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**PROJECT PERFORMANCE AUDIT REPORT**

**YUGOSLAVIA THIRD HIGHWAY PROJECT (LOAN 608-YU)**

December 10, 1976

Operations Evaluation Department

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Yugoslavia Highway System

Currency Equivalent -- Yugoslavian Dinar (Din)

1969	US\$1	=	Din 12.5
1970	US\$1	=	Din 12.5
1971	US\$1	=	Din 17.0
1972	US\$1	=	Din 17.0
1973	US\$1	=	Din 15.6
1974	US\$1	=	Din 17.1
1975	US\$1	=	Din 17.9

PROJECT PERFORMANCE AUDIT REPORT

YUGOSLAVIA THIRD HIGHWAY PROJECT (LOAN 608-YU)

Preface

This memorandum reports on an audit of performance under the Yugoslavia Third Highway Project, for which Loan 608-YU of June 5, 1969, in the amount of US\$30 million, was closed in August 1974. The performance audit is based on information contained in the Project Completion Report (PCR), prepared by the Bank's Europe, Middle East and North Africa Regional Office (Attachment). OED found the PCR to be satisfactory although information received since the time it was prepared alters to some extent its conclusions with respect to the impact of tolls; the implications of the fresh information are however reflected in this memorandum. Information contained in Bank files and discussions with Bank staff involved with the appraisal and supervision of this project have also provided valuable insights. No separate mission to Yugoslavia was made in connection with this performance audit.



PROJECT PERFORMANCE AUDIT BASIC DATA SHEET

YUGOSLAVIA THIRD HIGHWAY PROJECT (LOAN 608-YU)

(Amounts in US\$ mln)

	<u>Original</u>	<u>Disbursed</u>	<u>Cancelled</u>	<u>As of 12/31/75</u>	
				<u>Repaid</u>	<u>Outstanding</u>
Loan 608-YU	30.0	30.0	-	1.1	28.9

Project Data

	<u>Original Plan</u>	<u>Revisions</u>	<u>Actual</u>
Conception in Bank <sup>/a</sup>	-	-	7/31/68
Board Approval	-	-	5/27/69
Loan Agreement	-	-	6/5/69
Effectiveness	9/30/69	10/30/69	10/22/69
Physical Completion	6/72	-	6/30/74
% of Original Project Completed by Date Shown Above	70%	-	100%
Loan Closing <sup>/b</sup>	12/72	12/73	8/31/74
Total Costs (US\$ mln)	71.8 <sup>/c</sup>	-	73.7
Economic Rates of Return:			
Zagreb-Karlovac Road	13%	-	10%
Gostivar-Kicevo Road	15%	-	28%
Vrhnika-Postojna Road	12%	-	15%
Weighted average	-	-	18%

Mission Data

	<u>Month, Year</u>	<u>No. of Weeks</u>	<u>No. of Persons</u>	<u>Manweeks<sup>/d</sup></u>	<u>Date of Report</u>
Appraisal	10-11/68	5.0	3	15.0	5/15/69
Mission to collect additional informa- tion	2/69	0.7	1	0.7	3/24/69
Subtotal		5.7		15.7	
Supervision I	9-10/69	4.7 <sup>/e</sup>	1	4.7 <sup>/e</sup>	11/25/69
Supervision II	4-5/70	4.0 <sup>/e</sup>	1	4.0 <sup>/e</sup>	8/31/70
Supervision III	5/71	2.0	1	2.0	7/27/71
Supervision IV	6/72	2.5 <sup>/f</sup>	2	5.0 <sup>/f</sup>	7/6/72
Supervision V	11/72	2.3 <sup>/f</sup>	1	2.3 <sup>/f</sup>	1/11/73
Supervision VI	5-6/74	3.4	1	3.4	6/28/74
Subtotal		18.9		21.4	

Follow-on Project

Loan 678-YU of US\$40 million, signed May 28, 1970.

<sup>/a</sup> Date of Conception in Bank is date Bank first recorded project was being considered for financing and began to follow up that decision in a serious continuous way (Project Negotiations or Country General Files).

<sup>/b</sup> Actual Loan Closing Date is date of last disbursement out of the loan account as given by Controller's Department.

<sup>/c</sup> Includes contingencies.

<sup>/d</sup> Based on seven-day field week.

<sup>/e</sup> Of which two-thirds spent in supervision of Second and Fourth Highway projects.

<sup>/f</sup> Of which two-thirds spent in supervision of Fourth and Fifth Highway projects.





PROJECT PERFORMANCE AUDIT REPORT

YUGOSLAVIA THIRD HIGHWAY PROJECT (LOAN 608-YU)

Highlights

This project has been successfully completed. Most civil works were completed close to the appraisal schedule. Although a 33% cost overrun occurred, about half of it was due to price increases not anticipated at appraisal. The audit rates of return for two of the three roads included in the project are satisfactory, while that for the remaining road is only marginal.

The project illustrates the risks associated with the economic justification of a project when benefits depend upon a non-project item such as complementary investment. It also illustrates the need to adequately study tolls, so that their imposition does not impede the optimum use of roads. On the road whose audit rate of return is only marginal, high tolls and the failure to realize complementary investments were the major factors preventing full realization of the economic benefits.

The project also illustrates a successful method of channeling road funds in cases of highly decentralized highway administration.

The following points may be of particular interest:

Tolls and the optimum utilization of the roads (paras. 5, 14-16 and PCR paras. 11-14 and 23)

Channeling of road funds (para. 6)

Traffic forecasts and complementary investments (paras. 12-13, 17 and PCR paras. 15 and 23).



PROJECT PERFORMANCE AUDIT MEMORANDUM

YUGOSLAVIA THIRD HIGHWAY PROJECT (LOAN 608-YU)

Project Summary

1. The Government of Yugoslavia requested the Bank to assist in financing a highway construction program in July 1968. An appraisal mission visited Yugoslavia in October/November 1968 and identified a number of possible road projects. The preparation of three of these roads in the Republics of Croatia, Slovenia and Macedonia was well-advanced, final engineering had been completed and bidding documents were being prepared (See Map). These three roads were selected for inclusion in the project and it was agreed at the time that the remaining roads would be considered for financing later on.

2. The preparation and appraisal of the project was expeditious and by June 5, 1969, less than one year after the initial request, a loan for US\$30 million was signed. The efficiency with which this project was appraised was influenced by:

- (a) the continuing contact with Yugoslavia and the experiences gained through the First Highway Project, Loan 344-YU, of 1963 and the Second Highway Project, Loan 485-YU, of 1967;
- (b) the well-advanced stage in which the three roads were presented to the Bank and the fact the other roads were deferred thus avoiding delays; and
- (c) the prompt exchange of correspondence between Bank and Government.

3. The Third Highway Project for US\$30 million financed:

- (a) in Croatia, a highway from Zagreb to Karlovac with access roads in Zagreb and in Karlovac, accounting for 34% of project costs;
- (b) in Slovenia, a highway from Vrhnika to Postojna accounting for 54% of project costs; and
- (c) in Macedonia, a highway from Gostivar to Kicevo accounting for 12% of project costs (Attachment, para. 1).

The sections in Croatia and Slovenia, the more developed northern part of the country, formed parts of new international highways linking Yugoslavia's Adriatic coast to road networks in neighboring countries and were important

for expanding tourist traffic. Both of these sections would be operated as toll facilities. The Croatia section would also support the planned expansion of the Port of Rijeka. The third section in Macedonia replaced a low standard, mountainous road. All three sections would follow new alignments because it would be uneconomical to upgrade the existing roads.

4. The major components of the loan were completed slightly behind the appraisal schedule while minor components (the Karlovac and Zagreb access roads) were severely delayed and were completed in December 1973 and June 1974, respectively, one and a half to two years behind the appraisal schedule (Attachment, paras. 5-6). In the case of the Zagreb access, progress was slow because the designs were modified, leading to expropriation problems and difficulties in relocating public utilities.

5. On the whole, the Government was successful in its undertakings with respect to the loan covenants. It was apparently not successful however in setting tolls at levels permitting the optimum economic use of the Zagreb-Karlovac Road. The tolls imposed on the road after it was completed appear to be too high to attract traffic which has continued to use the free and inferior old road. A reduction in the level of the tolls would attract this traffic thus increasing the benefits to the project (Attachment, paras. 11-14). With respect to maintenance improvement and transport planning and coordination, the Bank is maintaining contact with the Government to ensure continued progress in these areas.

6. An interesting aspect of project implementation was the channeling of road funds. Highway administration had been decentralized in 1967, when the Government transferred its responsibility for public roads to the Republics and Autonomous Provinces of Yugoslavia. Because there was no central highway agency, the Bank considered making separate loans to each of the three Republics. But roads identified at appraisal for later Bank financing were located in other Republics which would entail the appraisal of a number of new borrowers each time a loan was made. Consequently the Bank discussed alternative methods of channeling funds with the Government. It was agreed that the Yugoslav Investment Bank (which had participated in previous Bank loans) would be the coordinator in matters related to project execution. The Government would then enter into subsidiary loan agreements with each Republic. The practice of entering into subsidiary loan agreements was successful and was used under the Fourth Highway Project, Loan 578-YU. It was continued under the Fifth Highway Project, Loan 751-YU, although the Yugoslav Investment Bank did not act as coordinator apparently because it was considered this service was no longer needed. In the Sixth and Seventh Highway Projects, Loan 990-YU and Loan 1143-YU, the Bank entered into agreements directly with the Republics involved. This was possible because these Republics had participated in previous Bank-financed projects and their performance had been satisfactory, removing the need to appraise their capacity.

7. The actual construction cost of the three project road sections of Din 1,191.9 million (US\$73.7 million in current dollars) represents an overrun of 33% over the appraisal estimate (including contingencies) of Din 898.7 million (US\$71.8 million) and 43% over the total bid price of Din 835.1 million (US\$66.8 million).<sup>1/</sup> Additional quantities accounted for about half of the Dinar overrun and price escalation for the remaining half (Attachment, Annex 3). The actual cost of supervision is not available.

8. The rates of return at appraisal for the Zagreb-Karlovac, Vrhnika-Postojna and Gostivar-Kicevo roads were projected at 13%, 12% and 15% respectively and the audit rates of return using the same methodology are 8%, 11% and 25%. While the rate of return shown in the Attachment (Annex 8) for the Vrhnika-Postojna section is 9%, recent additional traffic data for 1974 and 1975 received since the Attachment was prepared, indicate the audit rate of return would be about 11%, only slightly below the appraisal estimate of 12%.

9. The audit rates of return exclude important benefits such as passenger time savings and decongestion savings on the old roads. If the benefits from time savings are included, the rate of return on the Zagreb-Karlovac Road is satisfactory at 10%. Although time savings were not included in the project justification at appraisal, at writing, the Bank considers it to be an important benefit on four-lane roads such as these. The methodology used in the Attachment for computing time savings is similar to that being proposed by the Bank for use in the Eighth Highway Project, and it seems satisfactory. The other benefit arising from decongestion savings would improve the rates of return on all three roads even more, but it is not possible to include it due to lack of adequate information.

10. The lower than expected rates of return on the Zagreb-Karlovac Road and, to a lesser extent, on the Vrhnika-Postojna Road (using the appraisal methodology), result from the combined effect of cost overruns and traffic underruns. The higher than expected rate of return for the Gostivar-Kicevo Road is explained by the favorable development of traffic.

11. In 1973, traffic on the Zagreb-Karlovac Road was 46% of the appraisal forecast and traffic on the Vrhnika-Postojna Road was 64% of the appraisal forecast (Annex 1). The two additional years of traffic counts available only for the Vrhnika-Postojna Road and received since the Attachment was prepared, indicate that traffic on that road has grown 20% between 1973 and 1975 (Annex 2),<sup>2/</sup> mainly because of the completion of the adjoining road between Postojna and Razdrtro. But despite this substantial growth, traffic in 1975 was still only 72% of the appraisal forecast.

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<sup>1/</sup>In real terms, the 43% cost overrun is reduced to only 10% when expressed in US\$ due to exchange rate movements occurring since the time of appraisal.

<sup>2/</sup>Discrepancies in traffic data on the old Vrhnika-Postojna Road contained in Annex 4 of the Attachment and Annex 2 of the audit are explained by the use of counts from a sample survey in the case of the former, while the latter uses updated average annual traffic counts.

12. It is difficult to determine if the overestimation of traffic on the Zagreb-Karlovac and Vrhnika-Postojna roads could have been avoided. At appraisal, the growth trend of traffic for the preceding six-year period (1962-1968) had been over 24% per annum. The regions the roads traversed were expected to continue to grow, so that the forecast of about 7% per annum for the succeeding six-year period would seem conservative. A possible explanation for the underrun on the Zagreb-Karlovac Road is the failure to carry through with the planned expansion of the Port of Rijeka which reduced anticipated traffic growth. If the port were expanded, it is likely that traffic will increase significantly. Also if the Zagreb-Karlovac Road were extended beyond Karlovac to Rijeka, traffic could be expected to increase.

### Main Issues

13. The first issue arising from this project is the approach to construction used on the Zagreb-Karlovac Road. During project preparation, two construction alternatives were studied: the first was to construct two lanes in 1969-1970, and add two more lanes in 1974-1975; the second was to construct all four lanes in 1969-1971. The second alternative was selected as economically optimal after study by the highway authorities. However, the justification of four lanes depended on fairly rapid traffic growth based on the planned expansion of the Port of Rijeka, an item not included in the project. As it turned out, the expansion of the port was not undertaken and the traffic failed to materialize fully. In retrospect, the stage construction alternative might have been more economical. This experience suggests that a more cautious approach toward traffic projections be used when traffic depends on the materialization of a non-project item.

14. The second issue is that the tolls imposed on the Zagreb-Karlovac Road appear to be high, thus impeding the optimum use of the road and discouraging potential traffic which continues to use the older route to avoid paying the toll (Attachment, para. 12). In principle, tolls are intended to promote effective rationing of the use of an existing network when it is congested. The imposition of tolls on an uncongested road however can clearly lead to sub-optimal use of the facility; not all of the potential traffic that would have used the road in the absence of tolls uses it. Instead, this traffic continues to use alternative routes and the full benefits associated with the road improvement, i.e., the reduction of vehicle operating costs, is not realized. The Thailand Third Highway Project (Loan 535-TH) studied under Audit Report No. 758 (pp.6-7) provides an interesting example of a similar situation. On one of the roads financed by Loan 535-TH, traffic continued to use an older, inferior facility because of the toll charges. These charges were particularly high for trucks and heavy vehicles and consequently over half of the traffic in these categories continued to use the old road. Following the Bank's concern with this issue, tolls were reduced, and traffic using the older road began to divert to the new facility. This led to better utilization of the new road and to a lower social transport cost for traffic in the corridor.

15. The higher vehicle operating costs for the traffic using inferior, alternative routes constitute the social cost associated with the extra revenue that the Government raises through the tolls. Therefore, the issue in situations such as this where tolls are imposed on uncongested roads, is whether the same revenue could be collected at a lower social cost. In the

case of the Zagreb-Karlovac Road, a major objective of the Government in levying the toll is to tax the tourist traffic using the road. A lower level for the social cost associated with the collection of this tax can be estimated through the higher vehicle operating cost of the traffic which continues to use the old road because of the tolls on the new road. In 1973, this cost was about US\$200,000 (Din 3.1 million). It is estimated in the Attachment that if the traffic which continues to use the old road diverts to the new facility, the first year benefits would increase by 18% on the Zagreb-Karlovac Road. These additional benefits would increase the rate of return on this road from about 10% to 12%. The present high social cost and the opportunity for fully realizing the benefits of the road improvement suggest that alternative ways of raising equivalent revenue at lower costs might be explored.

16. It should be noted that the Attachment argues that the imposition of tolls is impeding the optimum use of the Vrhnika-Postojna Road. Traffic data received since the preparation of the Attachment show that between 1973 and 1975 traffic increasingly used the toll road in spite of a 25% increase in the toll amount imposed in October 1974. The additional traffic data contribute to a satisfactory rate of return of 11% at audit compared with 9% in the Attachment. In spite of this favorable impact however traffic is still lower than the appraisal forecast and the increase in traffic in 1975 results from the improvement of the section extending beyond Postojna to Razdrtro. In view of this, the effect of tolls could be further explored. It is possible that alternative ways of raising revenue might be more economical and that traffic on this road could be increased by reducing the toll thus further increasing the rate of return.

### Conclusions

17. The project has been successfully completed. Most of the works were completed nearly within the expected completion date and half of the 33% cost overrun is explained by price escalation. Applying the methodology used at appraisal, the rate of return on one of the three roads is lower than 10%, mainly because of substantial traffic underruns. This underrun in traffic is probably due to the failure of anticipated investments in the Port of Rijeka to materialize and to the high tolls imposed by the Government, although it may be that the original appraisal estimates were also overly optimistic. However, if the important benefit of time savings, excluded at appraisal, were considered, the rate of return rises to 10% and, were the toll to be reduced, the audit rate of return could rise further to 12%.

18. The role of the Bank in this project was satisfactory. It set up a workable system of channeling funds to the three borrowing Republics, it foresaw that the roads connecting the sections to be financed should also be upgraded, and it took a positive role in the expeditious and efficient preparation of the project. There were some problems of communication between the Government and the Bank with respect to the minor components of the project, and the Bank was not kept informed of changes made on the access roads; however, these did not affect the outcome of the project in any significant way.





PROJECT PERFORMANCE AUDIT MEMORANDUM  
YUGOSLAVIA THIRD HIGHWAY PROJECT (LOAN 608-YU)

Average Daily Traffic by Section  
(Vehicles per day)

	<u>Appraisal</u> <u>Forecast</u>	<u>Actual</u>	<u>Actual Traffic</u> <u>as a Proportion</u> <u>of Appraisal Forecast</u>
	-----1973-----	-----	----- % -----
1. Zagreb-Karlovac	7,169	3,280	46
2. Vrhnika-Postojna	11,587	7,375	64
3. Gostivar-Kicevo	470 <sup>/a</sup>	600 <sup>/a</sup>	128

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/a 1972 data.

PROJECT PERFORMANCE AUDIT MEMORANDUMYUGOSLAVIA THIRD HIGHWAY PROJECT (LOAN 608-YU)Traffic and Tolls on the Vrhnika-Postojna Road

Year	Traffic			Tolls Collected
	<u>Appraisal Forecast</u> Toll Road ----- (AADT) -----	<u>Actual</u> Toll Road    Old Road		
1973	11,587	7,375	1,883	21,892,774
1974	12,456	7,950	1,502	27,013,331
1975	13,390	9,576	1,375	43,174,494

YUGOSLAVIA

PROJECT COMPLETION REPORT

LOAN 608-YU - THIRD HIGHWAY PROJECT

A. Description and Objectives of the Project

1. The project consisted of the construction of three highway sections:
  - (i) in Croatia: a four-lane divided highway from Zagreb to Karlovac (45 km), with access roads in Karlovac (2.7 km) and in Zagreb (2.5 km)
  - (ii) in Macedonia: a two-lane highway from Gostivar to Kicevo (46 km); and
  - (iii) in Slovenia: a four-lane divided highway from Vrhnika to Postojna (32 km).

2. The objectives of the construction of the three highway sections were to generate savings in vehicle operating costs by providing four-lane divided highway sections in Croatia and Slovenia in addition to the existing two-lane highways and to upgrade the Gostivar - Kicevo highway from a sub-standard 4-5 m wide water-bound macadam road to a 6-7 m wide paved road with improved design characteristics. Project data are attached as Annex 1.

B. Project Execution

3. The loan became effective on October 22, 1969, three weeks late as compared to the originally anticipated date for loan effectiveness. Annex 2 shows particulars of the highway sections, the contracting firms that won the contracts, the cost figures and the starting and completion dates of the civil works. Because of two adjustments in the foreign exchange rate between the Yugoslav Dinar and the US Dollar (January 1971 and December 1971) the cost figures in the table are expressed in Yugoslav Dinar. All contracts were won by Yugoslav firms.

4. After prequalification of contractors by the three Road Organizations was completed in October 1969, bids from domestic and foreign contractors were invited in November 1969 to be submitted in January 1970. The Bank approved in March 1970 the award of contracts to domestic contracting firms as proposed by the Road Organizations and the execution of the civil engineering works started immediately thereafter in March/April 1970, i.e., about 10 months after the Board's Approval of the project. None of the prequalified foreign contractors submitted bids.

5. The road works in Macedonia were completed in November 1971, about two months behind schedule. In Slovenia completion, originally due in October of 1972, was delayed until late December 1972. Since the project was estimated at appraisal to be completed by June 30, 1972, the total delay in completion of

these parts of the project was about six months, caused by the cumulative effect of administrative delays in the procurement phase of the project (prequalification and bidding procedures) and delay in the execution of the civil works.

6. A much more severe delay occurred, however, in the completion of the sections in Croatia; specifically the access roads to the Zagreb - Karlovac road in Karlovac (2.7 km) and in Zagreb (2.5 km). The access road in Karlovac serves as a transit road through the city of Karlovac for traffic from or to Split and Rijeka. The access road in Zagreb leads traffic via a bridge over the river Sava to the Center of Zagreb. Its function has also been extended as part of a bypass road which leads traffic from Karlovac via a newly built bridge over the Sava river to the Zagreb - Belgrade road. The construction of the access roads in Karlovac and Zagreb was delayed because of expropriation problems, and because of delays in the execution of works for municipal services (sewerage ducts, telephone cables, electricity cables). The original closing date of December 31, 1972 had therefore to be postponed to December 31, 1973 and again to August 31, 1974 because of the delay in the completion of the access road in Zagreb. Traffic on the Zagreb - Karlovac road was, however, not impeded in any major way since traffic could use the existing roads in Karlovac and Zagreb.

7. The civil works were carried out on the basis of unit priced contracts by prequalified Yugoslav contractors resulting in an entirely satisfactory standard of construction. Some amendments were made in the drainage works of the Zagreb - Karlovac road because of the execution of a drainage scheme for the region through which the road traverses. These works were measured separately from the original contract works and are only included in the final cost figure of the road in as far as they were needed for drainage of the road bed.

8. The execution of the civil works was adequately supervised by the Road Organizations of the Republics of Croatia, Macedonia and Slovenia. Technical institutes in the three Republics (IGH in Croatia, the Federal Institute of the Skopje University in Macedonia and the Institute for Material and Construction Research and the Geological Institute in Slovenia) assisted the Road Organization in materials testing in their main and site laboratories.

#### C. Cost of the Project

9. Price escalation amounted to 27%, 12% and 19% of the bids in Croatia, Macedonia and Slovenia respectively. Additionally, the final cost of the sub-projects in Croatia and Slovenia increased by 19% and 28% respectively, due to extra quantities and additional works (see Annex 3 for details). The appraisal cost estimate provided for a 10% contingency allowance for physical quantities and a contingency allowance of 5% for price escalation.

#### D. Performance of the Borrower

10. The loan was made to the Federal Government of Yugoslavia which concluded subsidiary loan agreements with the Republics of Croatia, Macedonia and Slovenia. Coordination among the three Republics in matters relating to

the Bank (disbursements, progress reports, etc.) was achieved through the services of the Yugoslav Investment Bank. Performance of the Borrower, the subsidiary Borrowers and the Yugoslav Investment Bank in its relations with the Bank was satisfactory.

#### E. Toll Roads

11. Tolls are imposed on the project highway sections in Croatia and Slovenia. Both Republics undertook in the subsidiary Loan Agreements that if any tolls would be imposed, they would be set at such rates as to ensure an economic use of the toll roads and alternative routes or means of transportation. Recent traffic data on both toll roads and existing parallel roads are shown in Annex 4.

##### Zagreb - Karlovac Toll Road

12. The tolls imposed on the various vehicle types are set out in Annex 5. The traffic data (Annex 4) indicate that 52.5% of the traffic between the two cities uses the toll road as compared to the assumption of 65% in the Appraisal Report. A majority of the truck drivers still prefer to use the old road. An investigation among road users, carried out by the Road Organization of Croatia in April and July 1973, indicates that 20% of the traffic on the old road could have used the toll road. Although local traffic constitutes about 40% of the total traffic on both roads, about 10% of the total traffic was getting diverted to free but inferior facilities resulting in important economic losses. The diversion of these road users to the new facility would increase the present benefits by about 18%. Thus, the full potential economic benefits of the improved four-lane divided highway are not being realized.

##### Vrhnika - Postojna Toll Road

13. The tolls imposed are set out in Annex 5. About 70% of total traffic uses the toll road as compared to 65% envisaged in the Appraisal Report. Detailed traffic investigations were carried out on this toll road. It was noted that about 66% of the traffic moving on the existing old road was local traffic. Nevertheless, a considerable number of medium heavy and heavy trucks including truck trailers were using the old road primarily due to the tolls on the free-way; if all potential traffic would use the new road the present benefits would be increased by about 14%.

14. The introduction of tolls appears therefore to impede the optimum economic use of both highways. Moreover, the toll rates for commercial traffic are of the same order of magnitudes as the savings in transport costs and the general public is therefore unlikely to benefit from a decrease in transport costs. However, the introduction of tolls has made it possible to charge foreign tourists traffic for the better facilities which are offered on the new roads. From the more limited Yugoslav point of view it should be worthwhile to make an analysis of the toll revenues from foreign tourists in comparison to the loss of benefits for domestic traffic because of the toll system.

#### F. Economic Evaluation

15. The main objective of the project was to reduce the cost of transport and relieve congestions on three highway sections in the Republics of Croatia, Slovenia and Macedonia by replacing or improving the existing inadequate road

sections. The average daily traffic volumes on the project road sections as estimated at appraisal and from actual counts in 1972-1974 are shown in Annex 6. Average actual traffic on the two four-lane highways in Croatia and Slovenia is lower than the estimated volumes by about 50% and 30% respectively. On the third section in Macedonia, the average actual traffic on the other hand has turned out to be about 28% higher than the anticipated volume. The shortfall of traffic on the Zagreb-Karlovac highway section in Croatia is primarily due to non-realization of planned expansion of the port of Rijeka. At the time of appraisal the intention was to expand the handling capacity of Rijeka port from about 9 million tons in 1970 to about 20 million tons by 1985. But this development plan has not taken any concrete shape so far. Apparently the appraisal assessment of the prospect for traffic growth on the highway section in Slovenia was also somewhat optimistic. However, the traffic anticipations are more than realized in Macedonia as a result of increased economic activity in the region. The recent completion of the connecting sections of this highway which is only a part of the western road, Skopje - Kicevo - Ohrid, would further facilitate optimum utilization of this new infrastructure facility.

16. The principal benefits derived from the project are savings in vehicle operating costs. Vehicle operating costs by road section are shown in Annex 7, as estimated at appraisal and as revised on the basis of updated operating cost information available for the year 1972/73. The figures show that average vehicle operating costs, and therefore savings, have increased by an average of 50% from 1969 to 1972 and by another 16% from 1972 to 1973. This increase is partly due to inflation and partly to the recent producer price increases in petroleum products.

17. The rates of return of the project road sections are shown in Annex 8, as estimated at appraisal and as revised on the basis of updated traffic and vehicle operating cost information. The Annex shows that the revised economic return (ER), excluding benefits of passenger time is as high as 25% in the case of the Gostivar-Kicevo section but only 8.5% and 9% for Zagreb-Karlovac and Vrhnika-Postojna sections respectively. If the benefits due to savings of passenger time are included, the economic return increases to 12% for Vrhnika-Postojna section, confirming that this project is also economically justified. But the rate of return for the Zagreb-Karlovac Section, even after allowing for savings in passenger time, turns out to be marginal because of 50% shortfall in traffic volume and about 55% increase in construction costs. In retrospect, the staged improvement of this section to a four-lane divided highway might have been a better proposition.

#### G. Loan Covenants and Project Agreements

18. The following loan covenants were undertaken by the Government in Loan 608-YU:

- (i) To improve transport coordination by: improving the collection and preparation of traffic data; reviewing pertinent legislation with a view to developing highways within the framework of general economic development; and exchanging views with Bank on transport studies which would be undertaken by the Transport Institute of Belgrade.
- (ii) To improve maintenance by: adequately maintaining roads and providing funds for maintenance; ensuring that funds earmarked

for both maintenance and improvement would be allocated so that funds for maintenance would be adequate; improve data collection to ensure proper planning, maintenance and improvement; and, enforce vehicle axle load limits.

- (iii) To improve those roads providing access to the highways in Croatia and Slovenia.
- (iv) To ensure that tolls for the Zagreb-Karlovac and Vrhnika-Postojna highway would be set at levels which would permit economic use.

19. Transport policy and coordination was a central issue during loan negotiations. The decentralization of decision making to Republics, Provinces, Communes and Enterprises in 1967 enhanced the need for coordinating the efforts of a large number of decision makers. The Bank played a useful role in this context in the establishment of the:

- (i) Council of Republic and Provincial Roads Organization (CRO);
- (ii) Federal Committee for Transport and Communications; and
- (iii) Secretariats for Transport in the Republics and Provinces.

20. The CRO, established by the Road Funds, Councils and Enterprises in 1971, has been active in the standardization of engineering design criteria, data collection and other technical matters between the Republics and Autonomous Provinces. It has also been instrumental in the preparation of uniform guidelines for feasibility studies. However, it does not have the legal status or authority to play a fully effective role in overall transport planning and coordination between the Republics and Provinces. The Bank has maintained a close dialogue with the Yugoslav authorities concerning the institutional problems and the goals of improved transport coordination continue to guide Bank lending for future highway projects.

21. The loan covenants under this project are substantially met except those for the Zagreb-Karlovac section where tolls appear to have been set at such rates which do not seem to ensure economic use of the new highway.

#### H. Conclusions

22. The main benefits from the newly constructed roads are savings in transport costs. The economic returns of road construction for the two sections, Gostivar - Kicevo and Vrhnika - Postojna are now estimated at about 28% and 12% inclusive of benefits from savings in passenger time. The overall economic feasibility of these two sub-projects is, therefore, confirmed.

23. The economic return of about 10% (including passenger time saving) for the Zagreb - Karlovac four-lane divided highway, however, indicates this section to be marginally justified. Traffic projections for this road were based on the data and information provided at the time of appraisal. However, significant traffic generation such as the planned expansion of the port of Rijeka and the improved connecting road with Rijeka have not yet materialized. Moreover, the distribution of traffic between the new road and the old road is less favorable than the 65/35 ratio assumed at appraisal. In the light of the actual traffic situation the construction of an initial two-lane facility with the addition of two more lanes after about five years might therefore have been a better proposition than constructing the four-lane highway immediately.





YUGOSLAVIA

Third Highway Project, Loan 608-YU

Project Data

Amount of Loan		US\$30,000,000
Amount Disbursed		
Category I	US\$10,270,000.00	
Category II	3,569,999.98	
Category III	<u>16,160,000.02</u>	
	30,000,000.00	
Date of Loan Agreement		June 5, 1969
Effective Date		October 22, 1969
Closing Date	Original	December 31, 1972
	Revised	August 31, 1974
Original Exchange Rate		US\$1.00 = Yug. Din. 12.50
Current Exchange Rate		US\$1.00 = Yug. Din. 17.00

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Third Highway Project, Loan 608-YU

Construction of Civil Works and Costs (in million Dinar)

<u>Section</u>	<u>Contractor</u>	<u>Length (km)</u>	<u>Appraisal<sup>/1</sup> Estimate</u>	<u>Contract Amount</u>		<u>Starting Date</u>	<u>Due for Completion</u>	<u>Completion Date</u>
				<u>Original</u>	<u>Final</u>			
<u>Croatia</u>								
Zagreb - Karlovac	Hidroelektra	50.2	265.8	295.6	432.8	3/70	9/15/72	12/29/72 <sup>/2</sup>
<u>Macedonia</u>								
Gostivar - Kicevo	Granit	45.6	92.3	101.7	114.2	3/23/70	9/30/71	11/29/71
<u>Slovenia</u>								
Vrhnika - Logatec	Yugoslavia Put	9.2				4/ 1/70	10/31/72	12/29/72
Logatec - Unec	G.P. Mavrovo	12.0				4/ 1/70	10/31/72	12/29/72
Unec - Postonja	Gast	10.8				4/ 1/70	10/31/72	12/29/72
5 Bridges	Gast	-				4/ 1/70	10/31/72	12/29/72
2 Bridges	Giposs					4/ 1/70	10/31/72	12/29/72
	Total Slovenia	<u>32.0</u>	<u>418.3</u>	<u>437.8</u>	<u>644.9</u>			
	Total Project	127.8	776.4	835.1	1,191.9			

<sup>/1</sup> Excludes cost of supervision of Din 38.8 million.  
 Excludes contingencies; Zagreb - Karlovac: 41.9 million Dinar  
 Gostivar - Kicevo: 14.5 " "  
 Vrhnika - Postojna: 65.9 " "  
122.3

<sup>/2</sup> Opening date of motorway; completion dates of access roads Karlovac: December 1973, Zagreb: August 1974.

YUGOSLAVIAThird Highway Project, Loan 608-YUCosts of Civil Works (in million Dinars)

<u>Section</u>	<u>Cost Increases</u>			<u>Total Final Cost</u>
	<u>Bid Price</u>	<u>Additional Works</u>	<u>Price Escalation</u>	
<u>Croatia</u>				
Zagreb - Karlovac	295.6	56.7	80.5	432.8
<u>Macedonia</u>				
Gostivar - Kicevo	101.7	-	12.5	114.2
<u>Slovenia</u>				
Vrhnika - Postonja	437.8	124.2	82.9	644.9
Total	<u>835.1</u>	<u>180.9</u>	<u>175.9</u>	<u>1,191.9</u>

YUGOSLAVIA

Third Highway Project, Loan 608-YU

Average Daily Traffic Volumes - 1973/1974

	<u>Zagreb-Karlovac<sup>1/</sup></u>			<u>Vrhnika-Postojna<sup>2/</sup></u>		
	<u>Toll Road</u>	<u>Existing Parallel Road</u>	<u>Total</u>	<u>Toll Road</u>	<u>Existing Parallel Road</u>	<u>Total</u>
1. Motor cycle/scooters	6	55	61	14	6	20
2. Passenger cars	3,348	2,812	6,160	6,104	2,514	8,618
3. Trucks up to 3 axles	420	479	899	177	161	338
4. Trucks/Truck Trailers more than 3 axles	196	231	427	478	194	672
5. Others - including Autobus, Agricultural tractors	159	166	325	602	322	924
	<u>4,129</u>	<u>3,743</u>	<u>7,872</u>	<u>7,375</u>	<u>3,197</u>	<u>10,572</u>
	(52.5%)	(47.5%)	(100.0%)	(69.8%)	(30.2%)	(100.0%)

<sup>1/</sup> 1974 traffic

<sup>2/</sup> 1973 traffic

YUGOSLAVIAThird Highway Project, Loan 608-YUAmount of Tolls on Different Types of Vehicles

(1974)

Tolls in Dinars

<u>Types of Vehicles</u>	<u>Zagreb- Karlovac Rd. (50 km)</u>	<u>Vrhnika- Postojna Rd. (32 km)</u>
Motor cycle	5	6
Passenger car (small)	10	8
Passenger car (big)	15	10
Autobus	20	25
Trucks (2 axles)	15	14
Trucks (3 axles)	20	16

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Third Highway Project, Loan 608-YU

Average Annual Daily Traffic Volumes<sup>1/</sup> on Project Roads 1968-1992

<u>Sections</u>	<u>Appraisal Estimate</u>					<u>Revised Estimate</u>				
	<u>1968<sup>2/</sup></u>	<u>1972</u>	<u>1977</u>	<u>1982</u>	<u>1992</u>	<u>1968<sup>2/</sup></u>	<u>1972<sup>2/</sup></u>	<u>1977</u>	<u>1982</u>	<u>1992</u>
1. Zagreb-Karlovac	5,482	6,300	12,000	18,500	30,000	5,482	3,280 <sup>3/</sup>	5,950	11,000	25,000
2. Gostivar-Kicevo	250	470	730	1,090	2,300	250	600	1,200	1,800	3,000
3. Vrhnika-Postojna	8,039	10,200	19,300	30,000	43,000	8,039	7,375 <sup>3/</sup>	10,000	14,500	30,000

1/ Cars, trucks, buses and motorcycles.

2/ Actuals

3/ 1973 figures

Note (a) 80 percent car and 20 percent commercial vehicles (trucks and buses) on Zagreb-Karlovac and Vrhnika-Postojna sections.

(b) 55 percent car and 45 percent commercial vehicles on Gostivar-Kicevo section

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Third Highway Project, Loan 608-YU

Vehicle Operating Costs<sup>1/</sup>

(Dinars per km)  
 net of taxes

Representative Vehicle	Appraisal Estimate			Revised Estimate <sup>4/</sup>		
	Zagreb- Karlovac	Gostivar Kicevo	Vrhnika- Postojna	Zagreb- Karlovac <sup>2/</sup>	Gostivar- Kicevo <sup>3/</sup>	Vrhnika- Postojna <sup>2/</sup>
A. Passenger Car						
Existing Road	0.384	0.593	0.400	0.668	0.890	0.696
New Road	0.296	0.333	0.305	0.515	0.500	0.531
Saving	0.088	0.260	0.095	0.153	0.390	0.165
% Saving	23	44	24	23	44	24
B. Light truck						
Existing Road	1.177	1.792	1.345	2.048	2.688	2.340
New Road	0.933	1.177	0.979	1.623	1.765	1.703
Saving	0.244	0.615	0.366	0.425	0.923	0.637
% Saving	21	34	27	21	34	27
C. Heavy trucks						
Existing Road	1.207	2.246	1.384	2.100	3.369	2.408
New Road	0.969	1.275	1.073	1.686	1.912	1.867
Saving	0.238	0.971	0.311	0.414	1.457	0.541
% Saving	20	43	23	20	43	23
D. Truck with trailer						
Existing Road	1.643	3.601	1.881	2.859	5.401	3.273
New Road	1.349	1.842	1.480	2.347	2.763	2.575
Saving	0.294	1.759	0.401	0.512	2.638	0.698
% Saving	18	49	21	18	49	21
E. Autobus						
Existing Road	1.720	3.855	1.972	2.993	5.782	3.431
New Road	1.356	1.571	1.422	2.359	2.356	2.474
Saving	0.364	2.284	0.550	0.634	3.426	0.957
% Saving	21	59	28	21	59	28

<sup>1/</sup> Excludes passenger time

<sup>2/</sup> At 1973 price level

<sup>3/</sup> At 1972 price level

<sup>4/</sup> Average vehicle operating cost increase 1969-72: 50%  
 1969-73: 74%

Source: (i) Statistical Pocket Book of Yugoslavia, 1974  
 (ii) Guidelines for Highway Feasibility Studies Vol I - Dorsch/Berger





