FORM NO. 75
(7-73) WORLD BANK GROUP

ROUTING SLIP	DATE Nov 21

NAME	ROOM NO.
Mr Lehbat	

	APPROPRIATE DISPOSITION		NOTE AND RETURN
	APPROVAL		NOTE AND SEND ON
	COMMENT		PER OUR CONVERSATION
	FOR ACTION		PER YOUR REQUEST
	INFORMATION		PREPARE REPLY
	ITIAL		RECOMMENDATION
	NOTE AND FILE		SIGNATURE

REMARKS

Ben - attached is draft letter for you to touch up and send. 9'd appreciate a copy. 9 am also attaching draft cable but you may want to hold it till Monday? Should the ltr be sent to anyone in the Government too? 9 hope you find the letter OK

FROM	ROOM NO.	EXTENSION
Christopher Willoughby		2745

DRAFT
CRWilloughby/aga
November 21, 1974

Admiral Mellen ??

Dear Mr. _____:

Re: IBRD Loan 479-CH

A little over a year ago, the Bank's management decided to meet member countries' desire for information on the effects of its operations by setting up a system for preparation of brief reports to our Board of Executive Directors reviewing the execution of projects assisted by the Bank within about a year of completion of disbursement of the relevant loans. The main purpose of these reports is to show the extent to which originally stated project objectives were achieved, and the reasons for shortfalls, and to analyze the effectiveness and efficiency of the Bank itself in its handling of the project and the loan, with a view to assessing the overall efficiency of the World Bank and ways it might be improved. Responsibility for production of such reports is assigned within the Bank to a semi-independent Operations Evaluation Department, but it is often aided in its work by the preparation of internal project completion reports by the operating departments.

You will recall that final disbursements under the original Loan 479-CH of December 1966 occurred in March 1974 while the supplement arranged in April of this year was fully disbursed by the end of July. Thus the Operations Evaluation Department need now to prepare reports on the projects assisted by these loans. I understand that you have indeed yourselves been preparing a Project Completion Report on this project, in response to the request of our Projects Department, and so the Operations Evaluation Department felt it would be an additionally appropriate moment to review with you the Bank's performance in connection with this project.

Mr. Christopher R. Willoughby, the Director of this Department, would like to visit you in this connection for 3 or 4 days in mid-December, probably starting December 12, as part of a trip he would be making through Latin America, and we hope that this date would be convenient to you.

We will greatly appreciate the help you are able to give Mr. Willoughby in execution of this work, to which the Bank's management attributes a high importance. Mr. Willoughby will of course be particularly interested in any suggestions you would have, based on the experience of these loans, for improving the policies, practices and procedures of the Bank.

Yours sincerely,

Roger Nelson

Admiral Eduardo Mallaré Barrere
General Manager
Empresa Nacional de Electricidad, S.A.
P.O. Box 1392
Santiago, Chile

C A B L E

D R A F T
CRWilloughby:med

GERENTE GENERAL

ENDESA

CHILE

NOVEMBER 21, 1974

LT

CHRISTOPHER WILLOUGHBY DIRECTOR IBRD DEPARTMENT RESPONSIBLE FOR EVALUATION OF PERFORMANCE BANK AND PROJECTS IT FINANCES DESIRES VISIT YOU THREE OR FOUR DAYS MID-DECEMBER PROBABLY STARTING THURSDAY TWELFTH IN CONNECTION LOAN 479CH STOP THIS IS PART OF ROUTINE PROCEDURE BANK NOW HAS FOR REVIEWING BANK PARTICIPATION IN PROJECTS WITHIN ONE YEAR OF FINAL DISBURSEMENT OF LOAN STOP LETTER FOLLOWING BUT APPRECIATE EARLY INDICATION IF DATE INCONVENIENT TO YOU STOP REGARDS

NELSON

545

CONFIDENTIAL

SecM74-723

FROM: The Secretary

October 18, 1974

PROJECT PERFORMANCE AUDIT: CHINA THIRD RAILWAY PROJECT (LOAN 603-CHA)

Attached is a copy of a memorandum from Mr. Shoaib with its accompanying report entitled "Project Performance Audit: China Third Railway Project (Loan 603-CHA)", dated October 18, 1974 (report No. 545) prepared in the Operations Evaluation Department.

Distribution:

Executive Directors and Alternates
President
Senior Vice President, Operations
Executive Vice President and Vice President, IFC
President's Council
Directors and Department Heads, Bank

CONFIDENTIAL

Report No.545

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT PERFORMANCE AUDIT

CHINA THIRD RAILWAY PROJECT

October 18, 1974

Operations Evaluation Department

INTERNATIONAL BANK FOR
RECONSTRUCTION AND DEVELOPMENT
WASHINGTON, D.C. 20433, U.S.A.

OFFICE OF THE PRESIDENT

CONFIDENTIAL

October 18, 1974

MEMORANDUM TO THE EXECUTIVE DIRECTORS

SUBJECT: Project Performance Audit: China Third Railway Project (Loan 603-CHA)

Attached, for information, is a copy of a confidential report entitled "Project Performance Audit: China Third Railway Project (Loan 603-CHA)" produced by the Operations Evaluation Department under the system described in the President's memorandum of April 13, 1973 (SecM73-203). It is the first such report to consist of a brief Project Performance Audit Memorandum prepared by the Operations Evaluation Department itself, with the corresponding Project Completion Report, prepared by the responsible Regional Office, included as an attachment.

Attachment

PROJECT PERFORMANCE AUDIT MEMORANDUM

CHINA THIRD RAILWAY PROJECT

This memorandum represents an audit of achievements under the Third China Railway Project, for which Loan 603-CHA of May 29, 1969 was fully disbursed in October 1973. It is based mainly on a review of the substance of the corresponding Project Completion Report (PCR), herewith attached as prepared by the Bank's Asia Regional Office, against other relevant reports and important material from the Bank files (Loan and Project Agreements, Appraisal Report, Progress Reports, Supervision Reports, External Auditor's Reports, Borrower's Annual Reports, correspondence between Bank and Borrower), and on discussions with some of the Bank staff who had been involved with the project. Account has also been taken of comments given by the Taiwan Railway Administration on a draft version of this audit report.

Project Objectives at Appraisal Time

The main objective of the project was to increase the capacity of the Taiwan Railway Administration (TRA) -- which then carried about 60% of the total freight traffic and 40% of the total passenger traffic in Taiwan -- so as to meet the growing demand for transportation. The project was a natural continuation of the first two Bank-assisted railway projects (Loan 409-CHA of April 1965 for US$ 20 million and Loan 524-CHA of January 1968 for US$ 17.5 million). It consisted of high priority items of the first two years of TRA's 1969-1972 Investment Plan, which was part of the Fifth National Economic Development Plan; TRA's total investment for 1969 and 1970 was estimated at US$ 86 million equivalent with a foreign exchange component of US$ 54 million. The Bank loan of US$ 31.2 million was to finance the foreign exchange costs of rolling stock and motive power (mainly 18 diesel locomotives, 268 passenger cars and 600 freight cars), double tracking (34 km), track improvement (40 km) equipment for workshops, consulting services (electrification feasibility and costing studies) and training abroad of railway staff (in connection with the establishment of a Planning Department). The total project cost was estimated at US$ 44.1 million equivalent.

Project Accomplishments

The project was implemented almost exactly as planned, and was satisfactorily completed by the revised closing date of January 31, 1973, or about one year later than originally expected. Procurement of equipment, improvement of existing facilities and the provision of technical services were carried out with no major deviations from the original plan and at a total cost of US$ 47.6 million equivalent representing an 8% overrun over the appraisal estimate:

	Local Cost		Foreign Cost		Total Cost		
	Est.	Act.	Est.	Act.	Est.	Act.	Act. as % of Est.
	(US$ million equivalent)						
18 Diesel Locomotives	.4	.3	4.0	3.9	4.4	4.2	95
268 Passenger Cars	1.8	1.2	12.6	13.5	14.4	14.7	102
600 Freight Cars	1.0	4.3	5.8	4.5	6.8	8.8	129
Double Tracking (34 km)	1.7	2.2	1.1	1.1	2.8	3.3	118
Track Improvement (40 km)	1.7	3.1	1.6	1.9	3.3	5.0	152
Equipment for Workshops	.4	1.1	1.3	1.4	1.7	2.5	147
Consultants' services and Training	.1	.2	.3	.7	.4	.9	225
Others	.6	1.1	2.4	2.5	3.0	3.6	120
Contingencies on above IBRD-financed items	.6	-	2.1	-	2.7	-	-
Items Financed by TRA	1.1	1.1	3.5	3.5	4.6	4.6	100
Total Cost of Project:	9.4	14.6	34.7	33.0	44.1	47.6	108

This overall overrun of US$ 3.5 million is due mainly to higher unit costs than expected for freight cars (of which a larger than estimated number was procured locally, as reflected in higher local costs); to TRA's underestimates at appraisal time of costs of the double tracking, track improvement works and workshop equipment; and also to expanded consultant services (the scope of the costing study was broadened and the electrification study required more time than expected).

Despite the overall cost overrun, about US$ 1.5 million were cancelled out of the original loan amount (details given in para. 8.03 of the attached PCR). Most of the loan disbursements had taken place by the end of 1972, or about one year later than originally expected:

	1969	1970	1971	1972	1973	Total
	(US$ million)					
Est. Disbursements	0.3	30.2	0.7	-	-	31.2
Act. Disbursements	3.3	9.7	10.4	6.1	0.1	29.6

No significant delays were experienced in the procurement of locomotives and rolling stock. However, delays took place in the double tracking and track improvement works due to incomplete specifications and insufficient work planning by TRA, and in the execution of traffic costing studies by consultants due to the larger than expected time used in the selection of consultants and the expansion of the scope of the studies. There were also some substantial delays in the implementation of the electrification feasibility study (about one-year delay in selecting consultants) and the overseas

training program for railway staff (two-year delay in selecting a training institute and English-speaking candidates of adequate ability).

Since 1969 actual railway traffic has been on the whole close to the appraisal estimates. Freight traffic fell short of the appraisal estimate by about 8% between 1969 and 1972 (mainly as a result of overestimation of coal traffic) while passenger traffic exceeded the appraisal estimate by about 7% (with a large underestimation of long distance traffic more than offsetting the overestimation of short distance traffic):

	Freight			Passenger		
	Est.	Act.	Act. as % of Est.	Est.	Act.	Act. as % of Est.
	(Billion Ton-km)			(Billion Pass-Km)		
1969	2.61	2.45	94	5.32	5.61	106
1970	2.72	2.48	91	5.69	5.89	104
1971	2.78	2.45	88	6.06	6.48	107
1972	2.86	2.67	93	6.43	6.98	109
1973 (Est.)	2.94	2.85	97	6.85	7.59	111

In terms of traffic units (pass-km + ton-km), the actual traffic volume for 1972 (9.65 billion) was 4% higher than estimated (9.29 billion); this is apparently explained by the more rapid than expected economic growth of Taiwan over the 1969-72 period (10% per annum vs. 7.5%).

Operating performance has been good during the project implementation period. Most of the efficiency indicators have shown signs of gradual improvement. Traffic units (pass-km + ton-km) per employee and number of employees per 1,000 train-km between 1968 and 1972 have improved from 352,000 to 430,000 and .83 to .76, respectively. The availability of diesel locomotives has averaged about 85% in recent years, which is good. (Other selected operating indicators are listed on Table 9 of the attached Project Completion Report.) Generally TRA appears to be well managed and to have a skilled and efficient staff.

TRA's financial performance has also been good during the 1969-1972 period, with actual net income slightly surpassing the appraisal estimate in every year. This can be mainly attributed to the improved operational performance and also to the change in passenger traffic composition resulting from increased use of high rated express trains. The following table[1/] summarizes the actual financial developments as compared with appraisal estimates:

1/ The figures in the table are the unaudited ones as used in the PCR (and also TRA's annual reports); the audited figures are slightly different and show, for example, actual returns of 7.7% and 6.1% for 1969 and 1971, respectively, as compared with 7.0% and 6.6% in the PCR.

	1969		1970		1971		1972	
	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.
	(NT$ billion, with NT$ 40 = US$ 1)							
Total Operating Revenues	2.30	2.36	2.51	2.62	2.66	2.87	2.82	3.23
Total Operating Expenses (incl. depreciation)	1.78	1.83	1.97	2.10	2.05	2.29	2.14	2.50
Net Operating Revenue	.52	.53	.53	.52	.61	.58	.68	.73
Net Income[a/]	.38	.42	.33	.34	.40	.44	.48	.49
	(%)							
Return on Net Fixed Assets	7.8	7.0	6.7	6.5	6.8	6.6	7.3	7.2

a/ Net operating revenue + net non-operating income - interest.

Thus, with the exception of 1971, TRA has met the financial covenants of the Bank loan under which: a) TRA's earnings were to be sufficient to produce an annual rate of return of not less than 6.5% during 1969 and 1970 and not less than 7.0% thereafter and b) TRA's internally generated revenues were to be sufficient to meet debt service requirements, maintain adequate working capital and contingency reserves, and finance a reasonable proportion of its investment requirements -- over the 1969-72 period TRA was able to finance out of internally generated revenues 34% of its investments, as compared with an estimated 44% at appraisal time. Other loan covenants were fully met (mainly establishment of a Planning Unit within TRA by December 1969, annual certification by an independent auditor of TRA's financial statements, no decision to be made on electrification before consultation with the Bank).

Despite some substantial delays (as already mentioned), most of the institution-building objectives of the project have been or are in the process of being achieved. A main contribution of the project has certainly been the establishment within TRA of a Planning Department which has been made responsible for the preparation of TRA's investment programs and appears to have been performing well. As part of the project and in order to further strengthen the Planning Department, two members of TRA's staff have been trained in transport economics by the Canadian National Railways. On the other hand, as the costing studies were only completed by January 1973 their recommendations about traffic costing and related management information systems are still at an early stage of implementation. Traffic costing has already been applied to several traffic groups. It is likely that these costing studies will lead eventually to changes in the structure of railway tariffs; their level has already been changed to meet the increased financial

commitments resulting from implementation of the electrification scheme.[1/] The fourth railway project is now providing for a special training program of some TRA staff so as to help implement the recommendations of the costing studies, particularly regarding cost accounting and management information systems.

Finally, the project appears to be economically well justified. Based on a comparison of railway and highway (second best alternative) costs, the rate of return is now estimated by the Bank's Asia Regional Office (section 12 of attached PCR) to be above 25% as compared with an appraisal estimate of 14%. This higher return is expected in light of higher than expected railway traffic and conservative estimation of railway cost advantage at appraisal time. It can be said that the ultimate objective of the project, to meet the growing demand for transportation, has been largely achieved despite indications that TRA today begins to encounter major operational difficulties in meeting the existing demand.

The Bank's Performance

On the whole the Bank's performance during both the preparation and implementation of the Project has been satisfactory. The Bank played a relatively important role, which was facilitated by the fact that this railway project was a natural sequel to the two earlier ones.

The Bank proved to be flexible enough in its procedures regarding the financing of the 18 diesel locomotives so as to take full account of standardization and price advantages to TRA; in view of these advantages the Bank suggested to TRA earlier in 1968 that bids for the 26 locomotives under the second loan (524-CHA) include an option for 18 additional locomotives, which were then already expected to be part of a third loan (in light of then higher than originally expected traffic), and eventually General Motors (USA) won the bid for the combined 44 locomotives. It was also at the Bank's suggestion that the Project provided for a traffic costing study and the establishment of a Planning Department within TRA, which proved to be quite useful. Through its project supervision, the Bank helped prepare the fourth railway project (Loan 750-CHA, US$ 15 million), which was signed in June 1971, and succeeded in improving the Government's and TRA's contracting procedures, which had been judged too slow under the first and second projects. Also close attention was given to the review of the costing and electrification studies, and staff training; however, some of the delays that occurred regarding the implementation of these project components might have been avoided had the Bank supervised the project early enough. The first supervision mission took place only in July 1970, i.e. more than a year after signing of the loan, and the second one in November 1971 (thereafter supervision was more frequent: April 1972, November 1972, April 1973, October 1973, or about one mission every six

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1/ The Government increased the freight and passenger tariffs across the board by 42% and 25%, respectively as of January 27, 1974.

months). Due to a reorganization of the Bank's railway division in 1971 and the Bank's regionalization in 1972, there have been many changes in the Bank staff responsible for supervision of the project; but this does not appear to have had an impact on the project implementation itself, although it is likely that it has meant a greater use of Bank staff time than would otherwise have been necessary.

However, with hindsight, the Bank could be subject to criticism for its conservative policies regarding TRA's electrification plans. The Bank appears since the early 1960s to have consistently taken a pessimistic view towards the economic feasibility of the electrification[1/] of TRA's West Line (which carries 96% of railway traffic). One of the major considerations was the uncertainty about future railway traffic in light of growing highway competition (particularly the planned construction of a freeway parallel to TRA's West Line). Given this uncertainty, the Bank was not entirely convinced that electrification was the most economic solution even after the electrification feasibility study financed under the project reached a positive conclusion. The Bank had major reservations about the study's treatment of future rail/road traffic distribution, and therefore asked for additional studies, which further delayed the Government's decision (a one-year delay had already been experienced in completing the original feasibility study itself). As a result of this, the US$ 15 million fourth railway loan did not include any components related to electrification and was limited to covering the minimum short-term requirements of TRA. The postponement of the electrification scheme and the resulting uncertainty about the future role of TRA have largely led to much lower than expected railway investments over the 1971-73 period and therefore to the capacity problems TRA is now facing. Only now has TRA's electrification project commenced; the final decision to proceed with the electrification scheme was made by the Government in January 1974 by awarding the contract to U.S./U.K./ Swedish suppliers with attached financing arrangements. It is worth noting that the Government has already taken the decision to build a freeway parallel to the railway's West Line; but given the rapid economic growth of Taiwan and the high concentration of population and economic activities along the West Coast, there appears now to be room for both a freeway and an electrified railway line. However, it is too early to judge the full impact of the actual postponement of electrification by several years; after all, the railways have not been up to now a major bottleneck to economic development and a slight underinvestment in railways might prove to be still a better alternative than an overbuilt railway capacity.

Conclusions

The third China Railway Project appears to have been a successful project. It was executed practically as originally planned, with a slight

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1/ This view seems to have been generally prevalent within the Bank in the 1960s, when most Bank-financed projects included dieselization programs rather than electrification. Generally electrification becomes more economic than dieselization when traffic density is high.

cost overrun and some delays regarding the non-physical components. Its main objective, to meet the growing demand for transport, has been fulfilled. It has at the same time helped TRA to maintain its good operational performance and financial viability and it is now estimated to yield an economic return of over 25% (as compared with an appraisal estimate of 14%). Also, the Bank's performance during project preparation and implementation has been on the whole satisfactory. However, it is not yet clear whether the actual postponement of electrification, for which the Bank can be held partly responsible, was justified.

Attachment

PROJECT COMPLETION REPORT

CHINA - THIRD RAILWAY PROJECT

1. This project completion report has been prepared in accordance with OPM 3.50 of July 1973.

2. Project Data[1/]

2.01

	Loan 603-CHA[2/]
Original Amount of Loan	US$ 31,200,000
Revised Amount of Loan	US$ 29,630,000
Amount Disbursed (October 31, 1973)	US$ 29,630,000
Date of Agreement	May 29, 1969
Effective Date	August 22, 1969
Original Closing Date	June 30, 1972
Revised Closing Date	January 31, 1973
Current Exchange Rate	US$ 1 = NT$ 38
Exchange Rate, December 1969 (Date of Appraisal)	US$ 1 = NT$ 40

2.02 Main Components and Principal Covenants of Loan 603-CHA. The Loan was closed January 31, 1973. The third railway project represented the main part of the first two years of Taiwan Railway Administration's (TRA) 1969-1972 Investment Plan with some carry over to year 1971. It included the acquisition of diesel locomotives and rolling stock, signalling and level crossing warning equipment, equipment for workshops and freight handling, double tracking on 34 km, and track strengthening and improvement over 40 km. Special covenants in the Loan and Project Agreements related to the

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1/ A description of responsible Government agencies with main features of the railway system is provided in Annex 1. Map IBRD-1446R3 shows the location of the railway lines.

2/ The Loan Agreement was made between the Bank and the Ministry of Finance representing the Borrower, Republic of China. The Project Agreement was made between the Bank and Taiwan Railway Administration and the Province of Taiwan, which has immediate jurisdiction over the railways.

introduction of a traffic costing system, the carrying out of an electrification feasibility study, and the establishment of a Planning Department; there was provision in the Loan for related expenditure on consultancy services and training. The financial covenants required the Government and TRA: (i) to take steps to ensure TRA's earnings would be sufficient to produce an annual rate of return of not less than 6.5% during fiscal years 1969 and 1970 and of not less than 7.0% thereafter;[1/] and (ii) to meet debt service requirements, maintain adequate working capital and contingency reserves, and finance a reasonable proportion of its capital requirements from internally generated revenues.

2.03 The original closing date, June 30, 1972, was extended to January 31, 1973, on request by TRA to permit completion of consultants services employed for introduction of a traffic costing system (para. 8.05). Loan cancellations of US$ 0.90 million and US$ 0.67 million (total of US$ 1.57 million) were effected in 1971 and 1972 respectively for reasons given in para. 8.03.

3. Summary

3.01 The Bank Group to date has made four loans to TRA totalling US$ 83.7 million equivalent of which US$ 4.9 million has been cancelled, US$ 74.1 million disbursed, while US$ 4.7 million remained undisbursed as of October 31, 1973 (para. 5.01).

3.02 The Bank Group has made only one other lending operation in the transport sector consisting of a US$ 2.2 million credit for harbor dredging in 1961. This project was satisfactorily completed (para. 5.03).

3.03 During the past 10 years the Bank Group has supported efforts to improve transport planning and coordination. The first railway loan (409-CHA) was based on a comprehensive transport survey financed by the Bank in 1963 (para. 5.04); presently transport advisory services, financed from the proceeds of the fourth railway loan, are being provided to the Transportation Planning Board (TPB) (para 6.15).

3.04 The economy of Taiwan has experienced a very rapid development during the past 20 years, with a real growth in GNP of 8.7% p.a. (paras. 6.01 and 6.02).

3.05 The country's growth has constantly exceeded the best estimates of the Government, the Bank and the various advisors employed by both of them. This has resulted in railway projects supported by the Bank being based on

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1/ The Loan Agreement does not stipulate any time period for validity of this requirement; therefore, it may be aasumed to remain binding until repayment of the loan which under the present schedule will take place in 1984.

successively increased traffic forecasts. In spite of this, the 1972 railway traffic was higher than expected in the earlier appraisals (paras. 6.06, 6.11 and 6.12).

3.06 Because of the rapid economic development, the capacity of infrastructure, notably transport and power, has tended to lag behind the actual demand. This imbalance has lately become increasingly serious and the Government has now identified both these sectors as requiring the highest priority in the Sixth Four-Year Development Plan 1973-1976 (para. 7.04). Investments in the transport sector are being increased to NT$ 51.2 billion (US$ 1.3 billion) or by more than 100% over the previous, Fifth Plan investment of NT$ 22.4 billion (US$ 560 million) (para. 7.02).

3.07 In spite of the emphasis on transport in the Sixth Plan, the Government expects serious bottlenecks to develop, partly because of the long gestation period of major transport projects, and has therefore instructed modal agencies to prepare short-term emergency plans to meet the immediate demand (para. 7.05).

3.08 The third railway project was satisfactorily completed by the revised closing date January 31, 1973 (para. 8.05) and the appraisal cost estimates were close to the actual expenditure, except for items involving a large local cost component and civil works (paras. 8.03 and 8.05).

3.09 Some delays were experienced in the physical execution of the project (para. 8.05), but they were not serious if compared with a realistic time schedule; the project execution and disbursement schedule was overly optimistic (paras. 8.07 and 8.08); the actual disbursements (para. 8.07) reflect this.

3.10 There were more serious delays in accomplishing the non-physical project objectives, consisting of establishment of a traffic costing system (para. 8.05) and training (para. 8.06), but these problems have finally been solved.

3.11 The operating performance of the railways has continued to be good with gradually improving results (paras. 9.01 and 9.02).

3.12 The railway's performance has however now reached the operational limit beyond which any further improvement cannot be expected even with major investments to further modernize and increase the railway capacity (para. 9.03); in retrospect, conservative Bank policies may be considered to be one of the major factors which have created the present situation (para 9.04) and resulted in a smaller than planned actual investment during the Fifth Plan period 1969-1972 (Table 6).

3.13 Remedies for this situation are being sought through a short-term emergency program (paras. 7.05 and 9.03) and a long-term investment program consisting of electrification of TRA's West Line and other related improvement works (paras. 9.03 and 11.02 to 11.07).

3.14 The financial performance of the railways has been good and even exceeded the operational performance because of a shift in passenger traffic to higher rated express trains (para. 10.01).

3.15 TRA has met the requirements under all Loan Agreement covenants (paras. 10.03 and 11.01) except for that related to the electrification of TRA's West Line; the Government and TRA have however agreed to inform the Bank before entering into any final commitment on this project thereby observing the requirements of the Loan Agreement (para. 11.07).

3.16 The economic return of the project investment, at about 25-30% is estimated to be higher than the project appraisal estimate of 14% because of: (i) a too conservative appraisal in the first place; and (ii) the subsequent financial results and traffic development have exceeded the appraisal estimates (paras. 12.02 and 12.03).

4. Action Recommended or Taken

4.01 The only outstanding major issue relates to the electrification of TRA's West Line, which, according to Section 2.11 of the Loan Agreement, should not be implemented without prior consultation with the Bank. Letters have been sent to TRA and Ministry of Communications to remind the Government of this undertaking.

4.02 In addition, according to Section 2.02(b) of the Loan Agreement, TRA was to introduce a traffic costing system with assistance from experienced consultants. The consultants have completed their assignment (para. 11.09), but the traffic costing and related management information systems are still at early stages of implementation. Further progress in this regard will be monitored in connection with the continuing supervision of the fourth project (Loan 750-CHA), which contains a covenant of a similar nature (Section 4.08 of Loan Agreement 750-CHA).

4.03 The other covenants have been fully complied with and require no further action.

5. Bank Group Participation in the Transport Sector

5.01 Including the project now under review, the Bank has made four loans for development of Taiwan's railway system:

	Project/Loan			
	First/ 409-CHA	Second/ 524-CHA	Third/ 603-CHA	Fourth/ 750-CHA
	(US$ million equivalent)			
Original Amount	20.00	17.50	31.20	15.00
Revised Amount	17.46	16.71	29.60	-
Amount Disbursed (October 31, 1973)	17.46	16.71	29.60	10.27
Date of Agreement	4/28/65	1/18/68	5/29/69	6/11/71
Original Closing Date	12/31/69	6/30/70	6/30/72	10/31/74
Revised Closing Date	6/30/70	3/31/71	1/31/73	1/

Thus, the total Bank lending to the railways amounts to US$ 83.70 million equivalent, of which US$ 74.04 million has been disbursed, US$ 4.93 million cancelled, while US$ 4.73 million remain undisbursed (Loan 750-CHA) as of October 31, 1973. Except for minor difficulties experienced in procurement (which resulted in the cancellations), Loans 409-CHA and 524-CHA were satisfactorily completed by the revised closing dates. Progress under Loan 750-CHA is also satisfactory.

5.02 Each of the four railway projects has been of a similar nature: they have been designed to meet the foreign exchange requirements of a corresponding railway project, which in each case has represented a 2- or 3-year slice of the railways investment programs, which have varied between 4 and 6 years in length. A full reappraisal of these projects and of the effects of the Bank participation can be undertaken only after the fourth, ongoing project has been completed in 1975. In addition, that project contains as an important component the provision of transport coordination advisory services to the Transportation Planning Board (TPB) covering the transport sector as a whole. The present review discusses the progress made up to mid-1973.

5.03 Other Bank Group lending to the transport sector has been limited to an IDA Credit (6-CHA) of US$ 2.2 million equivalent made in 1961 for the financing of a harbor dredging project.

5.04 In addition to the above lending operations, a transport survey covering all modes of transport was carried out in 1963 at the request of the Government and financed by the UN Special Fund with the Bank as executing agency. This survey was undertaken by consultants (BCEOM) and resulted in an investment program for the years 1965-1970 for harbors, shipping, railways and highways. The first railway project (Loan 409-CHA) was essentially based on the results of the survey.

1/ Will be revised to 6/30/75 shortly.

6. The Economy and the Transport Sector

Economy

6.01 Economic development in Taiwan during the past 20 years is a record of continuous growth which has been remarkable since it has taken place at an accelerating rate in real terms excluding some temporary and short-term setbacks. Over the period 1953-1972 GNP has increased at an annual rate of 15.2% in current prices and 8.7% at constant 1972 prices. The GNP per capita in 1953 was NT$ 6,935 (US$ 175 equivalent) at constant 1972 prices compared to NT$ 18,900 (US$ 470 equivalent) in 1972, implying an annual real growth of 5.4%. The Government's Sixth Four-Year Plan 1973-1976 assumes that the GNP per capita will increase by 7.2% p.a. during the plan period. This appears to be realistic in view of the highly satisfactory performance of the economy during 1973 and the good prospects for 1974.

6.02 The rapid growth has resulted in a considerable change in the structure of the economy. In 1952, agriculture accounted for 35.7% of the NDP, while the share of industry was 17.9% and services 46.4%. In 1972 the share of agriculture was down to 15.7%, industry and services up to 36.6% and 48.2% respectively. Particularly remarkable has been the growth in exports which reached US$ 2,980 million in 1972 compared with US$ 120 million in 1952 at current prices (US$ 460 million at constant 1972 export prices). Imports were US$ 2,335 million in 1972 giving a surplus of US$ 645 million compared with imports of US$ 208 million in 1952 at current prices (US$ 840 million at constant 1972 export prices) and a deficit of US$ 88 million (US$380 million at constant 1972 prices). In 1952, only 4.8% of exports consisted of industrial products, while the remaining 95.2% represented agricultural products, mainly sugar and rice. In 1972, industrial products represented 83.1% of total exports, while the share of agricultural products had decreased to 16.9%.

6.03 At the time of appraisal of the first railway project in 1964, the economy was in a transition stage from an agricultural to an industrialized economy with agriculture still the predominant sector. The following quotation is from the appraisal report (para. 9):

> "The economy of the area served by TRA is largely agricultural, 47% of the total population being concentrated in farm families and 54.5% of the labor force being engaged in agriculture."

6.04 At the time of appraisal of the third railway project in 1968, industry had already surpassed agriculture in importance, although exports were just gaining momentum representing only 28% of the 1972 value and there was a foreign trade deficit of US$ 165 million.

Traffic

6.05 The development of freight and passenger traffic and the road vehicle fleet for the period 1956-1972 is shown in Tables 1 to 3 respectively. Freight traffic was estimated at 4,505 million ton-km in 1972 compared with

1,318 million ton-km in 1952, implying an annual growth rate of 6.3% over the 20-year period. In terms of ton-km, railways and highways have both captured about the same volume of the increase, 1.6 billion ton-km each. In relative terms, however, highway freight traffic has increased at a considerably higher rate, 17.8% p.a., than railway freight traffic, 4.1% p.a. In 1952, the railways' share of freight traffic was 95%, compared with the highways 5%. The railways were in 1972 still the most important freight carrier with 63%, but the highways had rapidly increased their share to 37%. At the time of appraisal of the first railway project in 1964 the percentage distribution was 82% and 18%, changing to 73% and 27% respectively by the time of the third railway project appraisal in 1968.

6.06 Although the railway appraisal reports have not contained any quantified, overall freight traffic forecasts the above described development was anticipated in each of them. As indicated in the following tabulation the appraisal estimates for TRA's freight traffic have been close to the actual development, although the first two appraisals tended to underestimate slightly the future increase:

	Million ton-km			
Year	Actual	Appraisal		Estimates
		First/ 409-CHA	Second/ 524-CHA	Third/ 603-CHA
1962	1917			
1964	2179	2179		
1967	2371	2156	2371	2371
1969	2455	2247	2450	2615
1970	2475	2293	2515	2715
1971	2450	N/A	2575	2725
1972	2665	N/A	2640	2855
1973 (Est.)	2850	N/A	2710	2940

The reasons for the slight shortfall between the third appraisal forecast and the actual development is found by comparing the commodity-wise forecasts in Table 4. The volume of coal traffic in 1972 was only about 2/3 of that forecast, due to dwindling coal reserves. This shortfall of about 225 million ton-km more than explains the difference between the overall forecast and the actual development; the other commodities have in most cases posted a higher increase than expected.

6.07 Published passenger traffic statistics in Taiwan relate to public transport only as shown in Table 2. Estimates on private car traffic are rough approximations only and indicate that private car traffic (including taxis) reached some 2.0 - 2.5 billion pass-km in 1972 or about 10% of the public passenger traffic. The growth in private car traffic has however been spectacular, about 17% p.a., as can be deduced from the development of the car fleet shown in Table 3.

6.08 Passenger traffic by public carriers has increased from 3,600 million pass-km in 1952 to 21,376 million pass-km in 1972 (Table 2), or by some 9.3% p.a. The growth rate has been slightly accelerating, exceeding 11% p.a. since appraisal of the third project in 1968. Excluding local traffic (railway commuters and city bus traffic), public passenger traffic has increased annually by 8.1% over the 15-year period 1957-1972 compared with 9.4% for local traffic.

6.09 As in the case of freight, highway transport has been increasing its share of total public passenger traffic, although at a less rapid rate. In 1952, 66% of public passenger traffic was carried by railways; by 1972 this share had decreased to 34%; excluding local traffic these percentages were 70% and 43% respectively.

6.10 Railway passenger traffic has increased from 4,030 million pass-km in 1964 (first appraisal) to 7,310 million pass-km in 1972 or annually by 7.7%. Particularly the long-distance traffic has increased rapidly, from 1,100 million pass-km in 1964 to 4,200 million pass-km in 1972, or by 18.2% p.a. During the same period railway short distance traffic increased from 2,400 million pass-km to 2,850 million pass-km, or by only 2.1% p.a. (Table 5). These growth rates indicate that the railways were able to compete successfully with bus traffic over longer distances, while the greater part of the increase in local traffic was carried by buses.

6.11 As indicated in the following tabulation, TRA's passenger traffic has increased at a considerably higher rate than estimated during the three railway appraisals:

	Million pass-km[1/]							
			Appraisal Estimates					
			First/ 409-CHA		Second/ 524-CHA		Third/ 603-CHA	
Year	Actual							
	Long-dist.	Short-dist.	Long-dist.	Short-dist.	Long-dist.	Short-dist.	Long-dist.	Short-dist.
1960	709	2584						
1963	901	2354	3368					
1966	1572	2722	3688					
1967	1860	2895	3794		1730	2776		
1969	2465	3148	4009		2052	2839	2274	3041
1970	2820	3066	4116		2211	2898	2568	3117
1971	3494	2982	4220		2430	2925	2861	3195
1972	4119	2862	4325		2675	2955	3202	3227
1973 (Est.)	4700	2890	4435		2950	2985	3585	3260

1/ West line only.

The first appraisal (Loan 409-CHA) in 1964 assumed that the total railway traffic would be 4,435 million pass-km in 1973, or only about 58% of the actual volume; the appraisal did not analyze long and short distance traffic separately. The second (Loan 524-CHA) and third (Loan 603-CHA) did estimate the development of short distance traffic fairly accurately, but still underestimated the growth in long-distance traffic considerably. The main reasons for the higher than expected increase in TRA's passenger traffic over longer distances have been:

(i) rapid economic development and a shift from a subsistence to cash economy;

(ii) railways ability to meet the demand and to continue with efficient operations (there has been no change in tariffs since 1967);

(iii) increasing congestion on highways, particularly on the main highway parallel to TRA's West Line which carries 96% of the railway traffic; and

(iv) Government's policy of discouraging private car ownership through high taxation.

The four Bank loans to the railways have clearly contributed to this development by providing necessary funds for modernization and expansion.

6.12 Summarizing the past traffic development on the railways, freight traffic, except for coal, has developed more or less as forecasted, while long-distance passenger traffic has far exceeded any forecasts. In terms of traffic units (pass-km + ton-km), railway traffic was in 1973 about 10.45 billion units, which is 1.8 billion (21%) more than estimated at the time of appraisal of the second project in 1967, and 0.65 billion (6%) more than estimated during the third appraisal in 1969. (The fourth railway project appraisal forecast for freight traffic was slightly higher while for passenger traffic it was lower than the actual traffic volumes; in traffic units the forecast and actual volumes more or less coincide with each other.)

Transport Coordination and Planning

6.13 Each of the three railway appraisals identified deficiencies in transport planning and coordination, although they were not considered serious enough to warrant covenants in the Loan Agreements. However, there has been a certain amount of institution building to remedy the deficiencies.

6.14 During the negotiations for the first loan (409-CHA) the Government expressed its intention to strengthen and expand the existing Transportation and Communications Committee of the Council for International Economic

Cooperation and Development (CIECD) "to enable it to coordinate effectively all forms of transport so that a comprehensive national transport system will be established and maintained at the least possible economic cost." (para. 17 of the Appraisal Report 409-CHA). According to the appraisal report for the second loan (524-CHA) this intention was carried out and the arrangements were stated to be, in principle, good (para. 2.17, Appraisal Report 524-CHA). It was however observed that the Committee was mainly studying urgent day-to-day problems. For this reason it was agreed during negotiations for the second project that the Committee would undertake long-term transport studies, including forecasts of future traffic, and the comparative advantages of the various modes of transport.

6.15 During the appraisal of the third project in 1968, it was concluded (para. 2.09, Appraisal Report 603-CHA) that the work of the Committee had in fact taken the course agreed upon and that "transport coordination through the CIECD had made a satisfactory beginning." (para. 2.12). The subsequent progress was not, however, as envisaged and the transport coordination mechanism was recognized as seriously deficient by the UNDP Transportation Economic Study undertaken during 1969/1970 by consultants (Robert R. Nathan Ass., Inc., RRNA). In response to the consultants' strong recommendation to strengthen and coordinate transport planning, the Government established in 1970 the Transportation Planning Board (TPB), chaired by the Minister of Communications and composed of 22 members representing various Government agencies and the private sector. The Board was assisted initially by a secretariat including 20 professionals. In connection with the appraisal of the fourth railway project in late 1970 it was, however, concluded that TPB still lacked both qualified manpower and a well defined work program (para. 2.15, Appraisal Report 750-CHA). Therefore, terms of reference and a 3-year work program were prepared by the Government in consultation with the Bank and included as a side letter to the Loan Agreement 750-CHA. In addition, Loan 750-CHA included an amount of US$ 850,000 for about 140 man-months of foreign consulting service to TPB over a three-year period. The Government subsequently contracted RRNA to perform these services from June 1972 to June 1975. As a result of these measures, transport coordination and planning has definitely improved on an agency level, although TPB is not always in the position to influence the Government's decisions on major transport issues. In addition, the Government had taken decisions in principle to proceed with several major transport projects (railway electrification, North-South Freeway, Taichung Seaport) prior to strengthening of TPB. These decisions appear to be firm although the Government maintains that no final decisions, except for construction of the freeway, have been taken. The major projects appear to be, in general, justified, although there are minor problems relating to timing and technical design.

6.16 In retrospect, the Bank's efforts to assist institution-building within this sector in Taiwan appear to have been sound and appropriately designed with due consideration to the country's capability to gradually absorb new ideas and decision making processes. As a result, a

professionally well-qualified staff has been created, familiar with advanced concepts in transport planning and coordination. However, as in many countries, the problem of how to influence decision making still remains.

7. Railway and Transport Sector Investment Programs

7.01 The third railway project (Loan 603-CHA) was based on TRA's Fifth Four-Year Investment Plan 1969-1972, which was part of the National Economic Development Plan for the same period. The planned and actual transport sector investment during 1969-1972 is shown in Table 6. Table 7 contains the planned investments during the Sixth Four-Year Plan 1973-1976.

7.02 The actual investments in the transport sector during the Fifth Plan period 1969-1972, NT$ 22,427 million (US$ 560 million equivalent), exceeded the planned investment, NT$ 20,632 million (US$ 515 million equivalent), by about 10% reflecting the higher than expected growth in transport demand. At the same time, considerable changes took place in allocation of investments by modes of transport. The combined investments for railways and highways were essentially the same as planned. In actual investments, however, the position of the two modes was reversed. This may indicate some overly ambitious planning on the part of TRA from the beginning, but on the other hand, the level of actual investments was certainly too low in view of the present difficulties of the railways in meeting the demand.[1/] The increase in highway investments reflects the very low level of investments during the 1950's and 1960's and the higher than expected growth in highway traffic.

7.03 The 1969-1972 transport sector investment program was fairly well conceived, in spite of the discrepancies between actual and planned investments. In 1968, when the investment program was prepared, the very rapid economic development which subsequently took place was not expected. The Bank economic report[2/] at that time predicted a real growth in GNP of 7.5% p.a. compared with an annual 10% actually achieved. Foreign trade was expected to show a deficit of US$ 163 million in 1972, in fact there was a surplus of US$ 483 million, with exports more than double the expected level (there was a modest increase in prices of about 3.5% p.a. during the period 1968-1972).

1/ The low investment level was mainly caused by the Government's and TRA's uncertainty on the content of the railways' long-term investment program. The conservative approach was supported by the Bank, which maintained that it would be uneconomic to expand dieselization if the electrification scheme was going to be implemented in near future.

2/ Current Economic Position and Prospects of the Republic of China, Report No. AS-142a, September 11, 1968.

7.04 During the Fifth Plan, transport sector investments represented about 14% of total public sector investments. This was a relatively small share, particularly observing the rapid growth of the economy and the initially underdeveloped transport system, which had been developed to serve an agricultural society. As a result, all modes of transport are at present experiencing severe congestion problems. There exists already some indications that bottlenecks in the transport system are restricting continued rapid economic growth (increased ship waiting times in ports, inability of railways to carry all freight offered). Realizing this, the Government identified the transport sector to be of highest priority in the Sixth Plan 1973-1976, together with energy, and allocated NT$ 51,187 million (US$ 1,300 million equivalent) representing 28% of total plan investments (Table 7) for its improvement. These investments are to be used for implementing major investment schemes for each mode of transport such as: (i) construction of the North-South Freeway; (ii) electrification and improvement of TRA's West Line; (iii) construction of a new seaport at Taichung; and (iv) construction of a new international airport serving Taipei and northern Taiwan. In general, the Government's investment plan seems to be well conceived, although timing, technical standards and coordination with other projects may require further investigations.

7.05 The Sixth Plan was drafted and approved by the Government in 1972, i.e., about a year ago. Since then, the start of major projects has been delayed and there are indications that further delays will be experienced in future because of overly optimistic implementation schedules in the first place. Consequently, there will most likely be a spill-over to the Seventh Plan 1977-1981 and the actual investments will be less than planned during the Sixth Plan. As a countermeasure, the Government instructed each of the modal agencies to prepare an emergency program for the period 1974-1976, additional to the Sixth Plan. For the railways, the emergency program involves an investment of about NT$ 1 billion (US$ 25 million equivalent) to meet the increased demand in the short term.

7.06 To summarize, it appears that the Fifth Plan 1969-1972, on which the third railway project was based, was well designed to meet the needs of the economy although the subsequent rapid growth could not be foreseen at the time of preparation of the Plan in 1968. The actual investment in the railways was much smaller than planned, partly because of uncertainties about the desirable scope of railways' long-term investment program and partly because difficulties were experienced in arrangement of further foreign financing for the railways. These problems appear now to have been at least partly solved by use of supplier credits and Exim Bank financing.

8. Project Execution and Disbursements

8.01 The composition, cost and implementation schedule of the third railway project are given in Table 8 as estimated during the project appraisal, together with the actual cost by project items.

8.02 The project cost was estimated at NT$ 1,764 million (US$ 44.1 million equivalent) including contingencies. The actual project cost was NT$ 1,905

million (US$ 47.6 million equivalent) representing an increase of about 8% over the original estimate.

8.03 The actual foreign cost was very close to the corresponding estimate except for rolling stock, track strengthening equipment and consulting services. The foreign component of passenger cars went up about 10%, but the increase was partly compensated by a decrease in the local component due to the fact that a larger part was procured abroad than originally estimated. For freight cars the situation was reversed because a larger than estimated number of the 600 freight cars was manufactured locally. This resulted also in cancellation of US$ 0.9 million of loan 603-CHA because a local bidder won the contract, so that the Bank only covered the foreign exchange component. The other cancellation, US$ 0.6 million, related to consulting services (by Kennedy & Donkin, U.K.) for the electrification scheme. This amount was over and above the US$ 0.3 million allocation in category 10 for Technical Services and Training and TRA, not aware that it could have been financed from the unallocated category[1/], paid from its own resources, while at the same time requesting cancellation of the equivalent amount in the unallocated category. There was a considerable increase in the cost of consulting services as indicated in Table 8. The reason for this increase was that the traffic costing study (para. 11.09) was considerably expanded to include other related aspects as well.

8.04 Except for the cost of freight cars discussed in para. 8.03, the local cost was exceeded considerably for the double tracking and track improvement works. The main reasons for this increase were TRA's low cost estimates at the time of appraisal rather than increases in unit costs. On the whole, the actual local costs exceeded the cost estimates by 30% excluding the increased local cost for freight cars.

8.05 The project was satisfactorily completed by the time of the revised closing date January 31, 1973, except for an undisbursed balance of US$ 133,214. This amount was fully disbursed in October 1973. Compared with the original time schedule, no significant delays were experienced in procurement of locomotives and rolling stock. However, the double tracking and track improvement works took a longer time than expected to complete, because of incomplete specifications and generally insufficient work planning by TRA, who executed the project on force account. Delays were also experienced in execution of the traffic costing studies by consultants. Reasons for these delays were the longer than estimated time used in selection of consultants and a subsequent expansion of the scope of the consulting services to cover other related areas (cost accounting, management, information systems and computerization studies) as well. These studies were completed by the revised closing date of January 31, 1973. Many of the consultants' (BAHINT, USA) recommendations were highly conceptual in nature and will require considerable "detailed

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1/ In accordance with Schedule 1 of the Loan Agreement.

design" efforts during implementation, which is now being carried out. In retrospect, more time should have been spent on preparation of detailed terms of reference and supervision of the consulting services; the consultants met their contractual obligations in substance, but more could have been expected in terms of the objectives of the assignment, which was to assist in solving the particular problems of TRA.

8.06 Training was another area where considerable delays were experienced. The Loan Agreement included a covenant on overseas training of two TRA Planning Department officials in transport economics for a one year period. Difficulties were experienced both in the selection of suitable candidates with sufficient knowledge of foreign languages and in selection of a training institute. There were also some administrative delays on the part of both the TRA and the Bank unrelated to the Project. These problems have finally been solved and the two trainees are being trained by the Canadian National (CN) railways.

8.07 As a result of these delays, Loan 603-CHA was not disbursed mainly in year 1970 as originally estimated, but over a longer time period. The appraisal estimate and the actual disbursements were as follows:

Year	Disbursements under Loan 603 - CHA			
	Appraisal Estimate		Actual	
	NT $	US$	NT $	US$
	------ million--------			
1969	13.0	0.3	131	3.3
1970	1,206.5	30.2	390	9.7
1971	30.1	0.7	418	10.4
1972	-	-	244	6.1
1973	-	-	4	0.1
Total	1,249.6	31.2	1,187	29.6

The difference in the totals, US$ 1.6 million, represents the amounts cancelled (para. 8.03).

8.08 In retrospect, it appears that the time schedule was originally too optimistic and longer time periods should be allowed for completion of this type of project, particularly if it is not restricted to procurement of equipment but involves also civil works. In other respects the appraisal estimates were accurate and all project items were urgently required, as indicated by the higher than expected traffic increase and present capacity problems.

9. Operating Results and Physical Performance

9.01 Selected operating statistics for the 15-year period 1958-1972 (as of December 31) are summarized in Table 9. The operating performance has been

good over the whole period with most of the efficiency indices showing gradual improvement. There have however been considerable changes in the structure of railway operations. In 1958, steam was used as motive power (except for railcars); in 1972, only 25% of locomotive-km and 5% of net ton-km represented steam traction. Because of the changes in traction and modernization of rolling stock, the trains are heavier and traffic units per motive-power unit and per train-km have increased considerably over the period.

9.02 The labor force has increased modestly from 22,395 in 1958 to 23,183 in 1972. With increased traffic, productivity per employee has increased considerably and is good:

	Labor Force	Traffic Units[1/] per Employee	Employees per 1,000 Train-Km
1950	22,395	229,000	1.39
1963	21,776	238,500	1.13
1968	21,817	352,000	0.83
1972	22,966	430,000	0.76

The average salary level has at the same time increased from a low NT$ 1,480 (US$ 37 equivalent) per month in 1963 to about NT$ 3,600 (US$ 90 equivalent) in 1972 (Table 10). As a result, the share of labor in total operating costs (excluding depreciation) has slowly increased from 36.2% in 1963 to 39.8% in 1972, which is still low in comparison with most other railway systems.

9.03 The highly satisfactory operating performance has been achieved by full utilization of the railway assets. However, TRA is now encountering a severe shortage of motive power, rolling stock and line capacity and operational limits are being exceeded. This is having an unfavorable effect on the quality and cost of services. TRA is planning to undertake two improvement programs to remedy the situation: (i) a short-term emergency program (para. 7.05), which will cover the period 1974-1976 and will provide additional capacity until; (ii) a longer term program (para. 7.04) is implemented consisting of electrification of TRA's West Line and related improvement work.

9.04 It may be asked why these programs are being designed at such a late stage, when the freight and passenger traffic demand is already exceeding the railways' traffic carrying capacity. In retrospect, the Bank may have inadvertently contributed to this situation since:

(i) there has been a tendency in all the appraisals to under- rather than over-estimate the future growth in railway traffic (paras. 6.06, 6.10 and 6.11); as a result, TRA's earlier investment programs and the size of projects supported by Bank financing were reduced at the instance of the Bank;

1/ pass-km + ton-km

(ii) TRA had in 1972 prepared an application for a fifth loan which would have approximately corresponded to the emergency program 1974-1976 now being prepared, but which did not materialize, resulting in a delay of 1 to 2 years in implementation of the project, now of emergency nature; and

(iii) the Bank has consistently taken a pessimistic - if not negative - view towards the economic feasilibility of TRA's long-term plan involving the West Line electrification although 3 different consultants (JARTS 1961, SOFRERAIL 1962, Kennedy & Donkin 1971) came to a positive conclusion.

TRA maintains now that the Bank view resulted in an uneconomic dieselization program instead of the direct conversion from steam to electric traction at the beginning of the 1960's. The view that TRA's insistence was justified is further supported by the deteriorating crude oil situation.

10. Financial Performance

10.01 TRA's financial performance over the past ten years 1963-1973 is shown in Tables 11, 12 and 13, with third appraisal report estimates for the period 1969-1972. The figures indicate that the financial position has continued to be good over the whole period with gradual improvement in the financial performance ratios and with net income in 1973 having increased to about nine times the level achieved in 1963 implying an annual growth rate of about 22%. This favorable development has been caused partly by the improved operational performance described in Chapter 9 above, but even more by the change in the structure in passenger traffic; there has been no change in railway tariffs since 1965 or in discounts given since 1967. The change in passenger traffic composition resulting from increased use of high rated express trains is shown in Table 14 while the development of tariffs and fares with discounts applied is given in Annex 2.

10.02 As a result of the favorable traffic development, the operating revenues have been considerably higher than estimated during the appraisal (Table 11). Operating costs have risen less rapidly. In fact, the high increase in revenues has allowed the railways to apply a much more liberal staff benefit policy than would otherwise have been possible. For instance, the contributions to the pension fund were in 1972 NT$ 64 million (US$ 1.6 million equivalent) or more than double the appraisal estimate of NT$ 31 million (US$ 0.8 million equivalent). Other higher than estimated increases were experienced in traffic management and depreciation. The total operating expenses were in 1972 17% higher than the appraisal estimate, which is partly explained by the fact that the traffic exceeded the appraisal estimate by 4%.

10.03 The financial covenants (para. 2.02) which were repeated in the fourth Loan Agreement 750-CHA for the period from year 1972 onward, have been fully met. The financial position is, however, expected to deteriorate over the next decade as a result of substantial increases in capital costs resulting

from implementation of TRA's long-term investment program including the electrification scheme. In the longer term, TRA's financial position is most likely to improve again, although no reliable forecast is possible.

10.04 The Government and TRA have agreed to provide the Bank details of TRA's investment programs including forecasts on the expected financial performance of the railways taking into account the financial covenants in the two Loan Agreements (Loan 603 and 750-CHA).

11. Commitments under Loan Covenants

11.01 As discussed in para. 10.03 above, TRA has met the financial covenants under Loan 603-CHA. The other covenants under this loan required:

(i) TRA to employ competent and experienced consultants:

- to review TRA's dieselization program and study the feasibility of the electrification of the main line of TRA's west system; and

- to introduce a traffic cost accounting system.

(ii) TRA to establish a Planning Unit by December 1969 to assist in preparing TRA's investment program to examine transport competition and to study operating efficiency, traffic costing and tariff policy;

(iii) annual certification by an independent auditor of TRA's financial statements (within 7 months after close of TRA's fiscal year);

(iv) TRA to submit to the Bank unaudited financial statements not later than 3 months after close of TRA's fiscal year;

(v) that during the period January 1, 1970 to December 31, 1972, TRA should not contribute to the Province in any TRA fiscal year more than the equivalent of US$ 1,250,000; and

(vi) that TRA should not implement the electrification of its railway system without prior consultation with the Bank.

Covenants (iii), (iv) and (v) have been met and are not discussed further.

TRA's West Line Electrification

11.02 In accordance with covenant (i) above, the review of TRA's dieselization program and the feasibility study on electrification of TRA's West Line was completed in February 1971 by consultants (Kennedy and Donkin, U.K.).

The consultants' evaluation indicated that the electrification scheme was economically feasible at a cost of US$ 146 million, including a foreign exchange component of US$ 100 million. The Bank raised some questions on the validity of the results, because it considered the treatment of important inter-modal issues had been too limited in scope (future traffic distribution between railways West Line and the parallel North-South Expressway which is planned to be constructed simultaneously with the railway electrification). The Bank did not directly dispute the result, but considered that further studies should be undertaken. For this reason, the fourth railway loan (750-CHA) did not include any components related to the electrification as originally requested by TRA; further, the loan (US$ 15 million equivalent) was limited to cover the bare minimum requirements of TRA which were needed, whatever the long-term program would be. The loan was in the preappraisal termed as a "holding" action. As events have turned out, this was not the best possible solution because of the capacity problems TRA is now facing (paras. 9.03 and 9.04).

11.03 Although never officially stated, both the Government and TRA appear to have been convinced even in the 1960's following the first two studies (para. 9.04) that electrification would be the best long-term solution. Being even more firmly convinced, TRA contracted in January 1972, DECONSULT from Germany to prepare technical specifications for the electrification scheme, including related telecommunications, signalling and track strengthening works and investments in motive power and rolling stock. In addition, TRA proceeded simultaneously with the procurement of 10 diesel locomotives with Exim Bank financing. These locomotives were excluded from Loan 750-CHA on the grounds that they were not needed if the electrification scheme was to be implemented. TRA maintained that the locomotives were required to provide necessary motive power in the short term and that they could be efficiently utilized even after electrification on sections not to be electrified. TRA's decision appears to have been the right one.

11.04 The specifications were completed in June 1972, and TRA was approached by the "50-cycle group" (Germany, France, Belgium, Switzerland), with a full-package offer, including financing of the project. However, the Government and TRA considered both the price and financing terms unacceptable and the negotiations were broken off in September 1972.

11.05 Until mid-1972, the electrification project had been prepared by TRA without any Government approval to proceed with the construction. Approval was given for the first time in November 1972, in conjunction with the formulation of the Sixth Four-Year Development Plan 1973-1976, and TRA was subsequently requested to proceed to issue tender invitations. The Government, however, reserved the right to with-hold the contract award if terms offered were unacceptable or in the case of any other major unforeseen event.

11.06 The invitations for full-package tenders were issued in May 1973 limited to the "50-cycle group", the GE of USA and the GEC of U.K. The tenders were submitted in August 1973; TRA is in the process of evaluating these tenders.

11.07 The Government has all along maintained that it will meet the commitments under the loan agreements in spite of the apparent disagreement with the Bank concerning TRA's long-term development plans. The Government and TRA have agreed on the following: (i) the Bank will be informed by letter of the results of the tender evaluation prior to the tender award; (ii) the Bank will, at the same time, be provided with forecasts on TRA's future financial position including the effects of the short-term emergency program and the electrification scheme; and (iii) the Government will, in preparing this information, take due account of the financial covenants.

Planning Department

11.08 TRA established a Planning Department in December 1969, as required by the Loan Agreement. The Department has been developing well and is at present divided into three separate divisions. As intended, this department has been responsible for preparation of TRA's investment programs; it has also coordinated the preparation of information requested by the Bank.

11.09 The department has also been responsible for the traffic costing study, completed by consultants (Booz, Allen & Hamilton Inc., BAHINT) in January 31, 1973, in accordance with the Loan Agreement. In spite of some deficiencies (para. 8.05), the study did provide TRA an acceptable framework for implementation of the proposed costing systems. Traffic costing has already been applied to several commodity and passenger traffic groups. The results are, however, not directly applicable in practice because TRA has no tariff setting powers of its own and the Government sees little point in changing the tariffs in a situation where the railway's financial position has been continuously improving. The Government, however, agrees that there may be a need to review the tariffs on a selective basis, if the electrification scheme is implemented, in which situation the results of the costing studies will be valuable.

11.10 Related to implementation of these systems, TRA has sent a group of six officials to Canada and U.S.A. for overseas training. This training is financed through proceeds of Loan 750-CHA. The training covers all aspects of the consultants' (BAHINT) study, but TRA has felt particular interest in cost accounting and management information systems which can be directly applied within the railways without Government sanctioning. It is however too early to evaluate the impact of these systems on TRA's operational efficiency.

12. Reassessment of Economic Feasibility

12.01 Any accurate reassessment of the economic feasibility of the third railway project is difficult because of the lack of detailed data in the original appraisal report, which indicated economic rates of return from 6% to 35% by project component. The average expected return was about 14% which was considered satisfactory.

12.02 The basic approach in estimating the economic return was to calculate the cost advantage of the railways carrying the anticipated increase in traffic over the second best alternative, the highways. If anything, the actual economic rate of return on the project investment has been higher than estimated during the appraisal for the following reasons: (i) the cost advantage was calculated by using average financial operating costs per pass-km and ton-km for rail and highway transport instead of long-term economic variable costs which would more correctly express the real economic costs of carrying increased traffic. If these had been used, the economic return of investments in motive power and rolling stock would have been about 25% compared with the 17% estimated in the appraisal; and (ii) the cost advantage was assumed to remain constant over the project life of 20 years. This was a conservative assumption because the long-term variable costs have increased both for railways and highways, but more for the latter mode. The reasons for this cost development are, a larger than anticipated congestion on highways and higher increases per traffic unit in major highway cost factors such as labor, fuels and maintenance costs. This cost development is expected to continue in favor of rail transport.

On the above basis, the economic return on the project investment is estimated at about 25-30% instead of the 14% calculated in the project appraisal.

December 28, 1973
Asia Projects Department

TABLE 1

TAIWAN RAILWAY ADMINISTRATION

THIRD RAILWAY PROJECT REAPPRAISAL

Rail and Road Freight Traffic
1956 - 1973

	Million Ton-Km			
	TRA	Other Railways	Road Truckers	Total
1956	1,647	149	155	1,951
1957	1,847	172	180	2,199
1958	1,834	166	194	2,194
1959	1,805	159	251	2,215
1960	1,913	159	317	2,389
1961	2,001	159	367	2,527
1962	1,918	138	412	2,468
1963	1,977	144	448	2,569
1964	2,179	185	521	2,885
1965	2,232	183	608	3,023
1966	2,255	180	716	3,151
1967	2,371	172	784	3,327
1968	2,544	165	989	3,698
1969	2,453	137	1,170	3,760
1970	2,477	154	1,363	3,974
1971	2,450	164	1,554	4,168
1972	2,666	154	1,685	4,505
1973	2,786	154	1,810	4,750
Average Annual Growth Rate During the Years:				
1957 to 1960	1.2%	(-2.6%)	20.9%	2.9%
1960 to 1964	3.3%	3.9%	13.2%	4.8%
1964 to 1969	2.4%	(-7.9%)	17.6%	5.5%
1969 to 1973	3.2%	3.0%	11.5%	6.0%
Average Length of Haul in (km):				
1967	160	11	34	63
1969	170	12	37	65
1970	167	11	38	62
1972	156	9	40	59

Source: Taiwan Railway Administration (TRA) and mission November 1973

TABLE 2

TAIWAN RAILWAY ADMINISTRATION

THIRD RAILWAY PROJECT REAPPRAISAL

Rail & Bus Passenger Traffic, 1956 to 1972
(Millions of Pass-km)

	Local Traffic			Inter-City and Other Traffic				Total			
	Rail	Road		Rail	Rail	Road		Rail		Road	
Year	TRA Commuters*	City Buses	Total	TRA Excluding Commuters	Other Lines	Inter-City** Buses	Total	TRA	Other Lines	All Buses	Grand Total
1956	508	1,031	1,539	2,134	219	2,298	4,651	2,642	219	3,329	6,190
1957	560	1,110	1,670	2,633	263	2,272	5,168	3,193	263	3,382	6,339
1958	594	1,146	1,740	2,851	258	2,668	5,777	3,445	258	3,184	7,517
1959	599	1,203	1,802	2,882	223	3,068	6,173	3,481	223	4,271	7,975
1960	638	1,187	1,825	2,768	203	3,173	6,144	3,406	203	4,360	7,969
1961	652	1,305	1,957	2,920	191	3,420	6,531	3,572	191	4,725	8,488
1962	633	1,430	2,062	2,656	188	3,343	6,187	3,289	188	4,772	8,250
1963	641	1,549	2,190	2,726	191	3,519	6,436	3,367	191	5,068	8,626
1964	697	1,788	2,485	3,134	196	4,322	7,652	3,831	196	6,110	10,137
1965	741	1,926	2,667	3,540	189	4,833	8,562	4,281	189	6,759	11,229
1966	770	2,014	2,784	3,690	182	5,261	9,133	4,460	182	7,275	11,917
1967	863	2,154	3,017	4,079	169	5,603	9,851	4,942	169	7,757	12,868
1968	906	2,608	3,514	4,476	135	6,278	10,889	5,382	135	8,886	14,403
1969	872	3,338	4,210	4,953	111	6,738	11,802	5,825	111	10,076	15,512
1970	847	4,175	5,022	5,267	98	7,004	12,369	6,114	98	11,179	17,391
1971	918	4,722	5,640	5,798	91	7,746	13,635	6,716	91	12,468	19,275
1972	876	5,504	6,380	6,353	81	8,562	14,996	7,229	81	14,066	21,376
Average Annual Growth Rate During the Years											
1957 to 1960	4.5%	2.3%	3.0%	1.7%	(-9.0%)	11.8%	5.9%	2.2%	(-9.0%)	8.9%	7.9%
1960 to 1969	3.5%	12.2%	8.2%	6.7%	(-7.0%)	8.7%	7.6%	6.2%	(-7.0%)	9.8%	7.7%
1969 to 1972	0.2%	18.1%	14.9%	8.7%	(-11.0%)	8.3%	7.5%	7.5%	(-11.0%)	11.8%	11.3%
Average Length of Passenger Journey in 1968 & 1972 (kms)											
1969	15	6	-	58	10	12	-	39	10	9	-
1972	17	7	-	75	13	12	-	53	13	10	-

Percentage of Traffic in 1968

Local		Long-Distance	
Rail	Road	Rail	Road
25.6	74.2	42.3	57.7

Percentage of Traffic in 1972

Local		Long-Distance	
Rail	Road	Rail	Road
14	86	43	57

* Includes estimates for the East Line.
** Includes a small amount of urban traffic conveyed by private bus companies.

Source: TRA and mission

November 1973

TABLE 3

TAIWAN RAILWAY ADMINISTRATION

THIRD HIGHWAY PROJECT REAPPRAISAL

Number of Motor Vehicles Registered, 1956 to 1972

End of Year	Common Carrier	Private	Buses	Private Cars	Taxis	Motor-cycles	Other	Total
1956	2,490	2,181	2,599	4,760	834	3,131	758	16,753
1957	2,486	2,477	2,783	5,044	897	4,039	1,012	18,736
1958	2,556	3,080	3,013	5,649	1,056	7,399	1,188	23,941
1959	3,166	3,598	3,111	5,589	1,466	15,836	2,767	35,533
1960	3,458	3,994	3,444	6,395	1,660	26,468	3,326	48,745
1961	3,709	4,160	3,600	6,671	2,297	32,733	3,604	56,774
1962	4,267	4,188	3,785	6,753	3,263	35,783	3,774	61,813
1963	4,568	4,634	4,027	7,278	3,677	40,217	4,230	68,631
1964	5,315	4,953	4,487	7,752	4,635	49,509	4,447	81,098
1965	6,904	5,634	4,953	8,943	6,156	68,198	4,802	105,590
1966	8,633	7,107	5,539	11,038	8,171	92,774	19,369	152,631
1967	9,509	9,215	5,757	14,245	10,863	141,705	20,456	211,750
1968	12,056	15,142	6,193	16,384	14,314	483,287	19,926	567,302
1969	13,522	21,903	7,315	21,137	18,483	629,358	20,001	731,719
1970	14,155	26,850	7,954	28,849	20,692	701,421	19,183	819,104
1971	14,871	32,714	8,900	32,824	22,287	826,492	19,207	957,294
1972	15,897	40,587	9,431	46,330	25,618	957,650	19,224	1,114,737
Average Annual Growth Rate During the Years:								
1957 to 1960	11.6%	17.3%	7.4%	8.2%	22.8%	87%	49%	37.5%
1961 to 1969	16.4%	20.8%	8.7%	14.2%	30.8%	42%	22%	35.0%
1969 to 1972	5.6%	22.8%	8.8%	30.0%	11.5%	15.0%	-1.5%	15.1%

Note: (1) Military vehicles are excluded.
(2) "Other" includes 3-wheeled trucks and cars. The former was introduced in 1966. The rapid increase in motorcycles in due to new local production.

Source: Ministry of Communications.
Transportation & Communications Information (Quarterly) 1973

November 1973

TAIWAN RAILWAY ADMINISTRATION

THIRD RAILWAY PROJECT REAPPRAISAL

Freight Traffic (Actual & Forecast, 1969-1976
(million of ton-km)

TABLE 4

Commodity West Line	Actual 1969	1970	1971	1972	Third Appraisal Estimate 1972	Actual in Excess (+) or Less (-) than Appraisal Estimate	Forecast 1973	1974	1975	1976	Average Annual Growth Rate % 1969-1972 Third Appraisal	Actual	1972-1976
Coal	590.7	561.4	468.8	438.0	662.5	-224.5	420.0	420.0	420.0	420.0	2.9%	-7.5%	-1.0%
Military supplies	191.0	184.1	174.9	189.7	181.3	+ 7.4	175.0	183.0	183.0	183.0	-2.0	-0.1	-0.9
Rice	92.6	90.4	104.0	85.7	122.6	- 36.9	90.0	96.0	96.0	96.0	9.9	-2.5	2.9
Cement	234.3	217.2	217.4	233.8	219.8	+ 14.0	250.0	280.0	318.5	331.5	-2.0	0.0	9.1
Sand, Gravel	72.6	80.0	93.4	108.2	110.9	- 2.7	115.0	89.6	92.6	95.7	15.2	14.2	-2.5
Sugar	56.1	51.4	57.2	56.5	71.5	- 15.0	57.2	57.2	57.2	57.2	8.4	0.0	0.1
Timber	76.2	72.5	77.2	82.7	89.5	- 6.8	80.0	81.5	83.0	84.5	5.5	2.8	0.7
Salt	58.8	79.0	103.8	103.8	85.3	+ 18.5	105.0	94.0	96.0	98.0	13.2	20.9	-1.5
L.C.L.	58.9	54.5	57.1	60.8	70.7	- 9.9	60.0	70.0	70.0	70.0	6.4	1.1	3.6
Oil	59.2	49.7	69.8	97.3	53.8	+ 43.5	100.0	105.0	112.1	118.1	- 3.5	18.0	5.0
Fruit	27.9	7.0	8.4	2.9	35.8	- 32.9	3.1	3.1	3.1	3.1	8.7	-55.0	1.7
Wine, Tobacco	25.3	25.7	17.1	19.5	40.1	- 20.6	20.0	20.0	20.0	20.0	16.6	-8.5	0.1
Mineral Products	16.8	16.6	8.5	14.4	21.5	- 7.1	-	-	-	-	8.6	-2.0	-
Other	849.4	934.0	933.8	1,113.1	1,026.6	+ 86.5	1,244.7	1,282.0	1,308.5	1,367.9	6.5	9.5	5.3
Total, West Line	2,409.8	2,423.5	2,391.4	2,606.1	2,791.8	-185.7	2,720.0	2,781.4	2,860.0	2,945.0	5.0	2.6	3.1
Total, East	43.6	53.2	58.2	59.7	63.9	- 4.2	66.0	68.0	70.0	72.0	13.6	11.1	4.8
Grand Total	2,453.4	2,476.7	2,449.6	2,665.8	2,855.7	-189.9	2,786.0	2,849.4	2,930.0	3,017.0	5.2	2.8	3.1

Source: TRA and Mission

November 1973

TABLE 5

TAIWAN RAILWAY ADMINISTRATION

THIRD RAILWAY PROJECT REAPPRAISAL

Passenger Traffic (Actual and Forecast)
1960 - 1976
(Pass-km, millions)

	Total TRA	West Line		East Line
		Long Distance	Short Distance	
1960 (Actual)	3,406	709	2,584	113
1963 (Actual)	3,367	901	2,354	112
1967 (Actual)	4,942	1,860	2,895	187
1968 (Actual)	5,382	2,135	3,039	207
1969 (Actual)	5,825	2,465	3,148	212
1970 (Actual)	6,114	2,820	3,066	228
1971 (Actual)	6,716	3,494	2,982	240
1972 (Actual)	7,229	4,119	2,862	250
1973 (Forecast)	7,850	4,700	2,890	260
1974 (Forecast)	8,341	5,128	2,933	280
1975 (Forecast)	8,851	5,584	2,977	290
1976 (Forecast)	9,392	6,070	3,022	300
Average Annual Growth Rate:				
1960 to 1969	6.2%	14.8%	2.2%	7.2%
1969 to 1972	7.5%	18.7%	(-2.9%)	5.7%
1972 to 1976	6.8%	10.2%	1.4%	4.7%

Source: TRA and Mission

November 1973

TABLE 6

TAIWAN RAILWAY ADMINISTRATION

THIRD RAILWAY PROJECT REAPPRAISAL

Planned and Actual Investment in the Transport Sector, Fifth Four-Year Plan 1969 - 1972

NT $ million

	Planned Investment						Actual Investment		Shortfall (-) or Increase (+) over Planned Investment
	1969	1970	1971	1972	Total NT $	%	NT $	%	
Railways	1,336	1,171	1,393	1,221	5,121	25	3,182	14	(-)1,939
Highways	734	863	852	822	3,271	16	5,161	23	(+)1,890
Harbors	878	1,098	983	850	3,809	18	3,391	15	(-) 418
Shipping	628	741	2,263	2,979	6,611	32	8,046	36	(+)1,435
Civil Aviation	590	1,028	81	121	1,820	9	2,647	12	(+) 827
Total Transport Sector					20,632	100	22,427	100	(+)1,795
Total Plan Investment					156,460				

Source: Transportation Planning Board (TPB)

November 1973

TABLE 7

TAIWAN RAILWAY ADMINISTRATION

THIRD RAILWAY PROJECT REAPPRAISAL

Planned Investment in the Transport Sector, Sixth Four Year Plan, 1973-1976

NT$ Million

	1973	1974	1975	1976	Total	%
Railways	1,429	1,657	1,930	4,388	9,404	18
Highways	3,108	4,057	5,867	7,350	20,382	40
Harbors	1,852	2,411	2,529	1,751	8,543	17
Shipping	900	1,320	1,740	2,160	6,120	12
Civil Aviation	992	2,408	2,357	981	6,738	13
Total Transport Sector					51,187	100
Total Plan Investment					184,384	

Source: TPB and the Sixth Four-Year Plan of Republic of China (Approved by Executive Yuan in November 30, 1972)

November 1973

TAIWAN RAILWAY ADMINISTRATION

TABLE 8

THIRD RAILWAY PROJECT REAPPRAISAL

Actual and Estimated (Appraisal) Cost of the Project

		NT$ (millions)			US$ equivalent (millions)			Actual (1) and Estimated (2) Cost in % of Total Estimated Cost
		Local	Foreign	Total	Local	Foreign	Total	
Items financed by Loan 603-CHA								
(i) 18 diesel electric locomotives (West Line)	(1)	13.1	157.3	170.4	0.3	3.9	4.2	9.7
	(2)	15.8	160.4	176.2	0.4	4.0	4.4	10.0
(ii) 268 passenger cars (West Line)	(1)	49.1	541.2	590.3	1.2	13.5	14.7	33.5
	(2)	72.0	503.0	575.0	1.8	12.6	14.4	32.6
(iii) 600 freight cars (West Line)	(1)	172.0	182.2	354.2	4.3	4.5	8.8	20.1
	(2)	38.8	233.9	272.7	1.0	5.8	6.8	15.4
(iv) Double tracking of 7 sections between Changhua & Taiwan (34 km)	(1)	89.2	45.0	134.0	2.2	1.1	3.3	7.6
	(2)	70.9	44.1	115.0	1.7	1.1	2.8	6.5
(v) 64 automatic level crossing warning equipment	(1)	20.4	13.2	33.6	0.5	0.3	0.8	1.9
	(2)	5.0	12.0	17.0	0.1	0.3	0.4	1.0
(vi) Track improvement and strengthening between Taipei and Hsin-Chu (40 km)	(1)	123.0	75.7	198.7	3.1	1.9	5.0	11.2
	(2)	70.5	64.0	134.5	1.7	1.6	3.3	7.6
(vii) Equipment for workshops	(1)	43.5	55.4	98.9	1.1	1.4	2.5	5.6
	(2)	14.8	52.1	66.9	0.4	1.3	1.7	3.8
(viii) Freight handling equipment	(1)	11.8	16.6	28.4	0.3	0.4	0.7	1.6
	(2)	3.5	12.0	15.5	0.1	0.3	0.4	0.9
(ix) 15 trailers (East Line)	(1)	3.5	28.2	31.7	0.1	0.7	0.8	1.8
	(2)	6.5	24.0	30.5	0.1	0.6	0.7	1.7
(x) 130 bogies for passenger cars	(1)	2.0	18.6	20.6	0.1	0.5	0.5	1.2
	(2)	3.0	20.0	23.0	0.1	0.5	0.6	1.3
(xi) Signalling (Patu and Kaohsiung)	(1)	2.7	23.6	26.3	0.1	0.6	0.7	1.5
	(2)	6.4	28.1	34.5	0.2	0.7	0.9	1.9
(xii) Consulting services and training	(1)	7.7	25.8	33.5	0.2	0.7	0.9	1.9
	(2)	0.8	12.0	12.8	0.1	0.3	0.4	0.7
Sub-Total	(2)	308.0	1,165.6	1,473.6	7.7	29.1	36.8	83.4
Contingencies	(2)	22.0	84.0	106.0	0.6	2.1	2.7	6.2
Sub-Total	(1)	538.0	1,182.9	1,720.9	13.5	29.5	43.0	97.6
	(2)	330.0	1,249.6	1,579.6	8.3	31.2	39.5	89.6
Items to be financed by TRA	(1)	46.2	138.0	184.2	1.1	3.5	4.6	10.4
	(2)	46.2	138.0	184.2	1.1	3.5	4.6	10.4
Total cost of the Project	(1)	584.2	1,320.9	1,905.1	14.6	33.0	47.6	108.0
	(2)	376.2	1,387.6	1,763.8	9.4	34.7	44.1	100.0

Note: (1) Indicates the actual cost
(2) The appraisal cost estimate

Contingencies in (2) have been included in actual cost.

Source: TRA and Mission

November 1973

TAIWAN RAILWAY ADMINISTRATION

THIRD RAILWAY PROJECT REAPPRAISAL

Summary of Selected Operating Statistics (West Line)

	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
I. TRAFFIC											
Pass-km (million)	3,178	3,256	3,696	4,130	4,295	4,755	5,175	5,613	5,886	6,476	6,980
Net ton-km (million)	1,881	1,939	2,138	2,183	2,212	2,326	2,500	2,410	2,423	2,391	2,606
Traffic Units (pass-km and ton-km) (million)	5,059	5,195	5,834	6,313	6,507	7,081	7,675	8,029	8,309	8,867	9,586
II. OPERATION											
Train-km ('000)	18,956	19,252	20,667	20,767	20,875	22,130	23,217	23,425	24,977	25,841	26,961
Engine-km ('000)											
Steam	10,950	11,071	11,990	12,150	11,111	7,592	8,500	8,728	7,072	6,616	7,041
Diesel (not including diesel railcars)	8,221	8,485	8,754	8,678	9,890	14,318	14,918	15,141	17,938	20,330	20,624
	19,171	19,556	20,744	20,828	21,010	21,910	23,418	23,869	25,010	26,946	27,665
Number of Engine in Fleet:											
Steam	191	191	191	191	191	191	168	168	163	163	163
Diesel	52	52	52	52	97	97	97	97	141	141	141
Railcars	41	41	41	41	72	72	72	72	72	72	72
Total	284	284	284	284	360	360	337	337	376	376	376
Number of freight cars in fleet	5,498	5,487	5,413	5,297	5,724	6,109	6,315	6,378	6,555	7,019	7,089
Engine-km per Engine in service per day:											
Steam	204	204	226	232	281	249	258	257	248	251	290
Diesel	495	520	567	556	625	547	570	568	530	541	540
Wagon-km per wagon day	108	111	119	112	107	114	110				
Traffic-Units per Motive Power Unit in fleet (million)	17.8	18.3	20.5	22.2	18.1	19.7	22.8	23.8	22.1	23.6	25.5
Traffic-Units per Train-km	267	270	232	304	212	320	331	342	333	343	356
Pass-km per Pass-car-km	39.7	40.7	44	48	46.3	44.9	44.6	47	43	40.9	41.6
Pass-km per pass-car in fleet (million)	4.6	4.8	5.5	6.2	6.0	6.7	6.7	6.5	6.2	5.6	5.6
Net Ton-km per Freight car in fleet (000)	342	353	395	412	388	381	396	378	386	341	369
Average turnaround time of freight cars (days)	2.4	2.3	2.2	2.1	2.3	2.4	2.4	2.6	2.5	2.5	2.7
Average net loading per freight train (tons)	279	279	283	238	208	305	309	293	286	304	317
Average load of freight cars (tons) (capacity)	16.8	17.3	17.4	17.6	17.6	17.2	17.6	18.1	18.5	19.7	20.1
Average load of freight cars loaded and empty (tons)	9.5	9.6	9.7	10.8	11.2	10.4	11.1	10.4	10.1	9.9	10.1
Average load of freight cars loaded (tons)	13.5	13.6	13.9	14.6	13.5	14.0	15.0	14.7	14.4	14.2	14.7

Source: TRA

November 1973

TABLE 9

TAIWAN RAILWAY ADMINISTRATION

THIRD RAILWAY PROJECT REAPPRAISAL

Manpower, Productivity and Wages

	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
Total staff at beginning of year	21,828	21,776	21,668	21,666	21,580	21,814	21,820	21,775	22,991	23,399
Total staff at end of year	21,776	21,668	21,666	21,580	21,814	21,820	21,775	22,991	23,399	22,986
Total staff average for year	21,800	21,722	21,667	21,623	21,700	21,817	21,797	22,383	23,195	23,183
Total train-km ('000)	21,768	23,285	23,673	23,793	25,133	26,336	26,466	27,948	28,861	29,982
Employees per 1000 train-km	1.00	0.93	0.92	0.91	0.86	0.83	0.83	0.80	0.80	0.77
Total traffic units:										
Pass-km plus ton-km (million)	5,343	6,009	6,511	6,715	7,312	7,928	8,277	8,590	9,165	9,896
Traffic units per employee ('000)	245	277	300	300	337	372	379	384	395	427
Labor costs: (NT$ million)										
Salaries and wages	339.7	374.3	403.0	461.0	537.1)	664.7	694.0	761.5	791.6	352.2
Bonus	35.5	35.5	35.3	46.5	60.6)		68.9	35.0	39.5	58.3
Pensions	11.0	11.2	13.6	12.8	14.7	22.9	19.3	35.8	52.6	83.7
Total Cost	386.2	421.0	451.9	520.3	612.4	687.6	782.2	832.3	883.7	994.2
Average cost per employee:										
per annum (NT$)	17,715	19,383	20,854	24,066	28,221	31,512	35,886	37,185	38,099	42,874
per month (NT$)	1,477	1,615	1,737	2,006	2,352	2,626	2,990	3,099	3,175	3,573
per month (US$ equivalent)	37	40	44	50	59	65	75	77	79	89
Average labor cost per traffic unit (NT$)	0.072	0.070	0.069	0.077	0.084	0.087	0.095	0.097	0.096	0.100
Labor cost % of total operating cost	336.2	36.3	35.7	39.2	40.0	41.6	43.8	39.6	38.5	39.8

Source: TRA

November 1973

TABLE 10

TAIWAN RAILWAY ADMINISTRATION

THIRD RAILWAY PROJECT REAPPRAISAL

Revenue, Expenses and Net Income 1963-1973[1/]

	Actual						Actual(a) and Appraisal Estimate(b)								
							1969		1970		1971		1972		1973
	1963	1964	1965	1966	1967	1968	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)
Operating Revenues															
Passengers	636	760	857	965	1,183	1,432	1,556	1,472	1,717	1,595	1,987	1,717	2,259	1,848	
Less Provincial Government levy	-	-	-	-	27	85	66	64	-	-	-	-	-	-	
	636	760	857	965	1,156	1,347	1,490	1,408	1,717	1,595	1,987	1,717	2,259	1,848	
Freight	532	586	616	644	718	840	852	868	856	894	843	921	920	947	
Railway Freight Service - Net Revenue (loss)	10	11	12	8	7	(4)	3	(4)	10	(3)	4	(2)	17	(1)	
Hotels and Dining Cars - Net Revenue	1	1	2	2	2	2	1	2	3	2	6	3	7	3	
Other Operating Revenues	17	17	25	34	19	21	17	30	30	24	33	21	25	18	
Total Operating Revenue	1,196	1,375	1,512	1,653	1,902	2,206	2,363	2,304	2,616	2,512	2,873	2,660	3,228	2,815	3,964
Operating Expenses															
Train Operations	325	363	386	368	433	426	460	464	523	507	546	523	576	541	
Stations	99	108	114	149	173	217	258	239	300	262	311	270	323	279	
Maintenance of Way and Structures	186	184	223	218	234	229	205	255	286	278	322	286	321	297	
Maintenance of Signal and Telecommunication Equipment	-	-	-	-	35	35	39	45	52	49	48	51	55	52	
Maintenance of Equipment	168	180	192	201	227	274	319	299	380	327	394	337	420	349	
Traffic Management	43	49	59	48	67	80	97	90	105	98	151	101	147	105	
Pensions	18	19	13	13	15	23	19	23	36	24	53	27	64	31	
General Administration	57	59	71	76	80	87	102	105	108	115	115	118	121	122	
Other Operating Expenses	9	7	7	57	46	51	9	5	12	4	19	4	30	4	
Total Operating Expenses (excluding depreciation)	905	969	1,065	1,130	1,310	1,422	1,568	1,525	1,802	1,664	1,959	1,717	2,057	1,780	
Depreciation	163	191	199	198	220	232	262	259	299	315	334	330	439	355	
Total Operating Expenses	1,068	1,160	1,264	1,328	1,530	1,654	1,830	1,784	2,101	1,979	2,293	2,047	2,496	2,135	3,150
Net Operating Revenue	128	215	248	325	372	552	533	520	515	533	580	613	732	680	814
Net Non-operating Income (Loss)	20	(12)	9	(14)	(9)	(51)	10	(5)	(2)	(5)	26	(5)	(12)	(5)	6
Net Revenue before Interest Charges	148	203	257	311	363	501	543	515	513	528	606	608	720	675	820
Interest	76	72	67	70	88	103	119	135	173	196	163	210	233	199	189
Net Income	72	131	190	241	275	398	424	38	340	332	443	398	487	476	631
Ratios:															
Operating Ratios	89	84	84	80	80	75	77	77	80	79	80	77	77	76	76
Times Interest Earned	1.9	2.8	3.8	4.5	4.2	4.9	4.6	3.8	3.0	2.7	3.7	2.9	3.1	3.4	4.3
Debt Service Coverage	1.6	2.5	2.7	2.4	2.9	3.3	2.8	2.6	2.3	2.4	2.4	1.6	2.6	1.7	2.2
Return on Net Fixed Assets	2.5	4.0	4.8	5.3	6.4	9.3	7.0	7.8	6.3	6.7	6.6	6.8	7.2	7.3	8.0

1/ Calendar years except for 1973, which covers period July 1, 1972 to June 30, 1973, the new financial year; before FY1973, the calendar and financial year coincided with each other.

Source: TRA and Mission

November 1973

TABLE 11

TAIWAN RAILWAY ADMINISTRATION

THIRD RAILWAY PROJECT REAPPRAISAL

Actual and Forecast Passenger-km Carried by TRA's West Line 1968-1976

Million Pass-Km

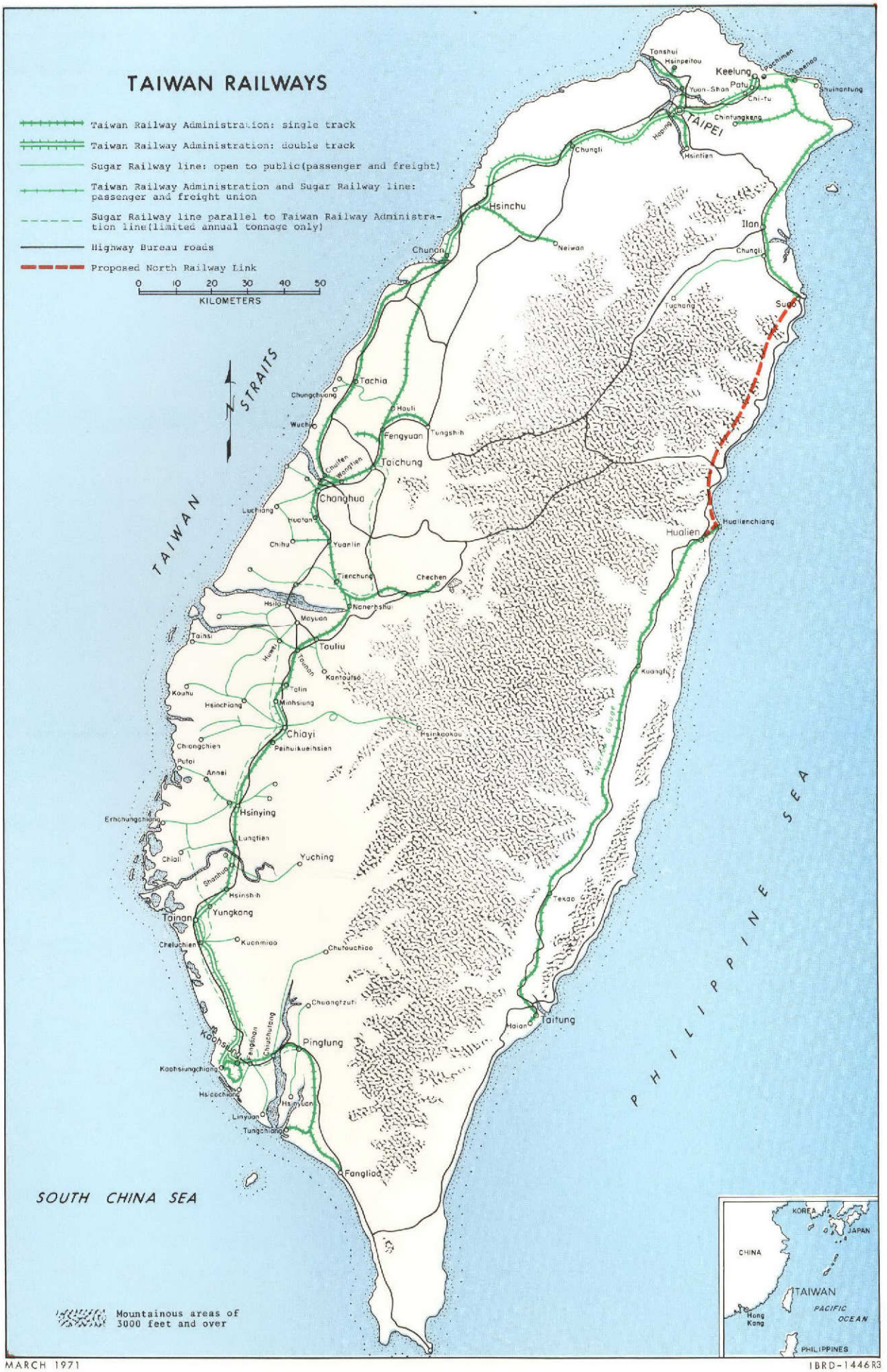
	Year	Chu 1/ Kuang (1)	Kuan 1/ Kuang (2)	Kuang Hua 1/ (3)	Limited Express (4)	Ordinary Express (5)	Sub-Total Express Trains (6)	Ordinary Trains (7)	Total (8)	% of Total (1) to (4)	% of Total (6)	% of Total (7)
- - Actual - -	1968		318	162	494	1,161	2,135	3,040	5,175	18.8	41.3	58.7
	1969		334	180	576	1,375	2,465	3,148	5,613	19.4	43.9	56.1
	1970	137	326	199	625	1,533	2,820	3,066	5,886	21.9	47.9	52.1
	1971	302	326	268	762	1,836	3,494	2,982	6,476	25.6	54.0	46.0
	1972	388	393	299	886	2,152	4,118	2,862	6,980	28.2	59.0	41.0
- - Forecast - -	1973	431	409	302	1,001	2,557	4,700	2,890	7,590	28.2	61.9	38.1
	1974	478	425	305	1,111	2,809	5,128	2,933	8,061	28.8	63.6	36.4
	1975	531	442	308	1,233	3,070	5,584	2,977	8,561	29.4	65.2	34.8
	1976	589	459	311	1,368	3,343	6,070	3,022	9,092	30.0	66.8	33.2

1/ Special airconditioned express trains between Taipei and Kaohsiung.

Source: TRA and Mission

November 1973

TABLE 12



MARCH 1971

IBRD-1446R3

FORM NO. 75
(7–73)

WORLD BANK GROUP

ROUTING SLIP	DATE Oct 10 '74

NAME	ROOM NO.
Mr Shoaib	

	APPROPRIATE DISPOSITION		NOTE AND RETURN
✓	APPROVAL		NOTE AND SEND ON
	COMMENT		PER OUR CONVERSATION
	FOR ACTION		PER YOUR REQUEST
	INFORMATION		PREPARE REPLY
	NITIAL		RECOMMENDATION
	NOTE AND FILE		SIGNATURE

REMARKS

I think we ought to give the EDs some little indication of the "new style" of PPA reports and since China Railways is the first one actually to be distributed I suggest your covering memo should read as attached

To Mr Willoughby OK Shoaib 10 Oct.

FROM	ROOM NO.	EXTENSION
Christopher Willoughby	G1050	2745

D R A F T
CRWilloughby/aga
October 10, 1974

MEMORANDUM TO THE EXECUTIVE DIRECTORS

SUBJECT: Project Performance Audit: China Third Railway Project (Loan 603-CHA)

Attached, for information, is a copy of a confidential report entitled "Project Performance Audit: China Third Railway Project (Loan 603-CHA)" produced by the Operations Evaluation Department under the system described in the President's memorandum of April 13, 1973 (SecM73-203). It is the first such report to consist of a brief Project Performance Audit Memorandum prepared by the Operations Evaluation Department itself, with the corresponding Project Completion Report, prepared by the responsible Regional Office, included as an attachment.

Attachment

INTERNATIONAL DEVELOPMENT ASSOCIATION | INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT | INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

TO: Mr. M. Shoaib, Vice President (3) DATE: October 3, 1974

FROM: C. R. Willoughby, OED CRW

SUBJECT: Project Performance Audit of China Third Railways Project (Loan 603-CHA)

I am attaching for your approval our project performance audit report for the China Third Railways Project (Loan 603-CHA); this one again follows the new format of a short 'audit memorandum' by ourselves to which is attached the Project Completion Report prepared by the responsible Regional Office.

The performance audit report has been revised in light of useful comments provided by the Taiwan Railway Administration as well as by the East Asia and Pacific Regional Office and CPS.

Attachment

cc: Mr. B. Bell
Mr. W. C. Baum
Mr. O. Rahkonen

CRWilloughby/aga

To Mr McNamara
Shoaib
3 Oct.

Mr Willoughby
10-7-74

10 54
OCT 7 1974

FORM NO. 75
(7–73)

WORLD BANK GROUP

ROUTING SLIP	DATE September 25, 1974

NAME	ROOM NO.
Mr. C.R. Willoughby	G-1050
file China Railways Audit	

	APPROPRIATE DISPOSITION		NOTE AND RETURN
	APPROVAL		NOTE AND SEND ON
	COMMENT	X	PER OUR CONVERSATION
X	FOR ACTION		PER YOUR REQUEST
	INFORMATION		PREPARE REPLY
	INITIAL		RECOMMENDATION
	NOTE AND FILE		SIGNATURE

REMARKS

Re: China Railway Audit

Please see my answer to your comments (attached herewith).

If you wish so, we could discuss the matter further at your convenience.

Alain

...OM	ROOM NO.	EXTENSION
A.M. Collion	C-508	2795

China Rlwys

Mr Collier.

?

1) They must straighten out para 8.03 Nanjundiah / Rahkonen or substitute.

or refer also para (2) TRA comments or Alan's comment on this. of PCR

2) I don't see full justification for change in last page of Audit Memo. Nanjundiah himself says Gledhill study under Third Loan deficient. Surely Bk should have supervised more or done better terms of ref to see that traffic forecasts more convincing, or else it shd have been less restrictive, pragmatic or something, or could traffic not be better forecasted pending "natural" development of better transport coordination, in which case fault is not the consultants'.

Chris:

1) I have just discussed at length with Rahkonen and he suggested deleting part of ¶ 8.03 (as shown in attachment)

2) Discrepancy with TRA's figure is unimportant (I agree) and the point made by TRA was an explanation regarding the local cost overrun rather than pointing out discrepancy in figures. All cost figures in PCR were given by TRA itself

3) Rahkonen agrees with deletion of sentence in conclusion. The point is the Bank was at the time pessimistic about TRA's electrification and whatever quality of study, we would have found points of criticism.

4) and more important, Rahkonen was last month in China (supervision mission). He confirmed that the report had been extremely well received by the Chinese, and he emphasized the fact that the Finance Minister liked the report so much that he gave order that such reappraisal reports (similar format etc) be prepared on all major projects in Taiwan. This has been and will be certainly the main impact of our China Railway Audit.

9/25

FORM NO. 75
(7–73)

WORLD BANK GROUP

ROUTING SLIP	DATE 09/12

NAME	ROOM NO.
~~Ms. Israel~~	G-1055
CW. This is no	OK
with me	
	A

	APPROPRIATE DISPOSITION		NOTE AND RETURN
	APPROVAL		NOTE AND SEND ON
	COMMENT		PER OUR CONVERSATION
	FOR ACTION		PER YOUR REQUEST
	INFORMATION		PREPARE REPLY
	INITIAL		RECOMMENDATION
	NOTE AND FILE		SIGNATURE

REMARKS

Arturo:

I have just met with Nanjundiah (a long, interesting, and "public relations" meeting).

In light of the discussion, I have made two additional changes (see clips on mastercopy).

Alain

09/12

FROM	ROOM NO.	EXTENSION
/		

FORM NO. 75
(7–73)

WORLD BANK GROUP

ROUTING SLIP	DATE

NAME	ROOM NO.
- See Nanjundiah	
- tell Arthur on Thursday	

	APPROPRIATE DISPOSITION		NOTE AND RETURN
	APPROVAL		NOTE AND SEND ON
	COMMENT		PER OUR CONVERSATION
	FOR ACTION		PER YOUR REQUEST
	INFORMATION		PREPARE REPLY
	INITIAL		RECOMMENDATION
	NOTE AND FILE		SIGNATURE

REMARKS

Arthur: Re: China Railway Audit

Attached are (i) the comments received on our first draft with my own remarks in the margin and (ii) the revised draft

I have spent quite a lot of time in trying to reconcile our figures for local costs of the 600 freight cars with those indicated in TRA's letter, but to no avail! My "best guess" is that the ~~Chinese~~ PCR figures (local costs) include the $0.9 million of FX not financed by the Bank...

Alain 09/05

FROM	ROOM NO.	EXTENSION
(Probably include a footnote explaining the discrepancy)		

8/28/74

臺灣鐵路管理局
Taiwan Railway Administration
2 Yenping N. Road, Section I, Taipei, Taiwan
Republic of China
Telephone-551131. Cable Address-TAIRAIL, TAIPEI

Ref. No. (P1)63-8-23(1)

August 23, 1974

International Bank for
Reconstruction & Development
1818 H Street, N.W.
Washington D.C. 20433
U. S. A.

Attention To: Mr. Christopher R. Willoughby
Director of Operations Evaluation Dept.

Dear Sir:

This reverts to your letter of July 16th and the enclosed Performance Audit Report which we have read thoroughly. We appreciate that on the whole the Report is fair and represents a complete examination & evaluation of the project in many respects. However, we would like to make some explanations and complementary comments for your reference.

(1) The third railway project was brought up in coordination with the fifth four-year economic development plan of our Government. It was geared to procuring enough quantity of locomotives, passenger cars, and freight cars in time to meet the fast g owing transport demand. TRA was able to do so in due course and has not only been relieved of capacity embarrassment, but also evidenced significant improvement in its financial performance as well as major contribution to the national economy. These certainly should be attributed to the third railway project (603-CHA Loan).

(2) As to the local-built freight cars, originally it was planned to procure 600 freight cars all from overseas with an estimated cost of 5.8 million US dollars and 38.8 million New Taiwan dollars. In total the cost was estimated to be 272.7 million New Taiwan dollars equivalent (or 6.818 million US$equivalent). The actual disbursement was 4.421 million US dollars and 137.89 N$ with a total of 315.17 New Taiwan dollars equivalent. Compared with the original plan, the foreign cost was underdisbursed for about 24%, whereas the local cost was overrun for 25.5%. with the average total cost overrun amounting to 15%. The major reason was due to the fact that at the appraisal time we estimated the unit cost of freight cars based on the former purchase price of similar freight cars from abroad. And then, it turned out that a local manufacturer who participated in the bidding won the world wide bid at the lowest competitive price.

臺灣鐵路管理局
Taiwan Railway Administration
2 Yenping N. Road, Section I, Taipei, Taiwan
Republic of China
Telephone-551131.Cable Address-TAIRAIL, TAIPEI

(3) It was the first time for TRA to strengthen the tracks by replacing the old rails with 50 kg. new ones. In order to match the old rails with the new rails, TRA has taken sufficient time to collect correct information for preparing engineering specifications. Moreover, the traffic frequency was greatly increased during the construction period and further delayed the progress of the construction. We consider this will be an area for improvement in future.

(4) Booz,Allen and Hamilton Company is a renowned consulting firm in the United States, we were quite convinced of its quality of service. However, we did consult the Bank on the terms of reference beforehand just as each time we did with our equipment procurement for which the Bank's approval of the specification was a must before any contract was awarded. As to the end product of the consulting work, it may seem conceptual but is valuable in instilling some new ideas into the mind of our management.

(5) As it is mentioned in the Project Completion Report, the transport economics study was delayed not because of the trainees' language inability but due to the difficulty of arrangement for their advanced study. Now the trainees together with the management team have returned from their training and started to renovate the corporate planning and control system. We are confident that it will be a success in gradual implementation of BAHINT's recommendations.

(6) TRA has always respected and conformed to the loan agreements. We have constantly consulted with the Bank on the electrification plan pursuant to the covenant of the third railway project. We are delighted to learn your comment that "TRA's decision appears to have been the right one". It is proven that an overworry of the distribution of highway and railway transport is unnecessary under the particular situation of this country.

We are obliged to the Bank for all it has done to improve our Administration in technical, financial as well as managerial aspects. We also think highly of your comments on TRA's performance in recent years. We would like to thank you for pointing out some of the setbacks in our operations and will see to improve them with our best efforts in the nearest future.

Yours truly,

T. N. Chen
Managing Director

cc: MOF

ASSOCIATION | RECONSTRUCTION AND DEVELOPMENT | CORPORATION

OFFICE MEMORANDUM

copy to Mr. Baumgartner
Mr. Willoughby

TO: Mr. E. V. K. Jaycox

DATE: August 1, 1974

(1) copy to Mr. Collier (o/r)
(2) file

FROM: M. S. Nanjundiah

SUBJECT: Project Performance Audit of China Third Railway Project (Loan 603-CHA)

1. Two criticisms are made in the draft report in regard to the Bank's role in this project. The first concerns the role in regard to TRA's electrification plans. The criticism is, in my view, not justified. The Bank rightly wanted a proper study of the question of electrification. Even the feasibility study made by Consultants under the third project was inadequate and did not cover some areas of concern to the Bank. It could not provide a basis for investment decision, without further scrutiny. This apart, the study had just been received when the Fourth Railway loan was being finalized; at the time of "appraisal" the study was still being made. The Fourth Railway loan did not naturally include investments on account of electrification, as the decisions had still to be taken and there were complex issues involved. The fourth project was intended to cover the investments in 1972 and 1973 of the "investment plan". A revision thereof to include electrification could have been proposed by the Government at any appropriate time should this have been fully justified. That Government did not take a final decision even till late 1973 indicates the complexities involved in this case. The comment in the report "but given the rapid economic growth of Taiwan and the high concentration of population and economic activities along the West Coast, there appears now to be room for both a freeway and an electrified railway line" needs substantiation - it also ignores the "timing" aspect.

2. The second criticism in the report that "with hindsight, it seems that at appraisal time the Bank could have done more for overall transport sector planning" is in my view, a negative comment, not justified in this case. One has to consider the situation at the time and also consider what action was taken during the project execution stage. The judgment at the appraisal stage was that "transport coordination through the CIECD had made a satisfactory beginning". During project execution the Bank laid considerable emphasis on "transport coordination" and had extensive discussions with the Government. The measures taken were later supplemented and the institutional framework and work program strengthened in the fourth loan. I think the Bank's efforts to assist in institution building have been sound and designed with due consideration to the country's capabilities to gradually absorb new ideas and decision making processes. The area of transport coordination is a complex and difficult one, even in developed countries and the Bank has to adopt a pragmatic approach. The criticism in the report arises from an attitude that much can be accomplished by Bank insistence on some aspects without taking into account what the country can and is willing to absorb by way of new concepts. In this case, quite a few measures were taken to ensure that a 'sectoral approach' is taken for purposes of investment decisions.

3. Apart from this, I have a few comments of a minor nature. In Page 3, it is stated "as a result of too strict an interpretation of Bank disbursement procedures (details given in para 8.03 of the attached PCR) about US$1.5 million were cancelled out of the original loan amount". Para 8.03 of the PCR itself needs factual verification - from the project correspondence files I see that the Bank agreed to foreign exchange financing for contracts for freight cars ordered on local manufacturers, as requested by TRA. Since "foreign exchange" financing was contemplated, I do not see anything to warrant the statement that it was "too strict" an interpretation. Bank Loan disbursement procedures have to be clear and specific. In this case, it seems TRA did not ask for reallocation from the "unallocated" category - this is not the Bank's fault. Again, in page 7 it is said that at appraisal time there was conservative estimation of railway costs and average financial operating cost was used instead of long term economic variable costs. In the first place it is perhaps better to be conservative in estimating cost advantages in Railway projects. Secondly, in this case, where rolling stock and locomotives were a large part of the project, the average financial operating cost and the long term economic variable costs would presumably not be significantly different.

now taken care of (deleted in mem.)

Clarity

financial vs. economic

MSNanjundiah:jc

file China Railway audit

Mr. Ossi J. Rahkonen

September 24, 1974

Alain M. Colliou

Audit China Third Railway Project

1. The China Railway Audit is now almost finalized and I have already taken account of your useful comments. However, there are two points that still need clarification:

(i) TRA disagrees with the PCR's figures for the local cost of the 600 freight cars (see attached comments of TRA para. 2); despite some lengthy research through files, I could not find the reason for discrepancy; and more importantly

(ii) Para. 8.03 of the PCR seems to be inaccurate (see attached comments by Mr. Nanjundiah, para. 3); again I was unable to find the facts.

2. I would like to meet with you as early as possible to clarify the above points.

cc: Mr. Willoughby (w/o attachment) ✓
Mr. Kalim (with attachments)

AColliou:ja

SEP 25 1974

FORM NO. 249
(7–74)

WORLD BANK GROUP

INCOMING MAIL

DATE: AUG 28 1974

	Mr. H. Adler	A1042		Mr. Knox	A813
	Mr. J. Adler	E624		Mr. Krieger	B906
	Mr. Alter	A908		Mr. Lari	D1032
	Mr. Bart	F718		Mr. Lejeune	A1013
	Mr. Baum	E1023		Mr. McNamara	E1227
	Mr. Bell	A613		Mr. Muller	N436
	Mr. Benjenk	E723		Mr. North	D1032
	Mr. Broches	E923		Mr. Nurick	E915
	Mr. Cargill	E1236		Mr. Paijmans	C702
	Mr. Chadenet	E1204		Mr. Rayfield	N434
	Mr. V. C. Chang	E516		Mr. de la Renaudiere	C302
	Mr. Chaufournier	A313			
	Mr. Chenery	E1239		Mr. Rotberg	E427
	Mr. Wm. Clark	E823		Mr. Thalwitz	A210
	Mr. Clarke	D1029		Mr. Tims	D428
	Mr. Damry	A1219		Mr. Twining	N635
	Mr. D. A. de Silva	N635		Mr. Van der Meer	A507
	Mr. Diamond	C502		Mr. Van der Tak	E1023
	Mr. Fowler	A1219		Mr. Votaw	C602
	Mr. Gabriel	E516		Mr. Wapenhans	A712
				Mr. Weiner	A513
	Mr. Graves	E1039		Mr. Wiehen	C1001
	Mr. Gulhati	D530		Mr. Wiese	A837
	Mr. Hittmair	E427	✓	Mr. Willoughby	G1050
	Mr. Hoffman	E823		Mr. Wright	A307
	Mrs. Hughes	D529			
	Mr. Husain	A1136			
	Mr. Kirmani	A610			
	Mr. Knapp	E1227			

FROM: Incoming Mail Unit, Room F–126, Extension 2023

File China – Railway audit.

✓ (1) ~~Loetrow~~
(2) CW 9/12

臺灣鐵路管理局

Taiwan Railway Administration

2 Yenping N. Road, Section I, Taipei, Taiwan
Republic of China
Telephone-551131.Cable Address-TAIRAIL, TAIPEI

Ref. No. (P1)63-8-23(1)

August 23, 1974

International Bank for
Reconstruction & Development
1818 H Street, N.W.
Washington D.C. 20433
U. S. A.

Attention To: Mr. Christopher R. Willoughby
Director of Operations Evaluation Dept.

Dear Sir:

This reverts to your letter of July 16th and the enclosed Performance Audit Report which we have read thoroughly. We appreciate that on the whole the Report is fair and represents a complete examination & evaluation of the project in many respects. However, we would like to make some explanations and complementary comments for your reference.

(1) The third railway project was brought up in coordination with the fifth four-year economic development plan of our Government. It was geared to procuring enough quantity of locomotives, passenger cars, and freight cars in time to meet the fast growing transport demand. TRA was able to do so in due course and has not only been relieved of capacity embarrassment, but also envidenced significant improvement in its financial performance as well as major contribution to the national economy. These certainly should be attributed to the third railway project (603-CHA Loan).

(2) As to the local-built freight cars, originally it was planned to procure 600 freight cars all from overseas with an estimated cost of 5.8 million US dollars and 38.8 million New Taiwan dollars. In total the cost was estimated to be 272.7 million New Taiwan dollars equivalent (or 6.818 million US$equivalent). The actual disbursement was 4.421 million US dollars and 137.89 NT$ with a total of 315.17 New Taiwan dollars equivalent. Compared with the original plan, the foreign cost was underdisbursed for about 24%, whereas the local cost was overrun for 25.5%. with the average total cost overrun amounting to 15%. The major reason was due to the fact that at the appraisal time we estimated the unit cost of freight cars based on the former purchase price of similar freight cars from abroad. And then, it turned out that a local manufacturer who participated in the bidding won the world wide bid at the lowest competitive price.

臺灣鐵路管理局
Taiwan Railway Administration
2 Yenping N. Road, Section I, Taipei, Taiwan
Republic of China
Telephone-551131.Cable Address-TAIRAIL, TAIPEI

(3) It was the first time for TRA to strengthen the tracks by replacing the old rails with 50 kg. new ones. In order to match the old rails with the new rails, TRA has taken sufficient time to collect correct information for preparing engineering specifications. Moreover, the traffic frequency was greatly increased during the construction period and further delayed the progress of the construction. We consider this will be an area for improvement in future.

(4) Booz,Allen and Hamilton Company is a renowned consulting firm in the United States, we were quite convinced of its quality of service. However, we did consult the Bank on the terms of reference beforehand just as each time we did with our equipment procurement for which the Bank's approval of the specification was a must before any contract was awarded. As to the end product of the consulting work, it may seem conceptual but is valuable in instilling some new ideas into the mind of our management.

(5) As it is mentioned in the Project Completion Report, the transport economics study was delayed not because of the trainees' language inability but due to the difficulty of arrangement for their advanced study. Now the trainees together with the management team have returned from their training and started to renovate the corporate planning and control system. We are confident that it will be a success in gradual implementation of BAHINT's recommendations.

(6) TRA has always respected and conformed to the loan agreements. We have constantly consulted with the Bank on the electrification plan pursuant to the covenant of the third railway project. We are delighted to learn your comment that "TRA's decision appears to have been the right one". It is proven that an overworry of the distribution of highway and railway transport is unnecessary under the particular situation of this country.

We are obliged to the Bank for all it has done to improve our Administration in technical, financial as well as managerial aspects. We also think highly of your comments on TRA's performance in recent years. We would like to thank you for pointing out some of the setbacks in our operations and will see to improve them with our best efforts in the nearest future.

Yours truly,

T. N. Chen
Managing Director

cc: MOF

INTERNATIONAL DEVELOPMENT ASSOCIATION | INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT | INTERNATIONAL FINANCE CORPORATION

OFFICE MEMORANDUM

TO: Mr. W. Baum, Vice President, Projects
Mr. B. Bell, Vice President, East Asia and Pacific

DATE: July 5, 1974

FROM: C. R. Willoughby, Director, OED

SUBJECT: Project Performance Audit of China Third Railway Project (Loan 603-CHA)

I attach a copy of the draft of a Project Performance Audit of the China Third Railway Project (Loan 603-CHA). In accordance with the new procedures set out in Mr. Knapp's memorandum of May 6, this audit report consists of an audit memorandum prepared by our Department to which is attached the corresponding Project Completion Report (excluding the names of authors and any sections that would be inappropriate for circulation outside the Bank). I would appreciate any comments you may have, and we would expect to be able to take them into account in finalization of the report if they are provided before August 16, 1974.

On July 12, I expect to send the audit report, as it now stands, to the Taiwan Railway Administration for their comments.

cc: Messrs. Shoaib
Jaycox
Kirmani
van der Tak
Votaw
Howell
Loos
Young
Shields
Chapman
Rahkonen
Tachibana
Israel

Attachment

AC:ch

Ln. 603

RESTRICTED

Report No. P-698

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

REPORT AND RECOMMENDATION OF THE PRESIDENT TO THE EXECUTIVE DIRECTORS ON A PROPOSED LOAN TO THE REPUBLIC OF CHINA FOR A THIRD RAILWAY PROJECT

May 14, 1969

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

REPORT AND RECOMMENDATION OF THE PRESIDENT TO THE EXECUTIVE DIRECTORS ON A PROPOSED LOAN TO THE REPUBLIC OF CHINA FOR A THIRD RAILWAY PROJECT

1. I submit the following report and recommendation on a proposed loan in an amount in various currencies equivalent to $31.2 million to the Republic of China, for relending to the Taiwan Railway Administration (TRA) for a Third Railway Project.

PART I - HISTORICAL

2. In April 1965 the Bank lent $20 million to the Republic of China for the TRA to help finance its capital improvements during the years 1965-68. Traffic rose much faster than expected, leading to a revision of the investment program and a second $17.5 million loan in January 1968 for imported rolling stock, motive power and other equipment.

3. The TRA has recently drawn up a new Capital Investment Plan for the period 1969-72 amounting to $125 million equivalent with a foreign exchange component of $74 million equivalent. This proposed loan would finance the foreign exchange cost of high priority investments to be made in 1969-70.

4. The proposed loan would support the Government's efforts to improve and expand the country's infrastructure, especially in transportation, to the level required for further economic progress. Public investment in infrastructure has increased appreciably in recent years but has not kept pace with the rapid development of the directly productive sectors of the economy. Accordingly greater emphasis is now being placed on investment in transportation, electric power, water supply, telecommunications and education.

5. Negotiations for the loan were held in Washington from March 28 to April 4, 1969. Representing the Central and Provincial Governments were Mr. Martin Wong, Economic Minister and Mr. T.W. Hu, Economic Attache in the Embassy. The TRA was represented by Mr. S.H. Chen, General Manager; Mr. C.F. Chen, Chief of Operations; and Mr. Tuan, Chief Engineer.

6. The Bank has made eight loans to the Republic of China and the proposed loan would bring the total to $178 million net of cancellations. IDA has made four development credits, totalling $13.1 million net of cancellations, which are fully disbursed. The following is a summary statement of Bank loans and IDA credits as of March 31, 1969:

Loan or Credit No.	Year	Borrower	Purpose	Amount net of cancellations (US$ million) Bank	IDA	Undisbursed
6	1961	China	Harbor dredging		2.2	
7	1961	China	Ground water		2.0	
9	1961	China	Water supply		4.0	
17	1961	China	China Development Corporation		4.9	
356	1963	China	Deep-sea fishing	7.6		
397	1964	CDC	Industrial Development Corporation	15.0		0.3
409	1965	China	Railways	17.8		1.6
498	1967	China	Deep-sea fishing	6.9		5.6
506	1967	DGT	Communications	17.0		16.6
508	1967	CDC	Industrial Development Corporation	15.0		10.7
524	1968	China	Railways	17.5		16.9
574 1/	1968	Taipower	Electric Power	50.0		
			Total net of cancellations	146.8	13.1	
			of which has been repaid to the Bank and others	3.5		
			Total now outstanding	143.3		
			Amount sold 7.6			
			of which has been repaid 1.1	6.5		
			Total now held by Bank and IDA	136.8	13.1	
			Total undisbursed	51.7		51.7

1/ Not yet effective

7. All the projects financed by IDA and the First Deep-sea Fishing project have been satisfactorily completed. The implementation of the projects financed by previous Bank loans is progressing satisfactorily. Disbursements under the Second Deep-sea Fishing loan (498 CHA) are related to the construction of fishing vessels which is on schedule. Disbursements of the Telecommunications loan (506 CHA) are about a year behind schedule because a major contract had to be retendered.

8. An appraisal mission for a thermal power project is scheduled to visit Taiwan shortly and a loan is expected to be presented to the Executive Directors in January 1970.

9. China has recently joined IFC, but so far no IFC investments have been made in the country.

PART II - DESCRIPTION OF THE PROPOSED LOAN

10.

Borrower:	Republic of China
Beneficiary:	Taiwan Railway Administration (TRA)
Amount:	The equivalent in various currencies of $31.2 million
Purpose:	To help finance the purchase of locomotives, rolling stock, track equipment, signalling equipment and miscellaneous items.
Amortization:	In fifteen and one-half years including a three and one-half year grace period, through semi-annual installments beginning December 15, 1972 and ending December 15, 1984.
Interest Rate:	6½ percent per annum
Commitment Charge:	3/4 of 1 percent per annum
Relending Terms:	The same as the terms of the Bank loan to the Republic of China

PART III - THE PROJECT

11. An appraisal report entitled "Appraisal of Third Railway Project, China" (PTR-10a) dated May 9, 1969 is attached.

12. Inland transport requirements are mostly concentrated within a corridor stretching the length of the western plain, and containing most of the country's large cities. The TRA's main railway line passes through this 400 km corridor, serving more than 80 percent of the population. Road transport of passengers and freight along the route is still largely confined to short distance and local traffic. Coastal shipping on the western coast of Taiwan is almost non-existent, and the narrow gauge railways operated by the sugar, mining and timber industries serve mostly as feeders for the TRA lines. The narrow valley on the east side of the island relies to an even greater extent on the narrow gauge East Railway Line. This railway is paralleled by an unpaved road which can be used throughout its length only in the dry season.

13. In compliance with the terms of earlier Bank loans a Committee for Coordination of Transport has been established, consisting of heads of transport agencies. Several short-term problems have been studied and the Committee is now concentrating on the preparation of long-term development programs. Current studies under way or to be started shortly cover the feasibility of railway electrification, proposals for

new port and airport facilities, the proposed north-south expressway connecting Keelung and Kaohsiung and urban transport problems. Regardless of the outcome of the above studies, the items to be financed by this loan would be required by the railways and are justified.

14. The loan would help finance the first two years of the TRA's Capital Investment Plan for 1969-72, making a total investment in the years 1969 and 1970 of $86 million, including foreign costs of $54 million. The proposed loan would cover the cost of imported locomotives, passenger and freight cars, track and signalling equipment, and minor miscallaneous items; and additionally would provide for the foreign exchange cost of consulting services.

15. Consultants to be financed out of the proceeds of the proposed loan would carry out a feasibility study of the electrification of TRA's main line and help in the establishment of a railway planning unit. The planning unit will assist TRA's management to plan investments, examine transport competition, review operational efficiency, traffic costs and tariff policy. In particular the consultants would help to introduce modern traffic costing techniques and would instruct TRA's staff in devising a rate and fare structure based on traffic costs. To ensure proper staffing of the planning unit to be established the proposed loan will also cover the foreign exchange costs of training abroad of suitable TRA staff. The allocation for the feasibility study, the assistance in planning, and for training amounts to $300,000.

16. The goods to be financed would be procured through international competitive bidding. Local suppliers will probably compete for some contracts, especially for freight cars and will be allowed a preference of 15 percent or the existing level of customs duties and taxes, whichever is lower. Disbursements from the loan against contracts won by local suppliers would be for the foreign cost component of the contract.

17. Arrangements for purchasing 18 locomotives to be included in the loan have already been made, as Executive Directors have been advised. This was done last March when at the Bank's suggestion TRA combined this purchase with the purchase of 26 locomotives under the previous Bank loan to TRA (524 CHA), both being on the basis of full international competition. In this way TRA was able to standardize on a single type and achieve substantial cost savings.

18. The railroad is generally well managed, its personnel are efficient, and the organization is qualified to carry out the project. The TRA is financially sound and earns a satisfactory rate of return. Under the loan the railroad would be required to earn a 6.5 percent rate of return for fiscal years 1969 and 1970, and not less than 7 percent thereafter. Cash requirements during the four-year period of the Capital Investment Plan are about $175 million. Internal cash generation of approximately $105 million leaves $70 million to be borrowed. The proposed and expected future Bank loans, together with modest short-term borrowing from local sources, would cover the gap.

Debt will constitute a reasonable portion of TRA's capitalization during the Plan period and earnings are expected to cover debt servicing requirements by a satisfactory margin.

19. The project will provide high priority items urgently needed by the railroad and will give economic rates of return varying from 9 to 35 percent on investments.

20. The proposed loan would be for a term of fifteen and one-half years, a period which is somewhat shorter than is customary for a project of this kind and which reflects China's favorable foreign exchange position and prospects. The Government will relend the proceeds of the proposed loan on the same financial terms and conditions to TRA, and cash flow projections indicate that the proposed repayment schedule will not be burdensome for the railway.

PART IV - LEGAL INSTRUMENTS AND AUTHORITY

21. The draft Loan Agreement between the Republic of China and the Bank, the draft Project Agreement between the Bank, the Province of Taiwan and the Taiwan Railway Administration, the Report of the Committee provided for in Article III, Section 4(iii) of the Articles of Agreement and the text of a draft Resolution approving the proposed loan are being distributed to the Executive Directors separately.

22. The draft loan documents are substantially in the form usually used for railway projects and follow closely the documents used for the previous two loans. In addition, provisions are made in the draft loan documents:

(i) amending rate covenants in the previous Loan and Project Agreements (Loan Nos. 409 CHA and 524 CHA) to conform with the new rate covenants (Sections 7.01(c) and 7.02(b) of the draft Loan Agreement and Sections 3.01(a) and 3.02(a) of the draft Project Agreement);

(ii) for cross defaults under the previous two Loan Agreements and the new Loan Agreement (Section 6.02(b), 7.01(a), (b) and 7.02(a));

(iii) restricting TRA's contribution to the Province during the period of January 1, 1970 to December 31, 1972 to $1.25 million in any year (Section 2.10 of the draft Project Agreement);

(iv) requiring TRA to consult the Bank on implementation of the electrification of its railway system (Section 2.11 of the draft Project Agreement); and

(v) for preference to the local suppliers (paragraph 5 of Schedule 4 of the draft Loan Agreement).

PART V - THE ECONOMY

23. An economic report, "Current Economic Position and Prospects of the Republic of China" (AS-142a), dated September 11, 1968, in two volumes was circulated to the Executive Directors on September 17, 1968. The economic growth of the Republic of China accelerated further in 1968; GNP in real terms increased by 10.3 percent as compared with 9.9 percent in 1967 and 9.4 percent in 1966. As a result of this and a notable decline in population growth, per capita GNP in real terms increased by almost 8 percent to US$273 equivalent. Prospects for further rapid growth are favorable. Wholesale prices on the average rose by 2 percent in 1968 and consumer prices by more than 6 percent. Being alerted by this evidence of some inflationary pressure from a considerable credit expansion, the Central Bank tightened credit.

24. Manufacturing and construction continued to grow faster than other sectors; manufacturing production increased by 20 percent in 1968, with more output from new and technically advanced industries. Power supply has improved as a result of a substantial increase in hydropower made possible by abundant rainfalls during the year. However, a drought could adversely affect the supply of hydroelectricity. Accelerated economic growth and the trade boom have led to rapidly increasing demand for transportation services. In 1968, overland passenger and freight traffic each rose by more than 10 percent, total import and export shipments by almost 30 percent, and the volume of cargo loaded and unloaded at the harbors by 17 percent.

25. Merchandise exports accelerated from a 20 percent increase in 1967 to a 26 percent increase in 1968 while the growth in merchandise imports slowed down from 22 percent in 1967 to 13 percent in 1968. The deficit on goods and services amounting to $130 million in 1968 is relatively small compared with the total export earnings from goods and services of over $1 billion. Possible reduction of receipts from Vietnam in case of a peace settlement is estimated at only 2-3 percent of total exports of goods and services.

26. Being fully aware of the bottlenecks existing in infrastructure services the Chinese Government in its Fifth Four-Year Development Plan (1969-72) emphasized investment in transportation, power, the expansion of urban facilities, and the development of technical and scientific education to train more technical personnel and skilled labor which are in short supply. Intensification of industrialization, particularly in increasing investment in more capital-intensive and technologically sophisticated industries, along with export promotion, is also emphasized. To finance the necessary investments in economic and social infrastructure, Government savings should increase through tax reform measures. A Tax Reform Commission has been established under the Executive Yuan and new tax legislation is being drafted. The Tax Reform is to be designed to increase total Government revenue from 18.5 percent of GNP in 1968 to 21.6 percent in 1972. Government savings will rise from a negligible amount in 1968 to 2.6 percent of GNP in 1972. Total domestic savings as percentage of GNP is expected to be stepped up from 21 percent in 1968 to 25 percent in 1972.

27. Gross official foreign exchange reserves amounting to $380 million at the end of 1968 were equivalent to more than five months' imports. Annual debt service in 1968 was less than 6 percent of exports of goods and services. It is estimated that further foreign capital requirements after taking account of relatively less favorable terms on which it can probably be obtained will raise the debt service ratio to 10 percent by the mid 1970's. Given the past record of progress and the favorable prospects for the future, the Republic of China is creditworthy for the proposed Bank loan.

PART VI - COMPLIANCE WITH ARTICLES OF AGREEMENT

28. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Bank.

PART VII - RECOMMENDATION

29. I recommend that the Executive Directors approve the proposed loan.

Attachment

Robert S. McNamara
President
by J. Burke Knapp

May 14, 1969

RESTRICTED

Report No. PTR-10a

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL DEVELOPMENT ASSOCIATION

APPRAISAL OF

THIRD RAILWAY PROJECT

CHINA

May 9, 1969

Transportation Projects Department

Currency Equivalents

Currency Unit	-	NT$
NT$ 40	=	US$ 1.00
NT$ 1	=	US$ 0.025
NT$ 1,000,000	=	US$ 25,000

Fiscal Year

January 1 to December 31

Units of Weights and Measures: Metric

1 kilometer (km)	=	0.62 miles (mi)
1 meter (m)	=	3.28 feet (ft)
1 square kilometer (km^2)	=	0.386 square miles (sq mi)
1 liter (l)	=	0.22 imp. gallons
	=	0.26 gallons (US)
1 metric ton	=	2,205 pounds (lbs)

Abbreviations

TRA - Taiwan Railway Administration
CIECD - Council for International Economic Cooperation and Development
THB - Taiwan Highway Bureau

CHINA

APPRAISAL OF THIRD RAILWAY PROJECT

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This Report has been prepared by Messrs. J. Brechot, engineer, F. Chapman, financial analyst and W. Hughes, economist.

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APPRAISAL OF THIRD RAILWAY PROJECT

SUMMARY

i. The Government of the Republic of China has asked the Bank for a loan of US$ 31.2 million to finance part of the Taiwan Railway Administration's (TRA) investments in 1969 and 1970 which are included in the Railway's revised Investment Plan for the period 1969-1972. TRA's total investment during the two-year period is estimated at NT$ 3,434 million (US$ 86 million equivalent) with a foreign exchange component of US$ 54 million equivalent.

ii. The Republic of China received from the Bank a first railway loan of US$ 20 million (409-CHA) on April 28, 1965, to help finance TRA's requirements during the first four years, 1965 to 1968, of the 1965-1970 Investment Plan. However, traffic increased much faster than expected and, on January 18, 1968, a second loan (524-CHA) of US$ 17.5 million was granted to meet additional requirements in 1967-1968. Execution of these projects has been satisfactory.

iii. The Project consists of high priority items of the new Investment Plan for the years 1969 and 1970 accounting for about 50% of the expenditure. The proposed loan would finance the foreign exchange cost of rolling stock and motive power, track materials, signalling equipment, machinery for workshops, consulting services and the training abroad of railway staff. All purchases would be procured under international competitive bidding.

iv. In addition to the items to be financed by the proposed loan, the Plan includes miscellaneous works and equipment which will also help to improve railway operation and which are justified.

v. TRA continues to be well organized and financially sound earning a rate of return of 9.3% in 1968. Operational efficiency is satisfactory and the utilization of rolling stock and motive power is good. Maintenance of railway property is also satisfactory.

vi. The Committee for Coordination of Transport of the Council for International Economic Cooperation and Development (CIECD), formed as the result of an undertaking to the Bank at the time of the first railway loan, is conducting studies for the preparation of long-term plans for transport; development studies under way or to be started shortly concern railway electrification, new port and airport facilities, a north-south expressway and urban transport. On the whole, transport coordination through CIECD has progressed satisfactorily and the pattern of further lending will be determined when the various studies now under way are completed.

vii. TRA is an agency of the Provincial Government of Taiwan. The previous Bank loans (409-CHA and 524-CHA) were made to the Central Government of the Republic of China, which owns the railway properties, and it is intended to follow the same procedure for the proposed loan, the proceeds of which would be re-lent to TRA on the same terms and conditions as those granted to the Central Government by the Bank.

viii. The Project is suitable for a Bank loan of US$ 31.2 million equivalent. Although the economic life of the assets in the Project is about 20 years, a term of 15 years, including a three-year period of grace, is recommended on country economic grounds, and TRA is capable of servicing the loan on these terms.

CHINA

APPRAISAL OF THIRD RAILWAY PROJECT

1. INTRODUCTION

1.01 The Government of the Republic of China has asked the Bank for a loan of US$ 31.2 million equivalent to help finance part of the foreign exchange costs of the Railway's new 1969-1972 Four Year Investment Plan, which extends and completes the previous 1965-1970 Investment Plan. The Project is designed to increase the Railway's capacity and to modernize its equipment; it would consist of the high priority items of the new Investment Plan for the years 1969 and 1970, additional to those being financed under the existing Bank loans (409- and 524-CHA). The proposed loan would be for the procurement of additional rolling stock and motive power, signalling equipment, track materials, workshops machinery and the financing of consulting services and training.

1.02 This Appraisal Report is based on the findings of a Bank mission in November-December 1968, consisting of Messrs. Brechot, Chapman and Hughes, and on information provided by TRA.

1.03 The Republic of China received on April 28, 1965, a first loan (409-CHA) of US$ 20 million to help finance the acquisition of diesel locomotives, passenger and freight cars, grade crossing and marshalling yard equipment. The first loan was intended to cover TRA's most urgent requirements during the first four-year period (1965 to 1968) of the then Six-Year Railway Investment Plan (1965-1970), but traffic increased more rapidly than expected, necessitating the acquisition of additional rolling stock, motive power and other equipment and resulting in the second loan of US$ 17.5 million (524-CHA of January 18, 1968).

1.04 The project under Loan 409-CHA has been satisfactorily completed, except for the construction of the marshalling yard in Chi-tu which was delayed by land acquisition difficulties and is now expected to be completed by 1971. The project under Loan 524-CHA is progressing satisfactorily and is on schedule.

2. BACKGROUND

A. General

2.01 Taiwan has an area of about 36,000 km^2, or about the same as the Netherlands. Development of the island has been significantly influenced by climatic and topographic conditions. High mountains, in the central and eastern regions, occupy about 64% of the area. Alluvial plains in the west

account for another 24%. A third distinguishable region is a narrow and highly fertile valley close to the east coast. Most of the economic and social development has taken place within the western coastal plain, stretching from Keelung on the north coast to Kaohsiung in the south.

2.02 The population of the island is about 13 million, or slightly more than that of the Netherlands. From a high growth rate of 3.7% per annum ten years ago, the population growth has slowed down to 2.3% per annum partly as a result of birth control programs. The density of the population is among the highest in the world in terms of available arable land, with 87% of the population living in the western plain between Keelung and Kaohsiung. Agriculture employs about half the population but industrial production is growing rapidly. Gross National Product was estimated in 1967 to be about NT$ 142 billion, or about US$ 3.5 billion equivalent. This represents US$ 260 per capita, as compared with US$ 150 for the Philippines and US$ 120 for Thailand. The real growth of GNP, which averaged 8% per annum from 1953 to 1964, increased to 8.9% in 1965-1967, and 10% in 1968 according to preliminary figures. A high growth rate is expected to continue providing expansion of the infrastructure keeps pace with economic development.

B. Transportation in Taiwan

2.03 Taiwan's main communications route traverses the western plain, which contains all the large cities. This axis is served principally by the Taiwan Railway Administration's (TRA) main line, by road transport and a small amount of coastal shipping. The main north-south highway has reached its capacity in parts. It is proposed to construct two sections of an expressway, mainly in urban areas, by 1975 but transport requirements in the densely populated corridor are likely to justify the existence of both the expressway and the railway in the foreseeable future (para. 6.01). The two main ports, Keelung in the north and Kaohsiung in the southwest, handle about 3 million tons and 7 million tons of traffic a year respectively. Feeder roads and small private railways connect the main route with industrial, agricultural, mining and timber enterprises. The eastern valley is served principally by a 176 km railway paralleled by an unpaved single lane road. Coastal shipping is relatively small but is important in connecting this eastern region with the rest of the country as no rail link exists and road connections are poor. Domestic air transport is comparatively insignificant.

2.04 The railways are the most important freight transport mode in Taiwan, accounting for over 70% of ton-km in 1967 (Table 1). This proportion has fallen from 80% in 1963, due to the increase in road transport. The average length of haul for the railways (160 km) is nearly five times that of road, indicating that road vehicles are important for large tonnages of short-haul traffic. Rail freight traffic has been increasing by about 3% per annum for the last seven years compared with an increase of 14% per annum for truck traffic. This is to be expected with the change in the

economy from basic industry and resource exploitation to more secondary industry, coupled with intensified road building in the last few years. The number of motor vehicles has increased rapidly in the last six years, cars increasing by about 12% and taxis by 31% (Table 2). Roads are congested with slow moving vehicles such as bicycles which are a common form of freight transport; there are six times as many motorcycles as all other vehicles (Table 2).

2.05 Railways accounted for 42% of the long distance pass-km in 1968, but only a small share of the local movement (Table 3). Rail passenger traffic has been growing rapidly in recent years at nearly 7% per annum.

2.06 The main West Line crossing Taipei through its center, together with a line going north, causes very serious traffic congestion at 37 level crossings. Following studies made by urban transport experts, the Executive Yuan 1/ has recently decided that the most economical solution to this situation is to elevate the railway line across the city; the cost of this construction has been estimated at some US$ 33 million and the execution of the project will require four years. Government agencies concerned are to draw detailed plans for the construction which does not physically interfere with the present railway project but reference to it has been included in the Terms of Reference for the proposed study on electrification (see para. 3.09). No arrangements have as yet been made for financing the elevation of the railway lines across the city which essentially aims at relieving urban road congestion and is not required by TRA's operations. Although the works are likely to be economically justified it is not considered that TRA should be asked to participate in the financing of these works, except to the extent of any improvement to their facilities, as the main beneficiaries will be highway users; an agreement on this has been reached during negotiations.

C. Transport Coordination

2.07 Transport organization in Taiwan is a mixture of public and private enterprise. TRA is wholly owned by the Central Government but there are also some private industrial railway lines. Taiwan Highway Bureau (THB), a government body, constructs and maintains the provincial highways and operates the largest fleet of buses on the most important routes, but it owns no trucks. Airports are operated by the Civil Aeronautics Administration, a bureau of the Central Government's Ministry of Communications, but the two airlines are privately owned. Two of the many shipping companies are owned by the government, Taiwan Navigation Company and China Merchant Steam Navigation Company.

2.08 Transportation is regulated by the Central Government directly for civil aviation and navigation but by authority delegated to the Provincial Government for land transport and harbors. Road transport is regulated by the THB in matters of competition, rates and vehicle registration.

1/ Administrative branch of the government.

2.09 A Committee for Coordination of Transport was set up in November, 1965 under the Communications Committee of the CIECD as a condition of loan 409-CHA. Members of the Committee are the heads of the transport agencies. In its first year, its staff studied a number of short-term problems, including the standardization of harbor accounting systems, a survey of inland warehouses, production of rail and port traffic forecasts, and traffic distribution between transport modes including commuter traffic. These studies are now being considered by the Government. Continuing work is being done regarding the establishment of longer term development programs. Current studies under way, or to be started shortly, include railway electrification, new port and airport facilities, a north-south expressway and urban transport.

2.10 Highway user charges are also being studied by CIECD. In 1967, total road expenditures, capital and current, were NT$ 315.5 million while total receipts from road users were NT$ 225.2 million.

2.11 Overall transport planning is still at an early stage in that each agency draws up its own plan and submits it to the Central Government through the appropriate channels. The investment program for the new Four Year Plan 1969-1972 is given in Table 4. Investment in shipping is expected to be 32% of fixed capital formation; railways, with 25%, exceed highways (16%), which is surprising as the highway figure includes investment in vehicles (probably one-half). This apparent imbalance may change slightly in the next planning period if the north-south expressway is constructed. The railway proposed electrification program (see para. 3.09), however, if it eventuates, could offset this to some degree.

2.12 On the whole, transport coordination through the CIECD has made a satisfactory beginning. Although the present project is well justified, future lending in the transport sector should have regard to the various studies now under way.

3. THE TAIWAN RAILWAY ADMINISTRATION

A. Organization, Management and Staff

3.01 TRA is an agency of the Provincial Government of Taiwan which is responsible for the Railways' operation. The Ministry of Communications of the Central Government also has authority over TRA and, as a result of this dual responsibility, some government control procedures are unduly complex and time consuming. The freedom of TRA, however, in day-to-day operations is not affected by these requirements.

3.02 Management, operations, administration and services are generally satisfactory and well organized. Staff is competent and industrious and labor relations are satisfactory.

3.03 TRA has no staff conversant with the economics of railroad and other modes of transport to assist management to prepare its investment program, examine transport competition, study operational efficiency, traffic costing and tariff policy. To correct this, TRA wishes to set up a Planning Unit, and proposes to send two of its staff abroad for a year to be trained in transport economics. The foreign exchange cost of this training is included in the proposed loan. Agreement has been reached during negotiations on the establishment and staffing of such a unit, its activities and, for coordination purposes, its relationship with CIECD.

B. Property

(i) Track

3.04 TRA consists of two systems: (a) the West Line (1.067 m gauge), with 408 km of main line and 397 km of branch lines; and (b) the East Line (0.762 m gauge), which is only 176 km long. The West Line has 210 km of double track while the East Line is all single track. Terrain presents some difficulties on both lines. There are 1,667 bridges with a total length of 41,900 m; and 69 tunnels totalling 19,820 m.

3.05 Both West and East Lines are well maintained. The West Line standard of construction, with mostly 37 kg/m rails, gravel ballast, wooden sleepers and dog-spikes is adequate at present. However, with increasing traffic density and greater train and car weights, a gradual improvement to 50 kg/m rail, concrete sleepers and welding of rails is necessary and is planned by TRA. The permanent way of the East Line, equipped with 30 kg/m rail is being re-ballasted to allow for an increase of maximum axle load from 8 to 10 tons after full dieselization.

3.06 The signalling system is being continuously improved to increase line capacity. A substantial part of the West Line is operated with the automatic block system and centralized traffic control (CTC) covers 324 route-km with 87 more route-km to be equipped under the present project. Forty stations and yards are equipped with relay, electric or electromechanical interlocking plants. Lines with lighter traffic have the electric token block system. Two hundred and sixty highway level crossings are now provided with automatic gate or alarm systems.

(ii) Motive Power and Rolling Stock

3.07 TRA's motive power and rolling stock as of December 31, 1968 are shown in Table 5 and summarized below:

	Number of Units		
	West Line	East Line	Total
Locomotives:			
Steam	168	21	189
Diesel	97	12	109
Railcars and Trailers	72	20	92
Passenger Vehicles	767	49	816
Freight Cars	6,315	532	6,847

3.08 Table 5 also indicates the number of motive power and rolling stock units under procurement during 1969. (26 diesel locomotives, 181 passenger cars and 446 freight cars for the West Line; 8 trailers and 40 freight cars for the East Line). Most of these items are being procured under Bank financing.

3.09 Most of TRA's steam locomotives are old, more than 40% being over 40 years. TRA is advancing a considerable way towards full dieselization by adding 12 diesel locomotives on the East Line in 1968, with 26 locomotives for the West Line to be delivered in 1969 (under loan 524-CHA) and 18 more included in the proposed project. However, the Government for economic and policy reasons (indigenous electric power, security, foreign exchange, etc.) wishes to study the possibilities of main West Line electrification. In view of the considerable expected increase in traffic beyond the present level of 100 trains a day and of the forecast high traffic density on this Line, there is a case for electrification or full dieselization. While the present number of diesel locomotives, together with the units ordered or planned to be ordered during the project period, would not exceed the needs for branch lines and shunting operations, an early decision on electrification or full dieselization is required to permit planning of future investments. To this effect TRA has decided to appoint consultants who will (i) review the dieselization program and (ii) make a study of the feasibility of the electrification of the main line of the West system. The foreign exchange cost of this study, the results of which should be available in the last quarter of 1969, is included in the proposed loan. Agreement on the terms of reference was reached during negotiations and assurances were also

obtained that no decision on electrification would be taken without consultation with the Bank.

3.10 About 10% of West Line passenger cars and 50% of East Line passenger cars are more than 30 years old. A substantial percentage of freight cars on both lines are also over 30 years old. Of freight cars in service on the West Line only 24% have bogies but all cars have automatic couplers. As a result of recent TRA studies, the loading capacity of freight cars will be increased from 30 to 35 tons for bogie box cars and from 15 to 18 tons for two-axle gondola cars.

(iii) Other Properties

3.11 Six marshalling yards serve West Line traffic. The largest, Hua-Shan yard, 4 km north of Taipei, which is not well designed and cannot be extended, will be replaced by the new Chi-tu fully mechanized marshalling yard being built with Bank financing (loan 409-CHA); construction, which was delayed because of land acquisition difficulties, is expected to be completed in June 1971. A new modern marshalling yard is also to be constructed at Kaohsiung in 1971-1972 to replace the existing one which has become inadequate.

3.12 TRA's buildings, stations, shops and sheds are well maintained. The West Line operates two workshops in Taipei and Kaohsiung. With the increasing number of diesel locomotives and passenger and freight cars, both shops need extension and modernization of facilities and equipment; Kaohsiung workshop cannot be extended at its present site and TRA has acquired land on which a new workshop -- included in the present project -- will be erected. Maintenance equipment will also be needed in the new diesel locomotive depot being built at the site of Chi-tu marshalling yard. On the East Line, maintenance and repairs are done at the Hwa-Lien workshop which is well equipped.

C. Manpower, Productivity and Wages

3.13 Details of TRA's labor force, productivity in terms of train-km and traffic units and labor costs are given for 1963 to 1968 in Table 6.

3.14 Over this period the average labor force has remained within close limits around 21,700 employees; and with increasing traffic, productivity has improved. The number of employees per 1,000 train-km has been reduced from 1.00 to 0.83, which compares quite favorably with the performance on most U.S. and European railways, and the traffic units (pass-km + ton-km) per employee have increased by 50% from 245,000 to 372,000.

3.15 Labor costs have increased in the same period by about 78%, but the average pay is only equivalent to US$ 65 per month and in 1968 the total staff costs accounted for 42% of total operating costs, which is low. Labor

cost per traffic unit rose in 1966 - 1968 after being static during 1963 to 1965. TRA's salaries and wages, especially those of the more senior technical and supervisory staff, are expected to be raised on July 1, 1969, costing an additional amount of NT$ 126 million in a full year. This will bring the salaries of such staff more in line with those of other entities directly under the Central Government.

D. Operations

3.16 Tables 7 and 8 present a summary of railway operating statistics for the West and East Lines over the last ten years which show improving efficiency in most of the important indices. However, diesel engine-km per engine day in service have decreased due to the assignment of new locomotives to shorter runs previously performed by steam, and average turn-around time of freight cars has increased slightly, though it is still satisfactory. Wagon-km per wagon day has slightly decreased. The average load of freight cars is static confirming the need to increase the capacity of new cars as is now planned. Passengers per car also show a slight downward trend, as new passenger cars are put into service, but this marks only some relief of overcrowding. Punctuality of passenger and freight trains averaged respectively 94 and 90% in 1967, which is good. The planned investments in track, workshops, motive power and rolling stock should enable TRA to make further improvements.

3.17 Operational statistics for the East Line are, as a whole, satisfactory; punctuality of trains, at 97% represents a very good performance.

E. Traffic

(i) Passenger Traffic

3.18 TRA obtains about 63% of its earnings from passenger traffic. In 1967, short distance traffic (an average of 25 km) accounted for about 3 billion pass-km, of which about one-third was commuter traffic (Tables 3 and 15). Long distance passengers accounted for about 2 billion pass-km but only 8% of the number of passengers. A recent study of CIECD, still under consideration by the Government, indicates that large losses are being incurred by commuter traffic, which is almost entirely made up of students carried at fares 75% below the basic rate.

3.19 Long distance and commuter traffic on the West Line has been growing at about 15% and 2% a year respectively from 1960 to 1967. Though the problem of unremunerative commuter traffic will remain for some time to come, it is expected to diminish in relative importance as the birth rate declines and as students come to be restricted to their own school zones under the Government's new school building program.

(ii) Freight Traffic

3.20 Freight traffic has been growing at about 3.8% per year over the last eight years, rising from about 2 billion ton-km in 1960 to nearly 2.6 billion ton-km in 1968 (Table 9). The West Line carries 98% of TRA freight

traffic, coal accounting for 25%. The next most important movements are military supplies 8%, cement 7% and grains 6%. Practically all of the traffic, 2.3 billion ton-km, or 93% of the total, consists of commodities which are bulky in relation to value, thus making them relatively unattractive to road transport. TRA is likely also, through its containerization program (paras. 6.13 to 6.15), to retain much of the traffic which might otherwise be expected to be lost to trucks.

F. Earnings and Finances

(i) Earnings

3.21 Earnings for the years 1963-1968, as shown in detail in Table 10, are summarized below:

	1963	1964	1965	1966	1967	1968
			(Millions of NT$)			
Operating revenues	1,196	1,375	1,512	1,653	1,902	2,206
Operating expenses (including depreciation)	1,068	1,160	1,264	1,328	1,530	1,654
Net operating revenues	128	215	248	325	372	552
Net income before interest	148	203	257	311	363	501
Interest on debt	76	72	67	70	88	103
Net income	72	131	190	241	275	398
Operating ratios %	89	84	84	80	80	75
Rate of Return %	2.5	4.0	4.8	5.8	6.4	9.3

3.22 The operating ratio has improved from 89 to 75 and the rate of return on the net fixed assets in use from 2.5% to 9.3%. Under Loan 409-CHA, a target of 5.5% was agreed upon with TRA as a minimum return to be achieved by 1970, so TRA's performance in this respect has been most satisfactory.

3.23 Operating expenses in 1968 were 55% greater than in 1963 due mainly to wage awards and other cost increases, but with traffic increasing by 48% over the period, unit costs have remained relatively stable as shown in the table below:

Year	Traffic Units (million)1/	Cost per Traffic Unit NT$	Average Revenue/ Traffic Unit NT$
1963	5,343	0.199	0.223
1964	6,009	0.193	0.228
1965	6,511	0.193	0.232
1966	6,715	0.197	0.246
1967	7,312	0.209	0.260
1968	7,926	0.208	0.277

1/ Ton-km plus pass-km

3.24 Average revenue per traffic unit has improved steadily, due to rapidly increasing higher class passenger traffic and tariff increases that were made effective August 15, 1967.

3.25 As a form of dividend from its earnings, TRA makes large contributions to the Provincial Government which annually amounted to NT$ 60 million until 1967, when the amount was increased to NT$ 72 million. In that year, in conjunction with an increase of 15% in passenger fares, TRA commenced paying an additional contribution based on two-thirds of the additional revenue earned by this 15% increase, but limited to NT$ 85 million in any one year. In 1967 the total paid to the Provincial Government amounted to NT$ 99.13 million, with the full amount of NT$ 157 million being paid in 1968.

3.26 Despite making these annual contributions to Government, TRA has accumulated a substantial earned surplus. Debt service and debt equity ratios remain satisfactory, as shown in Tables 10 and 11 respectively.

(ii) Tariffs

3.27 Rates and fares must be approved by the Commissioner of Communications, the Governor and the Assembly of the Provincial Government, and by the Minister of Communications and the Executive Yuan of the Central Government. The tariff structure, summarized in Annex 1, is generally satisfactory in that (apart from the social privilege rates and fares), individual freight rates, having regard to loading characteristics, bear reasonable relationships to each other.

1) Passenger Fares and Freight Rates

3.28 The first major change in tariffs since 1961 was introduced on August 15, 1967, when all passenger fares were increased by 15% and, by expanding the existing five freight commodity classes to eight, the rates for some lower class commodities, including the most important, coal, were raised by about 13%.

3.29 Due to lack of staff experienced in economics, TRA has not yet been able to comply with the undertaking, given under both Loans 409-CHA and 524-CHA, to introduce new tariffs based on costs. TRA has now agreed to appoint consultants to introduce modern traffic costing techniques, and instruct TRA staff in continuing such techniques and in establishing a rates and fares structure reasonably related to costs and which will ensure an adequate return on the net fixed assets in use. The proposed loan would finance the foreign exchange cost of such consultants. Agreement was reached during negotiations on the terms of reference of the consultants.

2) Social Privilege Rates and Fares

3.30 Social privilege fares, imposed by the Government, apply to school children and students, Government employees and military personnel; reduced freight rates apply to certain basic commodities and military traffic.

3.31 As agreed under Loans 409-CHA and 524-CHA, TRA has taken steps towards normalizing these rates and fares (see page 2 of Annex 1). Considerable traffic is carried at these reduced rates and fares and TRA estimates that in 1967 the total revenue lost, on the assumption of constant traffic, was NT$ 310 million. NT$ 80 million of this was on freight traffic, of which nearly NT$ 40 million was due to military supplies, and the remainder to military passengers (about NT$ 110 million) and commuters (about NT$ 120 million).

3.32 TRA's proposals for further steps include the abolition of the discounts on rice and fertilizer rates as from August 15, 1969. Agreement on this was obtained from the Government during negotiations. The annual increase in revenue would be about NT$ 34 million.

3.33 The study of TRA's commuter traffic (Annex 2) is still being considered by the Government which, as an interim measure, has decided to compensate TRA for the deficit on the traffic by reducing TRA's total annual contribution to the Provincial Government from the present NT$ 157 million to NT$ 50 million, as from July 1, 1969. Agreement was reached during negotiations on this matter.

(iii) Finances

3.34 The balance sheets as of December 31, 1965, 1966, 1967 and 1968 are shown in Table 11 and summarized below:

Assets	1965	1966	1967	1968
		(NT$ million)		
Current Assets	747	1,163	1,599	1,563
Funds, Advances and Investments	401	420	446	486
Net Fixed Assets	5,365	5,893	6,077	7,830
Other Assets	283	233	206	307
Total Assets	6,796	7,709	8,328	10,186
Liabilities				
Current Liabilities	252	592	805	691
Other Liabilities	30	17	4	6
Debt	1,066	1,444	1,554	1,595
Equity	5,448	5,656	5,965	7,894
Total Liabilities	6,796	7,709	8,328	10,186

The ratio of current assets to current liabilities, between 3.0 and 2.0, is good. The liquid ratio of current assets less stores to current liabilities was only 0.5 and 0.9 on December 31, 1966 and 1967 respectively, improving to 1.3 in 1968, but TRA has no real concern about liquidity because funds of all Government agencies are held in the "Provincial Government Pool" operated by the Bank of Taiwan, from which advances are readily available when required.

3.35 TRA has borrowed from the Pool, beginning in 1959, principally to meet major costs of typhoon damage, and also to finance capital investment. As of December 31, 1968, TRA owed the Government Pool NT$ 259 million, on which annual interest of almost 10% is paid. Over the last few years TRA has not been able substantially to reduce this comparatively expensive form of borrowing, but would be able to eliminate it in 1972 (see para. 5.08).

3.36 The total long-term debt outstanding as of December 31, 1968, including "Pool" borrowings, amounted to NT$ 1,595 million. The composition and general features of the debt structure are shown in Table 12. The amount and terms of debt capital are not over burdensome and TRA was able to cover its debt service 3.3 times in 1968. The debt-equity ratio was satisfactory, being 17/83 in that year.

3.37 Depreciation is charged on all assets except land, road-bed construction, tunnels and tracks and takes into account revaluation of assets. The charge in 1968 was almost 6% of the value of depreciable assets which is reasonable.

3.38 TRA is exempt from income taxes, but pays business tax, custom duties, stamp taxes, land and house taxes, etc., which in 1968 amounted to NT$ 36 million.

(iv) Budgets, Accounting, Auditing

3.39 TRA prepares annual operating and capital investment budgets which must be approved by the Provincial and Central Governments.

3.40 TRA's accounting and auditing procedures, except for the lack of adequate costing information already mentioned, are satisfactory. External auditing is done by staff of the Central Ministry of Audit and the procedures are satisfactory.

4. THE PROJECT

A. The 1969-1972 New Investment Plan

4.01 TRA's traffic has increased faster than expected, necessitating procurement of additional motive power and rolling stock, improvement and strengthening of track and modernization of workshops. Accordingly, TRA having reviewed its capital investment program for the period 1965-1970, has drawn up a new Capital Investment Plan for the period 1969 to 1972 with a total cost of NT$ 5,670 million (US$ 142 million equivalent), including a foreign exchange component of about US$ 82 million equivalent).

4.02 In view of recent and proposed investments, and given the continuation of TRA's present good standards of operating efficiency, certain parts of this revised plan seemed to be excessive and could be deferred or eliminated. A more realistic Capital Investment Plan 1969-1972 involving reductions in rolling stock over the years 1971-1972, and in miscellaneous investment over the whole period was discussed during negotiations, and agreement was reached with TRA on a Plan for the period 1969 to 1972 reduced to NT$ 4.7 billion (US$ 118 million equivalent) with a foreign exchange component of about US$ 69 million equivalent.

The revised plan (Table 13) comprises:

A) The project as described below consisting of:

(i) Items to be financed by the proposed loan; and
(ii) Items essential to the project but to be financed by TRA for reasons explained in para. 4.04.

B & C) Items included in the projects financed under the previous Bank loans and to be carried out during 1969 to 1971, and

D) Other capital investment, the major part of which is to be carried out in 1971-1972 consists of locomotives, rolling stock, and facilities to increase capacity, and improve service. The 1969-1970 portion consists mainly of improvements to buildings and structures.

B. Description of the Project

4.03 The project consists of high priority items of the new Investment Plan for the years 1969-1970 as summarized below; it will be executed largely in 1970, with some expenditures carrying over into 1971. The proposed Bank loan would finance the foreign exchange cost (US$ 31.2 million equivalent) of the items in Section i described below:

Estimated Cost of the Project

	NT$ (millions)			US$ equivalent (millions)			% of Total
	Local	Foreign	Total	Local	Foreign	Total	Expenditure
i) Items to be financed by the proposed loan							
18 diesel electric locomotives (West Line)	15.8	160.4	176.2	0.4	4.0	4.4	10.0
268 passenger cars (West Line)	72.0	503.0	575.0	1.8	12.6	14.4	32.6
600 freight cars (West Line)	38.8	233.9	272.7	1.0	5.8	6.8	15.4
Double tracking of 7 sections between Changhua & Tainan (34 km)	70.9	44.1	115.0	1.7	1.1	2.8	6.5
64 automatic level crossing warning equipment	5.0	12.0	17.0	0.1	0.3	0.4	1.0
Track improvement and strenthening between Taipei and Hsin-Chu (40 km)	70.5	64.0	134.5	1.7	1.6	3.3	7.6
Equipment for Workshops	14.8	52.1	66.9	0.4	1.3	1.7	3.8
Freight handling equipment	3.5	12.0	15.5	0.1	0.3	0.4	0.9
15 trailers (East Line)	6.5	24.0	30.5	0.1	0.6	0.7	1.7
130 bogies for passenger cars	3.0	20.0	23.0	0.1	0.5	0.6	1.3
Signalling (Patu and Kaohsiung)	6.4	28.1	34.5	0.2	0.7	0.9	1.9
Consulting Services and training	0.8	12.0	12.8	0.1	0.3	0.4	0.7
Sub-Total	308.0	1,165.6	1,473.6	7.7	29.1	36.8	83.4
Contingencies	22.0	84.0	106.0	0.6	2.1	2.7	6.2
Sub-Total	330.0	1,249.6	1,579.6	8.3	31.2	39.5	89.6
ii) Items to be financed by TRA	46.2	138.0	184.2	1.1	3.5	4.6	10.4
Total cost of the Project	376.2	1,387.6	1,763.8	9.4	34.7	44.1	100.0

4.04 The items to be financed by TRA are (a) the signalling equipment (CTC) required in the double tracking of the 7 sections between Changhua and Tainan; this equipment has to be of the same make as that presently in service and its procurement would therefore not follow the usual international competitive bidding procedures; (b) 100 suburban service passenger cars. TRA has ordered these cars to replace as a matter of urgency 94 over age 25-ton box cars used as temporary passenger cars; and (c) some freight handling equipment which can be locally produced without foreign exchange expenditure.

4.05 The additional locomotives and rolling stock, and the completion of the last seven sections of double tracking between Changhua and Tainan will allow TRA to carry the forecasted traffic in 1971 (9.0 billion traffic units against 7.3 billion traffic units in 1967).

4.06 Level crossing warning equipment and new passenger car bogies are intended to assure better safety of train operation. This is part of an on-going program for which funds were provided in Loan 524-CHA.

4.07 Track improvement and strengthening, better alignment, heavier rails (of 50 kg/m), better ballasting and rail welding, will permit higher train speeds and axle-loads, thus improving operating efficiency.

4.08 Improvement to workshops and maintenance depot equipment will increase their output, improving the availability of locomotives and rolling stock.

4.09 Consulting services and training are as described in paragraphs 3.03, 3.09 and 3.29. Tentative terms of reference for the study on electrification of the main West Line have been agreed with TRA, who will select a suitable firm of consultants, to be approved by the Bank. Completion of this study is planned for the end of 1969.

4.10 Cost estimates of the foreign exchange components of the project are based on quotations for items of similar nature recently ordered on the basis of international competitive bidding. A contingency of about 7.5% has been added to allow for a possible increase in the price of steel. Local costs which include port charges and fees, duties, assembly costs of bogies for passenger cars, track work costs, erection costs of signalling and level crossing warning equipment, are based on actual expenditures for similar works performed in Taiwan; a contingency of about 7.5% has also been added to allow for possible wage increases. Both foreign and local estimates are considered realistic.

C. Execution of the Project, Disbursement and Procurement

4.11 TRA is competent to carry out the project. Disbursements will be made on the basis of C.I.F. costs of imported equipment and the foreign costs of Consulting Services and overseas training. All of the items to be financed out of the proceeds of the proposed Bank loan will be procured through international competitive bidding, in accordance with the procedures of the Bank.

4.12 The project is expected to start by mid-1969 and to be completed by the end of 1971. Progress payments in foreign exchange and local currency are scheduled as follows:

	Items partly financed by proposed Bank loan			Items fully financed by TRA		
	(NT$ Millions)					
	Local	Foreign	Total	Local	Foreign	Total
1969	41	13	54	34	124	158
1970	236	1,206	1,442	11	14	25
1971	53	31	81	1	-	1
Totals	330	1,250	1,580	46	138	184

4.13 If any savings in foreign expenditure result from favorable prices in competitive bidding it is proposed that the corresponding savings in the loan account be used to finance the foreign exchange cost of additional but similar project items provided that they are justified at the time on the basis of traffic increases beyond those forecast in this appraisal.

5. FUTURE EARNINGS AND FINANCES

5.01 TRA has prepared forecasts of future earnings and finances for the years 1969-1972. The estimated revenues and expenses are shown in Table 10, the pro-forma balance sheet data in Table 11, and the expected cash flow in Table 14.

A. Earnings

5.02 The revenue estimates are based on the Railway's revised forecasts of traffic which are reviewed in Chapter 6 of this report. They take into account the revisions of privilege rates and fares proposed to go into effect on August 15, 1969. Also taken into account, as a deduction from passenger revenues, is the special contribution or levy payable to the Provincial Government of NT$ 85 million in 1968, reduced to NT$ 64 million in 1969, and eliminated thereafter, as explained in paragraph 3.33.

5.03 The expenditure estimates take into account the requirements of increased traffic and the economies of improved efficiency. Some increases in wages and other costs are included, particularly the increase in salaries and wages expected to become effective on July 1, 1969, costing NT$ 126 million in a full year. The net effect will be that the operating cost per traffic unit will increase by about 10% in 1970 to NT$ 0.230, reducing slightly thereafter to NT$ 0.225 in 1972.

5.04 A summary of estimated earnings in millions of NT$ is shown below. It makes no allowance for rate increases, as may be necessary, after 1969.

Years	Operating Revenues (Net of Levy)	Operating Expenses	Net Operating Revenues	Net Income	Operating Ratios	Rate of Return %
1969	2,304	1,784	520	380	77	7.8
1970	2,512	1,979	533	332	79	6.7
1971	2,660	2,047	613	398	77	6.8
1972	2,815	2,135	680	476	76	7.3

5.05 Over the period, operating ratios are expected to improve from 79 in 1970 to 76 in 1972: with interest requirements rising from NT$ 103 million in 1968 to NT$ 210 million in 1971, and falling to NT$ 199 million in 1972, the times interest earned ratio will decline from 3.8 to 3.2 in 1970, rising to 3.4 in 1972; these ratios are satisfactory. Net income after interest, after falling from NT$ 380 million in 1969 to NT$ 332 million in 1970, should rise to NT$ 476 million in 1972. The rate of return is expected to fall from 7.8% in 1969 to 6.7% in 1970, thereafter improving to 7.3% in 1972. Agreement was reached during negotiations that a rate of return of no less than 6.5 % would be earned in 1969 and 1970, with a minimum of 7% being earned thereafter.

B. Finances

5.06 The Railway's estimated cash needs and sources of funds for the four-year period 1969-1972 are detailed in Table 14 and summarized below:

Cash Requirements		Million NT$	
Capital Investment		4,669	
Debt Service		1,823	
Contribution to Government		211	
TOTAL:			6,703
Sources of Cash			
Railway -	Internally generated funds 1/	3,586	
	Sales of land 2/	500	
		4,086	
Less -	Increase in working capital	(20)	4,066
Loans:	IBRD Loan 409-CHA	70	
	IBRD Loan 524-CHA	702	
	IBRD Proposed Loan	1,250	
	Other borrowing	615	2,637
	TOTAL		6,703

1/ Before debt service and contribution to Government.
2/ Surplus land in Taipei, and land becoming vacant on removal of workshops at Kaohsiung.

5.07 Substantial internal cash generation, NT$ 4,066 million, would cover debt service and contributions to Government, amounting to NT$ 2,034 million, and provide NT$ 2,032 million towards total capital investment requirements of NT$ 4,669 million. The balance, NT$ 2,637 million, would have to be met by borrowing. Of this sum, NT$ 2,022 million would be provided by the existing and proposed Bank loans; of the remainder, NT$ 140 million would be drawn from the Provincial Government "Pool" (see below) and, for the foreign exchange requirements expected for the years 1971 and 1972 (NT$ 475 million, US$ 11.8 million equivalent), TRA proposes to obtain another external loan and may approach the Bank.

5.08 In order to provide for a) the construction of 100 commuter passenger cars, b) the removal of the workshops at Kaohsiung and c) the construction of a new and more efficient shop, together with a new marshalling yard on the outskirts of the city, TRA will borrow the above amount from the "Pool" funds during 1969 but should be able to repay all such borrowing before the end of the program period.

5.09 The forecast balance sheets as of December 31, 1969 to 1972, are shown in Table 11. The increase in the value of land resulting from the 1968 revaluation, NT$ 1,516 million, has been added to fixed assets under "non-operational" and is reduced as land is sold. The enhanced value of land actually required for operations will be transferred to "operational, fixed assets" when finally determined by TRA. The revaluation Surplus, NT$ 1,479 million, is added to equity. The current and liquid positions, 2.8 and 1.5 respectively, are satisfactory.

5.10 TRA's debt, assuming that the proposed loan will be for a term of 15 years, including a three-year grace period, is forecast to grow from NT$ 1,611 million as at the end of 1968 to NT$ 3,431 million in 1970, reducing to NT$ 3,165 million by the end of the period; debt-equity ratios will range between 29/71 in 1970 and 26/74 in 1972 which is quite favorable. Debt service coverage varying between 1.6 and 2.6 over the period is acceptable; it takes into account repayment of all TRA's high interest borrowings from the Government Pool.

6. ECONOMIC JUSTIFICATION

A. Traffic Forecasts

6.01 Traffic forecasts for the Taiwan Railways have been made on a regular basis since 1963. Forecasting of traffic is done at two levels. The CIECD forecasts traffic for all forms of transport, based on trends of industrial production, population, foreign trade and national income. TRA forecasts rail traffic only, basing its estimates entirely on industry interviews and population growth projections. The results of the two forecasts give quite similar results for rail traffic. TRA forecasts covering the period up to 1972, the last year of its Four Year Investment Plan, are extremely detailed and are acceptable to the Bank. It is reasonable to expect that the trend of the forecast will continue after 1972 with some modification, however, to take into account the proposed expressway sections. For the purposes of the following economic

analysis, therefore, passenger traffic is estimated to increase by 7% per annum to the end of 1974 and then fall to 4% per annum to the end of the project life. Freight traffic is forecast to grow at a rate of 4% per annum to 1974 and at 2.5% per annum thereafter.

6.02 The largest volume of railway freight traffic is coal, which accounts for about 25% of the total. Though future increases in local production are not expected, due to the exhaustion of the better seams and the substitution by some coal users of other forms of energy, demands are expected to rise as car shortages are alleviated. Cement transport is expected to increase by 4% per annum. This may be a somewhat conservative estimate, however, in view of the rapidly expanding construction industry and new kilns which are planned. As with coal, the railways have not been able to fulfill all car requests. Substitution of imported grains for domestic rice is expected as land is put to other uses. Fertilizer transportation will increase due to the expansion of local production at the expense of imports. An increase in salt transport is expected as more chemical industries are formed. On the East Line the most notable increase is in timber, rising from 2.3 million ton-km in 1967 to 16.3 million ton-km in 1972. This is due to new logging operations and planned exports of plywood and veneer.

6.03 Passenger traffic forecasts are given for both lines in Table 15. Long distance traffic is expected to grow at a rate of 12% per annum to 1972 and though the growth rate appears exceptionally high, it is reasonable given the absence of alternative highways, the density of population and the dynamic growth of the economy.

6.04 In the longer term, the railway can expect to suffer from highway transport competition even though, as Table 9 shows, most of TRA's freight traffic is of bulky low value commodities that are not attractive for road competition provided the railway can offer efficient services. Moreover road transport is relatively expensive and will remain so having regard to the poor alignments available; this is so even for short journeys. Nevertheless, if the West Coast expressway sections are constructed, some traffic will undoubtedly be diverted. This has been taken into account in the economic analysis.

B. Economic Benefits

6.05 The Project will increase TRA's capacity to meet traffic requirements in the next few years. New workshop and depot facilities will be needed to cope with the new motive power and rolling stock, as well as freight handling equipment and signalling devices to cope with congested conditions. A separate economic justification has not been made for the locomotives as they are not required to replace existing power but to haul additional traffic. Their cost has therefore been included with the cost of rolling stock. Similarly, the costs of workshop and depot equipment in the project have been included in the costs of motive power and rolling

stock. All benefits have been conservatively estimated and are discussed in detail in Annex 3. The economic rates of return on the items in the project are estimated to be:

(i)	passenger cars, West Line	9%
(ii)	freight cars	30%
(iii)	double tracking	12%
(iv)	automatic warning devices	24%
(v)	track strengthening	9%
(vi)	modernization of freight handling	35%
(vii)	trailers, East Line	12%
(viii)	passenger car bogies	33%
(ix)	signalling, Patu and Kaohsiung	6%

6.06 The largest benefits are derived from the freight and passenger cars, with 43% and 40% of the total respectively. The rate of return on the signalling equipment, 6%, may appear to be low but the signalling is justified on grounds of safety, the full economic benefits of which are not measurable. Not included as benefits to the project are savings in passenger time and benefits which cannot be easily quantified, such as increased safety, reliability and the saving in time for freight. All the benefits have been estimated conservatively and show the project to be well justified.

7. RECOMMENDATIONS

7.01 During negotiations assurances were obtained from the Government of the Republic of China and TRA on the following principal items:

i) TRA's capital investment plan (para. 4.02) and extent of participation in financing railway line elevation in Taipei (para. 2.06);

ii) TRA's proposed planning unit (para. 3.03), electrification study (para. 3.09), and traffic costing study (para. 3.29);

iii) abolition of discounted freight rates (para. 3.32) and reduction of annual contribution to Provincial Government (para. 3.33).

7.02 The Project, which is technically sound and of economic benefit to the country, would be a suitable basis for a Bank loan of US$ 31.2 million equivalent to the Republic of China. Although the economic life of the assets in the Project is about 20 years a term of 15 years, including a three year period of grace, is recommended on country economic grounds and TRA is capable of servicing the loan on these terms. The proceeds of the loan would be made available by the Central Government to the TRA on the same terms and conditions as those granted to the Central Government by the Bank.

May 8, 1969

TABLE 1

CHINA

THIRD RAILWAY PROJECT

Rail and Road Freight Traffic, 1956 to 1967

	Million Ton-Km			
	TRA	Other Railways	Road Truckers	Total
1956	1,647	149	155	1,951
1957	1,847	172	180	2,199
1958	1,834	166	194	2,194
1959	1,805	159	251	2,215
1960	1,913	159	317	2,389
1961	2,001	159	367	2,527
1962	1,918	138	412	2,468
1963	1,977	144	448	2,569
1964	2,179	185	521	2,885
1965	2,232	183	608	3,023
1966	2,255	180	716	3,151
1967	2,371	172	784	3,327
Average annual growth rate during the years:				
1957 to 1960	3.8%	1.6%	19.6%	5.2%
1961 to 1967	3.2%	1.8%	13.9%	4.9%
Average length of haul in 1967 (km)	160	11	34	63

Source: Taiwan Railway Administration, December 1968

March 5, 1969

TABLE 2

CHINA

THIRD RAILWAY PROJECT

Number of Motor Vehicles Registered, 1956 to 1968

End of Year	Trucks: Common Carriers	Trucks: Private	Buses	Private Cars	Taxis	Motor-cycles	Other	Total
1956	2,490	2,181	2,599	4,760	834	3,131	758	16,753
1957	2,486	2,477	2,783	5,044	897	4,039	1,012	18,736
1958	2,556	3,080	3,013	5,649	1,056	7,399	1,188	23,941
1959	3,166	3,598	3,111	5,589	1,466	15,836	2,767	35,533
1960	3,458	3,994	3,444	6,395	1,660	26,468	3,326	48,745
1961	3,709	4,160	3,600	6,671	2,297	32,733	3,604	56,774
1962	4,267	4,188	3,785	6,753	3,263	35,783	3,774	61,813
1963	4,568	4,634	4,027	7,278	3,677	40,217	4,230	68,631
1964	5,315	4,953	4,487	7,752	4,635	49,509	4,447	81,098
1965	6,904	5,634	4,953	8,943	6,156	68,198	4,802	105,590
1966	8,633	7,107	5,539	11,038	8,171	92,774	19,369	152,631
1967	9,509	9,215	5,757	14,245	10,863	141,705	20,456	211,750
1968	12,056	15,142	6,193	16,384	14,314	483,287	19,926	567,302
Average Annual Growth Rate During the Years:								
1957 to 1960	8.6%	16.2%	7.3%	7.8%	19.8%	71.2%	44.0%	31.0%
1961 to 1968	18.5%	21.3%	7.6%	12.5%	30.8%	53.8%	25.9%	40.9%

Note: (1) Military vehicles are excluded.
(2) "Other" includes 3-wheeled trucks and cars. The former was introduced in 1966. The rapid increase in motorcycles is due to new local production.

Source: Ministry of Communications, April 30, 1969.

May 8, 1969

TABLE 3

CHINA

THIRD RAILWAY PROJECT

Rail & Bus Passenger Traffic, 1956 to 1968
(Millions of Pass-km)

	LOCAL TRAFFIC			INTER-CITY AND OTHER TRAFFIC				TOTAL			
	Rail	Road		Rail	Rail	Road		Rail		Road	
Year	TRA Commuters*	City Buses	Total	TRA Excluding Commuters	Other Lines	Inter-city** Buses	Total	TRA	Other Lines	All Buses	Grand Total
1956	508	1,031	1,539	2,134	219	2,298	4,651	2,642	219	3,329	6,190
1957	560	1,110	1,670	2,134	263	2,272	4,669	3,193	263	3,382	6,339
1958	594	1,146	1,740	2,851	258	2,668	5,777	3,445	258	3,184	7,517
1959	599	1,203	1,802	2,882	223	3,068	6,173	3,481	223	4,271	7,975
1960	638	1,187	1,825	2,768	203	3,173	6,144	3,406	203	4,360	7,969
1961	652	1,305	1,957	2,920	191	3,420	6,531	3,572	191	4,725	8,488
1962	633	1,430	2,062	2,656	188	3,343	6,187	3,289	188	4,772	8,250
1963	641	1,549	2,190	2,726	191	3,519	6,436	3,367	191	5,068	8,626
1964	697	1,788	2,485	3,134	196	4,322	7,652	3,831	196	6,110	10,137
1965	741	1,926	2,667	3,540	189	4,833	8,562	4,281	189	6,759	11,229
1966	770	2,014	2,784	3,690	182	5,261	9,133	4,460	182	7,275	11,917
1967	863	2,154	3,017	4,079	169	5,603	9,851	4,942	169	7,757	12,868
1968	906	2,608	3,514	4,476	135	6,278	10,889	5,382	135	8,886	14,403
Average Annual Growth Rate During the Years											
1957 to 1960	5.9%	3.6%	4.4%	6.7%	(-1.9%)	8.4%	7.2%	6.6%	(-1.9%)	7.0%	6.5%
1961 to 1968	4.9%	10.5%	8.8%	6.6%	(-4.6%)	9.3%	7.8%	6.3%	(-4.6%)	9.6%	8.0%
Average Length of Passenger Journey in 1968 (kms)											
	15	6	-	58	10	12	-	39	10	9	-

Percentage of Traffic in 1968

Local		Long-distance	
Rail	Road	Rail	Road
25.6	74.2	42.3	57.7

* Includes estimates for the East Line.
** Includes a small amount of urban traffic conveyed by private bus companies.

Source: Taiwan Railway Administration, December 1968

May 8, 1969

TABLE 4

CHINA

THIRD RAILWAY PROJECT

Planned Investment in the Transport Sector, Four Year Plan, 1969-1972

	NT$ million	%
Railways	5,121 1/	25
Highways	3,271	16
Harbours	3,809	18
Shipping	6,659	32
Civil Aviation	1,820	9
Total Transport Sector	20,680	100
Total National Fixed Investment	156,460	

Source: Ministry of Finance, China, January 1968

1/ TRA's latest investment estimates are 10% higher (see para 4.01)

March 5, 1969

TABLE 5

CHINA

THIRD RAILWAY PROJECT

Taiwan Railway Administration

Motive Power and Rolling Stock as of Dec. 31, 1968

	West Line		East Line	
A. Locomotives	Existing	Under Procurement	Existing	Under Procurement
1. Steam				
Road	153	-	17	-
Shunting	15	-	4	-
	168	-	21	-
2. Diesel				
Road	64	21	12	-
Shunting	33	5	-	-
	97	26	12	-
B. Railcars				
Suburban	19(160/200 HP)	-	-	-
Interurban	43(300 HP)	-	20(200/260HP)	-
Trailer	10	-	-	8
	72	-	20	8
C. Passenger cars				
Coach	635	167	37	-
Dining car	4	4	-	-
Sleeping car	15	-	3	-
Coach mail and baggage	32	-	4	-
Mail and baggage	53	5	5	-
Power car (express trains)	20	5	-	-
Others	8	-	-	-
	767	181	49	-

D. Freight cars	4-wheelers	Bogie	4-wheelers	Bogie	4-wheelers	Bogie	4-wheelers	Bogie
Box with van	258	4	-	-	20	-	7	-
Box car	2,333	433	-	150	155	-	-	18
Refrigerating car	115	-	-	-	-	-	-	-
Poultry car	192	-	-	-	9	-	-	-
Gondola with van	8	8	-	-	58	-	-	-
Gondola	1,693	304	50	145	221	-	-	-
Flat car	23	499	-	-	-	63	-	15
Tank car	14	11	-	5	1	-	-	-
Hopper car	-	343	-	16	5	-	-	-
Others	71	6	80	-	-	-	-	-
	6,315		446		532		40	

Source: Taiwan Railway Administration, April 1969

May 8, 1969

TABLE 6

CHINA

THIRD RAILWAY PROJECT

Taiwan Railway Administration
Manpower, Productivity and Wages

	1963	1964	1965	1966	1967	1968
Total staff at beginning of year	21,828	21,776	21,668	21,666	21,580	21,814
Total staff at end of year	21,776	21,668	21,666	21,580	21,814	21,820
Total staff average for year	21,800	21,722	21,667	21,623	21,700	21,817
Total train-km ('000)	21,768	23,285	23,673	23,793	25,133	26,336
Employees per 1000 train-km	1.00	0.93	0.92	0.91	0.86	0.83
Total traffic units:						
Pass-km plus ton-km (million)	5,343	6,009	6,511	6,715	7,312	7,926
Traffic units per employee ('000)	245	277	300	300	337	372
Labor costs: (NT$ million)						
Salaries and wages	339.7	374.3	403.0	461.0	537.1)	) 664.7
Bonus	35.5	35.5	35.3	46.5	60.6)	
Pensions	11.0	11.2	13.6	12.8	14.7	22.9
Total Cost	386.2	421.0	451.9	520.3	612.4	687.6
Average cost per employee:						
per annum (NT$)	17,715	19,383	20,854	24,066	28,221	31,512
per month (NT$)	1,477	1,615	1,737	2,006	2,352	2,626
per month (US$ equivalent)	37	40	44	50	59	65
Average labor cost per traffic unit (NT$)	0.072	0.070	0.069	0.077	0.084	0.087
Labor cost % of total operating cost	36.2	36.3	35.7	39.2	40.0	41.6

May 8, 1969

CHINA

THIRD RAILWAY PROJECT

Taiwan Railway Administration
Summary of Selected Operating Statistics (West Line)

	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
I. TRAFFIC											
Pass-km (million)	3,330	3,363	3,293	3,456	3,178	3,256	3,696	4,130	4,295	4,755	5,175
Net ton-km (million)	1,803	1,770	1,879	1,966	1,881	1,939	2,138	2,183	2,212	2,326	2,500
Traffic Units (pass-km and ton-km) (million)	5,133	5,133	5,172	5,422	5,059	5,195	5,834	6,313	6,507	7,081	7,675
II. OPERATION											
Train-km (000)	16,436	16,375	16,923	18,557	18,956	19,252	20,667	20,767	20,875	22,130	23,217
Engine-km (000)											
Steam	16,917	16,720	15,770	12,342	10,950	11,071	11,990	12,150	11,111	7,592	8,500
Diesel (not including railcars)	-	-	1,553	6,395	8,221	8,485	8,754	8,678	9,899	14,318	14,918
	16,917	16,720	17,323	18,737	19,171	19,556	20,744	20,828	21,010	21,910	23,418
Number of Engines in Fleet:											
Steam	226	225	224	220	191	191	191	191	191	191	168
Diesel	-	-	21	52	52	52	52	52	97	97	97
Railcars	52	52	41	41	41	41	41	41	72	72	72
Total	278	277	286	313	284	284	284	284	360	360	337
Number of freight cars in fleet	5,180	5,228	5,329	5,678	5,498	5,487	5,413	5,297	5,724	6,109	6,315
Engine-km per Engine in service per day:											
Steam	247	244	236	213	204	204	226	232	281	249	258
Diesel	-	-	467	468	495	520	567	556	625	547	570
Wagon-km per wagon day	-	-	107	110	108	111	119	112	107	114	110
Traffic-Units per Motive Power Unit in fleet (million)	18.5	18.5	18.0	17.3	17.8	18.3	20.5	22.2	18.1	19.7	22.8
Traffic-Units per Train-km	312	313	305	292	267	270	232	304	212	320	331
Pass-km per Pass-car-km	48.9	48.0	45.7	43.7	39.7	40.7	44	48	46.3	44.9	44.6
Pass-km per Pass-car in fleet (million)	5.8	5.4	5.2	5.2	4.6	4.8	5.5	6.2	6.0	6.7	6.7
Net Ton-km per Freight car in fleet (000)	348	338	352	346	342	353	395	412	388	381	396
Average turn-round time of freight cars (days)	2.2	2.3	2.3	2.3	2.4	2.3	2.2	2.1	2.3	2.4	2.4
Average net loading per freight train (tons)	277	285	302	295	279	279	283	288	298	305	309
Average load of freight cars(tons)(capacity)	n.a.	16.2	16.5	16.5	16.8	17.3	17.4	17.6	17.6	17.2	17.6
Average load of freight cars loaded and empty (tons)	9.5	9.8	9.9	10.0	9.5	9.6	9.7	10.8	11.2	10.4	11.1
Average load of freight cars loaded (tons)	12.6	13.2	13.5	13.9	13.5	13.6	13.9	14.6	15.5	14.0	15.0

TABLE 7

May 8, 1969

CHINA

THIRD RAILWAY PROJECT

Taiwan Railway Administration
Summary of Selected Operating Statistics (East Line)

	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
I. TRAFFIC											
Pass-km (million)	114.2	118.0	113.1	115.8	111.4	111.5	135.0	150.9	165.4	187.0	207.1
Net ton-km	29.4	33.1	31.7	32.7	34.4	36.1	40.2	46.7	42.9	44.2	44.3
Traffic Units (Pass-km and ton-km) (million)	143.6	151.1	144.8	148.5	145.5	147.6	175.2	197.6	208.3	231.2	251.4
II. OPERATION											
Train-km (000)	2,203	2,296	2,301	2,249	2,391	2,516	2,628	2,896	2,918	3,003	3,119
Engine-km (000):											
Steam	901	999	1,000	916	923	972	1,042	1,159	1,078	1,075	1,004
Diesel Railcars	1,337	1,346	1,364	1,468	1,589	1,693	1,748	1,899	2,008	2,126	2,323
Total	2,238	2,345	2,364	2,384	2,512	2,665	2,790	3,058	3,086	3,201	3,327
Number of Engines in Fleet:											
Steam	24	24	24	24	24	24	24	24	24	21	21
Diesel Railcars	14	14	14	18	18	18	16	16	18	20	20
Total	38	38	38	42	42	42	40	40	42	41	41
Number of freight cars in Fleet	521	521	520	517	512	508	513	520	527	537	532
Engine-km per Engine-day in Fleet											
Steam	-	-	188.5	170.2	163.2	173.0	189.1	195.8	185.5	191.5	178.6
Wagon-km per wagon day	-	-	85	78	79	84	80	81	84	80	79
Traffic Units per Motive Power Unit in Fleet (million)	3.78	3.98	3.81	3.54	3.47	3.52	4.40	4.94	5.48	5.64	6.1
Traffic Units per Train-km	65.1	65.9	62.9	66.1	60.9	58.7	67.1	66.2	71.4	77.0	80.6
Pass-km per pass car-km	28.2	29.9	30.9	33.8	33.2	31.2	34.1	33.4	32.6	33.9	35.0
Pass-km per pass car in fleet (million)	1.78	1.84	1.79	1.73	1.66	1.69	2.04	2.32	2.46	3.82	3.9
Net ton-km per freight car (000)	56.5	63.6	61.0	63.3	67.2	70.9	78.4	89.8	81.5	82.3	83.3
Average turn-round time of freight cars (days)	1.4	1.3	1.3	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3
Average net loading per freight train (tons)	33.3	33.9	32.1	37.9	38.7	40.2	40.7	42.4	36.9	43.9	45.0
Average load of freight cars (loaded cars only) (tons)	5.2	5.1	4.9	5.0	5.2	4.9	5.1	5.5	5.4	5.3	5.4
Average load of freight cars (loaded and empty) (tons)	3.8	3.6	3.4	3.6	3.6	3.6	3.7	3.9	3.5	3.9	3.9

TABLE 8

May 8, 1969

CHINA

THIRD RAILWAY PROJECT

Taiwan Railway Administration
Freight Traffic (Actual & Forecast, 1960-1972)
(millions of ton-km)

Commodity West Line	Actual				Forecast				Average Annual Growth Rate, %	
	1960	1965	1967	1968	1969	1970	1971	1972	1960-1968	1969-1972
Coal	467.8	596.0	596.9	627.4	633.6	643.0	652.6	662.5	3.8	1.5
Military supplies	298.7	194.5	185.0	166.2	170.8	174.2	177.7	181.3	-7.5	2.0
Rice	78.2	151.0	128.5	112.2	117.2	119.0	120.8	122.6	4.5	1.5
Cement	94.5	117.9	163.0	192.4	195.4	203.2	211.4	219.8	9.3	4.0
Ballast	n.a.	n.a.	76.8	91.7	95.8	100.6	105.6	110.9	-	5.0 1/
Sugar	47.8	70.2	55.4	62.3	67.0	68.4	69.5	71.5	3.9	2.2 1/
Timber	69.6	82.1	88.1	81.3	84.4	86.0	87.8	89.5	2.0	2.0
Salt	53.1	77.0	78.2	75.4	78.1	80.4	82.7	85.3	4.5	3.0
L.C.L.	n.a.	n.a.	66.7	65.7	66.8	68.1	69.4	70.7	-	1.8
Oil	32.6	44.0	51.5	50.8	50.6	51.7	52.7	53.8	5.7	2.0
Fruit	n.a.	n.a.	41.8	31.5	32.8	33.7	34.7	35.8	-	2.9
Wine, Tobacco	n.a.	n.a.	36.2	30.7	37.9	38.6	39.4	40.1	-	1.7
Mineral Products	n.a.	n.a.	30.9	18.7	18.6	19.4	20.4	21.5	-	4.9
Other	736.2	849.9	727.6	916.5	907.6	977.0	987.1	1,026.6	-	4.2
Total, West Line	1,878.5	2,182.6	2,326.3	2,522.8	2,556.6	2,663.6	2,711.8	2,791.8	3.9	3.0
Total, East Line	34.4	48.9	44.2	45.1	58.4	60.4	62.0	63.9	3.5	3.1
Grand Total	1,912.9	2,234.3	2,370.5	2,567.9	2,615.0	2,724.0	2,773.8	2,855.7	3.8	3.0

1/ Sugar will increase about 5% in 1969 due to witheld stocks. After that about 2% per annum is expected.

Source: Taiwan Railway Administration, December 1968.

March 25, 1969

TABLE 2

TAIWAN RAILWAY ADMINISTRATION

REVENUES, EXPENSES AND NET INCOME

Actual: 1963 - 1968
Estimated: 1969 - 1972

	ACTUAL						ESTIMATED			
	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
OPERATING REVENUES										
Passengers	636	760	857	965	1,183	1,432	1,472	1,595	1,717	1,848
Less Provincial government levy	-	-	-	-	27	85	64	-	-	-
	636	760	857	965	1,156	1,347	1,408	1,595	1,717	1,848
Freight	532	586	616	644	718	840	868	894	921	947
Railway Freight Service - Net Revenue (loss)	10	11	12	8	7	(4)	(4)	(3)	(2)	(1)
Hotels and Dining Cars - Net Revenue	1	1	2	2	2	2	2	2	3	3
Other Operating Revenues	17	17	25	34	19	21	30	24	21	18
Total Operating Revenues	1,196	1,375	1,512	1,653	1,902	2,206	2,304	2,512	2,660	2,815
OPERATING EXPENSES										
Train Operations	325	363	386	368	433	426	464	507	523	541
Stations	99	108	114	149	173	217	239	262	270	279
Maintenance of Way and Structures	186	184	223	218	234	229	255	278	286	297
Maintenance of Signal and Telecommunication Equipment	-	-	-	-	35	35	45	49	51	52
Maintenance of Equipment	168	180	192	201	227	274	299	327	337	349
Traffic Management	43	49	59	48	67	80	90	98	101	105
Pensions	18	19	13	13	15	23	23	24	27	31
General Administration	57	59	71	76	80	87	105	115	118	122
Other Operating Expenses	9	7	7	57	46	51	5	4	4	4
Total Operating Expenses (excluding depreciation)	905	969	1,065	1,130	1,310	1,422	1,525	1,664	1,717	1,780
Depreciation	163	191	199	198	220	232	259	315	330	355
Total Operating Expenses	1,068	1,160	1,264	1,328	1,530	1,654	1,784	1,979	2,047	2,135
Net Operating Revenues	128	215	248	325	372	552	520	533	613	680
Net Non-operating Income/ (Loss)	20	(12)	9	(14)	(9)	(51)	(5)	(5)	(5)	(5)
Net Revenue before Interest Charges	148	203	257	311	363	501	515	528	608	675
Interest	76	72	67	70	88	103	135	196	210	199
Net Income	72	131	190	241	275	398	380	332	398	476
RATIOS:										
Operating Ratios	89	84	84	80	80	75	77	79	77	76
Times Interest Earned	1.9	2.8	3.8	4.5	4.2	4.9	3.8	2.7	2.9	3.4
Debt Service Coverage	1.6	2.5	2.7	2.4	2.9	3.3	2.6	2.4	1.6	1.7
Return on Net Fixed Assets	2.5	4.0	4.8	5.3	6.4	9.3	7.8	6.7	6.8	7.3

TABLE 10

April 10, 1969

TABLE 11

TAIWAN RAILWAY ADMINISTRATION

SUMMARY BALANCE SHEET DATA

Actual as of December 31, 1965 - 1968
Estimated as of December 31, 1969 - 1972
(millions of N.T. $)

	ACTUAL				ESTIMATED			
	1965	1966	1967	1968	1969	1970	1971	1972
ASSETS								
Current assets:								
Cash	17	15	20	31	30	33	30	34
Materials and supplies	353	877	899	646	619	622	620	624
Other	377	271	680	886	695	695	715	705
Total current assets	747	1,163	1,599	1,563	1,344	1,350	1,365	1,363
Funds, advances and investments	401	420	446	486	473	475	475	475
Fixed assets:								
a) Operational:				6				
Gross Value	6,175	6,888	7,206	7,696	9,151	11,130	11,707	12,365
Less Accumulated Depreciation	810	995	1,129	1,429	1,688	2,003	2,333	2,689
Net Operational Fixed Assets	5,365	5,893	6,077	6,267	7,463	9,127	9,374	9,676
b) Non-Operational	-	-	-	1,563	1,393	1,123	1,063	1,063
Total Net Fixed Assets	5,365	5,893	6,077	7,830	8,856	10,250	10,437	10,739
Other assets	56	89	88	170	175	81	60	48
Internal transactions in suspense	227	144	118	137	154	162	173	184
TOTAL ASSETS	6,796	7,709	8,328	10,186	11,002	12,318	12,510	12,809
LIABILITIES AND EQUITY								
Current liabilities	252	592	805	691	491	486	496	490
Debt:								
Long-term loans	853	1,273	1,341	1,336	1,893	3,016	3,031	3,149
Government Pool Borrowing	213	171	213	259	399	399	229	-
Total debt	1,066	1,444	1,554	1,595	2,292	3,415	3,260	3,149
Other liabilities	30	17	4	6	6	6	6	6
Total liabilities	1,348	2,053	2,363	2,292	2,789	3,907	3,762	3,645
Equity:								
Capital	4,816	4,816	4,816	4,816	4,816	4,816	4,816	4,816
Revaluation Surplus	-	-	-	1,479	1,479	1,479	1,479	1,479
Earned Surplus	632	840	1,149	1,599	1,918	2,116	2,453	2,869
Total Equity	5,448	5,656	5,965	7,894	8,213	8,411	8,748	9,164
TOTAL LIABILITIES AND EQUITY	6,796	7,709	8,328	10,186	11,002	12,318	12,510	12,809
RATIOS:								
Current assets to current liabilities	3.0	2.0	2.0	2.3	2.7	2.8	2.8	2.8
Current assets less materials and supplies to current liabilities	1.6	0.5	0.9	1.3	1.5	1.5	1.5	1.5
Debt to equity	15/85	20/80	21/79	17/83	22/78	29/71	27/73	26/74

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CHINA

THIRD RAILWAY PROJECT

NOTES ON TRA'S BALANCE SHEET
December 31, 1968

1. "Materials and supplies" includes NT$514 million for materials in transit under IBRD loans.

2. "Funds, advances and investments" includes NT$434 million as the value of assets used in TRA's auxiliary enterprises (freight forwarding service, hotels and catering service, printing works, etc.).

3. "Fixed Assets" - Value based on revaluation carried out in 1961 plus cost price of assets acquired since. Revaluation is governed by the movement of the wholesale price index in Taipei. On December 31, 1967 it had increased by 11.5% since 1961. Further revaluation can be considered when this index has increased by 20%. Land is not subject to this manner of revaluation, but in 1967 Government ordered a special revaluation for taxation purposes. TRA complied and the accounting adjustment has been made in 1968, the resulting net surplus of NT$1,479 being added to "capital surplus". The enhanced value arising from the revaluation has been added to "Fixed Assets" under "non-operational", until such time as TRA has determined the value of operational land.

4. "Capital" includes the surpluses resulting from revaluations of assets carried out in 1952 and 1961, which totalled about NT$4.1 billion.

5. Apparent discrepancies in reconciling figures between Tables 10 and 11, in 1966, 1967 and 1968 (mainly affecting Fixed Assets, Depreciation and Earned Surplus) arise from year-end adjustments due to a) retirements of assets and b) corrections to previous years' accounts.

April 11, 1969

TABLE 12

CHINA

THIRD RAILWAY PROJECT

Taiwan Railway Administration
Composition of Debt: December 31, 1968

Class of Loans	Year Contracted	Amount (million NT$)	Maturity Years	Rate of Interest	Outstanding (million NT$)
1. Counterpart Loan	1960	38.46	30	10	21.81
2. Special Account No. 4	1960	12.78	20	5	6.18
" " No.10	1965	9.02	20	5	6.87
		21.80			13.05
3. Development Loan Fund	1. 1958	121.34	15	3.5	14.88
	2. 1960	236.45	28	3.5	95.46
		357.79			110.34
4. Supply Contracts	1. 1959	429.20	15	5	125.60
	2. 1959	254.10	30	5	140.08
	3. 1960	178.80		5	108.00
		862.10			373.68
5. Taiwan Power Co. 1/ (for branch line)	1965	148.13	10) 15)	5) 10)	134.29
6. Bank of Communications 2/	1967	39.30	5	7.2	39.30
TOTALS		1,467.55			692.47
7. Provincial Government Pool		258.66	None	9.72	258.66
8. Loan 409-CHA	1966	713.78	20	5.5	643.78
		2,440.02			1,594.91

1/ For betterment of Shen-Ao line and new construction of Lin-Kou and Sui-Nan-Tung branch lines

2/ For 70% of cost of 35 reversible chair passenger coaches

April 11, 1969

C H I N A

THIRD RAILWAY PROJECT

Taiwan Railway Administration
Capital Investment Plan (1969 - 1972)

(NT $ millions)

	1969			1970			1971			1972			Total Cost		
	Total	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign
A. Project Items (Years 1969-1970)															
i) Items to be financed by the proposed Loan															
Diesel electric locomotives (WL)	-	-	-	176.2	15.8	160.4	-	-	-	-	-	-	176.2	15.8	160.4
Passenger cars (WL)	-	-	-	575.0	72.0	503.0	-	-	-	-	-	-	575.0	72.0	503.0
Freight cars (WL)	-	-	-	272.7	38.8	233.9	-	-	-	-	-	-	272.7	38.8	233.9
Double tracking of 7 sections	8.0	8.0	-	69.0	24.9	44.1	38.0	38.0	-	-	-	-	115.0	70.9	44.1
Level crossings warning equipment				12.2	0.2	12.0	4.8	4.8	-	-	-	-	17.0	5.0	12.0
Track strengthening	34.4	30.4	4.0	100.1	40.1	60.0	-	-	-	-	-	-	134.5	70.5	64.0
Equipment for workshops	-	-	-	66.9	14.8	52.1	-	-	-	-	-	-	66.9	14.8	52.1
Freight handling equipment	-	-	-	15.5	3.5	12.0	-	-	-	-	-	-	15.5	3.5	12.0
Trailers for East Line	-	-	-	30.5	6.5	24.0	-	-	-	-	-	-	30.5	6.5	24.0
Bogies for passenger cars	-	-	-	23.0	3.0	20.0	-	-	-	-	-	-	23.0	3.0	20.0
Signalling equipment	-	-	-	-	-	-	34.5	6.4	28.1	-	-	-	34.5	6.4	28.1
Consulting services	8.4	0.4	8.0	4.4	0.4	4.0	-	-	-	-	-	-	12.8	0.8	12.0
Sub - total	50.8	38.8	12.0	1,345.5	220.0	1,125.5	77.3	49.2	28.1	-	-	-	1,473.6	308.0	1,165.6
Contingencies	3.7	2.7	1.0	96.8	15.8	81.0	5.5	3.5	2.0	-	-	-	106.0	22.0	84.0
Sub - total	54.5	41.5	13.0	1,442.3	235.8	1,206.5	82.8	52.7	30.1				1,579.6	330.0	1,249.6
ii) Items to be financed by TRA	158.0	34.0	124.0	25.2	11.2	14.0	1.0	1.0	-	-	-	-	184.2	46.2	138.0
Total Cost of the Project	212.5	75.5	137.0	1,467.5	247.0	1,220.5	83.8	53.7	30.1	-	-	-	1,763.8	376.2	1,387.6
B. Project 409-CHA	205.0	135.0	70.0	120.0	120.0	-	69.0	69.0	-	-	-	-	394.0	324.0	70.0
C. Project 524-CHA	734.7	100.7	634.0	164.1	96.0	68.1	-	-	-	-	-	-	898.8	196.7	702.1
Sub - total	939.7	235.7	704.0	284.1	216.0	68.1	69.0	69.0	-	-	-	-	1,292.8	520.7	772.1
D. Other Capital Investment 1/	303.0	286.0	17.0	227.6	207.5	20.0	424.5	223.5	201.0	658.0	303.0	355.0	1,613.0	1,020.0	593.0
Grand Total Investment Program	1,455.2	597.2	858.0	1,979.2	670.5	1,308.6	577.3	346.2	231.1	658.0	303.0	355.0	4,669.6	1,916.9	2,752.7

1/ See text para. 4.02

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TABLE 13

TABLE 14

TAIWAN RAILWAY ADMINISTRATION

STATEMENT OF CASH FLOW

1966-1972 Inclusive
(Actual : 1966-1968)
(Estimated : 1969-1972)
(millions NT$)

	ACTUAL			ESTIMATED				TOTAL 1969-1972
	1966	1967	1968	1969	1970	1971	1972	
				(Fifth Four Year Plan Period)				
A. CASH REQUIREMENTS								
1. Capital investment program 1966-1970	733	389	490	1,455	1,979	577	658	4,669
2. Debt service:								
Interest	69	88	103	135	196	210	199	740
Repayments -								
Provincial Govt Pool Funds	42	-	-	-	-	170	228	398
Other	101	110	120	160	152	194	179	685
Total Debt Service	212	198	223	295	348	574	606	1,823
3. Changes in working capital	26	139	98	(9)	8	9	9	17
4. Contribution to Provincial Government	60	72	72	61	50	50	50	211
5. Total Cash requirements	1,031	798	883	1,802	2,385	1,210	1,323	6,720
B. CASH AVAILABLE:								
1. Net revenue	310	363	501	515	528	608	675	2,326
2. Depreciation	198	220	232	259	315	330	356	1,260
3. Sale of land	-	-	-	170	270	60	-	500
	508	583	733	944	1,113	998	1,031	4,086
4. Loans:								
IBRD Loan 409-CHA	479	120	45	70	-	-	-	70
IBRD Loan 524-CHA	-	-	-	634	68	-	-	702
Proposed Third IBRD Loan	-	-	-	13	1,207	30	-	1,250
Other foreign borrowings	-	-	-	-	-	179	296	475
Other borrowings	42	58	70	-	-	-	-	-
Provincial Govt Pool Funds	-	42	46	140	-	-	-	140
Total loans	521	220	161	857	1,275	209	296	2,637
5. Cash balance beginning of year	17	15	20	31	30	33	30	31
6. Total cash available	1,046	818	914	1,832	2,418	1,240	1,357	6,754
7. Cumulative cash position, end of year	15	20	31	30	33	30	34	34

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TABLE 15

CHINA

THIRD RAILWAY PROJECT

Taiwan Railway Administration
Passenger Traffic (Actual and Forecast)
1960 - 1972
(Pass-km, millions)

	West Line		East Line
	Long distance	Short distance	
1960 (Actual)	709	2,584	113
1963 (Actual)	901	2,354	112
1967 (Actual)	1,860	2,895	187
1968	2,038	2,927	179
1969	2,274	3,041	186
1970	2,568	3,117	193
1971	2,861	3,195	201
1972	3,202	3,227	209
Average Annual Growth Rate: 1960 to 1967	15%	2%	8%
1968 to 1972	12%	2%	4%

Source: Taiwan Railway Administration, December 1968

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CHINA

THIRD RAILWAY PROJECT

Taiwan Railway Administration
TARIFF STRUCTURE

1. Passengers

Basic fare is NT$0.22 per pass/km (as from August 15, 1967). Fare varies with each of six types of trains, i.e.:

	Fare per pass/km
Ordinary Trains	NT$0.220
Diesel Railcars	0.275
Ordinary Expresses	0.308
Limited Express Diesel Trains	0.396
Kung Hua Express Trains 1/	0.484
Bienvenue Express 1/ (air conditioned)	0.583

1/ Operating between Taipei and Kaohsiung

2. Freight

a) Carload

As from August 15, 1967, there are 8 classes of commodities; with varying rates per ton and per ton-km:-

Class	Terminal Charge per ton	Rate per Ton-km	Major Commodities
1	NT$ 6.2	NT$ 0.65	Dynamite
2	5.2	0.55	Wines, cigarettes
3	4.3	0.45	Tobacco, machinery, automobiles, cotton yarn
4	3.3	0.40	Cement, paper, bananas, molasses
5	3.3	0.35	Fish, canned goods, soap, cement products, sulphur, carbide
6	2.4	0.31	Coal, coke, cotton, bricks, salt (raw material), animals
7	2.4	0.28	Vegetables, lime, foodstuffs
8	2.4	0.25	Rice, limestone, gravel, grains, fertilizer, salt, wheat, firewood, potatoes)

There are presently no special agreement rates to encourage bulk loading or guaranteed tonnages.

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b) Less-than-Carloads

(L.C.L.) tariff is also based on a fixed terminal charge of NT$0.24 per 10 Kg and a variable rate of NT$.05 per 10 Kg for each 10 Km.

c) Miscellaneous

There are various additional charges for delivery, storage, detention, check weighing, handling, etc.

3. Social Privilege Rates and Fares

Privilege rates and fares currently in force, compared with those of 1965, are seen below:

	1965			Current		
		%			%	
Rates - NT$ per Ton-Km	Basic	Discount	Net	Basic	Discount	Net
Rice (local)[1/]	0.20	50	0.10	0.25	25	0.1875
Other grains	0.20	30	0.14	0.25	nil	0.25
Salt (local)[1/]	0.20	40	0.12	0.25	nil	0.25
Fertilizer (local)[1/]	0.20	40	0.12	0.25	25	0.1875
Wood-charcoal	0.20	25	0.15	0.25	nil	0.25
Military	0.25/ 0.65	50	0.125/ 0.325	0.25/ 0.65	50	0.125/ 0.325
Fares - NT$ per pass-km						
Primary school students	0.19	96	0.0026	0.22	96	0.0088
High school students	0.19	75	0.0475	0.22	75	0.055
Government Commuters	0.19	40	0.114	0.22	40	0.132
Military Commuters	0.19	80	0.038	0.22	80	0.044
Military half-fare	0.19	50	0.095	0.22	50	0.11
Military Party	0.19	50	0.095	0.22	50	0.11
Military free[2/]	0.19	100	-	0.22	100	-

1/ Full rate was charged for export rice, salt and fertilizer.
2/ In year July 1, 1967 to June 30, 1968, NT$7.5 million was paid to TRA against military free travel. This will be raised to NT$11.5 million in 1968/69 and to NT$15 million in 1969/70.

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ANNEX 2

CHINA

THIRD RAILWAY PROJECT
Taiwan Railway Administration
COMMUTER TRAFFIC AND FARES

The Communication Committee of CIECD has prepared a study of TRA's commuter traffic, based on 1966 operations.

The study shows that the deficit of about NT$125 million on this traffic was caused by Fixed Period Tickets for:

			Deficit
Students	(75% discount)	647 million Pass-Km	NT$113 million
Government Employees	(40% discount)	79 million Pass-Km	6 million
Military Personnel	(80% discount)	32 million Pass-Km	6 million
			NT$125 million

The recommendations of the study include:

a) Relief of overcrowding and increase in the Railroad's capacity to carry growing commuter traffic by:

   i) Restricting operation of non-commuter trains during peak hours of commuter traffic, and
   ii) Procuring more high-capacity commuter cars

b) Abolition of the 40% discount to government employees.
c) Students at above senior middle schools, universities and colleges should pay the same fares as the general public.
d) The price of military fixed-price tickets to be slightly increased.
e) More strict enforcement of the school zoning program by Government, thus reducing much unnecessary cross-city student travel.
f) TRA to be compensated by Government for the loss incurred.

No decision has yet been made by the Government, but government officials are of the opinion that a combination of gradual fare increases, together with the better enforcement of school zoning regulations (which would involve solving problems of uneven quality of education) would, in time, help to reduce the deficit.

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CHINA

THIRD RAILWAY PROJECT

Taiwan Railway Administration

Economic Benefits and Methodology

1. Passenger Cars - West Line

The largest element of the project, NT$ 550.5 million, consists of the provision of 268 long distance passenger cars for the West Line reflecting the rapid growth in traffic. Several reasons account for this high growth, the most important being rapidly expanding incomes and population, combined with poor highway alternatives. TRA now operates 705 cars on this line. During the 1969-70 period, a net addition of 137 cars will be made under the Bank first and second railway loans and by self-financed funds. The TRA will still require the 268 cars included in this project to meet the needs of long distance traffic. If the cars are not acquired, passengers would undoubtedly be diverted to the highways at substantially higher costs. When the operating costs for the 12 locomotives required to haul these cars are included, the cost per pass-km is NT$ 0.170 and NT$ 0.215 for rail and bus respectively. The comparison with private cars has not been made. The bus costs include a sum for maintenance of existing roads and because the railway passenger cars would be fully utilized on procurement, no traffic growth has been assumed.

The benefits of continuing to provide adequate rail service for passengers, rather than diverting them to road transport, result in a rate of return of at least 9% which is satisfactory.

2. Freight Cars

The traffic forecast for 1971 cannot be transported by rail unless new freight cars are acquired. TRA has consistently to turn down large volumes of traffic because of freight car shortages. The project includes 600 freight cars of 30 and 35 ton carrying capacity. These are much larger than most of the present cars which average 17 tons. If these new cars were not purchased, the result would be a diversion to the roads at substantially higher costs, even allowing for extra railway handling costs. Analysis suggests that rail costs, as compared with road haulage costs, result in net savings of NT$ 180 million/year. These benefits do not increase as the cars will be fully utilized immediately they are put into service. In order to haul the freight cars, 6 new locomotives will be required, the capital and operating costs of which are included in the economic justification. The freight cars are well justified, with an economic rate of return of 30% over their life.

3. Double Tracking

The total length of line between Changhua and Tainan is 142.5 km, out of which at present 54.9 km are double track and 53.5 are being converted to double track, mainly with funds provided in the second Bank loan, leaving a balance of 34.1 km single track. The Centralized Traffic Control (CTC) signal system, which is used on the line over the single track sections and the 54.9 km of double track sections, is being extended to the 53.5 km of double track under construction; though it is estimated that CTC, by raising track capacity to about 120 trains a day, would delay the need for total double tracking of the line, traffic forecasts are such that this measure now appears to be the only solution. The present project is for the double tracking of the remaining 34.1 km. Advantage of the double tracking work will be taken by TRA to install at low cost an individual CTC signal system on each of the two tracks. This will increase track capacity up to 244 trains a day against a forecast of 120 trains in 1972 with the present CTC. The economic comparison has been made with highways because the best alternative to capacity expansion is to divert to highways the traffic which could not be handled by rail. The benefits of double tracking result in an economic rate of return of 12% after taking into account the costs of additional CTC equipment to be financed by TRA and additional line maintenance costs.

4. Automatic Warning Devices

The installation of automatic warning devices is a continuing project, having been commenced under the first Bank loan. It is proposed to install devices at 64 highway grade crossings, including 14 on the East Line. Adequate warning is becoming urgent as there are now over 100 trains per day on many parts of the line and traffic, both rail and road, is growing rapidly. There were, for example, 61 traffic fatalities at crossings on both lines in 1967, as well as 194 serious injuries. A comparison of the costs for manually operated warning devices with those for automatic indicates that the latter are more economic, even allowing for much higher installation costs, one man for maintenance being required for ten places as compared with one man per crossing for manual operation. The savings to the TRA, and to the economy, of automatic warning devices result in a rate of return of 24% excluding any allowances for the value of improved safety.

5. Equipment for Workshops and Depots

To adequately maintain the proposed increases in motive power and rolling stock, it will be necessary to construct a new workshop and re-equip existing ones. The West Line now operates a shop in Taipei and another in Kaohsiung. The project would provide new equipment for both shops. A service and maintenance locomotive depot will be required at the Chi-tu marshalling yard (construction of which is being financed by the first Bank

loan), as well as new equipment in the car inspection yard at Kaohsiung which now handles about half of the West Line passenger cars. The cost of the equipment has already been included in the justification of the additional motive power and rolling stock being procured and so no separate justification is required.

6. Track Strengthening

The West Line consists almost entirely of 37 kg/m rail or lighter. This and the standard of construction of the substructure limits track capacity. Heavy axle loads cannot be carried safely at economic speeds. The project includes improvement of alignment, widening of roadbed, and strengthening of track by upgrading the rail and ballast. The improvements are part of a long range program and only the most urgent work -- the 40 km south of Taipei -- is included in this project. Reduction of curvature will reduce rail wear and train operating costs by eliminating the need to slow down and then accelerate, with corresponding heavy fuel consumption. Maintenance costs of track and the replacement of rails and ties will also be reduced considerably through the use of heavy welded rails in 1 km sections, better ballast and concrete ties. Running times will be improved by higher train speeds, resulting in time savings for crews. The benefits result in an economic rate of return of 9%. A further saving is important but is not included above, the time savings of passengers. If this benefit is added, the rate of return is increased to 18%.

7. Modernization of Freight Handling

TRA is making every effort to maintain a sound competitive position in the inland movement of international container traffic, rail being more economic than truck transportation for all but short hauls. At present, TRA is not equipped to handle containers from ships to inland consignees. The project calls for a pilot scheme in which the containers would be transferred from rail to road vehicles (private where available) by gantry cranes at two inland points and moved to the consignees.

TRA is also preparing to meet the growing competitive challenge of trucks in the domestic movements of traffic that is of high value in relation to bulk. This will be done by mechanizing handling through containerization and palletization.

The movement of international containers by rail/truck was compared with movement entirely by truck. The TRA traffic forecast is based on the expectations of major container shipping companies and has been treated conservatively. Domestic container and pallet movements were compared with movement of non-bulk traffic by normal railway labor intensive methods. The entire freight handling modernization program yields a rate of return of 35%.

8. Trailers - East Line

Passenger traffic on the East Line is expected to grow at an annual average rate of 4% per annum to 1972 and can be expected to continue at this rate in the absence of a paved road. It is proposed to add trailers to the existing diesel railcars to handle the additional traffic and to replace worn out passenger cars. Under the second Bank loan diesel railcars were fitted with more powerful engines to haul these trailers. A comparison of carrying the same traffic on the parallel gravel highway results in a rate of return of 12% over the project life.

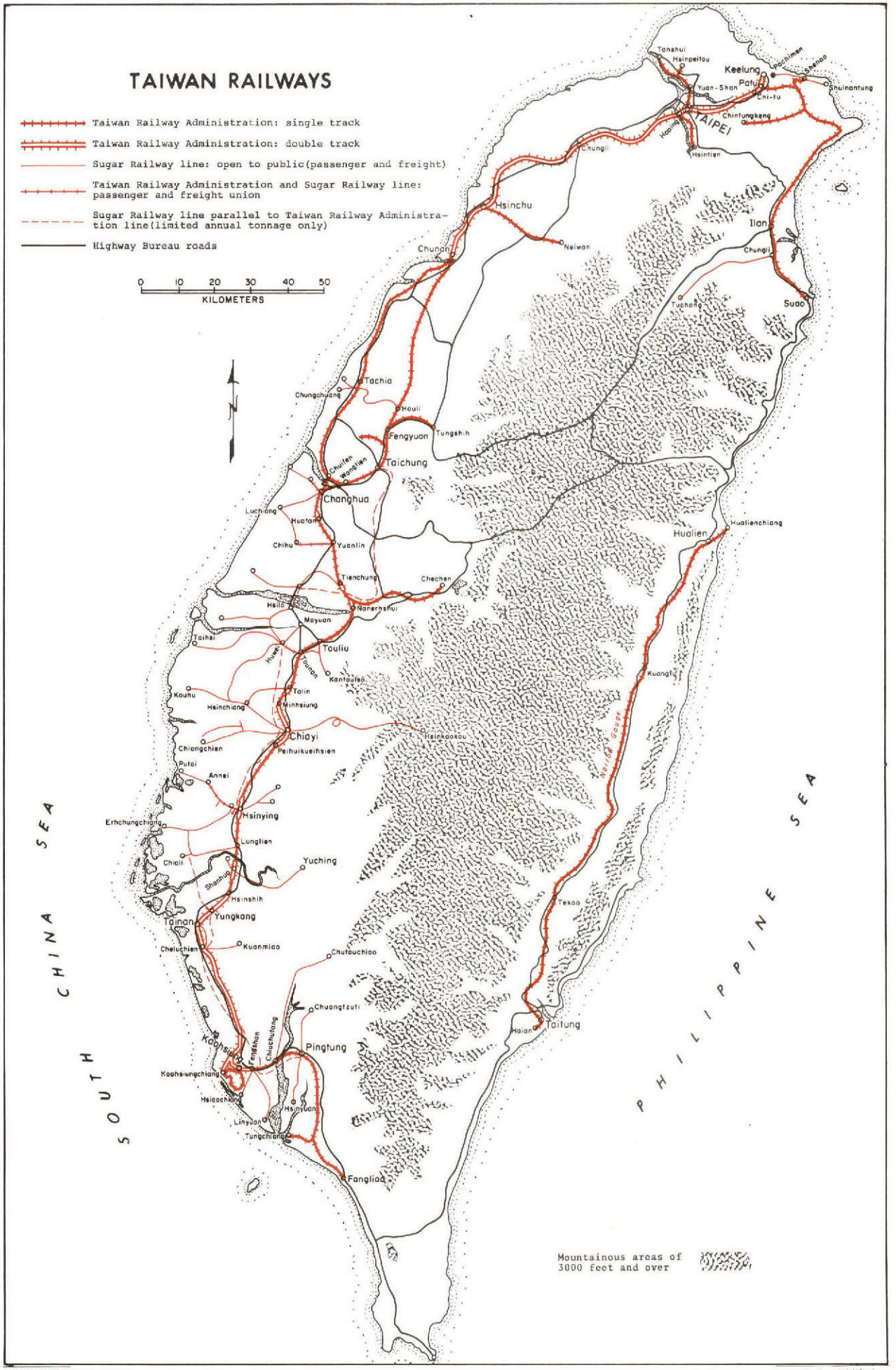
9. Passenger Car Bogies

The program of replacing over-aged passenger car bogies was commenced by the second loan under which 100-sets are being procured. The old wooden bodies have now all been replaced by steel bodies and the conversion of the bogies would considerably increase the working life of the coaches. Justification for the project lies not only in the elimination of dangerous operating conditions, but also in increased speeds, better riding qualities, and lower maintenance costs. The cost of the new bogies together with the cost of the steel bodies (now a sunk cost), would total NT$ 65.5 million. For completely new cars, the cost would have been NT$ 120.0 million, showing clear economic justification. If the coaches were not rehabilitated at all, the passenger traffic would have the alternative of travelling by road. Comparison of rail and bus costs indicate a rate of return of 33%.

10. Signalling - Patu and Kaohsiung

The manual signal interlocking systems of the TRA are inefficient and very old. Those in the worst condition are at Patu (41 years) and Kaohsiung stations which handle very heavy traffic. Because of the age of these installations, it is becoming extremely difficult to obtain replacement parts. The project will provide for electrification of the signalling which will result in vastly increased safety, savings in manpower and elimination of train delays. The cost savings only amount to about NT$ 2.5 million per annum and will yield a rate of return of about 6%. Though this rate of return may appear low, the signalling is justified on grounds of safety, the full economic benefits of which are not measurable.

March 17, 1969



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