rolling stock required for the operation of the line will be financed from the Railways' own funds. Part of the rolling stock would become available due to the reduced transport needs on other lines, but the balance to carry additional traffic would have to be procured under the Railways' Investment Program beginning in 1971. Agreement has been reached during negotiations that the Railways will make available the motive power and rolling stock needed during all stages of construction and on completion when estimated requirements are 44 electric main line locomotives, 8 diesel shunting locomotives, 6 light diesel railcar sets, 92 passenger coaches and 2,000 freight cars, having a total estimated cost of US\$32 million.

5.16 Extension of the port of Bar to handle the expected transit traffic will be carried out by the port administration. The port facilities to be added include 1,400 m of berths for general cargo, 930 m for dry bulk cargo, 1,014 m of passenger berths for Italian ferry and coastal traffic, as well as silos, open and covered storage space, bulk handling equipment and cranes. Dredging is also planned. Financing has been arranged for most of the required investment in the course of the present Five-Year Plan. The estimated costs of the new facilities to be constructed by 1973 are N. Din 410 million, of which N. Din 310 million will be financed from funds of the Republic of Montenegro, and N. Din 100 million from funds of Oil Enterprises for new oil berths. Agreement has been reached during negotiations that financing of the port extension will be assured and that the work will be phased to coincide with completion of the line, so that the required port capacity will be available when the Belgrade-Bar line begins to operate.

5.17 The loan amount of US\$50 million has been selected as the appropriate Bank contribution to the financing of the Project. It is proposed that the full amount be provided regardless of the outcome of the international tendering.

Administration and Execution

5.18 According to the July 1966 Law the Federal Government has transferred its rights and obligations as an Investor to the Republics of Serbia and Montenegro for the sections of line in their territories. The Railway Transport Enterprise (RTE) Belgrade is acting as Investor on behalf of the Republic of Serbia and the RTE Titograd on behalf of the Republic of Montenegro; they will be responsible for the execution of works. After completion of the Belgrade-Bar line, 304.8 km of the line in Serbia will be administered and operated by the RTE Belgrade, and 171.3 km of the line in Montenegro by the RTE Titograd.

5.19 The design and supervision of works have been entrusted to the Railways' Engineering Organization which is competent and has had extensive experience in such work. In addition, the Investors intend

to employ foreign consultants for the supervision of certain civil engineering works, in particular for tunnelling and major bridges and viaducts. An agreement has been reached in negotiations on the extent of the employment of foreign consultants satisfactory to the Bank.

5.20 Of the 371.4 km from Vreoci to Titograd which remain to be constructed and/or to be completed, works have already started on several sections, totalling 107.6 km. They include: (i) sections on which train operations are planned to begin during 1968-1970; (ii) four tunnels, and other difficult construction works which each require a construction period of up to five years, and which would have delayed the entire project if contracts had not been let before the end of 1966; and (iii) construction works, located within the water reservoir of the Potpec hydroelectric power plant, which had to be done before the filling of the reservoir and completion of the plant in November 1966.

5.21 Contracts for the above works were awarded after domestic competitive bidding, at a total value of US\$45.8 million equivalent. Minor construction works on 4.1 km of line, construction of buildings, and track laying are not suitable for international tendering. All other contracts for earthworks and structures on the remaining 259.7 km between Valjevo and Titograd, and all contracts for the supply of rails, points, crossings and accessories, for the supply and installation of signalling and telecommunication equipment, and for the supply and installation of electric traction equipment, would be subject to international competitive bidding from 1968 until completion of the line. These contracts would be US\$142.2 million equivalent or 63.1 percent of the total cost of the project, including contingencies (Table 15). The extent of contracts subject to international competitive bidding has been confirmed in negotiations.

5.22 It is proposed that the loan will be disbursed in the same way as the loans 361-YU and 395-YU, that is related to the progress at an agreed percentage of the total expenditures from January 1, 1968 until completion scheduled for 1972. The estimated disbursement rate is 23.7 percent, and a disbursement schedule is shown in Table 17.

6. ECONOMIC JUSTIFICATION ^{1/}

Economic Geography of the Belgrade-Bar Line's Zone of Influence

6.01 The Ljubljana - Belgrade main line divides the railway network into two parts. The area north of the main line has a well developed network and good international connections with Italy, Austria and Hungary, and with Bulgaria and Greece (Map 1). South of the main line the connections with the Adriatic do not conveniently serve the traffic originating to the north and southeast of Belgrade, Belgrade itself, or new traffic which may be forthcoming from Montenegrin and Western Serbian development.

6.02 The area of influence of the project line is potentially rich in mineral and timber resources. Sizeable deposits of minerals occur in the vicinity of the alignment; these will be brought into production primarily for internal consumption. Timber of commercial quality is important, the region having about 11 percent of the forest area of Yugoslavia (Map 2). Agriculture is also important though at present it is largely limited to local consumption because of the lack of transport facilities. There is considerable potential for increasing agricultural production including livestock and early fruit and vegetables if adequate transport facilities are provided (Map 3).

6.03 The zone of influence varies with each commodity, being affected by such factors as costs of transport to market and comparative costs of production. For forestry, the zone of influence is greater than for agriculture and is estimated to encompass an area which had a population (1965) of about 1.2 million as compared with about 0.9 million for agriculture, accounting for between $4\frac{1}{2}$ and 6 percent of the total population of Yugoslavia (19.5 million in 1965). Because industrialization is quite limited in the area, it is not useful to measure the population proportions applicable to an industrial zone of influence.

6.04 In all the above cases, the area between Titograd and Bar and between Vreoci and Belgrade were not included, because the lines on these areas have been in operation since 1966. Consequently, traffic which could move within those portions already completed are not counted in the railway benefits, nor is their sunk cost included in the investment on which an economic return is calculated. But these areas will also benefit from the railway and provide a market for goods produced within the area of influence.

6.05 The present per capita income of the area to be served by the Railway is low relative to that of Yugoslavia as a whole, and also low compared with the per capita income within the republics which it serves.

^{1/} For details of "Calculation of Benefits; Methodology" see Annex A, and of "Agricultural Situation and Prospects in the Zone of Influence" see Annex B.

In Serbia and Bosnia-Herzegovina, where 8 percent and 5 percent of the populations respectively are affected, the present per capita incomes are about 30 percent below the levels for Yugoslavia. In Montenegro, where over 3/4 of the population will be affected, the differential is only about 10 percent.

6.06 As part of the Five Year Plan, 1966-70, economic development of the area is to be promoted by better utilization of the region's natural resources in minerals, wood and agricultural land. The Railway will serve to reduce the cost of transport both for inputs used in production and for products shipped out. In mining, it will make possible the use of lower-grade ores which require proportionately more processing, thus extending the life of known ore deposits and possibly the utilization of minerals previously considered uneconomic. These possibilities have been accorded little or no weight in the traffic projections but should be recognized as a factor which may cause mission projections to be under-estimates of actual future traffic, particularly for iron and non-metallics.

6.07 Similarly, for timber, reduced transport costs will have the effect of widening the economic marketing area and/or increasing the economic hauling distance for processing. Because some existing timber mills have unused capacity, such output expansion is especially feasible in the short run provided that investment in the feeder roads required further to open the forest resources is forthcoming. It is estimated that between 1967 and 1973 more than 500 km of additional forest feeder roads, at a cost of over US\$6.0 million, will be required to ensure a sustained expansion of forest production. In agriculture, the availability of good grass lands for livestock grazing with unused carrying capacity is a favorable factor. Improved transport for these grass lands and for crop lands will reduce substantially costs of inputs such as fertilizers, insecticides, etc., and reduce outward transport costs, especially in such respects as weight loss for livestock and spoilage for fruits and fresh vegetables. These benefits will enable growers to tap profitable seasonal markets in large communities like Belgrade or in overseas export markets.

6.08 Certain industries will benefit. Cement mills do not now exist in Montenegro or Bosnia. In Serbia there are two mills at a considerable distance from the nearest point in the Railway's area of influence. Furthermore, these Serbian mills, though operating in excess of rated capacity in 1966 were unable to supply demand. The projected plants at Kosjeric (in southwestern Serbia) and Pljevlja (in Montenegro) would have considerable transport advantages within the area and even extending into Bosnia. Certain important export industries, like magnesite refractories and copper and brass products will gain substantial advantages improving their competitive position. Existing paper and pulp plants will also improve their position both in domestic and foreign markets. On the other hand certain industrial projects which will generate traffic for the railway will not be appreciably aided, for example the aluminum enterprise in

Montenegro, since its major raw materials and inputs can already be transported economically by the parts of the line already completed.

6.09 The pattern of fuel consumption will change substantially. At present, petroleum products are used in limited quantities in the area and are supplied from distant refineries (much of Montenegro is supplied by coastal imports from Rijeka, then transported by highway into the interior). Southwestern Serbia is supplied from a refinery several hundred miles away. A new refinery at Pancevo, 18 km northeast of Belgrade will, when completed, provide a less distant and more economical source of supply of petroleum products when the new railway comes into operation. Regular availability of fuel oil at lower prices will help industrial operations and will create a transport demand now latent. As incomes in the area increase this will likely find expression in increased industrial demands for fuel oil while better transport facilities on the highway will also increase demand for gasoline and diesel fuel. The Railway will also widen the competitive area to be served by the area's coal mines at Pljevlja and Ivangrad. The combined effect of an increased and more dependable supply of solid and liquid fuels at lower delivered costs will help existing industries and may increase the attraction of sites in the area for new industrial plants.

6.10 Apart from benefits arising from resources development there are considerable savings in distance to the Adriatic Sea from the major economic centers. At present, traffic to and from these main centers must move by extremely circuitous routing, incurring greater movement costs than would be the case if the Belgrade-Bar line were available. Map 1 shows that the nearest alternative port is Ploce, and comparable distances are given below:

<u>Main Economic Center</u>	<u>Distance in km</u>		
	<u>To Ploce</u>	<u>To Bar</u>	<u>Saving</u>
Belgrade	628	475	153
Zrenjanin	722	569	153
Nis	872	531	341
Kraljevo	823	391	432
Kosovska Mitrovica	950	522	428
Skopje	1,074	643	431

The building of the line would therefore go a considerable way towards rationalizing the transport network and reducing costs.

6.11 The building of the Sarajevo-Ploce line was undertaken having regard to the possibility of the Belgrade-Bar line being completed and there has been clear demarcation between the areas of influence of both railways. The Sarajevo-Ploce line does not rely on Belgrade-Bar traffic for its economic justification.

6.12 The highway network in the area of influence of the railway is being improved by links between Bar and Skopje, Bar and Belgrade, and

Belgrade to Kosovska Mitrovica. A comparison of vehicle operating costs in such mountainous territory with railway operating costs and the composition of the expected railway traffic (mainly low value bulk commodities and semi-finished products) indicates that the roads will mainly complement the railway. It is expected that the highways will carry mainly short-haul traffic for which the railway is unsuitable, and also supply feeder traffic for the railway.

6.13 In order to handle the diverted and generated traffic, it is planned to develop the Port of Bar for full operations in 1973. The port was expected to handle about 600,000 tons in 1967, much of it to and from the steel plant at Niksic and the industries of Titograd. Expansion of annual capacity to 6 million tons is planned for 1973, enough to handle more than the expected traffic.

6.14 The expansion of the port will obviate the need for construction of additional capacity at Ploce which would be necessary if the line were not built. Similarly, the Port of Ploce will relieve congested facilities at Rijeka for the handling of large volumes of planned transit traffic to and from Rumania and Austria.

Traffic on the Belgrade-Bar Railway

6.15 Traffic on the Belgrade-Bar line in 1973 is expected to be about 8 million tons, including 1.4 million tons which could be carried on sections already completed even if no further investment were made. This compares with total system tonnage in 1966 of 71.6 million tons (Table 10) and a forecast of 85.5 million tons in 1973 (Table 11). A breakdown of expected traffic on the new line is given below.

BELGRADE-BAR TRAFFIC, 1973 (000 Tons)

	Domestic	Export-Import via Bar:		Total	Percent
		<u>From area of influence</u>	<u>Diverted from Ploce</u>		
Coal and Coke	925	-	25	950	11.7
Oil and Products	299	60	-	359	4.5
Ores and Concentrates	130	-	162	292	3.6
Non-metals	23	339	317	679	8.4
Metallurgical Products	170	159	180	509	6.3
Timber, Logs and Products	421	125	10	556	6.9
Cement	564	-	-	564	7.0
Building Material	210	100	30	340	4.2
Fertilizers	263	15	-	278	3.4
Phosphate Rock	-	-	949	949	11.7
Cereals	61	50	190	301	3.7
Other agricultural products	519	10	290	819	10.1
Other, including less than carload	<u>1,214</u>	<u>72</u>	<u>200</u>	<u>1,486</u>	<u>18.4</u>
	<u>4,799</u>	<u>930</u>	<u>2,353</u>	<u>8,082</u>	<u>100.0</u>

Source: Mission estimates.

6.16 The traffic is expected to include about 4.8 million tons moving within the area of influence, either newly generated or diverted from narrow gauge lines or trucks. Another 2.3 million tons will be imported or exported via the Port of Bar rather than the best alternative, the Port of Ploce, and about 0.9 million tons will move through Bar from or to the area of influence. One of the largest categories of traffic expected to move is agricultural produce, accounting for 10 percent of tonnage. This will consist of a variety of vegetables, fruit and livestock. Coal and coke are important, with a 12 percent share of the traffic, as is phosphate rock which will move from Bar to plants beyond Belgrade.

6.17 Freight traffic on the new line has been estimated by the Railways to double in 30 years and passenger traffic to increase by 24 percent. These growth rates appear reasonable, having regard to the expected growth of industrial and agricultural production, income and population. The annual average growth rate for freight in the first five years of the economic life of the project would be 4 percent per annum, falling to about 1.25 percent in the last 5 years. Passenger growth is expected to be 1 percent annually in the first five years and 0.3 percent in the last period. It has not been possible to forecast individual movements for the line beyond 1973 but overall orders of magnitude based on such growth rates for the Belgrade-Bar line can be expected to be:

	Freight <u>Net ton-km (millions)</u>	Passengers <u>Passenger-km (millions)</u>
1973	2,329	900
1978	2,841	954
1983	3,284	985
1988	3,679	1,021
1993	4,029	1,044

Benefits

6.18 The benefits which will accrue from the project are of several kinds. They consist largely of savings which will occur from the use of lower cost transport as well as the inducement of traffic that cannot at present move because of prohibitive costs or the lack of any transport outlets. These, and other benefits, are tabulated below:

	Benefits, First Year of Operations, 1973 (N. Din millions)	<u>% of First Year Benefits</u>
A. Freight		
(a) Diverted from:		
Truck transport	64.88	30.3
Belgrade-Ploce rail route	9.72	4.5
Danube-Ploce (via river and rail)	0.34	0.2
(b) Generated, best alternative transport being:		
Truck transport	25.26	11.8
Narrow gauge railways	20.01	9.4
Danube-Ploce (via river and rail)	0.17	0.1
B. Passengers		
(a) Diverted from bus transport	31.99	14.9
(b) Generated, best alternative transport being:		
Bus transport	15.99	7.5
C. Other benefits common to freight and passengers		
(a) Diverted from narrow gauge railways	36.76	17.2
(b) Electrification of existing sections	1.94	0.9
(c) Shorter sea transport distance to Bar	5.18	2.4
(d) Interest savings on working capital	<u>1.71</u>	<u>0.8</u>
	213.95	100.0

6.19 The methodology used in the calculation of the benefits shown above is described in Annex A. One main point to be emphasized here is that while about 60 percent of the freight ton kilometers would otherwise be carried by the Belgrade-Ploce rail route, this traffic will provide less than 5 percent of the total railway benefits because such savings per unit are very small as compared with the savings on diverted truck traffic or on generated traffic where the best alternatives are truck transport or narrow-gauge railways.

6.20 The largest class of benefits arises from the diversion of traffic from trucks to the railway (30 percent). Much of this traffic is now moved over long distances at very high cost. Anticipated road improvements will not reduce costs sufficiently to make road competitive with rail transport for the forecast traffic. Additional benefits, not quantified, arise from the provision of all-weather rail transport through

an area subject to snow blockages on the highways. About 17 percent of the benefits will come from the diversion of freight and passengers from the narrow gauge railways which roughly parallel the new line for about one-third of its length. The operating costs alone on these lines is about three times the costs on the new electrified line and the benefits will be considerable. Passengers will benefit, transferring from the relatively high cost and slow buses, accounting for nearly fifteen percent of the benefits.

6.21 Traffic newly generated by the railway will contribute substantial benefits. In the absence of the railway the only alternatives would be relatively high cost road transport, narrow gauge railway lines or the Belgrade-Ploce railway route, depending on the location and characteristics of the traffic. Such generated traffic accounts for N.Din. 45 million in freight and N.Din. 16 million in passengers, shown in the above table, or 28 percent of the first full year benefits.

6.22 Sections of the line will be opened for traffic in stages until completion in 1973. As this occurs the parallel narrow gauge lines in Western Serbia will be abandoned and much of the traffic will be transferred. At the same time traffic which would otherwise move by bus or truck will be transferred. These benefits rise from N.Din 26 million in 1969 to N.Din 97 million in 1972 (Annex A).

6.23 Intangible benefits of a different nature will occur, such as the progress towards greater national cohesion with the connection of underdeveloped Montenegro with the richer Republics, the increased safety and reliability of an all-weather transport route and the saving in time which will occur for freight and passengers.

6.24 The tangible benefits described above have been projected for the economic life of the Railway by applying the traffic forecasts described in paragraph 6.17 above. Maintenance costs of the line have been deducted from these benefits for each year of operation.

6.25 The tangible net benefits thus derived have been measured against line construction costs, including contingencies, to arrive at the economic rate of return which is $8\frac{1}{2}$ percent, calculated from January 1, 1968 to the end of the railway's economic life of 35 years. If the benefits and costs are measured from January 1966, the rate of return would be $7\frac{1}{2}$ percent.

7. FINANCIAL ASPECTS

Rates and Fares

7.01 The rate and fare policy of the Railways stems from the Federal Constitution of 1963 and the Law on the Organization of the Yugoslav Railways of January 1, 1966. The Office of Price Controls controls all rates and fares which are required to cover costs and to make a contributant to investment needs. Funds for new lines are provided as grants directly by the Federal Government and the Governments of the Republics; and these Governments also provide up to 50 percent of other capital needs.

7.02 An important problem confronting the Railways has been their inability to increase rates and fares promptly to offset cost increases, especially higher wages, because of delays in getting government authorization through the Office of Price Controls. Government subsidies were necessarily provided in 1964 and 1965 until passenger fares were belatedly raised in April 1965, and freight rates in September 1965, by amounts ranging from 32 to 40 percent. No general rate increases have been effected since then.

7.03 It was expected, during the appraisal of the second railway project in 1964, that the narrow legal limits within which rates and fares might vary would be sufficiently widened to permit their timely adjustment in accordance with changes in costs. While this expectation was not realized, legislation is now being considered whereby the railways would be given greater freedom in fixing rates; and it was agreed during negotiations for the Belgrade-Bar project that the Government in the future would take such action as may be required to enable the Railways to adjust their rates and fares promptly in relation to costs and to make them effective promptly.

7.04 Prior to January 1, 1966 freight rates and passenger fares were on uniform bases for all of Yugoslavia; the operating revenues were first pooled and allocated to each enterprise on the basis of a formula designed to permit each to cover its terminal costs and to distribute the remainder on the basis of (i) work performed and (ii) differences in train-operating conditions. Beginning in 1966, each enterprise undertook to retain its own earnings, and to establish its own level of rates and fares, based on its own costs except for the railway transportation enterprises of Skopje and Titograd. These two enterprises were permitted to establish their rates and fares on bases lower than their relatively high costs; but they were also required to eliminate the divergence between rates and costs by the end of 1970. For the Skopje and Titograd enterprises, government subsidies are provided to meet the resulting deficiency in revenues from January 1, 1966 to December 31, 1970.

7.05 All carload freight traffic moves at class rates subject to a uniform national classification. There are now eight groups of commodities, two less than in 1964 and 1965. The relationship between them ranges from 100 to 50. The relationship is reasonable. Lower than normal rates on lignite, fertilizer, bauxite ore, coal, firewood, fruits, vegetables and sea food were eliminated in 1966. There are two classes of passenger fares, first class being double second class fares. Reduced passenger fares are prescribed by the Government for national heroes, partisans, invalids, children and students, among others; the Government pays the railway enterprises for the amount of the reduction below normal fares. This payment amounted to N. Din 45.5 million (US\$ 3.6 million) in 1966.

Budgets, Accounts and Auditing

7.06 A separate budget is prepared annually by the Community of Yugoslav Railways for the entire system, based on separate budgets for each enterprise and coordinated with an overall working plan which consists of an estimate of traffic demand and the financial resources, for both capital and operating purposes, required to meet it. This coordination is completed after discussions between the Management Board of the Community of Yugoslav Railways and the Transport Committee of the Federal Assembly. The only approval required is that of the Federal Secretariat.

7.07 Accounts are kept on a sound basis in accordance with a uniform system prescribed for all commercial enterprises by the Federal Government. Some deviation from practices customary in Western Europe occurs principally because of (a) the decentralized organization, and (b) the periodic supplemental payments to workers which might be considered to be an allocation of net income. The accounts of the six enterprises have been properly consolidated and inter-enterprise duplications have been eliminated. The supplemental payments to workers, for the purpose of the present analysis, have been included in operating expenses as "wages and salaries", inasmuch as the accounts do not separately state the amounts of basic wages and supplementary payments and the latter are progressively becoming a smaller proportion of the total wage bill.

7.08 Straight-line depreciation is applied on all assets except land and permanent way substructures which consist of earthworks, culverts and everything below the ballast including supporting walls. Depreciation on permanent way (ballast, rails, etc.), motive power and rolling stock has been assessed also in some cases on functional bases whereby the rates of annual depreciation increase in proportion with intensity of use. In 1966, depreciation charges to operating expenses were 12.8 percent of gross revenues and accumulated depreciation was 53 percent of the value of gross operating fixed assets which were revalued in 1954, 1957, 1962 and in 1966, (see paragraph 7.19). Depreciation allowances are adequate.

7.09 An audit of the accounts of the individual enterprises is made at least once a year by the Service of Social Accounting, a department of the National Bank. These enterprises are required to submit quarterly as well as annual reports to the National Bank which issues a statement annually, indicating the extent to which, if at all, the accounts have not been properly kept in accordance with the prescribed uniform regulations, and ordering remedial action, as required. The statements for 1966 have been received. It has been agreed that the financial statements of each of the Railway Transport Enterprises will be certified annually by the Service of Social Accounting, and that these statements and copies of the reports pertaining to the certification will be promptly forwarded to the Bank.

Earnings

7.10 As with the two prior Bank loans for the Railways, the subject of finances in this report covers the financial experience and prospects of the six railway transport enterprises (the railway operating units) to the exclusion of about 70 "auxiliary enterprises" which perform for some railway enterprises such services as track, car and locomotive repairs, trucking operations, construction, railway restaurants and holiday resorts, designing and engineering, etc. Each auxiliary enterprise has a separate accounting system and many of them serve industry generally as well as the railways. The use of the accounts of only the six "operating" enterprises makes the analysis more conservative inasmuch as the net income of the 70, which amounted to about N. Din 32 million in 1966, is not included. Part of this net income was derived from non-railway operations.

7.11 The 1963 and 1964 loan documents did not include a specific rate or revenue agreement. Financial forecasts were given resulting from the Bank's appraisal of the projects; but these forecasts have not been achieved, as shown in detail in Table 18. The forecasts and actual achievements in 1964, 1965 and 1966 are summarized below (in N. Din millions):

	1964		1965		1966	
	Forecast	Actual	Forecast	Actual	Forecast	Actual
Operating revenues	2,320	2,432	2,430	3,766	2,530	4,389
Operating expenses	2,080	2,437	2,150	3,916	2,230	4,157
Net operating revenues (loss)	240	(5)	280	(150)	300	232
Net income	90	103	120	138	130	261
Operating ratios	90	100	89	104	88	95
Rates of return ^{1/} (loss)	4.0	(0.1)	4.7	(2.4)	5.0	2.7

^{1/} Net operating revenues or (loss) as a percentage of net fixed assets in use.

7.12 The disappointing results in 1964 and 1965 were due in the main to delays in obtaining government authorization to increase rates and fares in order to offset higher costs. Had actual payments by Government in lieu of the withheld rate increases been considered as part of operating revenue, the operating ratios in 1964 and 1965 would have been 92 and 95, respectively. As shown above, the actual results in 1966 were also less favorable than expected; and 1967, based on the first nine-months' experience when net income, after all fixed charges but before debt repayments, was actually a loss of N. Din 46 millions, is expected to be less favorable than 1966. This situation requires immediate action to improve earnings and this matter is discussed in paragraph 7.16.

7.13 Future earnings, as estimated by the Railways and adjusted by the Bank on the criteria stated in paragraph 7.15 (b), are set forth in detail in Table 19 and summarized below, in millions of N. Din.

Year	Operating Revenues	Operating Expenses ^{1/}	Net		Operating Ratios	Percent Rates of Return
			Operating Revenues	Net Income		
1967	4,119	4,101	18	70	99	0.2
1968	4,266	4,075	191	210	95	1.6
1969	4,475	4,091	384	375	91	3.0
1970	4,589	4,100	489	438	89	3.6
1971	4,900	4,089	811	715	83	5.8
1972	5,061	4,184	877	785	83	6.1
1973	5,555	4,462	1,093	998	80	6.8
1974	5,720	4,569	1,151	1,016	80	6.4
1975	5,909	4,681	1,228	1,096	79	6.6

Note 1: Operating expenses include depreciation and all income payments to workers.

7.14 Operating ratios would improve progressively from 99 in 1967 to 79 in 1975; times interest earned would be no lower than the five times estimated for 1967 and debt service would remain good, improving progressively from 5.4 times in 1967. The return on the average net fixed assets would progressively range upward from 0.2 percent in 1967 to 6.0 percent in 1972 and to 6.6 percent in 1975. The return calculations are related to fixed-asset data as revalued in 1966.

7.15 The forecast of earnings is based on a number of important assumptions:

- (a) for 1968 and thereafter, the traffic forecasts discussed in paragraphs 3.14 through 3.16;
- (b) an increase in revenues, through rate and fare adjustments, equivalent to 3 percent as of December 1, 1968 and an additional 5 percent as of January 1, 1971;

- (c) the labor force reduction discussed in paragraph 3.05;
- (d) annual increases in payments to workers of one percent beginning in 1971 reflecting higher supplementary payments over and above basic wages which are at constant 1967 levels;
- (e) constant 1967 prices for materials and supplies;
- (f) any additional increases in operating costs would be promptly offset by increases in rates and fares as necessary to achieve the specified financial objectives.

7.16 The increases in revenues referred to in paragraph 7.15 (b) are required, on the basis of present estimates, for the Railways to earn an adequate rate of return on their net operating fixed assets. To this end, it has been agreed that the Railways will introduce an increase in rates and fares during the course of 1968 so as to produce additional gross operating revenues of N. Din 111 million in 1969 based upon the estimates of 1969 traffic agreed during negotiations (this is approximately equivalent to the 3 percent increase referred to in paragraph 7.15 (b); and that the Railways will take whatever additional measures may be required, whether increases in rates or reductions in expenses, to earn 3.5 percent in 1970 and at least 6.0 percent in 1975 and thereafter.

Finances

7.17 The Railways, as all economic enterprises in Yugoslavia, pay the Government for the use of fixed assets assigned to them. For industry generally, the charge is six percent; but the Railways, as other public utility enterprises, pay 1.7 percent on operating property (excluding land, permanent way and structures such as tunnels), and six percent on social standard assets, such as workers' housing.

7.18 Balance sheet data as of December 31, 1964/1966 and as of June 30, 1967 are shown in Table 20. The ratios of current assets to current liabilities were about 1.5:1. The liquid ratios (current assets less stores to current liabilities) were 1.1:1 at the end of each year, and 1.4:1 as of June 30, 1967. Operating cash as of December 31, 1964 and 1965 was only seven and four percent, respectively, of annual cash operating expenses (excluding depreciation). While the liquid ratios and operating cash were generally inadequate, ten percent of cash operating expenses, which may be considered adequate, was available on December 31, 1966; and this improved by June 30, 1967. The debt/equity ratios and debt service coverage have been good.

7.19 The latest revaluation of the Railways' fixed assets in 1966 increased the value by more than 50 percent as shown below:

	<u>Millions of New Dinars</u>			
	<u>As of</u> <u>6/30/66</u>	<u>As of</u> <u>7/1/66</u>	<u>Increase</u>	<u>Percent</u> <u>Increase</u>
Gross operating fixed assets	14,136	21,815	7,679	54.3
Accumulated depreciation	7,625	11,715	4,090	53.6
Net operating fixed assets	6,511	10,100	3,589	55.1

7.20 It has been agreed that the Railways will continue to revalue their assets from time to time in the future to reflect realistic values.

7.21 The future finances of the Railways are shown in the balance sheet projections, Table 21, and in the cash flow estimates, Table 22. The ratio of current assets to current liabilities would remain at about 1.6:1 and the liquid ratio would remain at about 1.3:1 throughout the period 1967-1975. The debt-equity ratio is estimated to remain good, ranging from 13/87 in 1967 to 19/81 in 1969 and improving thereafter to 13/87 in 1975.

7.22 The future earnings and finances of the Yugoslav Railway transport enterprises would improve sufficiently to permit the Railways to establish a modernization fund beginning in 1971 with a contribution of about N. Din 122 million in that year. The sum would grow to about N. Din 667 million by 1975 as shown in Table 21. This amount could be used for additional motive power, rolling stock and electrification, among other needs, in the 1971-1975 period.

7.23 The Railways' cash needs and sources of funds, in the period 1968-1973 are set forth in Table 22 and summarized below:

	<u>New Dinars</u> <u>(Millions)</u>
<u>Cash Requirements</u>	
Capital investments	13,058
Debt service	1,772
Working capital	53
Increase in cash position	<u>640</u>
Total cash requirements	15,523
<u>Cash Available</u>	
Railways	13,008
Bank loan	493
Other loans	<u>2,022</u>
Total cash available	15,523

7.24 Internally generated funds would amount to N. Din 13,008 million, and after covering debt service and working capital requirements of N. Din 1,825 million there would remain some N. Din 11,183 million. Of this N. Din 10,543 million would be applied toward capital investments amounting to N. Din 13,058 million, N. Din 493 million being covered by the second railway project of 1964 and N. Din 2,022 million by foreign and domestic loans as well as grants from republic and city governments. The overrun total N. Din 640 million, the amount whereby the cash position would be improved during this period, could be used for the purpose of financing the major part of the capital investments referred to in paragraph 7.22. It has been agreed that the Railways will contribute at least 50 percent of their capital needs from internally generated funds.

8. CONCLUSIONS AND RECOMMENDATIONS

8.01 The Belgrade-Bar Railway Project will significantly improve, and substantially complete, the railway transport network of Yugoslavia and permit more economical access between the developed central regions and the coast. It is well planned and technically sound and the cost estimates, which include adequate allowances for contingencies, are considered to be reliable. The economic return on the investment is somewhat less than is customary in Bank-financed projects, but in view of the important contribution of the project to the integration of the area served by the Railway with the remainder of the country, the project is considered to be justified. The Government and the Investors are well able to execute the project effectively.

8.02 Funds for the project will be provided from budgetary sources, the largest share to be provided by the Federal Government and the remainder by the Republics of Montenegro and Serbia.

8.03 During negotiations agreement was reached with the Yugoslav authorities on the following principal issues:

- (i) staff reductions (paragraph 3.05);
- (ii) satisfactory arrangements to provide the Investors with any funds that might be required to meet overruns of the estimated costs (paragraph 5.14);
- (iii) adjustment of rates and fares in relation to costs (paragraph 7.03);
- (iv) targets for rate of return (paragraph 7.16) and revaluation of fixed assets (paragraph 7.20); and
- (v) contribution to capital needs from internally generated funds (paragraph 7.24).

8.04 The Project provides a suitable basis for a Bank loan to the Yugoslav Investment Bank of US\$50 million equivalent for a term of 25 years, including a grace period of 6 years.

March 6, 1968

YUGOSLAVIAFreight Transport by Mode of Transport, 1956-1966
(millions of net ton-km)

<u>Year</u>	<u>Total</u>	<u>Railways</u>	<u>Inland Waterways</u>	<u>Coastal Shipping</u>	<u>Highways</u>	
					<u>Truck Enterprises</u>	<u>Own Account</u>
1956	n.a.	11,869	928	208	206	n.a.
1957	15,615	12,984	1,257	226	349	799
1958	16,284	13,031	1,491	257	560	945
1959	17,949	13,974	1,636	499	816	1,022
1960	20,534	15,191	2,009	390	1,016	1,928
1961	20,986	14,941	2,085	370	1,382	2,208
1962	21,575	15,033	2,212	358	1,615	2,357
1963	25,469	17,345	2,569	376	2,024	3,155
1964	28,559	18,258	3,108	370	2,399	4,424
1965	30,170	18,036	3,313	410	3,029	5,382
1966	31,495	17,491	3,853	459	3,616	6,049

Average Distance
Hauled

1965	241	360	84	14
1966	245	363	91	n.a.

Percentage Shares

1956	100	-	-	-	-	-
1957	100	83.2	8.1	1.4	2.2	5.1
1958	100	80.0	9.2	1.6	3.4	5.8
1959	100	78.8	9.1	2.8	4.6	5.7
1960	100	74.0	9.8	1.9	4.9	9.4
1961	100	71.2	9.9	1.8	6.6	10.5
1962	100	69.7	10.3	1.6	7.5	10.9
1963	100	68.1	10.1	1.5	7.9	12.4
1964	100	63.9	10.9	1.3	8.4	15.5
1965	100	59.9	11.0	1.3	10.0	17.8
1966	100	55.6	12.2	1.5	11.5	19.2

Source: Federal Institute for Statistics, Belgrade.

October 26, 1967

YUGOSLAVIAFreight Traffic by Mode of Transport, 1956-1966
(million tons)

<u>Year</u>	<u>Total</u>	<u>Railways</u>	<u>Inland Waterways</u>	<u>Coastal Shipping</u>	<u>Truck Enterprises</u>
1956	64.1	52.1	2.8	4.1	5.1
1957	71.5	56.6	3.6	4.8	6.5
1958	74.3	57.2	4.3	5.2	7.6
1959	81.7	60.7	4.8	6.1	10.1
1960	91.0	65.2	5.6	7.8	12.4
1961	93.0	64.2	5.9	8.3	14.6
1962	95.7	63.6	5.7	9.1	17.3
1963	111.9	71.8	6.9	9.4	23.8
1964	124.8	76.5	8.2	9.7	30.4
1965	130.6	74.8	9.2	10.6	36.0
1966	133.0	71.6	10.6	11.1	39.7

Percentage Shares

1956	100	81.3	4.4	6.4	7.9
1957	100	79.2	5.0	6.7	9.1
1958	100	77.0	5.8	7.0	10.2
1959	100	74.2	5.9	7.5	12.4
1960	100	71.6	6.2	8.6	13.6
1961	100	69.0	6.4	8.9	15.7
1962	100	66.5	6.0	9.5	18.0
1963	100	64.2	6.1	8.4	21.3
1964	100	61.3	6.6	7.8	24.3
1965	100	57.3	7.0	8.1	27.6
1966	100	53.8	8.0	8.4	29.8

Source: Federal Institute for Statistics, Belgrade.

October 26, 1967

YUGOSLAVIA

Passenger Traffic, by Mode of Transport, 1956-1965
(millions of passenger-km)

<u>Year</u>	<u>Total</u>	<u>Railways</u>	<u>Highways</u>		<u>Air</u>	<u>Maritime</u>	
			<u>Buses</u>	<u>Passenger Cars^{1/}</u>		<u>Coastal Shipping</u>	<u>Inland Waterways</u>
1956	8,817	7,314	966	220	48	248	21
1957	10,095	8,059	1,346	325	53	285	27
1958	11,492	8,877	1,760	425	60	340	30
1959	12,502	9,250	2,231	580	82	333	26
1960	14,574	10,449	2,826	810	114	348	27
1961	14,893	10,089	3,139	1,180	136	326	23
1962	15,187	9,908	3,315	1,425	165	354	20
1963	16,780	10,673	3,876	1,655	267	293	16
1964	19,698	12,308	4,843	1,875	366	293	13
1965	n.a.	12,800	6,025	n.a.	480	323	10
1966	n.a.	12,196	8,140	n.a.	538	295	10

Average Distance Hauled

1965	54.2	27.6	65.9	71.4
1966	57.2	27.3	76.2	90.9

Percentage Shares

1956	100	82.9	11.1	2.5	0.5	2.8	0.2
1957	100	79.8	13.4	3.2	0.5	2.8	0.3
1958	100	77.3	15.3	3.7	0.5	3.0	0.2
1959	100	74.0	17.8	4.6	0.7	2.2	0.2
1960	100	71.7	19.4	5.5	0.8	2.4	0.2
1961	100	67.7	21.1	7.9	0.9	2.2	0.2
1962	100	65.3	21.8	9.4	1.1	2.3	0.1
1963	100	63.6	23.1	9.9	1.6	1.7	0.1
1964	100	62.5	24.6	9.5	1.8	1.5	0.1
1965	100-n.a.						
1966	100-n.a.						

Source: Federal Institute for Statistics, Belgrade.

^{1/} Assumes that each passenger car travelled about 6,000 km annually in intercity traffic, with an occupancy rate of 2.5 persons per car.

October 26, 1967

YUGOSLAVIAPassenger Traffic, by Mode of Transport, 1956-1966
(millions of passengers)

<u>Year</u>	<u>Total</u>	<u>Railways</u>	<u>Buses</u>	<u>Air</u>	<u>Coastal Shipping</u>	<u>Inland Waterways</u>
1956	202.46	159	37	0.09	5.52	0.85
1957	228.73	171	51	0.11	5.74	0.88
1958	254.44	184	63	0.13	6.25	1.06
1959	279.56	191	81	0.17	6.75	0.64
1960	321.00	212	101	0.23	7.24	0.53
1961	311.52	195	109	0.27	6.65	0.60
1962	322.20	193	122	0.31	6.17	0.72
1963	354.59	201	147	0.44	5.62	0.53
1964	414.69	226	182	0.54	5.76	0.39
1965	459.67	236	218	0.63	4.90	0.14
1966	515.57	213	298	0.59	3.87	0.11

Percentage Shares

1956	100	78.7	18.3	0.0	2.7	0.3
1957	100	74.8	22.2	0.1	2.5	0.4
1958	100	72.4	24.8	0.0	2.4	0.4
1959	100	68.4	28.9	0.1	2.4	0.2
1960	100	66.0	31.4	0.1	2.3	0.2
1961	100	62.6	35.0	0.1	2.1	0.2
1962	100	60.0	37.8	0.1	1.9	0.2
1963	100	56.7	41.4	0.1	1.6	0.2
1964	100	54.5	43.8	0.2	1.4	0.1
1965	100	51.3	47.4	0.2	1.1	0.0
1966	100	41.3	57.8	0.1	0.8	0.0

Source: Federal Institute for Statistics, Belgrade.

October 26, 1967

YUGOSLAVIA

Expenditure on Investments in Fixed
Assets of the Socialized Sector, by
Sector, Percentage of Total, Selected
Years 1960-1965

	<u>1960</u>	<u>1962</u>	<u>1964</u>	<u>1965</u>
Total	100.0	100.0	100.0	100.0
Transportation	17.6	13.2	12.9	11.7
Manufacturing and mining	35.1	38.3	35.3	36.2
Agriculture and forestry	13.5	11.3	10.2	9.4
Construction	2.5	2.6	2.4	1.7
Trade, catering and handicrafts	6.4	5.7	7.2	6.1
Housing and communal development	15.0	16.0	21.0	24.2
Cultural and social Institutions	6.1	7.2	6.6	6.7
Government	<u>3.7</u>	<u>5.5</u>	<u>4.1</u>	<u>3.9</u>
	100.0	100.0	100.0	100.0

Source: Statisticki Bilten, recurrent

October 26, 1967

Table 6

YUGOSLAVIA
Yugoslav Railways
Selected Operating Statistics 1961-1966

	St.G. / 1961	N.O. /	St.G. / 1962	N.O. /	St.G. / 1963	N.O. /	St.G. / 1964	N.O. /	St.G. / 1965	N.O. /	St.G. / 1966	N.O. /
I. TRAFFIC												
Passengers carried, total (million)	175.5	19.5	n.a.	n.a.								
St.G. + N.O.	195.0	065	192.9	n.a.	201.3	n.a.	225.9	n.a.	236.0	n.a.	213.2	n.a.
Passenger-km, total St.G. + N.O.	9,224	10,089	9,908	7.5	63.9	10,673	7.9	12,308	12,801	n.a.	12,196	n.a.
Freight-tons carried, total	57.0	61.2	56.1	63.6	15,890	1,455	16,743	1,515	16,814	74.7	15,343	1,226
Freight-ton-km, total	113,664	1,277	13,663	1,370	15,890	1,455	16,743	1,515	16,814	74.7	15,343	1,226
St.G. + N.O. by total	114,914	2,142	15,033	n.a.	17,345	n.a.	18,258	n.a.	18,336	n.a.	17,569	n.a.
St.G. + N.O. %	25,030		24,914		28,018		30,566		31,137		29,765	
Traffic Units, total St.G. + N.O.												
II. OPERATION												
Train-km, Total (000)	93,152	14,883	95,330	14,374	110,621	14,694	103,514	14,698	104,321	14,360	103,695	11,795
- Steam locomotives	47,979	8,972	51,071	4,774	59,038	4,681	54,033	4,703	54,651	4,550	54,682	3,985
Train-km, Freight	14,742	2,912	14,319	9,600	17,586	10,013	19,481	10,195	19,670	9,810	19,013	7,810
Train-km by mode of traction, Steam	70,151	14,519	64,089	14,093	61,711	14,311	61,394	14,528	59,312	14,051	56,367	11,556
Train-km by mode of traction, Diesel	2,805	-	16,661	-	18,112	-	20,326	-	21,397	-	22,121	-
Train-km by mode of traction, Electric	2,805	-	3,131	-	4,987	-	5,317	-	5,935	-	5,486	-
Railcar-set-km, Diesel	9,764	364	13,536	361	15,485	383	16,228	370	16,902	309	17,210	239
Railcar-set-km, Electric	208	-	203	-	306	-	219	-	775	-	2,511	-
Total Train-km, St.G. + N.O.	33,217	2,558	28,008	2,487	29,485	2,611	30,438	2,728	29,862	2,614	29,072	2,125
Gross-ton-km, Steam	6,298	27	1,364	88	12,830	30	14,818	28	13,977	-	14,044	-
Gross-ton-km, Diesel	1,471	-	1,593	-	2,628	-	2,803	-	3,229	-	3,887	-
Gross-ton-km, Electric	n.a.	-	n.a.	-	n.a.	-	n.a.	-	1,126	-	1,202	-
Total Gross-ton-km	40,786	2,585	40,962	2,515	44,943	2,641	48,059	2,756	48,194	2,637	48,202	2,143
Total Gross-ton-km, St.G. + N.O.	43,371		42,477		47,584		50,815		50,831		50,345	
Locomotive-km %	97,434	21,761	87,919	21,112	89,254	21,634	89,028	21,907	85,841	21,183	81,466	17,463
- Diesel	1,753	-	19,032	-	21,089	-	23,787	-	25,126	-	26,999	-
- Electric	3,830	364	4,112	361	5,717	383	6,278	370	6,806	308	6,474	239
- Railcar-km, Diesel	10,850	-	16,574	-	20,587	-	23,178	-	25,092	-	26,565	-
Total Motive Power-Unit-km	123,898	22,125	127,850	21,473	136,993	22,017	142,422	22,277	143,641	21,491	144,190	17,752
Total Motive Power-Unit-km, St.G. + N.O.	146,023		149,323		159,010		164,699		165,132		161,892	
III. OPERATING EFFICIENCY												
Engine-km per engine-day available												
- Steam locomotives	207	195	200	157	200	160	201	164	189	152	195	148
- Diesel locomotives	363	-	394	-	408	-	428	-	391	-	370	-
- Electric locomotives	408	-	433	-	447	-	487	-	424	-	354	-
- Diesel railcars	396	334	404	244	397	349	369	338	337	281	375	347
- Electric railcars	n.a.	-	n.a.	-	n.a.	-	n.a.	-	226	-	433	-
Traffic-Units per train-km, St.G. + N.O.	302	130	308	228	332	243	338	258	262	155	323	256
Freight-ton-km per freight-train-km	215	141	214	156	249	166	261	176	263	181	257	151
Freight-ton-km per freight-car in fleet	5.8	4.7	5.6	4.5	5.2	4.3	4.2	3.0	4.1	3.1	4.5	2.2
Average turn-round time of freight cars % (days)	15.4	11.1	14.6	11.1	14.9	11.1	15.1	11.3	15.3	12.1	15.3	11.6
Ratio of loaded to total freight car-km	0.73	0.70	0.72	0.69	0.73	0.71	0.75	0.72	0.72	0.71	0.74	0.71
IV. STAFF EFFICIENCY												
Number of Employees	148,174		146,261		149,774		159,061		159,208		149,252	
Traffic Units per Employee	168		170		187		192		195		154	
Gross-ton-km per Employee	292		292		317		319		319		347	
Employees per km. of line	12.5		12.4		12.6		13.5		13.4		12.5	

Note: 1/ St.G. = Standard Gauge; N.O. = Narrow Gauge
 2/ Including dead-end traffic
 3/ Traffic Units are made up by adding passenger-km plus ton-km
 4/ Including shunting, double heading, etc.
 5/ Turn-round time of freight cars; number of available car days per year divided by total number of cars loaded plus number of cars entered loaded in the system.

YUGOSLAVIA
Yugoslav Railways
Railway Network and Traffic Density, 1925-1966

	1925		1950		1961		1962		1963		1964		1965		1966	
	St.G.	N.G.	St.G.	N.G.	St.G.	N.G.	St.G.	N.G.	St.G.	N.G.	St.G.	N.G.	St.G.	N.G.	St.G.	N.G.
I. NETWORK (end of the year)																
Route-kilometer of lines, km	6,700	2,187	8,429	3,112	9,162	2,705	9,174	2,618	9,276	2,580	9,273	2,581	9,311	2,528	9,437	2,143
Route-kilometer of lines, total standard plus narrow gauge, km		8,887		11,541		11,867		11,792		11,856		11,854		11,839		11,580
Double track lines, km	n.a.	n.a.	633	--	728	2	728	3	724	3	724	3	733	3	733	3
Electrified lines, km	-	-	103	-	235	-	310	-	310	-	432	-	472	-	483	-
II. TRAFFIC DENSITY																
Passenger-km per km of line, (000)	n.a.	n.a.	n.a.	n.a.	1,008	319	997	292	1,071	288	1,247	289	1,280	324	n.a.	n.a.
Passenger-km per km of line, average standard and narrow gauge (000)		184		718		850		840		900		1,038		1,081		1,035
Freight-net-ton-km per km of line (000)	n.a.	n.a.	n.a.	n.a.	1,491	472	1,560	329	1,796	361	1,902	376	1,869	370	n.a.	n.a.
Freight-net-ton-km per km of line, average for standard and narrow gauge (000)		243		861		1,274		1,287		1,484		1,569		1,549		1,541

Note: St.G. = Standard Gauge; N.G. = Narrow Gauge.

Changes in the network from 1965 to 1966:

The 194 km standard gauge line Sarajevo-Ploce has been opened for traffic; 68 km of standard gauge and 385 km of narrow gauge lines have been discontinued during 1966.

October 26, 1967

YUGOSLAVIA

YUGOSLAVIA RAILWAYS
MOTIVE POWER AND ROLLING STOCK, YEARLY AVERAGES 1961 - 1966

	1961		1962		1963		1964		1965		1966	
	St. G. 'a/	N.G. 'a/										
I. MOTIVE POWER												
Steam locomotives												
In Fleet (nos.)	1,722	565	1,693	534	1,650	511	1,629	505	1,604	487	1,573	468
Available (nos.)	1,285	373	1,204	367	1,220	370	1,214	366	1,252	381	1,143	323
Available (%)	75	66	71	69	74	72	75	72	78	78	73	69
Diesel locomotives												
In Fleet (nos.)	110	-	151	-	169	-	188	-	212	-	243	-
Available (nos.)	90	-	132	-	142	-	158	-	175	-	200	-
Available (%)	82	-	87	-	84	-	84	-	83	-	82	-
Electric locomotives												
In Fleet (nos.)	27	-	29	-	41	-	47	-	53	-	55	-
Available (nos.)	23	-	25	-	35	-	39	-	43	-	45	-
Available (%)	85	-	86	-	85	-	83	-	81	-	82	-
Diesel railcar sets b/												
In Fleet (nos.)	108	5	160	5	194	5	230	5	229	4	248	4
Available (nos.)	75	3	112	3	142	3	172	3	179	2	194	2
Available (%)	69	60	70	60	73	60	75	60	78	50	78	50
Electric railcar sets b/												
In Fleet (nos.)	4	-	4	-	4	-	5	-	7	-	22	-
Available (nos.)	2	-	2	-	2	-	2	-	5	-	17	-
Available (%)	50	-	50	-	50	-	40	-	71	-	77	-
Total H.P. of Motive Power Units												
Steam (000)	1,314	167	1,235	160	1,239	165	1,263	164	1,220	159	1,200	131
Diesel (000)	240	2	262	2	280	2	299	2	327	2	384	2
Electric (000)	96	-	113	-	141	-	177	-	182	-	210	-
II. ROLLING STOCK												
Passenger cars c/												
In Fleet	5,254	1,007	5,355	995	5,226	991	4,930	989	4,739	965	4,624	849
Available (%)	92	90	90	90	90	90	90	90	90	90	91	90
Total seating capacity (000)	231	24	240	26	242	23	237	23	235	22	239	19
Freight cars												
In Fleet	63,480	9,014	63,588	8,796	63,796	8,741	64,221	8,619	64,018	8,422	63,532	7,706
Available (%)	92	94	93	94	95	95	95	95	95	95	95	96
Total carrying capacity (000 m ton)	1,275	109	1,294	106	1,349	105	1,375	103	1,378	102	1,378	91
Average capacity per car (m ton)	20.1	12.1	20.3	12.1	21.5	12.0	21.4	12.0	21.5	12.1	21.7	11.8

Note: a/ St.G.' = Standard Gauge; N.G.' = Narrow Gauge

b/ Units of powered cars and trailers

c/ Excluding railcar trailers, but including restaurant, sleeping and service cars, and baggage and mail vans

YUGOSLAVIA

YUGOSLAV RAILWAYS

AGE OF MOTIVE POWER AND ROLLING STOCK

<u>TYPE</u>	<u>TOTAL NUMBER IN FLEET END OF 1965</u>	<u>PERIOD OF MANUFACTURE IN PERCENT OF THE TOTAL 1965</u>			<u>SINCE 1944</u>	<u>PROCUREMENT IN 1966 UNITS</u>
		<u>BEFORE 1920</u>	<u>1920-1929</u>	<u>1930-1944</u>		
Steam locomotives, St.G.	1,528	25	30	35	10	-
" " , N.G.	467	54	23	12	11	19
Diesel locomotives, St.G.	235	-	-	-	100	43
" " , N.G.	1	-	-	-	100	-
Electric locomotives, St.G.	53	-	-	32	68	-
Diesel railcar sets, St.G.	238	-	-	3	97	14
" " , N.G.	4	-	-	100	-	1
Electric railcar sets, St.G.	10	-	-	20	80	17
Passenger cars, St.G.	3,807 <u>a/</u>	18	13	7	62	4 axle 77 2 axle 104
" " , N.G.	739	55	33	10	2	-
Freight cars, St.G.	64,018	32	24	19	25	275 <u>b/</u>

Note: St.G. = Standard Gauge; N.G. = Narrow Gauge
a/ without service cars, baggage and mail vans
b/ including 10 service cars

October 26, 1967

Table 9

YUGOSLAVIAPrincipal Commodities Carried by
Yugoslav Railways, 1952 and 1962-1966

(thousand tons)

<u>Year</u>	<u>Total</u>	<u>Coal</u>	<u>Oil</u>	<u>Ores</u>	<u>Metal- a) a) lurgical Products</u>	<u>Wood</u>	<u>Building Material and Cement</u>	<u>Cereals</u>	<u>Other</u>
1952	37,939	10,447	885	2,379	1,237	6,155	7,876	2,332	6,628
1962	63,588	18,800	2,030	7,036	3,722	4,852	10,384	2,080	14,684
1963	71,777	21,199	2,135	7,253	4,262	5,264	11,249	2,766	17,649
1964	76,527	22,464	2,280	7,570	4,269	5,391	12,587	2,240	19,726
1965	74,781	21,881	2,026	7,524	4,137	5,147	12,116	2,634	19,316
1966	71,618	20,179	2,076	6,072	6,223	5,092	11,315	3,173	17,488
1967*	68,730	16,863	2,080	7,249	6,028	4,567	12,162	2,497	17,284

Percentage Shares

1952	100.0	27.5	2.3	6.3	3.3	16.2	20.8	6.2	17.5
1962	100.0	29.6	3.2	11.1	5.8	7.6	16.3	3.3	21.7
1963	100.0	29.5	3.0	10.1	5.9	7.3	15.8	3.8	24.6
1964	100.0	29.4	3.0	9.9	5.6	7.1	16.5	2.9	25.8
1965	100.0	29.3	2.7	10.1	5.5	6.9	16.2	3.5	25.8
1966	100.0	28.2	2.9	8.5	8.7	7.1	15.8	4.4	24.4
1967	100.0	24.5	3.0	10.5	8.8	6.6	17.7	3.6	25.1

Source: INDEX Monthly Review of Yugoslav Economic Statistics (Recurrent)

* Preliminary

a) Note: These groups include "non-metals" which is separately shown in Table 11.
Data for 1966 and 1967 may not be strictly comparable with previous years.

YUGOSLAVIAYugoslav Railway System
Freight Traffic Projection, 1966-1975

<u>Year</u>	<u>Tons</u> <u>(000)</u>	<u>Net Ton-Km</u> <u>(millions)</u>	<u>Average Length</u> <u>of Haul, km</u>
1966 (Actual)	71,618	17,491	245
1967 (Preliminary)	68,730	16,390	238
1968	70,496	16,993	241
1969	72,300	17,430	241
1970	74,292	17,915	241
1971	76,851	18,358	239
1972	79,948	19,119	239
1973	86,199	21,324	248
1974	89,257	22,160	248
1975	93,095	23,078	248

Tonnage By Commodity Group (Million Tons)

<u>Year</u>	<u>Total</u>	<u>Coal</u>	<u>Oil</u>	<u>Ores</u>	<u>Non</u> <u>Metals</u>	<u>Metal-</u> <u>lurgical</u> <u>Products</u>	<u>Wood</u>	<u>Building</u> <u>Materials</u> <u>& Cement</u>	<u>Cereals</u>	<u>Other</u>
1966	71.6	20.2	2.1	6.7	2.2	3.4	5.1	11.3	3.2	17.4
1967	68.7	16.9	2.1	7.2	2.1	3.9	4.6	12.2	2.5	17.2
1968	70.5	17.4	2.2	7.5	2.2	3.9	4.7	12.3	2.5	17.8
1969	72.3	17.9	2.2	7.6	2.3	4.1	4.8	12.6	2.6	18.2
1970	74.3	18.4	2.3	7.9	2.3	4.2	4.9	13.0	2.6	18.7
1971	76.9	19.0	1.3	8.2	2.7	4.3	5.1	14.0	2.7	19.6
1972	79.9	19.8	1.2	8.4	2.8	4.5	5.3	14.6	3.0	20.3
1973	86.2	21.3	1.4	8.8	3.0	4.7	5.6	14.9	3.0	23.5
1974	89.3	22.1	1.4	9.1	3.0	4.8	5.8	16.1	3.3	23.7
1975	93.1	23.1	1.5	9.5	3.1	5.0	6.0	16.8	3.5	24.6

Source: Yugoslav Railways

YUGOSLAVIAYugoslav Railway System
Passenger Traffic Projection, 1966-1975

	<u>No.</u> <u>(000)</u>	<u>Passenger-Km</u> <u>(million)</u>	<u>Average Length</u> <u>of Journey</u>
1966 (Actual)	213,207	12,196	57.2
1967	195,380	10,746	55.0
1968	197,432	10,918	55.3
1969	201,183	11,185	55.6
1970	205,407	11,461	55.8
1971	210,131	11,788	56.1
1972	215,959	12,158	56.3
1973	228,485	12,886	56.4
1974	233,283	13,204	56.6
1975	238,182	13,529	56.8

February 29, 1968

Source: Yugoslav Railways

YUGOSLAVIA
YUGOSLAV RAILWAYS

Original and Revised Railway Investment Program 1964 - 1970 and Preliminary Program 1971 - 1975

Item	Original Program 1964 - 1970		Revised Program 1964 - 1970						Preliminary Program 1971 - 1975	
	Number of units	New Din. million	Actual Expenditure 1964 - 1966		Estimated Expenditure 1967 - 1970		Total Expenditure 1964 - 1970		Number of units	New Din. million
			Number of units	New Din. million	Number of units	New Din. million	Number of units	New Din. million		
1. Reconstruction and Modernization Program	-	1,277.6	-	316.4	-	1,712.7	-	2,029.1	-	261.0
2. Additional works in connection with Modernization Program	-	296.3	-	41.5	-	180.0	-	221.5	-	-
3. Rehabilitation of track and stations										
3.1 Through lines	1,071	600.0	386	275.2	685	480.0	1,071	755.2	250	200.0
3.2 Other first class lines	716		331	191.2	385	270.0	716	461.2	800	560.0
3.3 Other lines	1,234	890.0	324	103.9	910	460.0	1,234	563.9	1,300	715.0
3.4 Reconstruction, substructure, and stations	-	278.1	-	192.9	-	240.0	-	432.9	-	475.0
Subtotal 3:	3,021	1,768.1	1,041	763.2	1,980	1,450.0	3,021	2,213.2	2,350	1,950.0
4. Motive Power										
4.1 Electric	250	590.1	-	55.0	215	716.3	215	771.3	125	464.0
4.2 Diesel	328	446.5	106	252.0	112	169.4	218	421.4	260	858.0
4.3 Steam	-	-	(76)	29.4	-	-	(76)	29.4	-	-
Subtotal 4:	578	1,036.6	106 a/	336.4	327	885.7	433 a/	1,222.1	385	1,322.0
5. Passenger Rolling Stock										
5.1 Passenger cars	1,601	530.9	600	199.7	619	288.8	1,219	488.5	450	360.5
5.2 Diesel railcar sets (4-car-sets)	42	118.0	3	6.6	11	26.0	14	32.6	20	70.0
5.3 Diesel rail buses (2-car-sets)	66	37.5	26	19.4	46	36.8	72	56.2	50	39.0
5.4 Electric railcar sets (4-car-sets)	32	89.6	25	90.0	3	36.5	28	126.5	40	180.0
Subtotal 5:		776.0		315.7		388.1		703.8		649.5
6. Freight cars	22,000	869.8	2,882	135.2	7,235	381.1	10,117	516.3	29,500	2,320.4
7. Reconstruction of junctions (not included in item 1, 2 and 3)	-	773.5	-	110.2	-	180.0	-	290.2	-	979.0
8. Mechanization of loading	-	112.3	-	23.4	-	160.0	-	183.4	-	375.5
9. Other Investments	-	147.0	-	211.9	-	108.5	-	320.4	-	160.6
T O T A L New Dinar million	-	7,057.2	-	2,253.9	-	5,446.1	-	7,700.0	-	8,018.0
Total US\$ million equivalent		940.7		approx. 222		435.7		approx. 658		641.4
Exchange rate, New Dinar per US\$ 1.00 b/		7.5		7.5/12.5		12.5		7.5/12.5		12.5

Note: a/ includes only diesel and electric locomotives.
b/ exchange rate 7.5 before, and 12.5 since July 27, 1965

February 29, 1968

YUGOSLAVIA

Belgrade-Bar Railway Project

Cost Estimate and Schedule of Expenditure

	Section from - to	Length km	Actual Expenditure until December 31, 1965 N Dinar million	Expenditure from January 1966 to completion New Dinar Million								Estimated Expenditure January 1968 - 1972			
				Actual			Estimated					Total 1966 -1972	N Dinar Million	US\$ million Equivalent	
				1966	January 1 - June 30 1967	July 1 - December 31, 1967	1968	1969	1970	1971	1972				
1.	(Belgrade) Resnik-Vreoci	(51.5) 37.3	50.04	-	-	1.570	14.480	10.930	1.270	-	-	28.250	26.680	2.13	
2.	Vreoci-Valjevo	40.2	6.01	0.410	0.150	20.920	19.050	24.040	5.610	-	-	70.180	48.700	3.89	
3.	Valjevo-Kosjeric	41.6	60.07	9.493	7.931	22.670	53.940	54.546	11.560	1.600	0.800	162.540	122.446	9.80	
4.	Kosjeric-Pozega	22.6	0.57	0.450	0.220	0.590	15.000	49.580	20.040	21.580	4.430	111.890	110.630	8.85	
5.	Pozega-Titovo Uzice	22.1	1.39	0.505	-	0.620	12.000	45.190	43.400	5.615	6.720	114.050	112.925	9.03	
6.	Titovo Uzice-Priboj	64.5	22.15	5.849	5.226	18.275	40.000	42.000	73.000	101.000	183.590	468.940	439.590	35.17	
7.	Priboj-Prijepolje	27.6	14.73	24.140	1.751	2.758	22.060	22.694	54.332	10.545	21.980	160.640	131.611	10.53	
8.	Prijepolje-Gostun	34.7	0.20	0.380	0.210	0.789	-	-	31.578	59.510	92.423	186.510	185.511	14.84	
9.	Gostun-Bijelo Polje	12.1	0.30	0.350	-	-	-	4.500	12.850	18.260	25.603	61.563	61.213	4.90	
10.	Gijelo Polje-Mojkovac	23.4	14.53	4.120	2.104	8.112	9.846	34.120	40.738	42.076	24.864	165.980	151.644	12.13	
11.	Mojkovac-Matesevo	24.2	1.05	0.504	-	-	5.000	33.734	51.772	72.040	87.625	253.420	250.171	20.01	
12.	Matesevo-Titograd	58.6	10.01	14.398	2.588	24.336	49.514	69.306	82.400	97.404	185.118	522.320	483.742	38.70	
13.	Titograd-Bar	53.0	116.94	-	-	-	-	-	-	18.420	31.197	49.617	49.617	3.97	
Total (Belgrade-) Resnik-Bar (476.1)461.9				297.99	60.600	20.180	100.640	240.890	392.640	428.550	448.050	664.350	2,355.900	2,174.480	173.96
The above total consists of the major groups of works as A to F below:															
A.	Earthworks and Structures			51.190	15.590	73.520	190.820	277.570	349.420	342.270	265.500	1,565.880	1,425.580	114.06	
B.	Tracks			-	-	13.810	29.930	40.000	25.450	40.000	139.500	288.690	274.880	22.00	
C.	Buildings			-	-	-	0.500	2.130	5.200	12.430	50.000	70.260	70.260	5.57	
D.	Signalling and Telecommunication			-	-	-	12.350	35.960	7.750	6.000	79.160	141.220	141.220	11.31	
E.	Electric Traction			-	-	-	2.820	14.140	15.050	30.000	96.000	158.000	158.000	12.65	
F.	Others (acquisition of land, engineering, supervision, etc.)			9.410	4.590	13.310	4.470	22.840	25.690	17.350	34.190	131.850	104.540	8.37	
Total				297.99	60.600	20.180	100.640	240.890	392.640	428.550	448.050	664.350	2,355.900	2,174.480	173.96
Contingencies				-	-	-	32.038	65.178	85.381	103.948	176.053	462.598	462.598	37.01	
Grand Total				-	-	-	60.600	20.180	100.640	272.928	457.818	513.933	2,818.498	2,637.078	210.97
Percentage of Contingencies to Total: (%)				-	-	-	-	-	13.3	16.6	19.9	23.2	26.5	Average 19.7	Average 19.7

Notes:

- Expenditure prior to January 1, 1966 is not included in the estimated total cost of the project.
- Contingencies for increase in quantities, unforeseen items, and price increases are added to the estimated expenditures from 1968 to 1972 in amounts and percentages as shown above.
- Completion of the project is scheduled by the investors as follows:

Resnik-Vreoci and Titograd-Bar	:	in operation since 1959 without electric traction and final engineering.
Vreoci-Valjevo	:	end of 1968 without electric traction and final engineering.
Resnik-Vreoci-Valjevo-Titovo Uzice	:	end of 1970 with final signalling.
do.	:	end of 1972 with electric traction.
Titovo Uzice-Titograd-Bar	:	end of 1972 with electric traction and final signalling.

February 29, 1968

YUGOSLAVIA

Belgrade-Bar Railway Project

Scope of International Competitive Bidding 1966-1972

Amounts in New Dinar million
unless otherwise indicated.

Item	Works started as of Sept 30, 1967	Works not yet started		Total
		not suitable for international competitive bidding	to be subject to international competitive bidding	
A. Earthworks and structures	452.39	13.33	1,100.16	1,565.88
B. Tracks				
1. Procurement of rails, points, crossings and accessories	-	-	86.60	86.60
2. Procurement of sleepers and ballast, and laying of tracks	-	202.09	-	202.09
C. Buildings	-	70.26	-	70.26
D. Supply and installation of signalling and telecommunication equipment	-	-	141.22	141.22
E. Supply and installation of electric traction equipment	-	-	158.00	158.00
F. Others ^{a/}	26.01	105.84 ^{a/}	-	131.85
Total	478.40	391.52	1,485.98	2,355.90
Contingencies, average of 19.7%	94.10	76.80	291.70	462.60
Grand Total New Dinar million	572.50	468.32	1,777.68	2,818.50
US\$ million equivalent %	45.80 ^{b/} 20.3	37.47 16.6	142.21 63.1	225.48 100
Foreign Exchange Component US\$ million equivalent minimum maximum	3.46 ^{c/} 3.46 ^{c/}	1.33 1.33	19.90 66.57	24.69 ^{d/} 71.36 ^{d/}

Note: a/ includes New Dinar 10.75 million (US\$ 860,000) for employment of foreign consultants for design and supervision of civil engineering works.

b/ estimated US\$31.29 million in the period 1968-1972.

c/ estimated US\$2.56 million. " " " "

d/ estimated US\$23.79 million " " " "

e/ estimated US\$70.46 million " " " "

February 29, 1968

BELGRADE-BAR RAILWAY PROJECT

ESTIMATED SCHEDULE OF FOREIGN EXCHANGE EXPENDITURES 1968-1972

Item	1968	1969	1970	1971	1972	Total 1968-1972	Total 1968-1972
							US\$ million equivalent
Amounts in New Dinar million							
I. Minimum Foreign Exchange Component							
a. Earthworks & Structures	15.27	22.21	27.95	27.38	21.24	114.05	9.12
b. Tracks	-	-	-	-	-	-	-
c. Buildings	0.02	0.06	0.16	0.37	1.50	2.11	0.17
d. Signalling & Telecommunication	3.45	10.92	2.45	1.80	23.75	42.37	3.39
e. Electric Traction	1.41	12.07	12.52	5.00	48.00	79.00	6.32
f. Others	0.70	1.87	2.60	1.68	3.90	10.75	0.86
Total	20.85	47.13	45.68	36.23	98.39	248.28	19.86
Contingencies	2.77	2.83	9.09	8.41	26.07	49.17	3.93
Grand Total I	23.62	49.96	54.77	44.64	124.46	297.45	23.79
II. Maximum Foreign Exchange Component							
a. Earthworks & Structures	52.40	87.50	118.30	119.10	88.90	466.20	37.29
b. Tracks	9.97	13.00	8.64	13.14	41.85	86.60	6.93
c. Buildings	0.02	0.06	0.16	0.37	1.50	2.11	0.17
d. Signalling & Telecommunication	6.89	21.83	4.91	3.60	47.50	84.73	6.78
e. Electric Traction	1.41	7.07	7.52	15.00	48.00	79.00	6.32
f. Others	0.70	1.87	2.60	1.68	3.90	10.75	0.86
Total	71.39	131.33	142.13	152.89	231.65	729.39	58.35
Contingencies	9.48	21.80	28.28	35.47	56.39	151.42	12.11
Grand Total II	80.87	153.13	170.41	188.36	288.04	880.81	70.46
III. Summary of Estimated Foreign Exchange Expenditure, in US\$ Equivalent							
(I) Minimum	1.89	4.00	4.37	3.57	9.96	23.79	
(II) Maximum	6.47	12.25	13.62	15.07	23.04	70.46	

Note: The minimum foreign exchange component represents the costs of equipment and materials to be imported for: (i) contracts not subject to international competitive bidding; (ii) earthworks and structures if only domestic contractors are successful in international competitive bidding; (iii) signalling and telecommunication if only domestic manufacturers are successful in international competitive bidding for supply and installation; (iv) electric traction, if a blend of foreign and domestic manufacturers and contractors are successful in international competitive bidding for supply and erection, and related services in the same percentage as in the case of the Modernization Program (Loan 395-YU); and (v) cost of employment of foreign consultants for the design and supervision of civil engineering works, shown in item I. f "Others" in the above table.

The maximum foreign exchange component represents the cost of: (i) equipment and materials to be imported for contracts not subject to international competitive bidding; (ii) imported equipment and materials and services for earthworks and structures if only foreign contractors are successful in bidding; (iii) rails, points, crossings and accessories if foreign manufacturers are successful in bidding; (iv) imported signalling and telecommunication equipment and the foreign exchange cost of the installation if only foreign manufacturers are successful in bidding; (v) imported electric traction equipment and materials, if a blend of foreign and domestic manufacturers and contractors are successful in international competitive bidding for supply and erection and related services, in the same percentage as in the case of the Modernization Program (Loan 395-YU), also same as in the minimum; and (vi) employment of foreign consultants, same as in the minimum.

Figures in the above table are based on previous experiences in Yugoslavia. Percentages are summarized below:

Proportion of Foreign Exchange and Local Currency Costs of Contracts

Item	When Executed by Domestic Contractors		When Executed by Foreign Contractors	
	Foreign Exchange %	Local Currency %	Foreign Exchange %	Local Currency %
Earthworks and Structures	8	92	40	60
Tracklaying	-	100		*)
Supply of track materials	-	100	100	-
Buildings	3	97		*)
Signalling and Telecommunication	30	70	60	40
Electric Traction	50	50	50	50

*) Not subject to international competitive bidding.

YUGOSLAVIA

Belgrade-Bar Railway Project

Estimated Disbursement Schedule 1968-1972

	Units	1968	1969	1970	1971	1972	Total 1968-1972
Total Expenditure	New Din. million	240.89	392.64	428.55	448.05	664.35	2,174.48
Contingencies	" " "	32.04	65.18	85.38	103.95	176.05	462.60
Total Basis for Disbursement	New Din. million	272.93	457.82	513.93	552.00	840.40	2,637.08
do.	US\$ million equiv.	21.83	36.63	41.11	44.16	67.23	210.97
Disbursement (23.7% of US\$210.97 million)	US\$ million	5.20	8.70	9.80	10.40	15.90	50.00
Foreign Exchange Component:							
Minimum	US\$ million equiv.	1.89	4.00	4.37	3.57	9.96	23.79
% of disbursement	%	36.3%	46.0%	44.6%	34.3%	62.6%	47.0%
Maximum	US\$ million equiv.	6.47	12.25	13.62	15.07	23.04	70.46
% of disbursement	%	124%	140%	139%	145%	145%	141%

December 29, 1967

YUGOSLAVIA

COMMUNITY OF YUGOSLAV RAILWAYS
RAILWAY TRANSPORT ENTERPRISES
REVENUE, EXPENSE AND NET INCOME 1961 - 1966, AND FIRST 6 MONTHS 1967
(Millions of New Dinars)

	1961	1962	1963	1964		1965		1966		1966	1967
				T0451(a) Forecast	Actual	T0451(a) Forecast	Actual	T0451(a) Forecast	Actual	Jan. 1 - Actual	Sept. 30 Actual
Operating Revenues											
Passenger	490	517	600	610	593	630	827	650	895	669	719
Freight	1,546	1,565	1,770	1,840	1,957	1,930	2,288	2,000	2,854	2,284	2,012
Mail 1/	22	23	20	20	23	30	23	30	23	-	-
Other	369	489	660	690	659	690	707	700	691	466	478
Gross Operating Revenues	2,427	2,594	3,050	3,160	3,232	3,280	3,845	3,380	4,463	3,419	3,209
Less Inter-enterprise Items	474	658	800	840	800	850	79	850	74	30	67
Total Operating Revenues	1,953	1,936	2,250	2,320	2,432	2,430	3,766	2,530	4,389	3,389	3,142
Operating Expenses (net of Inter-enterprise items)											
Wages and Salaries	561	550	675	680	885	710	1,228	740	1,557	1,187	1,086
Fuel and Electric Power	282	294	325	330	350	340	452	340	493	355	328
Materials and Supplies	43	49	80	80	103	80	128	90	135	249	96
Services	-	-	-	-	-	-	271	-	159	184	238
Other Expenditures	-	-	-	-	-	-	627	-	510	173	436
Current Maintenance and Purchase Taxes	6	11	20	20	17	20	-	20	-	-	-
Miscellaneous Expenses	52	67	80	70	103	70	116	70	112	85	85
Depreciation	199	208	260	500	512	530	538	570	570	423	474
Investment Maintenance, Renewals	556	552	550	400	467	400	556	400	621	464	384
Total Operating Expenses	1,699	1,731	1,990	2,080	2,437	2,150	3,916	2,230	4,157	3,120	3,127
Net Operating Revenues (Loss)	254	205	260	240	(5)	280	(150)	300	232	269	15
Miscellaneous Revenues	46	33	20	10	45	20	43	20	48	3	20
Allotments from Federal Budget	-	-	-	-	220	-	352	-	74	-	-
Net Revenue before Interest (Deficit)	300	238	280	250	260	300	245	320	354	272	35
Interest	5	13	10	10	17	20	17	20	26	18	26
Income before Deductions (Deficit)	295	225	270	240	243	280	228	300	328	254	9
Deductions from Income:											
Payments to Government for use of fixed assets	99	101	60	70	70	70	70	70	67	50	55
Payments to social investment funds	26	19	40	30	70	40	4	50	-	-	-
Appropriated to Modernization Fund	-	-	50	50	-	50	16	50	-	-	-
Total Deductions from Income	125	120	150	150	140	160	90	170	67	50	55
Net Income (Deficit)	170	105	120	90	103	120	138	130	261	204	(46)
Ratios:											
Operating Times Interest Earned	87	89	88	90	100	89	104	88	95	92	99
Rates of Return	60	18	28	25	15	15	14	16	14	15	1
	5.2	3.7	4.4	4.0	-	4.7	-	5.0	2.7	-	-

Note 1/ - Mail revenues for 9 months periods 1966 and 1967 are included in passenger revenues.

February 29, 1968

YUGOSLAVIA
RAILWAY TRANSPORT ENTERPRISES
REVENUES, EXPENSES AND NET INCOME
ACTUAL 1966, ESTIMATED 1967 BASED ON 9 MONTHS ACTUAL
ESTIMATED 1968 TO 1975, INCLUSIVE
(millions of New Dinars)

	E S T I M A T E D									
	ACTUAL 1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Operating Revenues										
Passenger	895	861	875	896	923	956	977	1,043	1,069	1,096
Freight	2,854	2,651	2,748	2,819	2,897	2,970	3,098	3,489	3,615	3,763
Mail	23	23	24	24	24	24	24	24	24	24
Other	691	660	680	695	700	700	700	700	700	700
Gross Operating Revenues	4,463	4,195	4,327	4,434	4,544	4,650	4,799	5,256	5,408	5,583
Less Inter-enterprise items	74	76	70	70	70	70	70	70	70	70
Subtotal	4,389	4,119	4,257	4,364	4,474	4,580	4,729	5,186	5,338	5,513
Increased Revenues through Rate Adjustments (See Note 1)	-	-	9	111	115	320	332	369	382	396
Total Operating Revenues	4,389	4,119	4,266	4,475	4,589	4,900	5,061	5,555	5,720	5,909
Operating Expenses (excluding inter-enterprise items)										
Wages and Salaries (See Note 2)	1,557	1,502	1,467	1,453	1,434	1,406	1,432	1,484	1,527	1,571
Fuel and Electric Power	493	428	420	402	408	342	352	391	405	427
Materials and Supplies	135	120	123	125	129	132	136	136	139	141
Services Purchased	159	267	240	220	210	200	196	210	212	214
Current Maintenance and Other Expenses	510	527	530	531	544	558	572	602	617	632
Miscellaneous Expenses	112	100	101	102	104	105	105	108	109	110
Depreciation	570	655	684	733	751	851	893	1,001	1,017	1,036
Investment Maintenance, Renewals	621	502	510	525	520	495	498	530	543	550
Total Operating Expenses	4,157	4,101	4,075	4,091	4,100	4,089	4,184	4,462	4,569	4,681
Net Operating Revenues	232	18	191	384	489	811	877	1,093	1,151	1,228
Non-operating Revenues	122	145	150	127	97	58	59	60	13	16
Net Revenues Before Interest	354	163	341	511	586	869	936	1,153	1,164	1,244
Interest	26	32	46	48	57	60	54	54	46	44
Income Before Payments to Government	328	131	295	463	529	809	882	1,099	1,118	1,200
Payments to Government for Use of Fixed Assets	67	61	85	88	91	94	97	101	102	104
Net Income	261	70	210	375	438	715	785	998	1,016	1,096
Ratios:										
Operating Times Interest Earned	94.7	99.6	95.5	91.4	89.3	83.4	82.7	80.3	79.9	79.2
Rates of Return %	13.6	5.1	7.4	10.6	10.3	14.5	17.3	21.4	25.3	28.3
Rates of Return %	2.7	0.16	1.60	2.96	3.58	5.80	6.05	6.75	6.39	6.57

Note 1: Freight and passenger revenues have been increased by 3 percent as of December 31, 1968 and by an additional 5 percent as of January 1, 1971, weighted on the basis of estimated traffic for each year 1968 to 1975, inclusive.

Note 2: Wages and salaries include all personal income payments.

February 29, 1968

TABLE 20

YUGOSLAVIA
COMMUNITY OF YUGOSLAV RAILWAYS
RAILWAY TRANSPORT ENTERPRISES
BALANCE SHEET DATA, 1964, 1965 AND 1966
(Millions of New Dinars)

	<u>AS OF DECEMBER 31</u>			<u>JUNE 30,</u>
	<u>1964</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>
<u>ASSETS</u>				
<u>Current Assets</u>				
Cash - Operating	138	138	392	524
Investment	279	314	304	329
Total	<u>417</u>	<u>452</u>	<u>696</u>	<u>853</u>
Accounts Receivable	66	51	106	133
Other Current Items	528	584	787	1,814
Materials and Supplies	287	366	365	279
Total Current Assets	<u>1,298</u>	<u>1,453</u>	<u>1,954</u>	<u>3,079</u>
<u>Fixed Assets</u>				
Land - Railway	68	69	68	70
Permanent Way & Structures	7,960	8,189	16,113	16,045
Rolling Stock	4,271	4,406	6,614	6,253
Buildings ^{1/}	687	720	--	--
Other Operating Property	575	567	181	599
Gross Operating Fixed Assets	<u>13,561</u>	<u>13,951</u>	<u>22,976</u>	<u>22,967</u>
Less Accumulated Depreciation	<u>7,287</u>	<u>7,689</u>	<u>12,178</u>	<u>12,230</u>
Net Operating Fixed Assets	<u>6,274</u>	<u>6,262</u>	<u>10,798</u>	<u>10,737</u>
Work in Progress	413	374	881	983
Net Social Standard Fixed Assets	388	430	143	137
Total Net Fixed Assets	<u>7,075</u>	<u>7,066</u>	<u>11,822</u>	<u>11,857</u>
 TOTAL ASSETS	 <u>8,373</u>	 <u>8,519</u>	 <u>13,776</u>	 <u>14,936</u>
 <u>LIABILITIES AND EQUITY</u>				
<u>Current Liabilities</u>				
Accounts Payable	240	195	273	291
Current Accounts - Wages, Other Items	662	734	1,162	1,625
Accrued Debt Service	49	24	4	25
Total Current Liabilities	<u>951</u>	<u>953</u>	<u>1,439</u>	<u>1,941</u>
 Long-term Debt for:				
Working Capital	70	30	13	12
Operating Fixed Assets	573	656	958	972
Social Standard Property	154	186	98	44
Total Long-term Debt	<u>797</u>	<u>872</u>	<u>1,069</u>	<u>1,028</u>
Total Liabilities	<u>1,748</u>	<u>1,825</u>	<u>2,508</u>	<u>2,969</u>
 Total Equity	 <u>6,625</u>	 <u>6,694</u>	 <u>11,268</u>	 <u>11,967</u>
 TOTAL LIABILITIES AND EQUITY	 <u>8,373</u>	 <u>8,519</u>	 <u>13,776</u>	 <u>14,936</u>

^{1/} In 1966 and 1967 buildings are included in Permanent Way and Structures.

October 26, 1967

YUGOSLAVIA
COMMUNITY OF YUGOSLAV RAILWAYS
RAILWAY TRANSPORT ENTERPRISES
ESTIMATED BALANCE SHEET DATA, 1967-1975
(Millions of New Dinars)

ASSETS	E S T I M A T E D								
	1967	1968	1969	1970	1971	1972	1973	1974	1975
<u>Current Assets</u>									
Operating Cash	520	520	500	556	550	550	550	550	550
Capital Investment Cash	107	142	140	100	90	80	70	60	50
Total Cash	627	662	640	656	640	630	620	610	600
Accounts Receivable	106	107	87	88	88	88	92	84	84
Other Current Items	800	806	720	726	736	741	766	771	776
Materials and Supplies	376	380	335	340	355	360	367	370	380
Total Current Assets	1,909	1,955	1,782	1,810	1,819	1,819	1,845	1,835	1,840
<u>Railway Contingency Funds</u>	-	-	-	-	122	297	349	415	667
<u>Fixed Assets</u>									
Land Railway	69	69	69	70	70	70	75	76	76
Permanent Way and Structures	17,024	17,999	19,470	19,939	20,368	20,960	23,797	24,415	25,059
Rolling Stock and Buildings	6,879	7,185	7,485	7,704	8,427	9,023	9,762	10,596	11,317
Other Operating Property	229	278	330	383	437	503	713	798	891
Gross Operating Property	24,201	25,531	27,354	28,096	29,302	30,556	34,347	35,885	37,343
Less Accumulated Depreciation	12,671	13,192	13,772	14,354	15,071	15,821	16,680	17,512	18,353
Net Operating Fixed Assets	11,530	12,339	13,582	13,742	14,231	14,735	17,667	18,373	18,990
Work in Progress	1,075	1,059	696	876	826	766	721	729	715
Social Standard Assets	244	343	444	544	664	794	933	1,133	1,334
Total Fixed Assets	12,849	13,741	14,722	15,162	15,721	16,295	19,321	20,235	21,039
TOTAL ASSETS	14,758	15,696	16,504	16,972	17,662	18,411	21,515	22,485	23,546
<u>LIABILITIES AND EQUITY</u>									
<u>Current Liabilities</u>									
Accounts Payable	300	302	263	264	265	271	276	280	285
Current Accounts	916	924	841	843	845	853	858	860	861
Accrued Debt	16	12	11	9	8	7	7	-	-
Total Current Liabilities	1,232	1,238	1,115	1,116	1,118	1,131	1,141	1,140	1,146
<u>Long Term Debt For:</u>									
Working Capital	15	15	15	15	15	15	15	15	15
Operating Fixed Assets	1,692	2,471	2,749	2,737	2,710	2,724	2,741	2,766	2,804
Social Standard Property	100	110	120	140	140	140	140	140	140
Total Long Term Debt	1,807	2,596	2,884	2,892	2,865	2,879	2,896	2,921	2,959
<u>Equity</u>	11,719	11,862	12,505	12,964	13,679	14,401	17,478	18,424	19,441
TOTAL LIABILITIES AND EQUITY	14,758	15,696	16,504	16,972	17,662	18,411	21,515	22,485	23,546
<u>RATIOS:</u>									
Current Assets to Current Liabilities	1.55	1.58	1.60	1.62	1.63	1.61	1.62	1.61	1.61
Current Assets (less stores) to Current Liabilities	1.24	1.27	1.30	1.32	1.31	1.29	1.30	1.29	1.27
Long-term Debt - Equity	13/87	18/82	19/81	18/82	17/83	17/83	14/86	14/86	13/87

February 29, 1968

YUGOSLAVIA
COMMUNITY OF YUGOSLAV RAILWAYS
RAILWAY TRANSPORT ENTERPRISES
CASH FLOW DATA
ACTUAL 1966, ESTIMATED 1967-1975
(millions of New Dinars)

	Actual 1966	ESTIMATED									Total 1968-1975	Percent
		1967	1968	1969	1970	1971	1972	1973	1974	1975		
I. Capital Requirements												
<u>Capital Investments</u>												
Railways	921	1,496	1,534	1,356	1,060	1,300	1,400	1,808	1,800	1,710	11,968	
Social Standard	71	100	100	100	100	120	130	140	200	200	1,090	
Total Capital Investments	992	1,596	1,634	1,456	1,160	1,420	1,530	1,948	2,000	1,910	13,058	87.7
<u>Debt Service</u>												
Interest	26	32	46	48	57	60	54	54	46	44	409	
Repayments	103	105	131	165	182	202	178	163	170	172	1,363	
Total Debt Service	129	137	177	213	239	262	232	217	216	216	1,772	11.9
<u>Changes in Working Capital</u>	(133)	232	4	(28)	21	13	(3)	26	2	18	53	0.4
Total Cash Requirements	988	1,965	1,815	1,641	1,420	1,695	1,759	2,191	2,218	2,144	14,883	100.0
II. Cash Available												
<u>Net Income Before Interest</u>	287	102	256	423	495	775	839	1,052	1,062	1,140	6,042	40.6
<u>Depreciation</u>	570	655	684	733	751	851	893	1,001	1,017	1,036	6,966	46.8
<u>Loans</u>												
IBRD Second Railway Project	66	241	254	180	59	-	-	-	-	-	493	
Republics, Cities and												
Commercial Banks	53	156	160	83	31	-	-	-	-	-	274	
Loans and Credits - Home and												
Foreign	257	496	496	200	100	175	192	180	195	210	1,748	
Total Loans	376	893	910	463	190	175	192	180	195	210	2,515	16.9
<u>Cash Surplus, Beginning of Year</u>												
Operating Funds	392	542	520	520	500	556	672	847	899	965		
Capital Investment Funds	305	400	107	142	140	100	90	80	70	60		
Total Cash Beginning of Year	697	942	627	662	640	656	762	927	969	1,025		
Total Cash Available	1,930	2,592	2,477	2,281	2,076	2,457	2,686	3,160	3,243	3,411	15,523	104.3
Cash Position at End of Year	942	627	662	640	656	762	927	969	1,025	1,267		
Increase in Cash Position During Year											640	4.3

February 29, 1968

CALCULATION OF BENEFITS: METHODOLOGY

1.01 The building of the Belgrade-Bar railway will result in substantial cost reductions for traffic which is diverted to it after its opening from existing means of transport, which may be either alternative railway routes or highways. Reductions in transport costs, if passed along to the shippers, can be expected to result in new traffic which could not move without the railway either because of the total absence of transport or because of prohibitive transport costs. This new business is generally called generated traffic. The true value of the new traffic is the value it adds to the national economy, but such calculations often pose great difficulties such as insufficient data. For this reason another method of calculating benefits is used (see para 1.07).

1.02 The specific benefits of the Belgrade-Bar railway were given in para 6.18 of the main report as follows:

BENEFITS OF BELGRADE-BAR RAILWAY
(N. Din Millions)

	<u>Value of Benefits</u>	<u>% of First Year Benefits</u>
<u>I. First Full Year of Operation, 1973</u>		
A. Freight		
(a) Diverted from:		
Truck transport	64.88	30.2
Belgrade-Floce rail route	9.72	4.5
Danube-Floce river/rail route	.34	0.2
(b) Generated, best alternative transport being:		
Truck transport	25.26	11.8
Narrow gauge railways	20.01	9.4
Danube-Floce river/rail route	.17	0.1
B. Passengers		
(a) Diverted from bus transport	31.99	14.9
(b) Generated, best alternative transport being:		
Bus transport	15.99	7.5
C. Freight and Passengers		
(a) Diverted from narrow gauge railways	36.76	17.2
(b) Electrification of existing sections	1.94	0.9
(c) Shorter sea transport distance to Bar	5.18	2.4
(d) Interest savings on working capital	1.71	0.8

Additionally there will be benefits accruing before the line is fully operative:

II. Prior to Full Opening

<u>Year</u>	<u>Freight</u>	<u>Passengers</u>	<u>Freight and Passengers</u>	<u>Dismantled Narrow Gauge Materials</u>	<u>Total</u>
1968	-	-	-	-	-
1969	2.63	-	12.75	10.70	26.08
1970	2.96	10.23	12.88	-	26.07
1971	20.37	10.23	29.41	13.00	73.01
1972	22.99	39.36	29.69	5.10	97.14

1.03 The calculation of these benefits is explained further by the table following.

Calculation of Benefits to Freight Traffic

	Gross ton-km (000)		Cost per Gross ton-km N. Din		Total Cost (N. Din millions)		Savings	Benefits ^{1/}
	By Best Alternative	By Belgrade-Bar	Alternative Transport	Belgrade- Bar	Alternative Transport	Belgrade- Bar		
Diverted from:								
Truck transport ^{2/}	786,110	725,376	0.11	0.02	86.47	11.51) 7.08) ^{4/}	64.88	64.88
Belgrade-Ploce rail route ^{3/}	3,688,646	2,628,800	0.01222	0.01345	45.08	35.36	9.72	9.72
Danube-Ploce river/ rail route ^{3/}	156,556	116,620	0.01222	0.01345	1.91	1.57	0.34	0.34
Generated, best alternative being:								
Truck transport ^{2/}	632,220	555,936	0.11	0.02	69.54	11.12) 7.89) ^{4/}	50.53	25.26
Narrow gauge railways ^{2/}	170,521	135,588	0.3250	0.1153	55.42	15.40	40.02	20.01
Danube-Ploce river/ rail route ^{3/}	156,556	116,620	0.01222	0.01345	1.91	1.57	0.34	0.17

- Notes: ^{1/} 50% of full benefits for generated traffic, see text para 1.07.
^{2/} Compares operating costs of trucks with operating costs of rail.
^{3/} Compares traction costs of alternative rail routes.
^{4/} Pick up and delivery costs, and additional truck transport to rail of wood products, etc. from Pljevlja and Ivangrad to railhead.
^{5/} Net ton-km. A detailed breakdown net of indirect costs is not available for narrow gauge lines and therefore costs for the Belgrade-Bar line have been calculated on the same basis.

1.04 Freight diverted from trucks

The largest single class of benefits results from the diversion of traffic from trucks to the new railway. Although the road system will be greatly improved by 1973 when the railway will be fully open, road transport costs will still be high because of the mountainous territory with its steep grades and many curves. On the other hand, railway operating costs will be much lower because, among other things, there will be 353 tunnels and many bridges and viaducts meaning low grades and minimum curvature.

Truck operating costs were originally calculated for typical trucks now operating in the area for long distance transport, i.e. with a carrying capacity of 22 tons and operating over good and bad roads. Fuel taxes do not now cover the highway maintenance costs, therefore the amount allowed for taxes was doubled to take this factor into account. Construction costs were not allowed for because there is now a network of roads in the area which will be improved by 1973 whether or not the line is constructed. The cost thus obtained was N.Din 0.11 per gross ton-km. This was checked with three large truck operating enterprises in the Belgrade-Bar region. Very detailed accounting figures were obtained from one of those enterprises and a weighted average for the fleet showed the cost to be N.Din 0.115 for present operations in the area. The former cost was used.

Railway operating costs for the Belgrade-Bar line were calculated by the Yugoslav Railway Engineering Organization and agreed by the Mission to be N.Din 0.02015 per gross ton-km. This excludes line maintenance costs which are accounted for in other calculations (para.1.12). The main expenses included are those related to traction, stations and depreciation of motive power and rolling stock.

The above table illustrates the following steps:

- (a) The traffic forecasts for 1973 were estimated by the mission.
- (b) The origin and destination points of the traffic, and vehicle gross operating weights gave the estimate of gross ton-km, 786 million for trucks and 725 million for the railway.
- (c) The gross ton-km, multiplied by N.Din 0.11 for trucks and N.Din 0.02 for rail gave the costs for the traffic, N.Din 86.4 million for trucks and N.Din 14.51 million for railway.
- (d) Because road transport must still be used to carry goods to the railway (an average distance of 15 km was assumed), as well as movements from such distant places as Ivangrad and Pljevlja, additional pickup and delivery costs were added to the rail costs to give savings of N.Din 64.88 million.

1.05 Freight traffic diverted from Belgrade-Ploce rail route

A great deal of traffic now moves to and from Ploce from south-eastern Yugoslavia and from regions north of Belgrade by the best alternative rail route. By 1973 this will be the fully operational Belgrade-Sarajevo-Ploce line. If the Belgrade-Bar railway is built, however, it may be expected to attract this traffic because of lower costs. It will be seen from the above table that the costs per gross ton-km will be higher on the new line (because of mountainous terrain) but the kilometers are fewer, resulting in savings of N. Din 9.72 million. In this instance the savings will be the traction, or movement, costs only as overhead costs will be the same on each line. The Belgrade-Ploce railway has the capacity to handle the traffic expected to be diverted and so full savings have been taken as benefits.

1.06 Danube-Ploce river/rail route

Export and import traffic to and from the Belgrade river port on the Danube would, in the absence of the Belgrade-Bar line, move via Ploce. Such traffic will consist of manufactured articles such as cars and other consumer durables, farm and industrial equipment, fertilizers and foodstuffs. By 1973 the Danube port will have gained considerably in importance for international traffic because of new navigational facilities such as the Iron Gate Dam near Belgrade and the port facilities in Belgrade are being expanded accordingly. The savings of N. Din 0.34 million have been calculated as the difference between total traction costs on the Belgrade-Ploce route as compared with the Belgrade-Bar route.

1.07 Freight-generated

At the present time traffic in the zone of influence is not fully developed because of prohibitive transport costs. Estimates of traffic which would develop by 1973, if the Belgrade-Bar line were available, were made by the Mission. The benefits were then measured by estimating the transport cost savings which could be realized if the Belgrade-Bar line were used rather than the best alternatives. These values were then halved to avoid overstating benefits, which could only be realized when transport cost reductions are reflected in delivered prices. Traffic which would develop between 1968 and 1973 even without the railway was regarded as normal rather than generated.

1.08 Passengers diverted and generated bus transport alternative

The assumption was made that automobile and air transport passengers would not be diverted to the Belgrade-Bar line and so no benefits were credited to them. The best alternative transport to the line was assumed to be the road system in the zone of influence, it being also assumed that passengers would not use the alternative railway route to the Adriatic from Belgrade to Ploce. (Bar not being a substitute for

Ploce for passengers in the same way as it is for freight.) Based on considerations of regional income, population and Yugoslav experience the Mission expects that 15 million railway passenger journeys will be made in 1973 on the Belgrade-Bar line, (12.2 million diverted from buses and the remainder from narrow gauge lines) and the average journey will be 60 km. The difference between the bus and rail costs, multiplied by the number of passenger-km, gives the total savings. Bus operating costs are N. Din 0.90 per passenger-km compared with rail costs of N. Din 0.228. Based on traffic counts it was then assumed that half of the traffic would have moved by road even without the railway line, and half would be generated.

1.09 Freight and Passengers - diverted from narrow gauge lines

Actual cost data are available for the narrow gauge lines which are to be abandoned, and since so many of the costs are common to both passengers and freight they were treated together. Narrow gauge lines are three times more expensive to operate than the new line would be because of large staff requirements and low efficiency. The lines now carry high volumes of traffic resulting in the large saving of N. Din 36.76 million in 1973.

1.10 Other savings

About 100 km of the Belgrade-Bar line are already in diesel operation. When the line is completed, but not before, it will be advantageous to convert this 100 km to electric traction, resulting in savings. Another saving is in the shorter steaming distance that will be necessary for ships in taking on or discharging cargo at Bar rather than at Ploce. Based on the steaming time involved, ships' costs and the quantity of traffic, the savings are estimated to be N. Din 5.18 million in 1973. These savings have been applied only to Yugoslav ships in Mediterranean trade. A further small saving is the reduced interest on capital tied up in transporting commodities via the Belgrade-Bar rather than the Belgrade-Ploce route.

1.11 Benefits accruing before full opening

The line will be constructed in stages resulting in a gradual transfer of traffic from roads as well as newly generated. At the same time the parallel narrow gauge lines will be dismantled and the scrap materials sold.

1.12 Line Maintenance Costs

From the benefits thus derived line maintenance costs were deducted to arrive at annual net benefits.

1.13 Construction Costs

Construction costs for the line were estimated by the Yugoslav Railways and checked by the Mission. The Mission thought that a contingency factor should be added to allow for unforeseen circumstances. This has been included in the calculations. Allowances for possible price escalation have been excluded from the rate of return calculations, however, as all benefits and costs have been measured in constant prices.

In order to realize the full benefits of the railway it will be necessary to complete conversion to standard gauge of a narrow gauge section from Cacak to Pozega in order that traffic from south-east Yugoslavia can pass 50 km to the south of Belgrade. Although these costs are not in the project they have been included in the rate of return calculations as these benefits could not be obtained if this expenditure were not made. Similarly, maintenance costs for this section have been included.

1.14 Motive Power and Rolling Stock Costs

The railway will require additional motive power and rolling stock to handle the expected traffic. The capital cost of this can be treated in two ways, either by treating it in the same way as construction costs to be measured against the net benefits, or by regarding the costs as depreciation and included as operating costs. The latter method was used because depreciation costs are more accurately known from experience on the Yugoslav railways.

1.15 Port of Bar Costs

The extension of the Port of Bar to handle expected traffic is included in the project, though the estimated costs of N. Din 410 million are not to be financed by the Bank. Normally the costs of construction and operation would be included with the railway costs in order to calculate the rate of return on the entire project. In this case, however, such is not necessary. If the railway line is not built the best alternative route for export/import traffic would be via the Belgrade/Ploce route. The Port of Ploce is already congested and would need similar expansion to Bar to handle the forthcoming traffic, at approximately the same cost. This being so, the construction and operating costs of the alternative ports offset each other and can be left out of the calculations.

1.16 When all net benefits and construction costs were calculated for each year from January 1, 1968 to the end of the economic life of the line, 2007, the resulting benefit and cost streams were discounted to present value, giving a rate of return of $8\frac{1}{2}$ percent.

YUGOSLAVIA

BELGRADE-BAR RAILWAY LINE

AGRICULTURAL SITUATION AND PROSPECTS
IN THE ZONE OF INFLUENCE

Background

1.01 Agriculture has long occupied an important position in the economy of the zone of influence. Despite the development of industry following World War II, it still provides the principal means of occupation and livelihood, with some 60 per cent of a population of 940,000 engaged in agriculture producing some 30 per cent of the total national income of the region.

1.02 The agricultural zone of influence of the proposed railway line has been determined as a belt of agricultural area following the planned alignment of the railway line, varying in width from 30 to 100 km. Its general direction is from north to south beginning in Vreoci and ending south of Titograd. The borders of the zone of influence were adjusted to the prevailing conditions of the mountainous terrain running either along the respective watersheds or following administrative borders of communes as determined by the market orientation of current agricultural traffic. Detailed adjustments to the border were made during an extensive field trip which was concluded by an inspection from the air. (Map 3)

1.03 About one-half of the agricultural zone of influence is agricultural land comprising approximately one million hectare, of which 26 per cent is arable land, five per cent orchards and vineyards while the rest is under meadows and permanent pastures. The terrain is predominantly mountainous with only some 15 percent of the area in river valleys. The soils of the northern region of the zone of influence are more productive than the remainder. The climate is mainly continental, with warm summers, cold winters, sufficient precipitation but a seasonal lack of rain during summer in the south. A Mediterranean climate prevails only from the region around Titograd towards the Adriatic coast. Basic data on the agricultural zone of influence are given in Table B.1.

1.04 The major portion of the agricultural land is hilly terrain rising to 1,200 meters. Extensive meadows and up-land pastures make possible livestock raising which besides fruit and potato provides some surplus for the market. The lower slopes and river valleys are devoted mainly to cereal production.

1.05 Land tenure and agricultural production falls into two sectors, social and private. The social sector comprises social estates, farms, agro-industrial enterprises and general cooperatives and occupies about four per cent of the agricultural area. This proportion is only about one-third of the national average. The general cooperatives are important because they represent the sole source from which private farmers may obtain, on a contractual basis, credit, machinery, inputs, other services and technical advice.

1.06 The private sector is composed of owner farmers who work the major portion of the agricultural area and who are largely self-sufficient. Their holdings are small and average four to five hectare in size of agricultural land and are often fragmented.

1.07 Output levels for major crops and livestock products over the years have remained at or below the overall Yugoslav averages. Yields are largely governed by climatic effects which account for their fluctuations from year to year. Crop yield trends in the private sector are shown in the following table:

YIELDS OF SOME COMMODITIES

(in 100 kg per ha)

<u>COMMODITY</u>		<u>SFRJ</u>	<u>SERBIA</u> ^{1/}	<u>Montenegro</u>
Wheat	1955/64	15.9	16.3	12.8
	1964	17.6	18.2	17.8
	1965	20.5	22.8	21.3
Maize	1955/64	20.8	22.2	13.3
	1964	28.6	31.9	17.3
	1965	23.1	25	10.1
Potato	1955/64	93.6	74.1	54.9
	1964	86.3	79.1	59.8
	1965	73.2	75.1	42.1
Meadows (hay)	1955/64	19.3	14.8	11.4
	1964	20	16.3	13.8
	1965	19.4	16.2	10.9

1.08 1964 and 1965 were average to relatively poor crop years. As a result of general development efforts yield levels have been raised slightly also in the zone of influence in the past few years. Yields in the social sector which has to date received the largest part of new inputs are about 80 to 100 per cent higher than on private holdings. Crop production levels in the private sector are similar to those achieved in other South European countries, with small holding structure.

^{1/} Refers to total Serbia minus Vojvodina and Kosovo-Metohija.

1.09 Fruit and livestock production show a similar pattern of growth during past years, but yields of milk, meat and wool per animal are lower in Montenegro than in the northern region of the zone.

1.10 The agricultural zone of influence of the proposed railway line is self-sufficient in meat, milk products, fruit and vegetables including potatoes; it is deficient in cereals, sugar and cattle feed (Table B.2). Fruit (fresh, dried and processed) followed by vegetables and meat represent the important items of marketable surplus, while foodgrains, maize and animal feed are the main commodities imported into the region. Some part of the marketable surplus, in particular fruit, fruit products, meat and potatoes is exported to Western Europe and Mediterranean countries.

1.11 The use of fertilizers in the region is estimated to have reached about 155 kg per hectare of cultivatable area which is approximately 60 kg below the Yugoslavian average. Fertilizer usage is particularly low in Montenegro compared with the Serbian region of the zone. Improved varieties of wheat and maize for general cultivation and high yielding grass-clover mixtures for meadow melioration and improved planting material for orchard renewal, have been introduced more widely in the Serbian part of the zone of influence than in Montenegro. The introduction of well adapted cattle, pig and sheep breeds from foreign countries and the use of artificial insemination is also more advanced in Serbia than in Montenegro which still depends largely on local breeds with low productivity. Agricultural draught power is mainly supplied by horses and cattle while the tractor density is only one tractor for each 220 ha of arable land.

Stagnation in Agriculture

1.12 The main routes of communication in Yugoslavia have been conditioned by the country's terrain. They have followed the easy paths and have avoided the mountain barriers in Serbia and Montenegro. As a result, the predominantly mountainous agricultural area of the two republics which falls in the zone of influence has been relatively isolated from the country's communication system, except in the northern part near Belgrade. The secondary and other low grade roads and few narrow gauge lines which predominate in this area of difficult communication are inadequate to satisfy present needs for agricultural development. Access to markets is limited both for supply of inputs and disposal of agricultural output. As a result, agriculture in the zone of influence is still backward in comparison with other areas of Yugoslavia. Modern techniques are not uniformly applied; fertilizer use continues to be low and crop yields are static. The agricultural stagnation, which has been overcome in other parts of the country, has continued in large areas of the zone of influence. The region is a deficit area for some basic agricultural produce despite the fact that agricultural land per capita is higher than the national average at 1.1 ha and 0.74 ha respectively.

Scope for Development

1.13 A comparison between crop and livestock production data in the social and private sectors shows a large potential for increasing yields on the private

farms which predominate in the zone of influence. This potential can be tapped by greater use of industrial inputs, in particular fertilizers, farm machinery, improved seed and animal feed and by raising the productivity of existing livestock through imported breeding material. There is little scope for increasing the area under cultivation.

1.14 Urban settlements have grown fast in recent years in the zone of influence and there has been a steady movement of population from agricultural to non-agricultural activities. Despite this movement a part of the rural population is still considered to be underemployed and official opinion is that further transfer from agriculture would be possible without adversely affecting agricultural development.

1.15 The general cooperatives which have been established in the area during recent years appear to be effective institutions through which to foster the agricultural development. Some enlargement of the areas cultivated by cooperatives is possible by acquiring land from out-going farmers and extending cooperatively managed fruit plantations and pastures. An important contribution to increasing agricultural production could come from extending the system of contracts between the general cooperatives and the private sector. This contract system gives to private farmers the opportunity to buy needed inputs; it provides machinery on loan and promotes better management through its extension service. The general cooperatives coordinate the production of many small units, collecting, processing and marketing their produce. They are also instrumental in pooling a part of farmers' savings and could be the main suppliers of necessary farm working capital. General cooperatives have produced quick results in other parts of the country.

1.16 Other institutional arrangements including agricultural research and education facilities and a number of well equipped food processing enterprises are already established in the area. Their current capacity is sufficient to support the beginning of an increased rate of development. The capacity of one of the larger processing units is at present underutilized, due to lack of supplies.

1.17 A further incentive to increase agricultural production and to overcome the inherent stagnation in agriculture would be achieved by improving the underdeveloped communication system and by providing adequate transport facilities to markets which now can only be reached at prohibitive cost. Provision of relatively cheap transport through the proposed Belgrade-Bar railway line is considered essential to stimulate the increased use of agricultural inputs and to promote increased production of fruit and bulk vegetables, including potatoes, for which growing conditions in the area are very suitable. In particular, early vegetables and fruit produced in the southern region of the zone would be benefited. The market advantage of an early growing season, which is one to four weeks earlier than in the rest of the country could then be fully exploited.

1.18 Rural road construction is the responsibility of the local administration and is undertaken to a varying extent in the majority of communes within the zone of influence. Minimum plans are generally to have gravelled

access roads by 1970, permitting the passage of a seven ton truck from all settlements in the area to administrative and marketing centres. Provision of finance for rural road construction seems to be adequate. Grants and loans are available from the federation and the respective republics, supplemented from the communes' own funds and free labor supplied by farmers through cooperative effort. Several commune officials indicated that investment in rural road construction would be stepped up and permanent paving of roads undertaken to facilitate heavier traffic immediately the construction of the Belgrade-Bar railway line is decided. Current activities and future plans to improve the access and feeder road system inside the zone of influence appear to be satisfactory to serve the needs of expected agricultural development.

1.19 Information on the value of investment in the important private sector in the zone of influence is scanty. Better data is available from the social sector and it is roughly estimated that this sector absorbs some 60 per cent of the total agricultural investment available. Investment in the social sectors is shown in new Dinars per ha of agricultural area in the following table for Montenegro and Yugoslavia as a whole:

	<u>Agricultural investment in the social sector</u> (new dinars)	
	<u>Montenegro</u>	<u>Yugoslavia</u>
1961	32.89	72.43
1962	33.20	80.08
1963	30.88	96.89
1964	34.24	115.75

The level of social sector investment in Montenegro is thus stagnant and very low in comparison with the overall average hectare investment rate. The main reasons for this comparatively low investment rate, according to official opinion, is the remoteness of the area resulting in a lack of viable projects. Investment performance in the Serbian part of the zone of influence is estimated to have been slightly higher but is also below the country's average.

1.20 The authorities have plans to make up the leeway but sufficient investment is likely to be provided only when it is assured that the Belgrade-Bar railway line comes into operation. Under this condition the Federal Agricultural Investment Bank, which arranges 95 per cent of the current investment, would be prepared to make available 530 million new Dinar for each of two three-year development periods, or on an average 175.70 new Dinar annually per ha. This approximately corresponds with the current investment rate in Vojvodina, which is estimated to grow further during coming years.

1.21 Available resources are to be devoted to farm machinery and equipment and livestock purchases, meadow melioration, orchard rehabilitation, farm buildings, rural and forestry roads, food processing facilities, slaughter houses, storage and refrigeration installations plus land melioration and irrigation mainly in Montenegro. While the planned investment targets for agriculture in the zone of influence appear to be rather ambitious compared with past performance, provided appropriate measures are taken, the investment targets in the agricultural sector seem feasible.

Changes in Agricultural Pattern

1.22 The operation of the proposed Belgrade-Bar railway line and other improvements of the infrastructure supported by the planned agricultural investment are expected to bring about changes in the current land use pattern. The important change which can be expected is the extension and intensification of forage, vegetable and fruit production at the expense of other crops, which are now mainly grown for home consumption. Cereal cultivation with probable higher yields resulting from better use of inputs is likely to be retained only when rotational considerations and the equalization of farm work load during the season require it. The area under cereals is now approximately 170,000 ha in the zone of influence. It can be expected that at least 70,000 ha of this area could be made available for forage, vegetable and potato cultivation. The healthy climate in hilly regions is well suited to extend the cultivation of seed potatoes.

1.23 An increase in the area under permanent fruit plantations, mainly plums, is also feasible by replanting suitable land which is now used as pasture. By tapping the reserves of such land it appears to be possible to double the present area under orchards from approximately 49,000 to 100,000 ha. A beginning in this direction has already been made through cooperative effort.

1.24 The tangible increases of expected agricultural output would, however, come from the intensification of agriculture through the increased use of inputs, the improvement of forage cultivation and preservation, improvement of livestock and the introduction of better management through extension work.

Expected increase in output

1.25 Considering the agricultural potential, the probable and adequate investment provisions and the possible changes in the agricultural pattern it seems likely that the current agricultural gross output could be increased by 50 per cent by 1973. The marketable surplus needing commercial transportation over longer distances would more than double. After that period a normal growth rate of agricultural output similar to other comparable areas could be expected for the zone of influence.

Fertilizers and other Inputs

1.26 Yugoslavia's fertilizer consumption is moderate compared with that of neighbouring countries (Tables B.3 and B.4). The planned growth rate in consumption is in proportion to past performance and it is possible that the set targets can be reached. It can be expected that fertilizer consumption in the zone of influence will follow a similar trend and it is conservatively estimated that by 1973 200,000 tons of fertilizers will be used, provided rail transport is available. This would represent an increase in fertilizer usage of some 200 kg over current levels to 350 kg per hectare of cultivable land. It compares with an application of 400 kg per hectare anticipated by the Agricultural Development Plan for Yugoslavia as a whole at the same period. In estimating future fertilizer consumption account was

taken of farm supplies in plant nutrients coming from animal dung and the expected high percentage of fodder legumes grown on the arable land and meliorated meadows, which need less nitrogen than other field crops.

1.27 The estimation of future animal feed requirements is rendered more difficult because current average consumption levels of livestock, which are almost totally confined to the private sector, are not readily available. The basic feed for pig fattening, which is an important activity in the zone of influence, is cereals and it is estimated that the major portion, after satisfying human consumption, of current cereal production is utilized this way. Concentrates for cattle fattening and milk production, particularly protein, are also needed. A rough estimate which includes the current cereal production minus what is used for human consumption, shows that there is a shortage of approximately 80,000 tons of animal feed including concentrates in the zone of influence. It is likely that the deficit would reach 160,000 tons by 1973 if railway transport with relatively low freight rates were available.

Agricultural Produce needing Transport

1.28 It has been stated earlier that the marketable surplus of agricultural produce in the zone of influence is expected to more than double as a result of the impact of the proposed railway line and related development efforts. A detailed estimation for the major surplus produce based on data collected from communes is given in Table B.5. The targets for marketable commodities are rough estimates. They reflect approximately what could be produced and are within the possibilities of the agricultural potential in the zone. Like fertilizers and animal feed it is expected that bulky commodities such as vegetables including potatoes and the major portion of less perishable produce, in particular processed food and meat, would be transported by rail. On the other hand, early vegetables and fruit which have to reach markets quickly are likely to take the road. It is difficult to estimate exactly the distribution of goods between the two major carriers. Considering the difficult terrain through which roads in the zone of influence run, as well as the transport work, it is assumed that not more than 50 percent of the agricultural produce would go by road transport and that the remaining half would be transported on the proposed Belgrade-Bar railway line.

1.29 The expected development of agriculture would not only generate traffic for the railway but also improve the earnings from agriculture. The opportunity to produce competitively more of high value livestock products and of early vegetable and fruit crops would increase returns from farming considerably. These possibilities were not considered in the economic projections of the railway but may be regarded as an important benefit to the economy of the zone.

YUGOSLAVIA
BELGRADE - BAR RAILWAY LINE
A. BASIC AGRICULTURAL DATA 1964/65

TABLE B.1

	<u>Yugoslavia</u>	<u>Serbia</u> ^{1/}	<u>Montenegro</u>	<u>Zone of Influence</u>		
				<u>Total</u>	<u>Serbia</u>	<u>Montenegro</u>
<u>AGRICULTURAL AREA ('000 ha)</u>						
Total	14,800	3,469	584	1,024	586	438
Arable	7,610	1,988	66	266	215	46
Orchards, vineyards	696	234	10	49	44	5
Meadows	1,950	493	114	310	216	94
Pastures	4,500	672	399	404	111	293
<u>LIVESTOCK (head per 100 ha)</u>						
Cattle and horses	46.3	49.3	32.2	-	-	-
Pigs	48.5	64	5.9	-	-	-
Sheep	66.6	81	98.1	-	-	-
<u>MILK (in kg per cow, 1965)</u>	1,184	1,185	804	-	-	-
<u>WOOL (in kg per sheep, 1965)</u>	1.37	1.55	1.36	-	-	-
<u>TRACTORS</u>						
Total	45,364	8,228	315	-	-	-
Per 100 ha arable land	0.6	0.4	0.5	-	-	-
<u>GROSS RECEIPT OF AVERAGE</u>						
Peasant Holding (US\$, 1964)	504	424	388	-	-	-

B. METEOROLOGICAL DATA 2)

	<u>VALJEVO</u>	<u>TITOVO UZICE</u>	<u>SJENICA</u>	<u>TITOGRAĐ</u>	<u>NIKSIC</u>
Altitude (in m)	176	440	1,015	52	201
Precipitation (in mm)	782	760	672	1,622	1,789
Average Annual Temperature (in °C)	10.8	9.7	6.3	15.4	10.9
Average Relative Humidity (in percent)	75	76	77	63	69
Show Fall (days per annum)	43	51	90	9	38

1/ Serbia minus VOJVODINA and KOS. MET.

2) Averages 1953 to 1962

Source: Statistical Year Book 1966.

YUGOSLAVIA
BELGRADE - BAR RAILWAY LINE

SURPLUS OR DEFICIT FOR MAJOR AGRICULTURAL PRODUCE 1965 - ZONE OF INFLUENCE

	<u>Production</u>			<u>Surplus/Deficit</u>		
	<u>Total</u>	<u>Serbia</u>	<u>Montenegro</u>	<u>Total</u>	<u>Serbia</u>	<u>Montenegro</u>
Meat (net slaughtered)	31,600	25,600	6,000	+ 5,200	+ 8,900	- 3,700
Cereals (as flour of wheat, maize)	223,580	200,180	23,400	-27,800	+23,500	-51,300
Fruit (plums only at 10 kg per tree)	147,000	132,000	15,000	+87,600	+94,400	- 6,800
Vegetables (potatoes only)	212,850	162,250	50,600	+85,100	+81,400	+ 3,700
Sugar	-	-	-	-18,900	-12,000	- 6,900
Other foodstuffs (milk, fats, etc)	88,000	60,000	28,000	+ 4,000	+ 7,000	- 3,000
Cattle Feed <u>1/</u>	-	40,000	40,000	-80,000	-60,000	-20,000

NOTE: The production is based on data available for communes; human consumption is the annual average per capita for Yugoslavia as a whole; animal feed consumption is an estimated 100 kg per adult head.

1/ Mission's estimate

Source: Statistical Yearbook 1966.

October 26, 1967

YUGOSLAVIA
BELGRADE - BAR RAILWAY LINE
CONSUMPTION OF FERTILIZERS IN YUGOSLAVIA
(in metric tons)

Year	Fertilizers				Plant Nutrients			
	Total	Nitrogen	Phosphate	Potash	Total	N	P ₂ O ₅	K ₂ O
1957	805,600	298,072	378,632	128,896	179,754	61,105	63,610	55,039
1958	1,000,202	369,875	460,093	170,234	229,766	75,865	77,296	76,605
1959	1,147,356	390,101	585,151	172,104	259,853	79,971	98,305	81,577
1960	1,197,724	538,976	419,203	239,545	283,681	109,412	71,265	103,004
1961	1,092,555	502,576	437,022	152,957	262,466	107,952	74,921	79,593
1962	1,434,331	634,800	661,143	138,388	325,191	134,577	111,733	78,881
1963	1,896,125	733,012	880,502	282,611	443,775	152,100	149,069	142,606
1964	1,904,005	807,262	754,397	342,346	460,768	166,942	127,343	166,483
1965	2,010,523	811,325	917,007	282,191	455,132	166,322	151,214	137,596

Plant Food Ratio 1965

$$N : P_2O_5 : K_2O = 1 : 0.9 : 0.8$$

Source: Statistical Yearbook SFRJ, 1966, page 146.

October 26, 1967

TABLE B.4

YUGOSLAVIA

Comparative Fertilizer Consumption per Hectare of
Agricultural Land 1/ 1964/65
(in kg/ha)

Continent/Country	Total	N	P ₂ O ₅	K ₂ O
Yugoslavia	30 (60)	11 (22)	10 (20)	9 (18)
Austria	112	37	33	42
Italy	52	22	22	8
Greece	22.5	10	11	1.5

1/ Includes arable land, gardens, permanent crops, meadows and pastures.

Source: Statistical Yearbook SFRJ 1966; FAO Bulletin March 1967.

() = expected 1973.

October 26, 1967

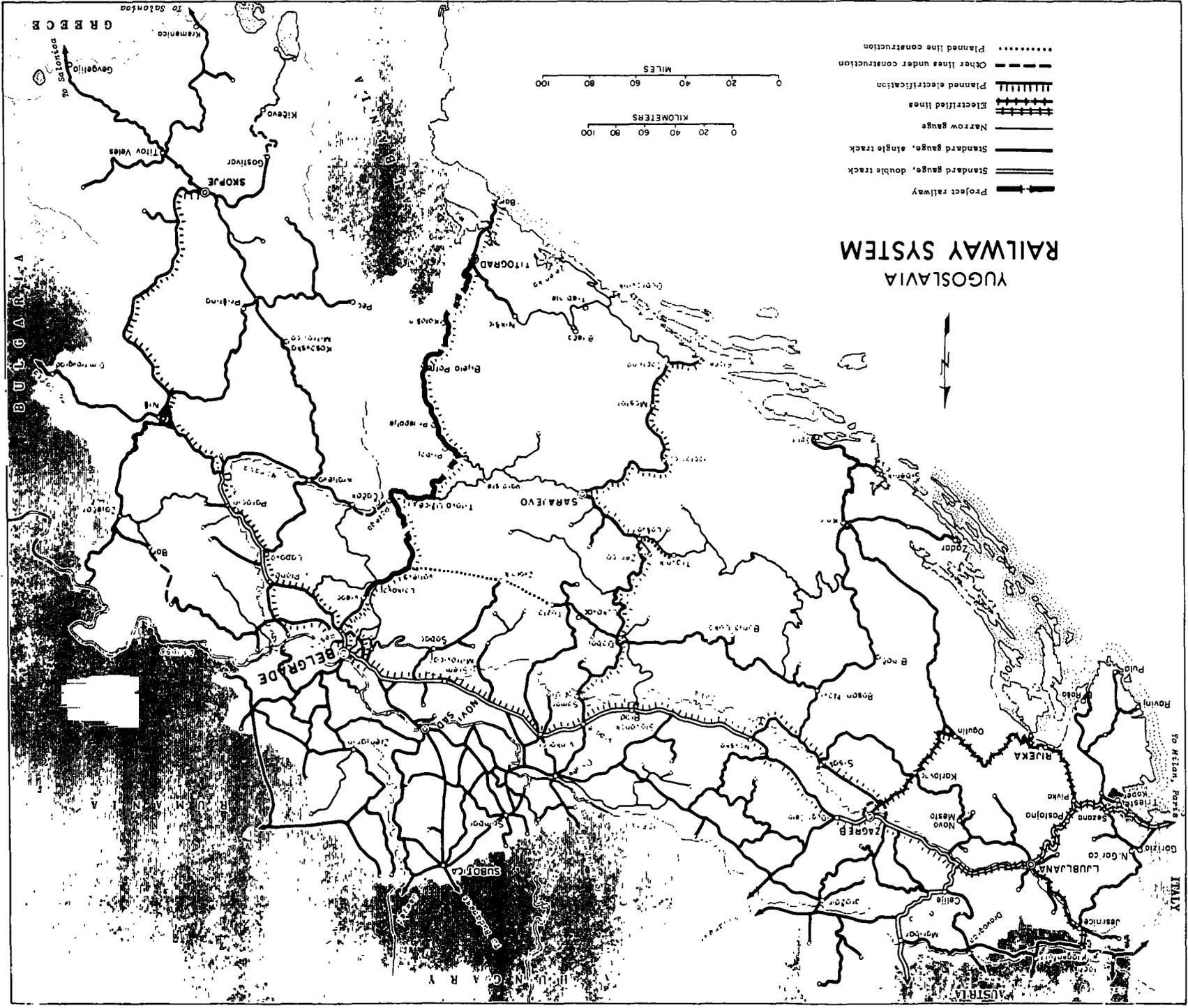
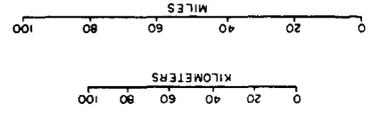
YUGOSLAVIA
BELGRADE - BAR RAILWAY LINE
COMPARATIVE ESTIMATES OF MAJOR AGRICULTURAL PRODUCE
AND INPUTS NEEDING TRANSPORT
(in metric tons)
ZONE OF INFLUENCE

<u>COMMODITY</u>	<u>1967</u>	<u>1973</u>	<u>RAILWAY TRANSPORT</u>
		<u>TOTAL</u>	
Foodgrains and Flour	60,000	70,000	35,000
Sugarbeets	10,000	15,000	7,500
Oilseeds	3,000	3,000	1,500
Oilcakes	3,000	5,000	2,500
Vegetable oils	2,500	6,000	3,000
Vegetables including potatoes	105,000	220,000	110,000
Fruit (fresh and processed)	145,000	290,000	145,000
Meat, live weight	17,000	48,500	24,250
slaughtered and canned	2,000	8,000	4,000
Milk products	10,000	15,000	7,500
Tobacco	300	400	200
Other Produce	56,000	70,000	35,000
Fertilizers	97,000	200,000	200,000
Animal Feed	<u>80,000</u>	<u>160,000</u>	<u>160,000</u>
	<u>590,800</u>	<u>1,110,900</u>	<u>735,450</u>

Note: Estimates are based on information collected from communes within the zone of influence during July 1967.

YUGOSLAVIA RAILWAY SYSTEM

- Project railway
- Standard gauge, double track
- Standard gauge, single track
- Narrow gauge
- Electrified lines
- Planned electrification
- Other lines under construction
- Planned line construction



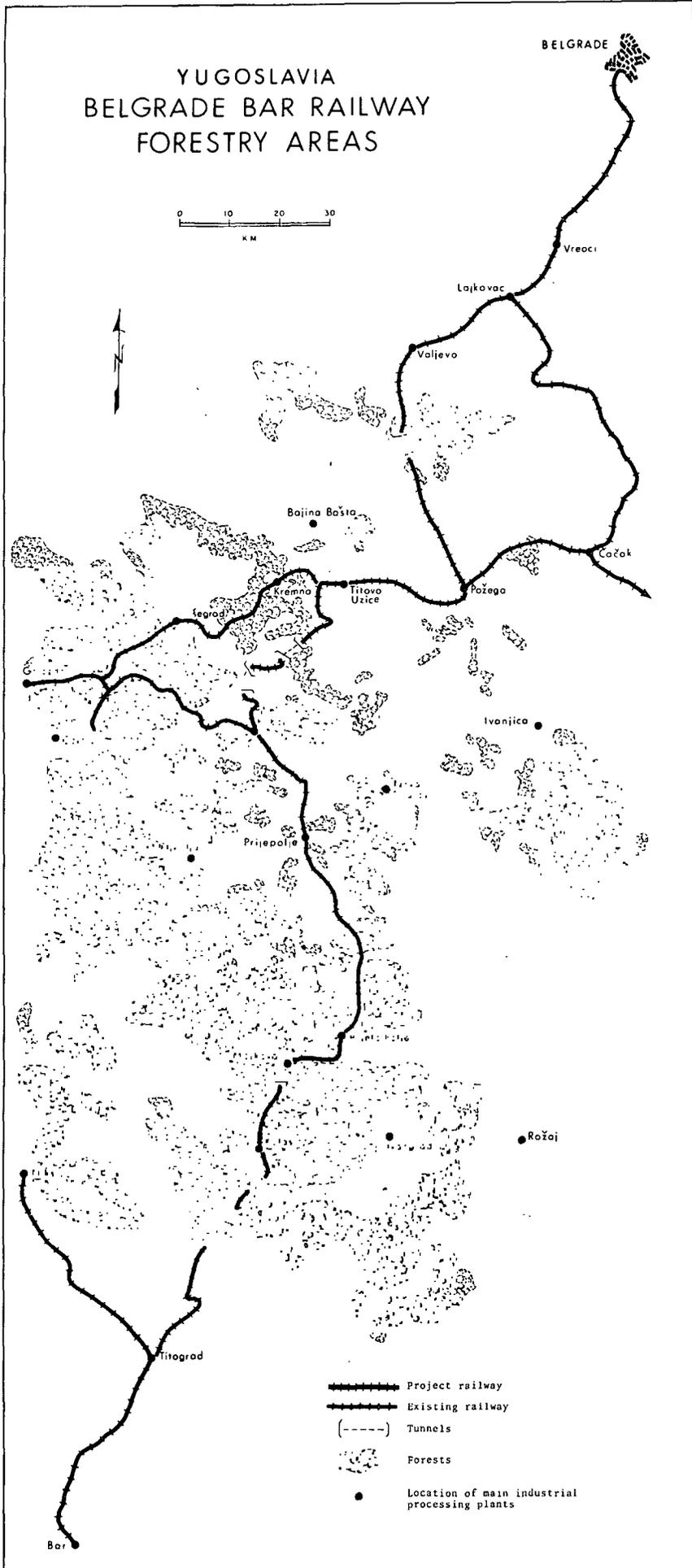
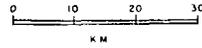
BULGARIA

GREECE

ITALY

AUSTRIA

YUGOSLAVIA BELGRADE BAR RAILWAY FORESTRY AREAS



- Project railway
- Existing railway
- Tunnels
- Forests
- Location of main industrial processing plants

YUGOSLAVIA BELGRADE-BAR RAILWAY AND MAIN TRANSPORT ROUTES IN ZONE OF INFLUENCE

MAP 3

