CONFIDENTIAL

FROM: The Secretary

SecM75-531

July 18, 1975

PERFORMANCE AUDIT REPORT ON MALAGASY REPUBLIC SECOND HIGHWAY PROJECT (LOAN 570-MAG/CREDIT 134-MAG)

Attached is a copy of a memorandum from Mr. Shoaib with its accompanying report entitled "Project Performance Audit Report on Malagasy Republic Second Highway Project (Loan 570-MAG/Credit 134-MAG)", dated July 18, 1975 (report No. 811) prepared in the Operations Evaluation Department.

Distribution:

Executive Directors and Alternates
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THE WORLD BANK
Washington, D.C. 20433
U.S.A.

Office of the President

CONFIDENTIAL

July 18, 1975

MEMORANDUM TO THE EXECUTIVE DIRECTORS

Subject: Performance Audit Report on Malagasy Republic Second Highway Project (Loan 570-MAG/Credit 134-MAG)

Attached, for information, is a copy of a confidential report entitled "Project Performance Audit Report on Malagasy Republic Second Highway Project (Loan 570-MAG/Credit 134-MAG)" prepared by the Operations Evaluations Department under its responsibility to produce such a report on all projects completed with IBRD/IDA assistance. Points of particular interest to the Bank Group in the report may be:

Adequacy of Supervision (page 10)
Pre-project Studies of Base Materials (page 4)
Scope of Economic Appraisal (pages 10-11)
Transport Regulation (pages 9-10).

Attachment

Report No. 811.

CONFIDENTIAL

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT

(LOAN 570-MAG/CREDIT 134-MAG)

July 18, 1975

Operations Evaluation Department

PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT (LOAN 570-MAG/CREDIT 134-MAG)

PREFACE

The Second Highway Project in the Malagasy Republic supported by the World Bank Group was partially financed by an IBRD loan (570-MAG) and an IDA credit (134-MAG), which were signed on November 12, 1968. The credit was fully disbursed in June 1971; the loan in October 1973. The purpose of this performance audit is to assess the extent to which the original project objectives were met and to analyze the role of the IBRD/IDA in meeting those objectives.

The audit is based on a review of: correspondence and reports in IBRD/IDA files (appraisal reports; economic reports; supervision reports; and construction progress reports) as well as discussions with IBRD/IDA staff members and Malagasy officials.

In September 1974, a two-week visit was made to the Malagasy Republic to update information and to discuss relevant issues.

The valuable assistance of the Government of the Malagasy Republic is gratefully acknowledged.

PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT (LOAN 570-MAG/CREDIT 134-MAG)

PROJECT DATA

	Loan 570-MAG	Credit 134-MAG
Amount of Loan/Credit	US$3.5 million	US$4.5 million
Amount Disbursed	US$3.5 million	US$4.5 million
Dates of Loan/Credit Negotiations	September 19-27, 1968	
Date of Loan/Credit Agreement	November 12, 1968	
Original Effective Date	February 5, 1969	
Final Effective Date	April 1, 1969	
Original Closing Date	December 31, 1972	
Final Closing Date	October 1973	June 1971
First Supervision Mission	February 1969	
Final Supervision Mission	August 1974	

Exchange Rates (Malagasy franc):

Through July 1969 ---------- US$1 = FMG 247
August 1969 - November 1971 --- US$1 = FMG 278
December 1971 - January 1973 -- US$1 = FMG 256
February 1973 to present ------ US$1 = FMG 230

PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT (LOAN 570-MAG/CREDIT 134-MAG)

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MALAGASY REPUBLIC SECOND HIGHWAY PROJECT (LOAN 570-MAG/CREDIT 134-MAG)

SUMMARY

On November 12, 1968, the IBRD/IDA signed agreements to provide a US$3.5 million loan (570-MAG) and a US$4.5 million credit (134-MAG) to the Malagasy Republic to finance the foreign exchange cost of a US$11.5 million highway project. This represented the IBRD/IDA's second involvement in highways in the country. The loan/credit became effective on April 1, 1969.

Project components included construction and bituminous paving of the Fanjakamandroso-Tsiroanomandidy Road (55 km) and Ambilobe-Ambanja Road (91 km); construction of the Onibe, Fanandrana, and Ambanja Bridges; and consultants' services for construction supervision. Detailed engineering of the Analavory-Arivonimamo Road and feasibility studies of three roads were deleted from the project during negotiations as sufficient IDA funds were not available to cover them. Completion was about a year behind schedule because of design difficulties and construction delays. The December 31, 1972 closing date was met for the credit but extended one year for the loan because of construction delays on the Ambilobe-Ambanja Road and on the Ambanja Bridge.

The actual cost of the project was US$15.2 million in contrast to the estimate of US$11.5 million, including contingencies. This represented an overrun of some 30%, of which about half was due to price increases and half to quantity underestimates, mainly resulting from road base materials being of lower quality than expected. The overrun was financed in large part by the Government, but savings from the First Highway Project (Credit 90-MAG of 1966 for US$10 million) also contributed to the financing.

The economic rate of return for the Fanjakamandroso-Tsiroanomandidy Road estimated at audit is 21%, or well above the 13% appraisal estimate, because the cost overrun was compensated by a substantial traffic increase. On the Ambilobe-Ambanja Road, the range of the audit rate of return is 6%-8% and 8%-11% (depending on the figures used), as compared with the appraisal estimate of 8%. If account is not taken of higher oil prices and traffic increases that will probably follow improvement of the southern link from Ambanja to Antsohihy, the substantial cost overrun together with the traffic level close to appraisal expectations result in a rate of return of 6% and 8%, depending on the figures used. But if account is taken of these factors, the rate of return rises to 8% and 11%, respectively.

The rate of return on the Onibe and Fanandrana Bridges (13%) is roughly as expected at appraisal (16% and 12%, respectively) because the combined cost overrun was largely offset by traffic increases. However,

the rate of return at audit is lower than at appraisal for the Ambanja Bridge (4% versus 9%) because the actual cost was more than double the estimate whereas traffic increased only slightly.

Developmental benefits from the project roads and bridges are difficult to identify precisely, but population and production have increased in the influence areas. In addition, social and administrative links on a year-round basis have been provided, an important factor in a country where regions had remained largely isolated because of difficult topography.

Due to the limits of the audit, the distribution of project benefits could not be investigated thoroughly, but the system of fixed transport rates which has been introduced on a regional basis would imply that transport enterprises pass on only part of the savings from the investments to producers and consumers. However, a question has arisen recently as to how far the rate regulations are in fact followed.

The IBRD/IDA made a positive contribution to the project by encouraging the Government to: select components of high economic priority; employ consultants for technical assistance; maintain the professional standard and strength of the highway administration; and introduce economic criteria into the selection of investments for the 1969-73 Highway Development Plan.

In retrospect, however, it is doubtful whether the Ambilobe-Ambanja Road should have been included in view of its low expected rate of return (8%) and the risk associated with the project. The audit rate of return is over 10% for this road, which accounts for 54% of the project investment, only under very optimistic assumptions. Given the scarce resources available for investment, a more detailed study of alternatives should have been explored and a more comprehensive study of the main north-south road in the country, of which the Ambilobe-Ambanja Road is one section, should have been made.

The project's impact could have been improved if transport regulation problems had been investigated fully and if more IBRD/IDA supervision had been provided to help avoid some of the design and construction problems.

PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT (LOAN 570-MAG/CREDIT 134-MAG)

BACKGROUND

Since independence in 1960, the Government of the Malagasy Republic has been endeavoring to develop viable connections between regions and between widely separated economic and social centers. Development has been impeded, however, by the early stage of economic development, the small size of the regional economy and low population density, as well as by high construction costs due to rugged topography and scarcity of suitable construction materials due to difficult geological conditions. Only earth roads, impassable in rainy weather, have joined the northern and part of the western regions with the rest of the country, and mere trails have linked these regions with the south (see map). The Government has been increasing road investments and maintenance expenditures since 1964, but only a few sections of the primary road network have been brought up to modern standards while inland connections remained poor, road alignments located badly, and structures obsolete.

The Government wished to improve this situation by providing a primary road network to connect the main economic and social centers. Therefore, it decided that roads and bridges should be constructed in the northern, central, and eastern regions where population density as well as agricultural output and potential were highest. In 1966, the Government asked the IBRD/IDA for assistance in preparing a project that would represent the organization's second investment in Malagasy highways. The project was identified by the Permanent Mission in Eastern Africa and comprised construction and paving of two road sections, construction of seven bridges, detailed engineering of four road sections, and feasibility studies of three road sections. In 1967, the Government submitted an application to the IDA for a credit to help finance the project.

Between November 1966 and December 1967, three missions from the Permanent Mission in Eastern Africa visited the country to assist in preparation and to assess the applications. As a result, the Government withdrew applications for three bridges because of insufficient economic justification and initiated a feasibility study for a fourth bridge, to be financed under the ongoing First Highway Project (Credit 90-MAG of 1966 for US$10 million). In addition, the Government decided that detailed engineering should be carried out on only one of the original four road sections.

In February 1968, a mission from headquarters visited the country to appraise the revised project proposal. Components would be (a) construction and bituminous paving of the Fanjakamandroso-Tsiroanomandidy Road (55 km) and Ambilobe-Ambanja Road (91 km); (b) construction of the Onibe, Fanandrana, and Ambanja Bridges; (c) detailed engineering of the Analavory-Arivonimamo Road; (d) feasibility studies of the Lac Alaotra-Vavatenina Road; Moramanga-Tamatave Road, and Tananarive-Fianarantsoa Road; and (e) consultants' services for construction supervision of the Ambilobe-Ambanja Road and the three bridges. Supervision of the Fanjakamandroso-Tsiroanomandidy Road would not be included in the project because the Government felt that its Central Technical Service, assisted by the Public Works Laboratory, was qualified to carry out the work. The appraisal mission stated that this arrangement would be adequate.

The road sections and bridges would be constructed on existing primary roads. The Fanjakamandroso-Tsiroanomandidy Road was a section of National Road 1 (RN 1). Construction would improve connections between Tananarive, the capital, and Tsiroanomandidy, an important marketing center in the agriculturally rich midwest. The Ambilobe-Ambanja Road was a section of National Road 6 (RN 6), and construction would improve links with the north, western shore, and central plateau. Both roads would be paved with bitumen.

The Onibe and Fanandrana Bridges would be constructed on National Road 2 (RN 2), linking the main port of Tamatave with areas to the north and south along the eastern coast. The bridges would improve road connections of the port with the hinterland by eliminating bottlenecks because ferries were the only means of crossing the Onibe and Ivondro Rivers. The Ambanja Bridge would be constructed on RN 6 to eliminate the bottleneck at the Sambirano River resulting from use of a collapsible wooden bridge in the dry season and a ferry in the wet season.

Negotiations were held in September 1968. Financing was discussed in detail because IDA replenishment had been delayed and sufficient IDA funds were not available for the project. Therefore, a joint loan/credit was proposed unless timely replenishment occurred. The Malagasy delegation accepted the blend so that the project would not be delayed, but asked that IDA funds be disbursed before IBRD funds. The delegation further obtained an assurance that a proper balance of IBRD/IDA lending would be restored for future projects if and when IDA funds were replenished.

As a consequence of the change in financing, the delegation requested that the costs of detailed engineering (one road section) and feasibility studies (three road sections) be deleted from the project.

The Government intended to approach the UNDP for funds, or, if the UNDP refused, to provide them itself.

In addition to covenants on financing, uses of consultants and contractors, design standards, and vehicle dimensions and axle loads, covenants on highway maintenance and administration were discussed. Regarding the maintenance covenant, the Transportation Projects Department supported a detailed clause. But the Working Party discussed similar cases and decided that a general clause would be sufficient.

Regarding administration, the IBRD/IDA concluded that, considering the good performance of the Malagasy highway services, the draft loan and credit agreements would not contain a provision on strengthening of highway administration. Instead, a supplemental letter provided that the professional standard and strength of highway administration should be maintained at appropriate levels by increasing the number of nationals in professional positions and other technical positions. The letter also provided that national talent should be developed by promoting technical education and training as well as career incentives.

Finally, another supplemental letter required the Government to undertake to introduce economic criteria into the selection of investments for the Five-Year Highway Development Plan of 1969-73.

The agreed components of the Second Highway Project are shown in Table 1. Their cost was estimated at US$11.5 million (FMG 2,843 million), including contingencies. The foreign exchange component was estimated at 70%, or US$8 million (FMG 1,990 million). An IBRD loan of US$3.5 million and an IDA credit of US$4.5 million were provided to cover the foreign exchange cost. The loan was for a 30-year term, including 10 years of grace, at 7% interest, and the credit was for the usual terms. Lending documents were signed on November 12, 1968. The loan/credit became effective on April 1, 1969 after an extension from February 1 to allow time for the IBRD/IDA to obtain clarification of the legal opinion from Malagasy authorities.

PROJECT IMPLEMENTATION

Bids for construction of the roads were received in August 1968 and for the bridges in October 1968. Contracts for the roads and for consulting services were signed in April 1969. Contracts for the Onibe and Fanandrana Bridges were signed in September 1969 and for the Ambanja Bridge in October 1969. The long time span between receipt of bids and signing of contracts was because of the Government's delay over studying the bids. Construction was largely completed in December 1972. The closing date

of December 31, 1972 was met for the credit, but extended one year for the loan because of construction delays on the Ambilobe-Ambanja Road and on the Ambanja Bridge. At appraisal, construction contracts had been expected to be awarded around the end of 1968 and work to be started in April 1969 and completed by the end of 1971. The names of firms selected as well as estimated and actual completion dates are shown in Table 1.

Fanjakamandroso-Tsiroanomandidy Road (RN 1)

The contractor, who had a good reputation, had to overcome difficulties with construction on National Road 4 (RN 4) under the First Highway Project before starting construction of this road. These difficulties meant that the contractor's equipment was tied up and could not be transferred to the Fanjakamandroso-Tsiroanomandidy Road as soon as expected. Construction finally was started in November 1969 and was scheduled to be completed within two years, in accordance with the original completion date of April 1971. A field laboratory, financed under the loan/credit, was operated by Government staff to test building materials and soils for this road. Tests on base materials proved them to be of lower quality than expected, and the pavement structure had to be redesigned. Consequently, the contract was amended in June 1970 to include the new design and to reflect a cost increase of about 15%.

Construction was completed satisfactorily in December 1972. Although the last supervision mission stated that construction quality was adequate and no failures were apparent, settlement of the embankment adjacent to the bridge abutments has become evident. This settlement is due to the design of the abutments, which is very economic but requires frequent maintenance. Because of this condition, traffic has to reduce speed substantially.

Ambilobe-Ambanja Road (RN 6)

Construction of this road began in October 1969. In March 1970, a study by the Public Works Laboratory found that local materials were of much lower quality than expected and were not suitable for use as originally designed. Consequently, new materials were investigated and the pavement structure for different road sections was redesigned. Earthworks for some sections also were redesigned as a result of unfavorable climatic conditions during construction. The original contractual completion date of June 1971 was revised to August 1972 in light of the design changes. Work was completed in December 1973 after the contractor had mobilized sufficient new construction equipment.

According to IBRD/IDA supervision missions, work was completed satisfactorily. In fact, however, the quality and finish of the bituminous surface is unsatisfactory. Some potholes have appeared and need to be repaired before

becoming worse. An August/September 1974 mission of the IBRD/IDA asked the Government to investigate the reasons for the failures, to make the necessary repairs promptly, and to watch closely the performance of the road.

Bridges

Onibe and Fanandrana (RN 2). Three construction alternatives were considered for the two bridges. A two-lane bridge at Onibe and a one-lane bridge at Fanandrana were selected as the most economical solutions. The supervisory consultants analyzed bids for the bridges. After reviewing the analysis with the Government, the IBRD/IDA concurred with the consultants that the contract should be awarded to the lowest bidder.

Construction began on the Onibe Bridge in July 1969 and on the Fanandrana Bridge in January 1970. During construction, imperfections appeared in the quality of the concrete in some prestressed beams (porosity near the cables) and of the bituminous pavement. The imperfections were corrected by the contractor, and the construction quality and finish are satisfactory. Construction of the Onibe Bridge was completed in July 1971 and of the Fanandrana Bridge in July 1972, instead of March 1972 as estimated at contract signing.

Ambanja (RN 6). Bidding was on a design-construction basis, and bids were received for truss-type and suspended span-type bridges. Although costs were lower for the suspended-span type than for the truss-type, the latter was selected because the former was technically unacceptable. The supervisory consultants also analyzed the bids for this bridge. Construction began in May 1970. Delays occurred because the consultants had to redesign the steel structure to meet wind loading requirements and because changes in the European steel market resulted in slow supply. In June 1971, the contract was amended, extending the completion date from June 1971, estimated at contract signing, to August 1972. Work was completed in September 1973, and the construction quality and finish are satisfactory.

Consulting Services

According to supervision reports, the quality of construction supervision of the Fanjakamandroso-Tsiroanomandidy Road by Government staff was satisfactory as were the quality, qualifications, and experience of the consultants supervising construction of the Ambilobe-Ambanja Road and Onibe, Fanandrana, and Ambanja Bridges. The consultants' cooperation with Government staff was good. Due to construction delays on the Ambilobe-Ambanja Road and on the Ambanja Bridge, the contract for consulting services was extended from October 1971 to November 1972. Services were completed in December 1972.

PROJECT COSTS

The actual project cost of US$15.2 million (FMG 3,676 million) represents an increase of 32% in foreign currency terms and 29% in local currency terms over the US$11.5 million (FMG 2,843 million) appraisal estimate which included contingencies. The difference is the result of fluctuations in the exchange rate of the United States dollar against the Malagasy franc. To avoid complications due to these fluctuations, estimated versus actual project costs are shown in local currency in Table 1.

The total cost overrun (excluding contingencies) is about 50%. About 52% of the overrun can be attributed to quantity changes, and 48% to price increases. Therefore quantity increases imply a cost overrun of about 26%, while price increases imply a cost overrun of 24%. The contingencies included in the project cost estimate, 10% for quantities and 5% for prices, were clearly inadequate, particularly those for prices.

The cost overrun was financed in large part by the Government, but savings from the First Highway Project of US$303,643.40 (FMG 63,153,786) also contributed to the financing.

ECONOMIC ANALYSIS

Economic justification of the Second Highway Project at appraisal had been based on considerable reductions in transport costs and generation of important developmental benefits. The justification was reevaluated for this audit using actual construction costs, actual traffic figures,[1/] and new estimates of savings in vehicle operating costs derived by BCEOM in 1972[2/] (Table 2). These new estimates were based on a detailed empirical study of vehicle operating costs in the Malagasy Republic,[3/] while the appraisal estimates in some cases were just interpolations based on studies in neighboring African countries and were incomplete both with regard to different vehicle types and road conditions. Unfortunately, the information available in the appraisal report does not permit a comparison of

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1/ Future traffic development has been assumed to continue at the same growth rates as stated in the appraisal report. Benefits to normal traffic have been valued at 100% of road user savings and benefits to induced traffic at 50% of road user savings.

2/ BCEOM, Feasibility Study of the Antsohihy-Ambanja Road, July 1972.

3/ Taking into account traffic composition, load factors, vehicle lifetime, insurance premiums, etc.

vehicle operating costs with the new BCEOM estimates, mainly because relevant information is lacking or different vehicle types are indicated. The new BCEOM estimates seem to be more reliable than the appraisal estimates; they have therefore been used in the estimation of the audit rate of return.[1/]

The proportion of the total investment devoted to each project component and a comparison of rates of return as estimated at appraisal and at audit are:

	Proportion of Total Investment %	Rate of Return	
		Appraisal Estimate %	Audit Estimate %
Fanjakamandroso-Tsiroanomandidy Road	28	13	21
Ambilobe-Ambanja Road	54	8	6 - 8 [a/] / 8 - 11 [b/]
Onibe Bridge	12	16	13
Fanandrana Bridge		12	
Ambanja Bridge	6	9	4

a/ Based on BCEOM's figures of vehicle operating costs.
b/ Based on figures used for the appraisal of the proposed Fourth Highway Project.

Cost overrun percentages are shown in Table 1 and average daily traffic in 1972 and 1973, in Table 3.

The economic rate of return for the Fanjakamandroso-Tsiroanomandidy Road estimated at audit (21%) is well above that at appraisal (13%) because the cost overrun (11%) was compensated by a substantial traffic increase, 437 vehicles per day (vpd) in 1972 versus 140 vpd projected at appraisal.[2/]

1/ Yet another set of estimates of vehicle operating costs has been recently prepared by the Bank in connection with the appraisal of the proposed Fourth Highway Project. These estimates are based on SETEC's "Etudes de Factibilite Routiere." A direct comparison between these and the BCEOM estimates is also difficult because of the different vehicle types used and the fact that the two estimates refer to different years. However, since these new estimates indicate higher cost savings than the BCEOM study, both estimates have been applied in the audit of the Ambilobe-Ambanja Road, which has the lowest return.

2/ The difference between actual and projected traffic is probably because existing traffic on the road was underestimated at appraisal, as indicated by more elaborate traffic counts now available, and because the effects on traffic of linking a departmental administrative center (Tsiroanomandidy) with the capital may genuinely have been underestimated. The actual traffic increase, as compared with the base year figures, essentially related to passenger traffic.

On the Ambilobe-Ambanja Road, the difference between the audit rate of return (6%-8% and 8%-11%, depending on the figures used) and the appraisal estimate (8%), is the consequence of higher oil prices and of traffic increases that will probably follow improvement of the southern link from Ambanja to Antsohihy. If these factors are not taken into account, the substantial cost overrun (52%) together with the traffic level close to appraisal expectations (201 vpd in 1972, only slightly above the 195 vpd appraisal estimate), results in a rate of return of 6% and 8%, depending on the figures used. But if these factors are taken into account, the rate of return rises to 8% and 11%, respectively.

For the Onibe and Fanandrana Bridges, the audit estimate of a 13% combined rate of return on construction is in the range of the appraisal estimates of 16% and 12%, respectively. This was because the combined cost overrun (28%) was largely offset by traffic increases (in 1972, on Onibe Bridge, 306 vpd versus 260 vpd projected and on Fanandrana Bridge, 173 vpd versus 120 vpd projected). The estimated return of 4% at audit on construction of the Ambanja Bridge is considerably below the 9% at appraisal because the actual cost was more than double the estimate (211%) whereas traffic increased only slightly (in 1972, 147 vpd versus 135 vpd projected).

In 1973, about two-thirds of traffic on the project roads and bridges was composed of cars and buses and one-third, pickups, trucks, and trailers (Table 4). For the Fanjakamandroso-Tsiroanomandidy Road, this conflicted with appraisal expectations that cattle production would increase significantly and that large cattle trailers would comprise an important share of new traffic from Tsiroanomandidy to market in Tananarive. These expectations were not realized because cattle production did not increase as expected due to new cattle diseases and government restrictions on cattle export and, therefore, trailer traffic could not develop. In 1972, of the 58,400 cattle transported from Tsiroanomandidy to Tananarive, 35,400 were on hoof for the entire distance, 22,400 on hoof part of the distance and in trailers for the rest, and 600 in 10-ton trucks for the entire distance.1/

The preponderance of cattle transport on hoof between Tsiroanomandidy and Tananarive has resulted because of the freight rate structure and the poor condition of the Analavory-Arivonimamo section, which was not improved under the project. Freight rates are structured so that truck transport is profitable only if return freight from Tananarive to Tsiroanomandidy can be guaranteed. With transport heavily in the direction of Tananarive, many small firms cannot guarantee return freight and are charged one-way rates that are 60%-70% higher than when return freight is guaranteed. Consequently, the freight rate charges make truck transport of cattle from Tsiroanomandidy to Tananarive unprofitable for firms that cannot guarantee return freight. As to the condition of the Analavory-Arivonimamo section, its narrow and winding alignment prohibits use by cattle trailers. Only 10-ton trucks operating at slow speed and high cost can maneuver on it.

1/ Even if all of the cattle had been transported the entire distance in trucks, only about 8 trucks/day would have been needed.

Detailed engineering and construction of this section were included in the Third Highway Project (Loan 876-MAG/Credit 351-MAG of 1973 for US$30 million). However, because of substantial cost overruns the design standards have been revised and the completion of the works is included in the proposed Fourth Highway Project, which was appraised in April 1975.

In regard to the appraisal expectation that the project roads and bridges would contribute to the economic development of the areas in which they were located, population and production have increased in those areas, but the amount of the increases attributable to the investments is difficult to identify precisely. Another important contribution of the roads and bridges has been to provide social and administrative links on a year-round basis between areas of the country that had been seasonally isolated, an impact reflected in the larger than expected growth in car and bus traffic.

Although the distribution of project benefits could not be investigated thoroughly due to the limits of the audit, indications are that part of the benefits from the investments have not been passed on to producers and consumers. This is as a result of a system of fixed transport rates, introduced in April 1969 by the Government in the Province of Diego Suarez (site of the Ambilobe-Ambanja Road and Ambanja Bridge).[1/] Under this system, freight rates and passenger fares on paved roads were set 20% and 33% lower, respectively, than on earth roads. But these differentials are much lower than the savings in vehicle operating costs under the same circumstances (Table 2). As a consequence, transport enterprises would seem to pass on only part of the savings to producers and consumers. At present, the Government is aware that certain anomalies exist in the sector and intends to carry out a study of the transport regulation in the country.

ROLE OF THE IBRD/IDA

The IBRD/IDA played an important role in the Second Highway Project. It encouraged the Government to select components of high economic priority for financing with scarce resources and to postpone others. It also convinced the Government to supplement the capacity of the Roads Department with consulting services, which provided technical assistance. In addition, it encouraged the Government to maintain the professional standard and strength of the highway administration by increasing the number and training of nationals. Finally, the IBRD/IDA influenced the Government to introduce economic criteria into the selection of investments for the 1969-73 Highway Development Plan.

In retrospect, however, the IBRD/IDA should have paid closer attention to transport regulation in the country. For example, a study

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1/ Some question has arisen recently as to how far these regulations are actually followed, so that the industry may be more competitive and benefits more widely disseminated than the regulations suggest.

should have been made of the establishment of the structure of rates and fares applied in the Province of Diego Suarez. This maybe significant now insofar as the Government is apparently thinking of imposing fixed rates throughout the country. Also, the IBRD/IDA could have looked in more detail into the transport problems in the Tsiroanomandidy-Tananarive corridor, where the Tsiroanomandidy-Fanjakamandroso and Analavory-Arivonimamo sections are located. Preparation of detailed engineering for the latter was included in the original proposal by the country, but withdrawn when not enough IDA funds were available. The work was finally carried out under the Third Highway Project four years later.

Eight supervision missions were mounted between loan/credit signing and the final closing date, or an average of one every nine months. Given the IBRD/IDA's awareness that investment in the project was risky, more frequent supervision would have been expected, especially in 1970 and 1971 (only one visit was made in each of these years when major design and construction problems occurred). This probably would have resulted in more advice being provided, which could have reduced delays in contract awards and construction, as well as more on-site inspections being made, which could have identified possible construction defects. However, although more on-site inspections were not within the capacity of IBRD/IDA, the problems should have been noted by supervision missions.

One aspect of the project that supervision missions apparently did not follow up thoroughly was the Government's progress in increasing technical education and training programs as well as career incentives in highway administration.

CONCLUSIONS

Construction of the roads and bridges under the Second Highway Project has been successfully completed, but with a 29% cost overrun in local currency terms due to design difficulties, construction delays, and price increases. These elements, as well as changes in traffic from expectations, are reflected in the discrepancy between the range of the rates of return on the individual components at audit (4%-21%) and at appraisal (8%-16%). The cost overrun suggests that the 5% allowance at appraisal for price increases was inadequate.

In retrospect, it is doubtful whether the Ambilobe-Ambanja Road should have been included in view of the low expected rate of return (8%) and the risk associated with the project. As it turned out, the audit rate of return is over 10% for this road, which accounts for 54% of the total project investment, only under very optimistic assumptions. Given

the scarce resources available for investment, a more detailed study of alternatives should have been explored and a more comprehensive study of RN 6, which was intended to provide an all-weather link between Diego Suarez and the rest of the island, probably should have been made. The Ambilobe-Ambanja Road is just one link in that road and failure to improve other sections has prevented further traffic growth. In addition, transport regulation problems should have been investigated fully as existing regulations will already reduce the potential impact of some of the investments. Finally, more supervision should have been provided by the IBRD/IDA to help avoid design and construction problems.

TABLE 1

PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT (LOAN 570-MAG/CREDIT 134-MAG)

Project Costs, Completion Dates, and Contractors/Consultant

Project Component	Cost /1 Estimated /2 (FMG million)	Cost /1 Actual (FMG million)	Cost /1 Overrun %	Completion Date Estimated at Contract Signing	Completion Date Actual	Contractor/Consultant
Construction and Bituminous Paving: Fanjakamandroso-Tsiroanomandidy Road	907	1,006	11	April 1971	December 1972	Société des Grandes Travaux de l'Est (SGTE) and Nationale de Terrassements, Routes et Ouvrages d'Art (CITROA)
Ambilobe-Ambanja Road	1,239	1,881	52	Original Contract: June 1971 Amended: August 1972	December 1973	Murri Frères
Construction:						
Onibe Bridge	171	416	28	March 1972	July 1971	SGTE
Fanandrana Bridge	153			March 1972	July 1972	SGTE
Ambanja Bridge	92	194	111	Original Contract: June 1971 Amended: August 1972	September 1973	Société de Construction des Batignolles
Consultants' Services	146	179	23	Original Contract: October 1971 Amended: November 1972	December 1972	Rhein - Ruhr Ingenieurs Gesellshaft MBH
Price Contingency	135	-	-			
Total	2,843	3,676	29			

/1 Shown in local currency only to eliminate the influence of exchange rate fluctuations.
/2 Physical contingencies have been added to the estimated cost of each component.

Sources: Ministry of Public Works, Directorate of Public Works, Central Technical Service, Progress Reports, and IBRD/IDA Supervision Reports.

TABLE 2

PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT (LOAN 570-MAG/CREDIT 134-MAG)

Vehicle Operating Costs

Vehicle	Road Surface		Savings per Vehicle-km	
	Earth	Paved		
	FMG per vehicle-km		FMG	%
Cars	25.6	15.7	9.9	39
Buses	64.3	35.7	28.6	44
Pickups 1-3.5 tons	13.3	9.8	3.5	26
Trucks 3.5-10 tons	52.5	33.7	18.8	36
Trucks Over 10 tons	105.0 /1	52.3	52.7	50
Trailers	157.5 /1	93.3	64.2	41

/1 Estimates.

Source: BCEOM, Feasibility Study of the Antsohihy-Ambanja Road, July 1972.

TABLE 3

PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT (LOAN 570-MAG/CREDIT 134-MAG)

Average Daily Traffic, 1972 and 1973

Project Component	1972 Estimated	1972 Actual	1973 Actual
	vehicles per day		
Fanjakamandroso-Tsiroanomandidy Road (RN 1)	140	437 /1	437
Ambilobe-Ambanja Road (RN 6)	195	201 /1	201
Onibe Bridge (RN 2)	260	306	347
Fanandrana Bridge (RN 2)	120	173	170 /2
Ambanja Bridge (RN 6)	135	147 /1	147

/1 Traffic counts were made on RN 1 and RN 6 in 1971 and 1973. The figures shown for 1972 are from the 1973 count. They were not reduced by an annual growth factor because traffic in 1971 was higher than in 1973.

/2 Post No. 17A.

PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT (LOAN 570-MAG/CREDIT 134-MAG)

Traffic Composition, 1973

Project Component	Cars	Buses	Pickups 1-3.5 tons	Trucks 3.5-10 tons	Trucks Over 10 tons	Trailers	Total
			%				
Fanjakamandroso-Tsiroanomandidy Road	35	32	16	17	0	0	100 /1
Ambilobe-Ambanja Road	42	21	21	13	1	2	100 /2
Onibe Bridge	59	8	18	9	3	3	100 /3
Fanandrana Bridge	35	23	21	21	0	0	100 /4
Ambanja Bridge	63	12	17	6	0	2	100 /5

/1 Based on figures of first and second traffic counting campaign and extrapolated from previous years for the third campaign.

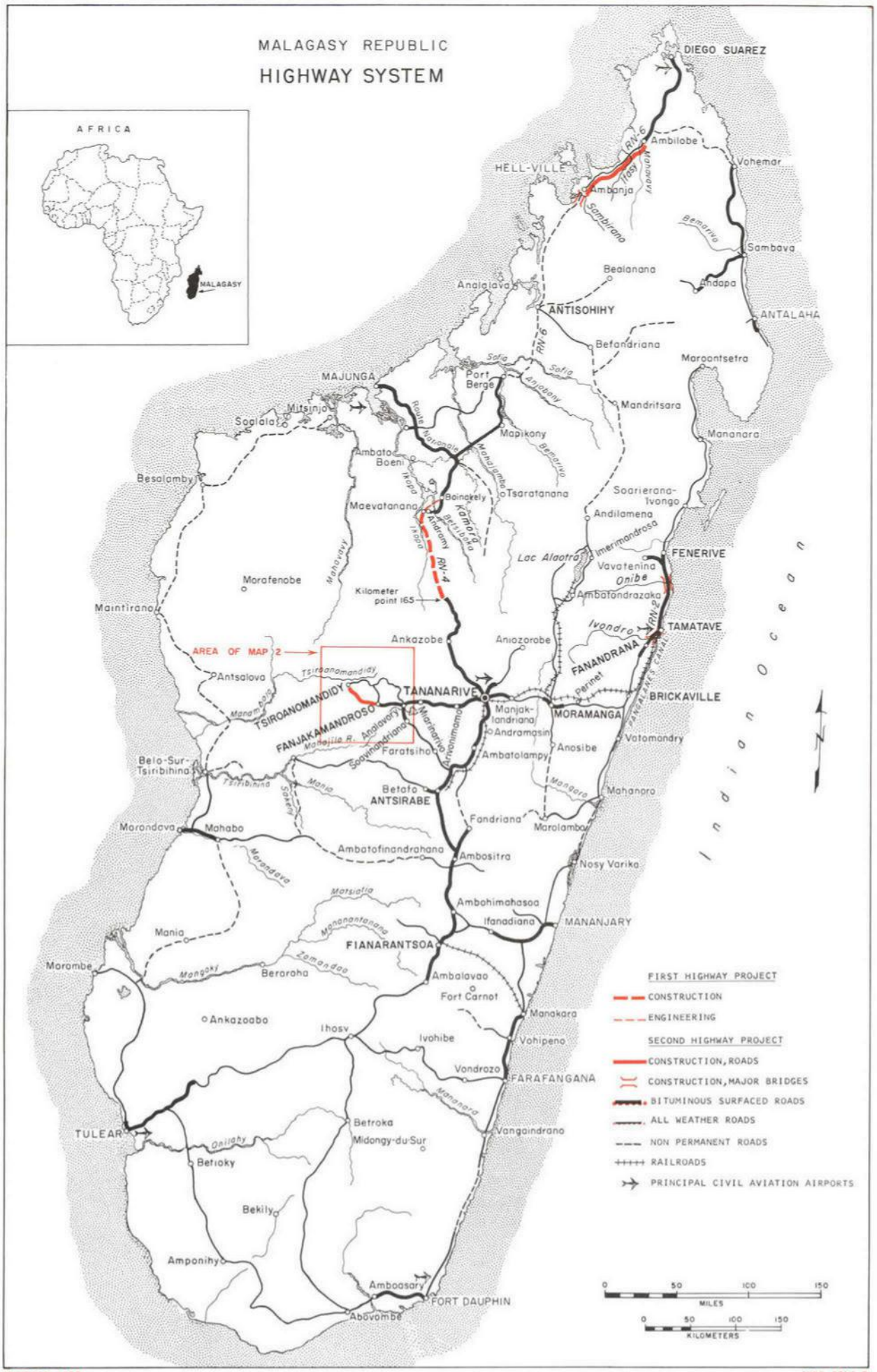
/2 Post No. 8D, halfway between Ambilobe and Ambanja.

/3 Post No. 9A, the first counting post north of the bridge.

/4 Post No. 17A.

/5 Post No. 12D, the first counting post south of the river.

TABLE 4


MALAGASY REPUBLIC
HIGHWAY SYSTEM
AFRICA
MALAGASY
DIEGO SUAREZ
Ambilobe
Vohemar
HELL-VILLE
Ambanja
Sambava
Bealanana
Andapa
Analalava
ANTISOHIHY
ANTALAHA
Befandriana
Maroantsetra
MAJUNGA
Port Bergé
Mandritsara
Mitsinjo
Soalala
Mapikony
Mananara
Ambato Boeni
Besalamby
Tsaratanana
Soarierana-Ivongo
Maevatanana
Andilamena
Lac Alaotra
FENERIVE
Vavatenina
Morafenobe
Ambatondrazaka
Maintirano
Kilometer point 165
Ankazobe
Anjozorobe
TAMATAVE
AREA OF MAP 2
Antsalova
FANANDRANA
TSIROANOMANDIDY
TANANARIVE
BRICKAVILLE
FANJAKAMANDROSO
MORAMANGA
Manjakandriana
Andramasina
Vatomandry
Anosibe
Faratsiho
Ambatolampy
Bela-Sur-Tsiribihina
Betafo
ANTSIRABE
Mahanoro
Fandriana
Morondava
Mahabo
Marolambo
Ambatofinandrahana
Ambositra
Nosy Varika
Ambohimahasoa
Ifanadiana
MANANJARY
Mania
FIANARANTSOA
Morombe
Beroroha
Ambalavao
Fort Carnot
Manakara
Ankazoabo
Ihosy
Ivohibe
Vohipeno
Vondrozo
FARAFANGANA
TULEAR
Betroka
Midongy-du-Sud
Vangaindrano
Betioky
Bekily
Amponihy
Amboasary
FORT DAUPHIN
Abovombe
Indian Ocean
FIRST HIGHWAY PROJECT
CONSTRUCTION
ENGINEERING
SECOND HIGHWAY PROJECT
CONSTRUCTION, ROADS
CONSTRUCTION, MAJOR BRIDGES
BITUMINOUS SURFACED ROADS
ALL WEATHER ROADS
NON PERMANENT ROADS
RAILROADS
PRINCIPAL CIVIL AVIATION AIRPORTS
0 50 100 150
MILES
0 50 100 150
KILOMETERS

FORM NO. 75
(7–73)

WORLD BANK GROUP

ROUTING SLIP	DATE 7/9/75

NAME	ROOM NO.
Mr. C. Willoughby	G-1050

	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

For your consideration.

Paula:
Could you please read this Malagasy rep [illegible] one part time, and think about these comments.
[illegible]

FROM	ROOM NO.	EXTENSION
Hans A. Adler	A-1042	2668

File loan 570

OFFICE MEMORANDUM

TO: Mr. Hans A. Adler, Director, EAPDR DATE: July 9, 1975

FROM: F. D. T. Reid, Chief, EAPHW

SUBJECT: Project Performance Audit Report on Malagasy Republic
Second Highway Project (Loan 570-MAG/Credit 134-MAG)

Please refer to your routing slip of June 30 on the above subject. There were just three comments:

Firstly, the report indicates on page ii that as a result of a system of fixed transport rates in Madagascar, transport enterprises pass on only part of the savings from the investments to producers and consumers. The recently returned appraisal mission considers that, although such a regionalized system officially exists, it is not respected by the transport industry because of high competition, so that any savings from investments are very well passed on to producers and consumers.

Secondly, in the background chapter, page 1, in the first paragraph there appears the statement, "Development has been impeded, however, by the small size of the regional economy and early stage of economic development..." This doesn't sound right somehow. Revise

Finally, on page 10, paragraph 2, the final sentence says, "...problems should have been noted by supervision missions toward the end of construction, especially the final one." It is not clear what this means, particularly since at the time of the final supervision mission all construction works had been completed. Revise

FDTReid/PLudwig:js/ss

2331
JUL 9 1975

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

Final

OFFICE MEMORANDUM

TO: Mr. M. Shoaib, Vice President

DATE: June 27, 1975

FROM: C. R. Willoughby, Director, OED AI

SUBJECT: Project Performance Audit Report on Malagasy Republic Second Highway Project (Loan 570-MAG/Credit 134-MAG)

I am attaching for your approval the Project Performance Audit Report on the Malagasy Republic Second Highway Project supported by Loan 570-MAG/Credit 134-MAG of 1968. The report has been revised in light of comments provided by the Eastern Africa Regional Office and the Ministry of Public Works in Malagasy.

Attachment

cc: Messrs. Baum
Husain

9/2

To Mr McNamara
Woard
2 July

To Mr Willoughby
Woard
July 8

JUL 9 1975

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

OFFICE MEMORANDUM

TO: Mr. M. Shoaib, Vice President

DATE: June 27, 1975

FROM: C. R. Willoughby, Director, OED

SUBJECT: Project Performance Audit Report on Malagasy Republic Second Highway Project (Loan 570-MAG/Credit 134-MAG)

I am attaching for your approval the Project Performance Audit Report on the Malagasy Republic Second Highway Project supported by Loan 570-MAG/Credit 134-MAG of 1968. The report has been revised in light of comments provided by the Eastern Africa Regional Office and the Ministry of Public Works in Malagasy.

Attachment

cc: Messrs. Baum
Husain

To Mr Knapp
MShoaib
2 July

OK

JUL 3 1975

To Mr Willoughby
MShoaib
3 July

CONFIDENTIAL

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT

(LOAN 570-MAG/CREDIT 134-MAG)

June 27, 1975

Operations Evaluation Department

PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT (LOAN 570-MAG/CREDIT 134-MAG)

PREFACE

The Second Highway Project in the Malagasy Republic supported by the World Bank Group was partially-financed by an IBRD loan (570-MAG) and an IDA credit (134-MAG), which were signed on November 12, 1968. The credit was fully disbursed on December 31, 1972; the loan on December 31, 1973. The purpose of this performance audit is to assess the extent to which the original project objectives were met and to analyze the role of the IBRD/IDA in meeting those objectives.

The audit is based on a review of: correspondence and reports in IBRD/IDA files (appraisal reports; economic reports; supervision reports; and construction progress reports) as well as discussions with IBRD/IDA staff members and Malagasy officials.

In September 1974, a two-week visit was made to the Malagasy Republic to update information and to discuss relevant issues.

The valuable assistance of the Government of the Malagasy Republic is gratefully acknowledged.

PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT (LOAN 570-MAG/CREDIT 134-MAG)

PROJECT DATA

	Loan 570-MAG	Credit 134-MAG
Amount of Loan/Credit	US$3.5 million	US$4.5 million
Amount Disbursed	US$3.5 million	US$4.5 million
Dates of Loan/Credit Negotiations	September 19-27, 1968	
Date of Loan/Credit Agreement	November 12, 1968	
Original Effective Date	February 5, 1969	
Final Effective Date	April 1, 1969	
Original Closing Date	December 31, 1972	
Final Closing Date	December 31, 1973	December 31, 1972
First Supervision Mission	February 1969	
Final Supervision Mission	August 1974	

Exchange Rates (Malagasy franc):

Through July 1969 ---------- US$1 = FMG 247
August 1969 - November 1971 --- US$1 = FMG 278
December 1971 - January 1973 -- US$1 = FMG 256
February 1973 to present ------ US$1 = FMG 230

PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT (LOAN 570-MAG/CREDIT 134-MAG)

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PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT (LOAN 570-MAG/CREDIT 134-MAG)

SUMMARY

On November 12, 1968, the IBRD/IDA signed agreements to provide a US$3.5 million loan (570-MAG) and a US$4.5 million credit (134-MAG) to the Malagasy Republic to finance the foreign exchange cost of a US$11.5 million highway project. This represented the IBRD/IDA's second involvement in highways in the country. The loan/credit became effective on April 1, 1969.

Project components included construction and bituminous paving of the Fanjakamandroso-Tsiroanomandidy Road (55 km) and Ambilobe-Ambanja Road (91 km); construction of the Onibe, Fanandrana, and Ambanja Bridges; and consultants' services for construction supervision. Detailed engineering of the Analavory-Arivonimamo Road and feasibility studies of three roads were deleted from the project during negotiations as sufficient IDA funds were not available to cover them. Completion was about a year behind schedule because of design difficulties and construction delays. The December 31, 1972 closing date was met for the credit but extended one year for the loan because of construction delays on the Ambilobe-Ambanja Road and on the Ambanja Bridge.

The actual cost of the project was US$15.2 million in contrast to the estimate of US$11.5 million, including contingencies. This represented a 29% overrun. The overrun was financed in large part by the Government, but savings from the First Highway Project (Credit 90-MAG of 1966 for US$10 million) also contributed to the financing.

The economic rate of return for the Fanjakamandroso-Tsiroanomandidy Road estimated at audit is 21%, or well above the 13% appraisal estimate, because the cost overrun was compensated by a substantial traffic increase. On the Ambilobe-Ambanja Road, the range of the audit rate of return is 6%-8% and 8%-11% (depending on the figures used), as compared with the appraisal estimate of 8%. If account is not taken of higher oil prices and traffic increases that will probably follow improvement of the southern link from Ambanja to Antsohihy, the substantial cost overrun together with the traffic level close to appraisal expectations result in a rate of return of 6% and 8%, depending on the figures used. But if account is taken of these factors, the rate of return rises to 8% and 11%, respectively.

The rate of return on the Onibe and Fanandrana Bridges (13%) is roughly as expected at appraisal (16% and 12%, respectively) because the combined cost overrun was largely offset by traffic increases. However,

the rate of return at audit is lower than at appraisal for the Ambanja Bridge (4% versus 9%) because the actual cost was more than double the estimate whereas traffic increased only slightly.

Developmental benefits from the project roads and bridges are difficult to identify precisely, but population and production have increased in the influence areas. In addition, social and administrative links on a year-round basis have been provided, an important factor in a country where regions had remained largely isolated because of difficult topography.

Due to the limits of the audit, the distribution of project benefits could not be investigated thoroughly, but indications are that, as a result of a system of fixed transport rates, transport enterprises pass on only part of the savings from the investments to producers and consumers.

The IBRD/IDA made a positive contribution to the project by encouraging the Government to: select components of high economic priority; employ consultants for technical assistance; maintain the professional standard and strength of the highway administration; and introduce economic criteria into the selection of investments for the 1969-73 Highway Development Plan.

In retrospect, however, it is doubtful whether the Ambilobe-Ambanja Road should have been included in view of its low expected rate of return (8%) and the risk associated with the project. The audit rate of return is over 10% for this road, which accounts for 54% of the project investment, only under very optimistic assumptions. Given the scarce resources available for investment, a more detailed study of alternatives should have been explored and a more comprehensive study of the main north-south road in the country, of which the Ambilobe-Ambanja Road is one section, should have been made.

The project's impact could have been improved if transport regulation problems had been investigated fully and if more IBRD/IDA supervision had been provided to help avoid some of the design and construction problems.

PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT (LOAN 570-MAG/CREDIT 134-MAG)

BACKGROUND

Since independence in 1960, the Government of the Malagasy Republic has been endeavoring to develop viable connections between regions and between widely separated economic and social centers. Development has been impeded, however, by the small size of the regional economy and early stage of economic development as well as by high construction costs due to rugged topography and scarcity of suitable construction materials due to difficult geological conditions. Only earth roads, impassable in rainy weather, have joined the northern and part of the western regions with the rest of the country, and mere trails have linked these regions with the south (see map). The Government has been increasing road investments and maintenance expenditures since 1964, but only a few sections of the primary road network have been brought up to modern standards while inland connections remained poor, road alignments located badly, and structures obsolete.

The Government wished to improve this situation by providing a primary road network to connect the main economic and social centers. Therefore, it decided that roads and bridges should be constructed in the northern, central, and eastern regions where population density as well as agricultural output and potential were highest. In 1966, the Government asked the IBRD/IDA for assistance in preparing a project that would represent the organization's second investment in Malagasy highways. The project was identified by the Permanent Mission in Eastern Africa and comprised construction and paving of two road sections, construction of seven bridges, detailed engineering of four road sections, and feasibility studies of three road sections. In 1967, the Government submitted an application to the IDA for a credit to help finance the project.

Between November 1966 and December 1967, three missions from the Permanent Mission in Eastern Africa visited the country to assist in preparation and to assess the applications. As a result, the Government withdrew applications for three bridges because of insufficient economic justification and initiated a feasibility study for a fourth bridge, to be financed under the ongoing First Highway Project (Credit 90-MAG of 1966 for US$10 million). In addition, the Government decided that detailed engineering should be carried out on only one of the original four road sections.

In February 1968, a mission from headquarters visited the country to appraise the revised project proposal. Components would be (a) construction and bituminous paving of the Fanjakamandroso-Tsiroanomandidy Road (55 km) and Ambilobe-Ambanja Road (91 km); (b) construction of the Onibe, Fanandrana, and Ambanja Bridges; (c) detailed engineering of the Analavory-Arivonimamo Road; (d) feasibility studies of the Lac Alaotra-Vavatenina Road; Moramanga-Tamatave Road, and Tananarive-Fianarantsoa Road; and (e) consultants' services for construction supervision of the Ambilobe-Ambanja Road and the three bridges. Supervision of the Fanjakamandroso-Tsiroanomandidy Road would not be included in the project because the Government felt that its Central Technical Service, assisted by the Public Works Laboratory, was qualified to carry out the work. The appraisal mission stated that this arrangement would be adequate.

The road sections and bridges would be constructed on existing primary roads. The Fanjakamandroso-Tsiroanomandidy Road was a section of National Road 1 (RN 1). Construction would improve connections between Tananarive, the capital, and Tsiroanomandidy, an important marketing center in the agriculturally rich midwest. The Ambilobe-Ambanja Road was a section of National Road 6 (RN 6), and construction would improve links with the north, western shore, and central plateau. Both roads would be paved with bitumen,

The Onibe and Fanandrana Bridges would be constructed on National Road 2 (RN 2), linking the main port of Tamatave with areas to the north and south along the eastern coast. The bridges would improve road connections of the port with the hinterland by eliminating bottlenecks because ferries were the only means of crossing the Onibe and Ivondro Rivers. The Ambanja Bridge would be constructed on RN 6 to eliminate the bottleneck at the Sambirano River resulting from use of a collapsible wooden bridge in the dry season and a ferry in the wet season.

Negotiations were held in September 1968. Financing was discussed in detail because IDA replenishment had been delayed and sufficient IDA funds were not available for the project. Therefore, a joint loan/credit was proposed unless timely replenishment occurred. The Malagasy delegation accepted the blend so that the project would not be delayed, but asked that IDA funds be disbursed before IBRD funds. The delegation further obtained an assurance that a proper balance of IBRD/IDA lending would be restored for future projects if and when IDA funds were replenished.

As a consequence of the change in financing, the delegation requested that the costs of detailed engineering (one road section) and feasibility studies (three road sections) be deleted from the project.

The Government intended to approach the UNDP for funds, or, if the UNDP refused, to provide them itself.

In addition to covenants on financing, uses of consultants and contractors, design standards, and vehicle dimensions and axle loads, covenants on highway maintenance and administration were discussed. Regarding the maintenance covenant, the Transportation Projects Department supported a detailed clause. But the Working Party discussed similar cases and decided that a general clause would be sufficient.

Regarding administration, the IBRD/IDA concluded that, considering the good performance of the Malagasy highway services, the draft loan and credit agreements would not contain a provision on strengthening of highway administration. Instead, a supplemental letter provided that the professional standard and strength of highway administration should be maintained at appropriate levels by increasing the number of nationals in professional positions and other technical positions. The letter also provided that national talent should be developed by promoting technical education and training as well as career incentives.

Finally, another supplemental letter required the Government to undertake to introduce economic criteria into the selection of investments for the Five-Year Highway Development Plan of 1969-73.

The agreed components of the Second Highway Project are shown in Table 1. Their cost was estimated at US$11.5 million (FMG 2,843 million), including contingencies. The foreign exchange component was estimated at 70%, or US$8 million (FMG 1,990 million). An IBRD loan of US$3.5 million and an IDA credit of US$4.5 million were provided to cover the foreign exchange cost. The loan was for a 30-year term, including 10 years of grace, at 7% interest, and the credit was for the usual terms. Lending documents were signed on November 12, 1968. The loan/credit became effective on April 1, 1969 after an extension from February 1 to allow time for the IBRD/IDA to obtain clarification of the legal opinion from Malagasy authorities.

PROJECT IMPLEMENTATION

Bids for construction of the roads were received in August 1968 and for the bridges in October 1968. Contracts for these works and for consulting services were signed in April 1969. Contracts for the Onibe and Fanandrana Bridges were signed in September 1969 and for the Ambanja Bridge in October 1969. The long time span between receipt of bids and signing of contracts was because of the Government's delay over studying the bids. Construction was completed in December 1972. The closing date

of December 31, 1972 was met for the credit, but extended one year for the loan because of construction delays on the Ambilobe-Ambanja Road and on the Ambanja Bridge. At appraisal, construction contracts had been expected to be awarded around the end of 1968 and work to be started in April 1969 and completed by the end of 1971. The names of firms selected as well as estimated and actual completion dates are shown in Table 1.

Fanjakamandroso-Tsiroanomandidy Road (RN 1)

The contractor, who had a good reputation, had to overcome difficulties with construction on National Road 4 (RN 4) under the First Highway Project before starting construction of this road. These difficulties meant that the contractor's equipment was tied up and could not be transferred to the Fanjakamandroso-Tsiroanomandidy Road as soon as expected. Construction finally was started in November 1969 and was scheduled to be completed within two years, in accordance with the original completion date of the end of 1971. A field laboratory, financed under the loan/credit, was operated by Government staff to test building materials and soils for this road. Tests on base materials proved them to be of lower quality than expected, and the pavement structure had to be redesigned. Consequently, the contract was amended in June 1970 to include the new design and to reflect a cost increase of about 15%.

Construction was completed satisfactorily in December 1972. Although the last supervision mission stated that construction quality was adequate and no failures were apparent, settlement of the embankment adjacent to the bridge abutments has become evident. This settlement is due to the design of the abutments, which is very economic but requires frequent maintenance. Because of this condition, traffic has to reduce speed substantially.

Ambilobe-Ambanja Road (RN 6)

Construction of this road began in October 1969. In March 1970, a study by the Public Works Laboratory found that local materials were of much lower quality than expected and were not suitable for use as originally designed. Consequently, new materials were investigated and the pavement structure for different road sections was redesigned. Earthworks for some sections also were redesigned as a result of unfavorable climatic conditions during construction. The original contractual completion date of June 1971 was revised to August 1972 in light of the design changes. Work was completed in December 1973 after the contractor had mobilized sufficient new construction equipment.

The quality and finish of the bituminous surface is unsatisfactory. Some potholes have appeared and need to be repaired before

becoming worse. An August/September 1974 mission of the IBRD/IDA asked the Government to investigate the reasons for the failures, to make the necessary repairs promptly, and to watch closely the performance of the road.

Bridges

Onibe and Fanandrana (RN 2). Three construction alternatives were considered for the two bridges. A two-lane bridge at Onibe and a one-lane bridge at Fanandrana were selected as the most economical solutions. The supervisory consultants analyzed bids for the bridges. After reviewing the analysis with the Government, the IBRD/IDA concurred with the consultants that the contract should be awarded to the lowest bidder.

Construction began on the Onibe Bridge in July 1969 and on the Fanandrana Bridge in January 1970. During construction, imperfections appeared in the quality of the concrete in some prestressed beams (porosity near the cables) and of the bituminous pavement. The imperfections were corrected by the contractor, and the construction quality and finish are satisfactory. Construction of the Onibe Bridge was completed in July 1971 and of the Fanandrana Bridge in July 1972, instead of March 1972 as estimated at contract signing.

Ambanja (RN 6). Bidding was on a design-construction basis, and bids were received for truss-type and suspended span-type bridges. Although costs were lower for the suspended-span type than for the truss-type, the latter was selected because the former was technically unacceptable. The supervisory consultants also analyzed the bids for this bridge. Construction began in May 1970. Delays occurred because the consultants had to redesign the steel structure to meet wind loading requirements and because changes in the European steel market resulted in slow supply. In June 1971, the contract was amended, extending the completion date from June 1971, estimated at contract signing, to August 1972. Work was completed in September 1973, and the construction quality and finish are satisfactory.

Consulting Services

According to supervision reports, the quality of construction supervision of the Fanjakamandroso-Tsiroanomandidy Road by Government staff was satisfactory as were the quality, qualifications, and experience of the consultants supervising construction of the Ambilobe-Ambanja Road and Onibe, Fanandrana, and Ambanja Bridges. The consultants' cooperation with Government staff was good. Due to construction delays on the Ambilobe-Ambanja Road and on the Ambanja Bridge, the contract for consulting services was extended from October 1971 to November 1972. Services were completed in December 1972.

PROJECT COSTS

The actual project cost of US$15.2 million (FMG 3,676 million) represents an increase of 32% in foreign currency terms and 29% in local currency terms over the US$11.5 million (FMG 2,843 million) appraisal estimate which included contingencies. The difference is the result of fluctuations in the exchange rate of the United States dollar against the Malagasy franc. To avoid complications due to these fluctuations, estimated versus actual project costs are shown in local currency in Table 1.

The total cost overrun (excluding contingencies) is about 50%. About 52% of the overrun can be attributed to quantity changes, and 48% to price increases. Therefore quantity increases imply a cost overrun of about 26%, while price increases imply a cost overrun of 24%. The contingencies included in the project cost estimate, 10% for quantities and 5% for prices, were clearly inadequate, particularly those for prices.

The cost overrun was financed in large part by the Government, but savings from the First Highway Project of US$303,643.40 (FMG 63,153,786) also contributed to the financing.

ECONOMIC ANALYSIS

Economic justification of the Second Highway Project at appraisal had been based on considerable reductions in transport costs and generation of important developmental benefits. The justification was reevaluated for this audit using actual construction costs, actual traffic figures,[1/] and new estimates of savings in vehicle operating costs derived by BCEOM in 1972[2/] (Table 2). These new estimates were based on a detailed empirical study of vehicle operating costs in the Malagasy Republic,[3/] while the appraisal estimates in some cases were just interpolations based on studies in neighboring African countries and were incomplete both with regard to different vehicle types and road conditions. Unfortunately, the information available in the appraisal report does not permit a comparison of

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1/ Future traffic development has been assumed to continue at the same growth rates as stated in the appraisal report. Benefits to normal traffic have been valued at 100% of road user savings and benefits to induced traffic at 50% of road user savings.

2/ BCEOM, Feasibility Study of the Antsohihy-Ambanja Road, July 1972.

3/ Taking into account traffic composition, load factors, vehicle lifetime, insurance premiums, etc.

vehicle operating costs with the new BCEOM estimates, mainly because relevant information is lacking or different vehicle types are indicated. The new BCEOM estimates seem to be more reliable than the appraisal estimates; they have therefore been used in the estimation of the audit rate of return.[1/]

The proportion of the total investment devoted to each project component and a comparison of rates of return as estimated at appraisal and at audit are:

	Proportion of Total Investment %	Rate of Return	
		Appraisal Estimate %	Audit Estimate %
Fanjakamandroso-Tsiroanomandidy Road	28	13	21
Ambilobe-Ambanja Road	54	8	6 - 8 [a/] / 8 - 11 [b/]
Onibe Bridge	12	16	13
Fanandrana Bridge		12	
Ambanja Bridge	6	9	4

a/ Based on BCEOM's figures of vehicle operating costs.
b/ Based on figures used for the appraisal of the proposed Fourth Highway Project.

Cost overrun percentages are shown in Table 1 and average daily traffic in 1972 and 1973, in Table 3.

The economic rate of return for the Fanjakamandroso-Tsiroanomandidy Road estimated at audit (21%) is well above that at appraisal (13%) because the cost overrun (11%) was compensated by a substantial traffic increase, 437 vehicles per day (vpd) in 1972 versus 140 vpd projected at appraisal.[2/]

1/ Yet another set of estimates of vehicle operating costs has been recently prepared by the Bank in connection with the appraisal of the proposed Fourth Highway Project. These estimates are based on SETEC's "Etudes de Factibilite Routiere." A direct comparison between these and the BCEOM estimates is also difficult because of the different vehicle types used and the fact that the two estimates refer to different years. However, since these new estimates indicate higher cost savings than the BCEOM study, we have used both estimates in the case of the Ambilobe-Ambanja Road, which has the lowest return.

2/ The difference between actual and projected traffic is probably because existing traffic on the road was underestimated at appraisal, as indicated by more elaborate traffic counts now available, and because the effects on traffic of linking a departmental administrative center (Tsiroanomandidy) with the capital may genuinely have been underestimated. The actual traffic increase, as compared with the base year figures, essentially related to passenger traffic.

On the Ambilobe-Ambanja Road, the difference between the audit rate of return (6%-8% and 8%-11%, depending on the figures used) and the appraisal estimate (8%), is the consequence of higher oil prices and of traffic increases that will probably follow improvement of the southern link from Ambanja to Antsohihy. If these factors are not taken into account, the substantial cost overrun (52%) together with the traffic level close to appraisal expectations (201 vpd in 1972, only slightly above the 195 vpd appraisal estimate), results in a rate of return of 6% and 8%, depending on the figures used. But if these factors are taken into account, the rate of return rises to 8% and 11%, respectively.

For the Onibe and Fanandrana Bridges, the audit estimate of a 13% combined rate of return on construction is in the range of the appraisal estimates of 16% and 12%, respectively. This was because the combined cost overrun (28%) was largely offset by traffic increases (in 1972, on Onibe Bridge, 306 vpd versus 260 vpd projected and on Fanandrana Bridge, 173 vpd versus 120 vpd projected). The estimated return of 4% at audit on construction of the Ambanja Bridge is considerably below the 9% at appraisal because the actual cost was more than double the estimate (211%) whereas traffic increased only slightly (in 1972, 147 vpd versus 135 vpd projected).

In 1973, about two-thirds of traffic on the project roads and bridges was composed of cars and buses and one-third, pickups, trucks, and trailers (Table 4). For the Fanjakamandroso-Tsiroanomandidy Road, this conflicted with appraisal expectations that cattle production would increase significantly and that large cattle trailers would comprise an important share of new traffic from Tsiroanomandidy to market in Tananarive. These expectations were not realized because cattle production did not increase as expected due to new cattle diseases and government restrictions on cattle export and, therefore, trailer traffic could not develop. In 1972, of the 58,400 cattle transported from Tsiroanomandidy to Tananarive, 35,400 were on hoof for the entire distance, 22,400 on hoof part of the distance and in trailers for the rest, and 600 in 10-ton trucks for the entire distance.1/

The preponderance of cattle transport on hoof between Tsiroanomandidy and Tananarive has resulted because of the freight rate structure and the poor condition of the Analavory-Arivonimamo section, which was not improved under the project. Freight rates are structured so that truck transport is profitable only if return freight from Tananarive to Tsiroanomandidy can be guaranteed. With transport heavily in the direction of Tananarive, many small firms cannot guarantee return freight and are charged one-way rates that are 60%-70% higher than when return freight is guaranteed. Consequently, the freight rate charges make truck transport of cattle from Tsiroanomandidy to Tananarive unprofitable for firms that cannot guarantee return freight. As to the condition of the Analavory-Arivonimamo section, its narrow and winding alignment prohibits use by cattle trailers. Only 10-ton trucks operating at slow speed and high cost can maneuver on it.

1/ Even if all of the cattle had been transported the entire distance in trucks, only about 8 trucks/day would have been needed.

Detailed engineering and construction of this section were included in the Third Highway Project (Loan 876-MAG/Credit 351-MAG of 1973 for US$30 million). However, because of substantial cost overruns the design standards have been revised and the completion of the works is included in the proposed Fourth Highway Project, which was appraised in April 1975.

In regard to the appraisal expectation that the project roads and bridges would contribute to the economic development of the areas in which they were located, population and production have increased in those areas, but the amount of the increases attributable to the investments is difficult to identify precisely. Another important contribution of the roads and bridges has been to provide social and administrative links on a year-round basis between areas of the country that had been seasonally isolated, an impact reflected in the larger than expected growth in car and bus traffic.

Although the distribution of project benefits could not be investigated thoroughly due to the limits of the audit, indications are that part of the benefits from the investments have not been passed on to producers and consumers. This is as a result of a system of fixed transport rates, introduced in April 1969 by the Government in the Province of Diego Suarez (site of the Ambilobe-Ambanja Road and Ambanja Bridge). Under this system, freight rates and passenger fares on paved roads were set 20% and 33% lower, respectively, than on earth roads. But these differentials are much lower than the savings in vehicle operating costs under the same circumstances (Table 2). As a consequence, transport enterprises pass on only part of the savings to producers and consumers. At present, the Government is aware that certain anomalies exist in the sector and intends to ask for a study of transport regulation in the country.

ROLE OF THE IBRD/IDA

The IBRD/IDA played an important role in the Second Highway Project. It encouraged the Government to select components of high economic priority for financing with scarce resources and to postpone others. It also convinced the Government to supplement the capacity of the Roads Department with consulting services, which provided technical assistance. In addition, it encouraged the Government to maintain the professional standard and strength of the highway administration by increasing the number and training of nationals. Finally, the IBRD/IDA influenced the Government to introduce economic criteria into the selection of investments for the 1969-73 Highway Development Plan.

In retrospect, however, the IBRD/IDA should have paid closer attention to transport regulation in the country. For example, a study

should have been made of the establishment of the structure of rates and fares applied in the Province of Diego Suarez. This is particularly significant now because the Government is thinking of imposing fixed rates throughout the country. Also, the IBRD/IDA could have looked in more detail into the transport problems in the Tsiroanomandidy-Tananarive corridor, where the Tsiroanomandidy-Fanjakamandroso and Analavory-Arivonimamo sections are located. Preparation of detailed engineering for the latter was included in the original proposal by the country, but withdrawn when not enough IDA funds were available. The work was finally carried out under the Third Highway Project four years later.

Eight supervision missions were mounted between loan/credit signing and the final closing date, or an average of one every nine months. Given the IBRD/IDA's awareness that investment in the project was risky, more frequent supervision would have been expected, especially in 1970 and 1971 (only one visit was made in each of these years when major design and construction problems occurred). This probably would have resulted in more advice being provided, which could have reduced delays in contract awards and construction, as well as more on-site inspections being made, which could have identified construction problems. However, although more on-site inspections were not within the capacity of IBRD/IDA, the problems should have been noted by supervision missions toward the end of construction, especially the final one.

One aspect of the project that supervision missions apparently did not follow up thoroughly was the Government's progress in increasing technical education and training programs as well as career incentives in highway administration.

CONCLUSIONS

Construction of the roads and bridges under the Second Highway Project has been successfully completed, but with a 29% cost overrun in local currency terms due to design difficulties, construction delays, and price increases. These elements, as well as changes in traffic from expectations, are reflected in the discrepancy between the range of the rates of return on the individual components at audit (4%-21%) and at appraisal (8%-16%). The cost overrun suggests that the 5% allowance at appraisal for price increases was inadequate.

In retrospect, it is doubtful whether the Ambilobe-Ambanja Road should have been included in view of the low expected rate of return (8%) and the risk associated with the project. As it turned out, the audit rate of return is over 10% for this road, which accounts for 54% of the total project investment, only under very optimistic assumptions. Given

the scarce resources available for investment, a more detailed study of alternatives should have been explored and a more comprehensive study of RN 6, which was intended to provide an all-weather link between Diego Suarez and the rest of the island, probably should have been made. The Ambilobe-Ambanja Road is just one link in that road and failure to improve other sections has prevented further traffic growth. In addition, transport regulation problems should have been investigated fully as existing regulations will already reduce the potential impact of some of the investments. Finally, more supervision should have been provided by the IBRD/IDA to help avoid design and construction problems.

L570

SCHUSTER

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GERMANY

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FORM NO. 249
(10–74)

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Service Central de programmation

REPOBLIKA MALAGASY
Fahafahana-Tanindrazana-Fandrosoana
****

cc. (1) Mr. Marburg
(2) Mrs. Valad
(3) File loan 570

Antananarivo, le 23 MAI 1975

Nº 012 - SG/SCP.

R A H A L I S O N E d s o n
Secrétaire Général des Travaux Publics

à

Monsieur WILLOUGHBY
DIRECTEUR DU DEPARTEMENT DE L'EVALUATION
RETROSPECTIVE DES OPERATIONS

- WASHINGTON -

O B J E T : Prêt 570-MAG et crédit 134-MAG
République Malgache - deuxième projet routier -
Rapport de Monsieur SCHUSTER.

REFERENCE : Votre lettre du 9 Avril 1975.

Monsieur Le Directeur,

Suite à votre sus-référenciée, j'ai l'honneur de vous faire parvenir copie des observations et remarques qu'appelle, de la part de mon Département, le rapport de Monsieur SCHUSTER sur le deuxième projet routier. L'original de ce document a été transmis à Monsieur le Ministre des Finances qui se chargera de vous transmettre officiellement le sentiment du Gouvernement Malagasy à l'égard de ce rapport.

Vous souhaitant bonne réception,

Je vous prie d'agréer, Monsieur Le Directeur, l'assurance de ma considération distinguée.

MINISTERE DES TRAVAUX PUBLICS – SECRETARIAT GENERAL – Service Central de Programmation – REPOBLIKA MALAGASY

Le Secrétaire Général

RAHALISON Edson

2153
JUN 4 1975

OBSERVATIONS SUR LE RAPPORT DE M. SCHUSTER SUR LE DEUXIEME PROJET ROUTIER FINANCE PAR LE GROUPE DE LA BIRD

****

I.-CONSIDERATIONS GENERALES

L'intérêt de l'établissement d'un tel rapport est évident. En effet, il permet d'améliorer les investissements d'évaluation mis à la disposition des évaluateurs de projet. A notre avis, il serait souhaitable que d'autres sources de financement en fassent autant sur chaque investissement important.

II.-CONTENU DU RAPPORT

Observations ponctuelles

a) - Trafic routier : Pont de l'ONIBE (RN 5).
Le trafic réel en 1973 n'est que de 247 véhicules/jour. Cette baisse s'explique par les événements de Décembre 1972 dont l'incidence est telle que le trafic de la première campagne n'a été que de 40% de la normale. Sans ces incidents, on aurait pu attendre un trafic de l'ordre de 320 véhicules/jour comme le montre la première campagne 1974.

b) - Répartition de trafic : Pont ONIBE
En 1973, la répartition du trafic était :

VL	: 29%
Autocars	: 34%
Camionnettes	: 22%
Camions 10 T	: 11%
Camions 10 T	: 4%

En 1972, elle était à 2 ou 3% près du même ordre.

c) - Economies sur les coûts d'exploitation des véhicules (tableau 2)
A notre avis, les diminutions des coûts de fonctionnement retenues par le BCEOM, du fait de l'utilisation d'une route revêtue au lieu d'une route en terre sont sous évaluées. Celle retenue dans le deuxième projet routier semble plus proche de la réalité. Pour s'en convaincre, on se referera à l'étude de factibilité routière recemment faite par la SETEC qui préconisait les diminutions de coût suivants :

- véhicules légers 47 à 52% selon que la base retenue soit une bonne ou une mauvaise route en terre
- camions de 8 à 15 T PTC 54 à 63% pour les mêmes raisons que ci-dessus.

.../...

d) - Hausse des prix : le rapport souligne à juste titre l'insuffisance du montant non affecté. Au vu de tels rapports, la Banque devrait essayer d'augmenter le pourcentage du volume non affecté pour permettre à l'emprunteur de faire face à la hausse générale des prix.

e) - Réglementation des transports : Le Gouvernement est conscient de l'existence de certaines anomalies dans le transport et se propose incessamment d'étudier la planification et la réorganisation de la réglementation des transports.

f) - Rentabilité de la route Ambilobe - Ambanja et du Pont d'Ambanja.
Le contrôle à posteriori semble infirmer la rentabilité de ces projets et Monsieur SCHUSTER pense que l'on aurait dû reduire les caractéristiques de la route ou différer son aménagement.

L'objet de la RN 6 est, outre la desserte régionale, d'assurer une liaison permanente entre Diégo-Suarez et le reste de l'Ile. On aurait dû donc, non pas faire l'étude économique tronçon par tronçon, mais, en un seul bloc. En effet, du fait du non aménagement de la totalité de la RN 6, une grande partie du trafic de liaison (Hauts-Plateaux et Majunga - Diégo-Suarez) n'est pas encore apparue. Les avantages dus à ce trafic supplémentaire devraient donc être attribués au tronçon le moins rentable car le non aménagement de ce tronçon, pour sa faible rentabilité, annihilerait ce trafic.

Quant aux caractéristiques techniques de la route, ce sont, d'après les services techniques, le minimum qu'on peut admettre. En effet, il eut fallu garder pour toute la RN 6 une certaine homogénisation, si l'on ne veut imposer des ruptures de charges au transport de bout en bout.

III.-OBJECTIFS DU RAPPORT

Dans l'ensemble, les objectifs du rapport, à savoir information sur la hausse des prix, cause des retards dans la mise en oeuvre des projets, contrôle à postériori des rentabilités ont été atteints.

Toutefois, il est regrettable que l'auteur ne s'est contenté d'actualiser les avantages trouvés dans le rapport d'évaluation. Pour des pays sous-développés, les avantages apportés par

.../...

l'aménagement routier ne sont pas seulement la diminution des coûts de transport, le surplus dû au trafic détourné, mais aussi le développement économique de la région. A notre avis, le trafic induit ne traduit pas d'une manière satisfaisante le développement économique de la région. On sait combien cette tâche est difficile, mais on pense qu'il serait préférable que le groupe de la Banque limite une telle évaluation retrospective à certains projets importants et y consacre les hommes et le temps nécessaires. Une telle procédure permettra d'appréhender d'une manière plus précise les avantages inhérents à l'ouverture d'une route dans un pays sous développé.

FORM NO. 788
(1-74)

IBRD LANGUAGE SERVICES DIVISION	
CONTROL NO. E-1399/75	DATE: June 6, 1975
ORIGINAL LANGUAGE: French (Malagasy)	
DEPT. Opns. Evaluation	TRANSLATOR: GAG:cb

cc. (1) Mrs. Valad
(2) Mr. Martinez
(3) file Loan 570
done 6/6/75 (Thai)

REPUBLIC OF MALAGASY
MINISTRY OF PUBLIC WORKS
GENERAL SECRETARIAT
Central Planning Service

Antananarivo, May 23, 1975

No. 012 - SG/SCP

From: Edson RAHALISON
Secretary General of Public Works

To: Mr. Willoughby
Director, Operations Evaluation
Operations Evaluation Department
Washington

Subject: Loan 570-MAG and Credit 134-MAG
Malagasy Republic -- Second Highway Project
Report by Mr. Schuster

Ref: Your letter of April 9, 1975

Dear Mr. Director:

In response to your above letter I am sending you a copy of my Department's observations and comments on Mr. Schuster's report on the Second Roads Project. The original of this document has been sent to the Minister of Finance, who will transmit to you officially the views of the Malagasy Government on this report.

We trust that it arrives safely.

Very truly yours,

/s/ RAHALISON Edson

OBSERVATIONS CONCERNING MR. SCHUSTER'S REPORT ON THE SECOND HIGHWAY PROJECT FINANCED BY THE WORLD BANK

I. GENERAL

The value of a report of this kind is obvious. It makes it possible to improve the evaluation "stock" made available to the project appraisers. Other financing sources should do likewise for each large investment.

II. CONTENT OF THE REPORT

Point-by-point comments

(a) Road traffic: ONIBE Bridge (RN 5)

Actual traffic in 1973 was only 247 vehicles a day. This decline is explained by the events of December 1972, the effect of which was to reduce the first traffic count to 40 percent of normal. Without these incidents traffic of the order of 320 vehicles a day could have been reached, as the 1974 traffic-count figures show.

(b) Traffic distribution: ONIBE Bridge

In 1973, traffic distribution was as follows:

	%
Cars:	29
Buses:	34
Pickups:	22
Trucks (10-ton):	11 (? up to 10 tons)
Trucks (10-ton):	4 (? over 10 tons)

Traffic distribution in 1973 was about the same, within 2 or 3%.

(c) Savings on vehicle operating costs (Table 2)

In our opinion the reductions in operating costs adopted by BCEOM following from the use of a paved instead of an earth road are underestimated. The figure taken in the second highway project is much more realistic. Proof of this is that the road feasibility study recently conducted by SETEC recommended the following cost reductions:

- Light vehicles 47 to 52 percent, depending on whether the basis used is a good or a bad earth road;
- Trucks of 8 to 15 tons PTC 54 to 63 percent, same circumstances as above.

(d) Price increases

The report rightly stresses the inadequacy of the amount unallocated. In the light of such reports the Bank should try to increase the percentage unallocated so as to enable the borrower to meet the general rise in prices.

(e) Transportation regulations

The Government is aware that certain anomalies exist in transportation and intends to begin at any time now a study on planning and reorganization of the transportation regulations.

(f) Economic return characteristics of the Ambilobe-Ambanja Road and of the Ambanja Bridge

The a posteriori check seems to invalidate the economic return on these projects, and Mr. Schuster thinks that the specifications of the route should have been reduced or work on it deferred.

The purpose of RN 6 is, apart from regional service, to provide a permanent link between Diégo-Suarez and the rest of the island. The economic study should therefore not have been carried out section by section but on a "block" basis. The fact is that because failure to complete the whole of RN 6, much of link traffic (Hauts-Plateux and Majungo-Diégo-Suarez) has not yet materialized. The advantages due to this additional traffic should therefore be attributed to the least profitable section, since failure to habilitate this section, for its low economic return, would nullify this traffic.

As for the technical specifications of the road, the technical services describe these as the minimum acceptable. A certain homogeneity should in point of fact have been retained for the whole of RN 6 in order to avoid having to impose load breaks on end-to-end transportation.

III. PURPOSES OF THE REPORT

Overall, the purposes of the report -- information on price rises, causes of project implementation delays, and a posteriori control of economic return -- have been achieved.

It is regrettable, however, that the author did not limit himself to updating the benefits expected in the appraisal report. For the under-developed countries, the benefits of road-system rehabilitation are not

limited to reduction of transportation costs, the surplus due to the traffic diverted to it, but also include the economic development of the region. In our opinion, the induced traffic does not satisfactorily reflect the economic development of the region. This is a notoriously difficult task but it is felt that it would be better if the Bank Group were to limit retrospective evaluation of this kind to certain important projects and devote the necessary time and manpower to it. With such a procedure it will be possible to obtain a more precise picture of the advantages inherent in the opening up of a road in an underdeveloped country.

White

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

1818 H Street, N.W., Washington, D. C. 20433, U.S.A.

Area Code 202 · Telephone - EXecutive 3-6360 · Cable Address - INTBAFRAD

le 9 avril, 1975

M. Raymond Randriamandranto
Secrétaire Général des Finances
Ministère des Finances
Tananarive
République Malgache

Objet: Prêt 570-MAG et Crédit 134-MAG
République Malgache - Deuxième projet routier

Monsieur le Secrétaire Général,

Le 14 août, 1974, M. B. Q. Lan vous a envoyé une copie de sa lettre à M. Edson Rahalison, Secrétaire Général du Ministère des Services Publiques. Dans cette lettre il vous parlait de la visite que M. Schuster avait l'intention de faire au mois de septembre dernier pour assembler l'information nécessaire pour faciliter la préparation de notre rapport de contrôle de réalisation des objectifs du deuxième projet routier de la République Malgache, assisté par le Groupe de la Banque Mondiale.

Comme M. Lan vous l'indiquait dans sa lettre, nous avons, il y a plus d'un an, reçu de la direction de la Banque instruction d'établir, dès qu'un prêt ou un crédit a été entièrement déboursé, un rapport de contrôle de réalisation des objectifs du projet correspondant, et ceci pour tous les projets bénéficiant du concours financier de la BIRD et de l'IDA. Ces rapports doivent nous permettre d'évaluer dans quelle mesure les objectifs définis dans les rapports d'évaluation ont été effectivement atteints et d'apprécier l'efficacité de la participation de la BIRD/IDA à la préparation et à l'exécution du projet, le but principal étant essentiellement de tirer les leçons de ces expériences. Cette évaluation rétrospective devrait permettre à la BIRD/IDA d'améliorer l'assistance qu'elle fournit à ses emprunteurs en général et à la République Malgache en particulier.

Je vous envoie deux copies du projet de rapport jointes à cette lettre. Nous vous serions très obligés de bien vouloir nous faire connaître les observations, rectifications ou réactions que suscite de votre part le rapport. Nous souhaiterions, si possible, les recevoir avant le 15 mai, afin de pouvoir, comme nous l'avons promis, soumettre le rapport final aux Administrateurs de la BIRD/IDA au début du mois de juin.

Je pense aussi envoyer une copie de ce même rapport à M. Edson Rahalison, Secrétaire Général, Ministère de l'aménagement du territoire.

Je vous prie d'agréer, Monsieur le Secrétaire Général, l'assurance de ma haute considération.

Christopher R. Willoughby

Christopher R. Willoughby
Directeur
Département de l'évaluation
rétrospective des opérations

Pièces jointes

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

OFFICE MEMORANDUM

TO: Mr. W. Baum, Vice President, Projects

DATE: March 25, 1975

FROM: A. Churchill

SUBJECT: Project Performance Audit Report on Malagasy Republic Second Highway Project

We have no substantive comments on the draft Performance Audit. We, however, would like to draw your attention to the fact that the draft report was sent to the Malagasy Ministry of Public Works for their comments before getting the comments of the Bank staff. Is this in accordance with the policy of the Bank?

* Unless a quick glance indicates there are overriding reasons not to do so.

WS

HSingh:cb

pre - La 570/a.13F
Malagasy

March 12, 1975

Mr. Helmut Schuster
Technische Universitat Berlin
1 Berlin 12
Uhlandstrasse 4-5
GERMANY

Dear Helmut:

We have finally completed the audit of the Malagasy Highway Project, which is attached. We have done some editing to it, rather heavy in parts to shorten the paper to the length that the Executive Directors like. On the whole I think that it is a very interesting paper.

We have given the people in Malagasy until mid-April to comment on it. I would obviously greatly appreciate your comments and, more than that, your corrections to the paper as it now stands.

In addition, a few questions, which we have not been able to answer, arose during preparation of the audit. The sections of the paper involved are marked in blue in the left margin, and the questions are:

1. Why wasn't supervision of the Fanjakamandroso-Tsiroanomandidy Road included in the project? (page 2)

2. Were there any other reasons for extending the closing date of the loan? (page 5)

3. What difficulties did the contractor of the Fanjakamandroso-Tsiroanomandidy Road have to overcome on National Road 4, and, if his work had not been good, why was he employed a second time? (page 6)

4. In view of the defects that have occurred on the Fanjakamandroso-Tsiroanomandidy Road, were supervision reports correct in their statement that construction supervision by Government staff was satisfactory? If not, what was the quality? (page 8)

5. Why were the estimates of vehicle operating cost savings used from the BCEOM study instead of from the Third Highway Project? (page 10)

6. Were the appraisal estimates of future traffic growth (long-term) correct? If not, why? (page 10)

7. Are any details available on the Government's use of economic criteria for investments under the 1964-73 Highway Development Plan? (page 14)

I would be very grateful for any information you can provide.

Thank you again and I hope to hear from you soon.

Sincerely,

Arturo Israel

Attachment

AIsrael/PVahlad:tdj

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

Copies (1) Mr. Mayhney (2) Mrs Valad (3) file In 570

OFFICE MEMORANDUM

TO: Mr. C. R. Willoughby, Director, OED
(through F.D.W. Reid)

DATE: March 18, 1975

FROM: Peter Ludwig, Highways Projects, EA

SUBJECT: Comments on "Project Performance Audit Report on Malagasy Republic Second Highway Project."

1. Economic Analysis RN 1

On pages ii and 12 the report states that a better economic return for the Tanjakamandroso-Tsiroanomandidy road section could have been achieved if the Analavory-Arivominamo section of the Tsiroanomandidy-Tananarive road had been improved at the same time so that a good road was available for truck transport of cattle from Tsiroanomandidy to Tananarive.

Comments:

(a) The transport of the total 1972 cattle production (58,400 heads) destined for consumption in Tananarive would have added an average of only 8 vehicles per day to present traffic;

(b) Although the improvement of the Analavory-Arivominamo section might have added some marginal economic benefits to the Tanjakamandroso-Tsiroanomandidy section, the report should not give the impression that this improvement had high priority without examining whether it was economically justified at that time.

As a matter of fact, the design standards for the reconstruction of the Analavory-Arivominamo section initially included in the THIRD HIGHWAY PROJECT are presently being reviewed since the very high investment costs as designed (US$ 200,000/km) will not be justified by the expected traffic volume.

2. Economic Analysis RN 6

On pages ii and 11 it is stated that the cost overrun for the construction of the RN 6 between Ambilobe and Ambanja was not compensated by a significant traffic increase, so that the economic return on this road section was lower than estimated at appraisal.

Comments: The main reason for the slowly increasing traffic volume between Ambilobe and Ambanja is that the adjacent road section between Ambanja and Antsohihy is impracticable during five months of the year. This road section is the only missing all-weather road link between Diego-Suarez and Tananarive. It is proposed to include improvement of this road section to bituminous standards in the Fourth Highway Project to be appraised in April 1975.

3. Technical defects of RN 1

On page 6 of the report the author states that defects of bridge approaches have become evident as a result of soil problems.

Comments: Settlement of the embankment adjacent to the abutments has occurred, thus creating a step between embankment and bridge. But this settlement is not due to soil problems or faulty construction, but the extremely economic design of the abutments, which, however, need more frequent maintenance.

PLudwig:ss

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Copies (1) Mrs. Valad (2) Mr. [illegible] (3) File [illegible] 570

OFFICE MEMORANDUM

TO: Mr. C.R. Willoughby, Director, OED

DATE: March 10, 1975

FROM: F.D.T. Reid, Chief, EAPHW

SUBJECT: Project Performance Audit Report - Madagascar Second Highway Project

I refer to your memorandum of February 25 and enclose comments on the above report prepared by Mr. Jan de Weille. You will already have received Miss Johansen's comments, and Mr. Ludwig has given his verbally to Ms. Paula Valad. I have asked him to confirm them in writing on his return from leave.

Atchm.

FDTReid:js

cc: Mr. de Weille

1656

MAR 11 1975

JdeWeille:nom
Feb. 27, 1975

Comments on Project Performance Audit Report
on Malagasy Republic Second Highway Project
(Draft, February 25, 1975)

Cost Overruns and Contingencies

1. It might be useful to point out on page 9 that the original cost estimate used in the comparison with actual cost includes a 10% quantity and a 5% price contingency. Perhaps it would be more meaningful first to compare the original cost estimate excluding contingencies with the actual cost and then to compare the cost overrun (broken down into a quantity and a price componeht) with the contingencies.

Vehicle Operating Cost Savings

2. The comparison between the estimates of operating cost savings in the appraisal report and those made by BCEOM in 1972 (page 10 and table 2) could best be presented in absolute terms rather than as a percentage of operating costs. While the savings percentages in the appraisal report and according to BCEOM may be the same, the absolute savings may be different, and vice versa. For the rate of return calculation it is the absolute savings which count, not the savings percentages.

3. A minor point: page 10, line 9 should refer to 8-ton rather than 10-ton trucks.

Traffic on the Fanjakamandroso-Tsiroanomandidy Road

4. The actual 1972 traffic is more than three times the estimated 1972 traffic (page 11 and table 3). The audit suggests (page 11, footnote) that "the difference between actual and projected traffic is probably due to the fact that existing traffic on the road was underestimated at appraisal, as indicated by more elaborate traffic counts now available." Should the conclusion not be drawn, and emphasized in the main text, that during appraisal more solid traffic data should have been collected?

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2 copies: (1) Mr. Martinez original (2) file Ln. 570/k.134

OFFICE MEMORANDUM

TO: Mr. C.R. Willoughby, Director, OED DATE: March 6, 1975

FROM: Frida Johansen (through F.D.T. Reid, Chief, EAPHW)

SUBJECT: Comments on "Project Performance Audit Report on Malagasy Republic Second Highway Project."

Page i - Second paragraph - It is not clear that "loan disbursements could not begin until credit disbursements have been completed." They could have started anyway before implementation of the project was finished.

It should be mentioned that the feasibility studies were deleted at negotiations and not later.

Page ii - "...cost overrun was compensated by a substantial traffic increase." It should be compensated by traffic increase savings.

It is mentioned that the Analovary-Arivonimamo section should have been undertaken in order to improve the rate of return of the evaluated section of route No. 1. However, nothing is said about what the rate of return would have been on this Analovary-Arivonimamo section nor what the rate of return of both sections together would have been.

"...whereas traffic increased only slightly." Did it increase above original estimates or is a reference made to an annual growth rate?

Nothing is mentioned about the southern link from Ambanja to Antsohihy for the RN 6.

"all benefits of part of the investments have not been passed on to consumers and producers..." This should be re-worded.

It is not clear why the fixed rates originate that the transport enterprises pass only part of the savings.

Page iii - Is a project with a 6% rate of return of high economic priority?

Page 1 - Why should low population density have impeded development and why is development impeded by an early stage of development?

Did the government expenditure on road investments and maintenance since 1964 increase in real terms?

What are modern standards?

Page 2 - What is meant by "ready for detailed engineering"?

Page 7 - Is the section of road RN 6 satisfactorily or unsatisfactorily completed?

"The imperfections were corrected by the contractor. With these exceptions,..." If they were corrected, are they still exceptions?

Page 10 - It is indicated that actual traffic figures were used, but has there been any change in growth estimates?

Have road maintenance costs been considered?

A comparison is made between appraisal and BCEOM vehicle operating costs and their differences are given. How good are both estimates basically?

Page 11 - "...was not compensated by significant traffic increases..." Over appraisal estimates?

"...actual cost was more than double the estimate (111%)..." It should be 211% instead of 111% or if not, it is an increase of 111%.

Page 12 - It is said that cattle is transported in 10-ton trucks. However, in Table 4 no 10-ton trucks are indicated in the traffic counts.

"windy alignment" - winding alignment.

Implementation of the section of RN 1 to be improved under the Third Highway Project has not yet started.

Page 13 - Re-word the paragraph about "economic development benefits."

"...transport enterprises prefer contracts along paved roads, to the detriment of rural producers and consumers." Producers and consumers along paved roads in these areas are also rural.

Again, is 6% rate of return high?

From this report, it would look like the section from Analovary-Arivonimamo would have had higher priority than Ambilobe-Ambanja.

Page 15 - The word "risk" doesn't seem appropriately used in this section.

Ln 570

DRAFT

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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT PERFORMANCE AUDIT REPORT

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT

(LOAN 570-MAG/CREDIT 134-MAG)

1975

Operations Evaluation Department

PROJECT PERFORMANCE AUDIT MEMORANDUM

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT - LOAN 570-MAG/CREDIT 134-MAG

PREFACE

The Second Highway Project in the Malagasy Republic supported by the World Bank Group was partially-financed by an IBRD loan (570-MAG) and an IDA credit (134-MAG), which were signed on November 12, 1968. The credit was fully disbursed on December 31, 1972; the loan on December 31, 1973. The purpose of this performance audit is to assess the extent to which the original project objectives were met and to analyze the role of the IBRD/IDA in meeting those objectives.

The audit is based on a review of: correspondence and reports in IBRD/IDA files (appraisal reports; economic reports; supervision reports; and construction progress reports) as well as discussions with IBRD/IDA staff members and Malagasy officials.

In September 1974, a visit was made to the Malagasy Republic to update information and to discuss relevant issues.

The valuable assistance of the Government of the Malagasy Republic is gratefully acknowledged.

PROJECT PERFORMANCE AUDIT MEMORANDUM

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT - LOAN 570-MAG/CREDIT 134-MAG

PROJECT DATA

	Loan 570-MAG	Credit 134-MAG
Amount of Loan/Credit	US$3.5 million	US$4.5 million
Amount Disbursed	US$3.5 million	US$4.5 million
Dates of Loan/Credit Negotiations	September 19-27, 1968	
Date of Loan/Credit Agreement	November 12, 1968	
Original Date of Effectiveness	February 5, 1969	
Final Date of Effectiveness	April 1, 1969	
Original Closing Date	December 31, 1972	
Final Closing Date	December 31, 1973	December 31, 1972
First Supervision Mission	February 1969	
Final Supervision Mission	August 1974	

Exchange Rates:

Through July 1969 ---------- US$1 = FMG 247
August 1969 - November 1971 ---- US$1 = FMG 278
December 1971 - January 1973 --- US$1 = FMG 256
February 1973 to present ------- US$1 = FMG 230

PROJECT PERFORMANCE AUDIT MEMORANDUM

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT - LOAN 570-MAG/CREDIT 134-MAG

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PROJECT PERFORMANCE AUDIT MEMORANDUM

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT - LOAN 570-MAG/CREDIT 134-MAG

SUMMARY

On November 12, 1968, the IBRD/IDA signed agreements to provide a US$3.5 million loan (540-MAG) and a US$4.5 million credit (134-MAG) to the Malagasy Republic to finance the foreign exchange cost of a US$11.5 million highway project. This represented the IBRD/IDA's second involvement in highways in the country. The loan/credit became effective on April 1, 1969.

Project components included construction and bituminous paving of the Fanjakamandroso-Tsiroanomandidy Road (55 km) and Ambilobe-Ambanja Road (91 km); construction of the Onibe, Fanandrana, and Ambanja Bridges; and consultants' services for construction supervision. Detailed engineering of the Analavory-Arivonimamo Road and feasibility studies of three roads were deleted from the project during negotiations because sufficient IDA funds were not available to cover them. Completion was about a year behind schedule because of design difficulties and construction delays. The December 31, 1972 closing date was met for the credit but extended one year for the loan because loan disbursements could not begin until credit disbursements had been completed.

The actual cost of the project was US$15.2 million in contrast to the estimate of US$11.5 million. Of the 29% overrun, 15% can be attributed to quantity increases and 14% to price increases. The overrun was financed in large part by the Government, but savings from the First Highway Project (Credit 90-MAG) also contributed to the financing.

The economic rate of return for the Fanjakamandroso-Tsiroanomandidy Road estimated at audit is 21%, or well above the 13% appraisal estimate, because the cost overrun was compensated by a substantial traffic increase. But on the Ambilobe-Ambanja Road, the range of the audit rate of return is 6%-8%, as compared with the appraisal estimate of 8%. If account is not taken of higher oil prices and traffic increases that will probably follow improvement of the southern link from Ambanja to Antisohihy, the substantial cost overrun together with the traffic level close to appraisal expectations result in a rate of return of only 6%. But if account is taken of these factors, the rate of return rises to 8%.

The rate of return on the Onibe and Fanandrana Bridges (13%) is roughly as expected at appraisal (16% and 12%, respectively) because the combined cost overrun was largely offset by traffic increases. But the rate of return at audit is lower than at appraisal for the Ambanja Bridge (4% versus 9%) because the actual cost was more than double the estimate whereas traffic increased only slightly.

Developmental benefits from the project roads and bridges are difficult to identify precisely, but population and production have increased in the areas where they are located. In addition, social and administrative links on a year-round basis have been provided, an important factor in a country where regions had remined largely isolated because of difficult topography.

Due to the limits of the audit, the distribution of project benefits could not be investigated thoroughly. But indications are that part of the benefits from the investments have not been passed on to producers and consumers as a result of a system of fixed transport rates. Consequently, transport enterprises pass only part of the savings to producers and consumers and prefer contracts along paved roads, to the detriment of producers and consumers along unpaved roads.

The IBRD/IDA made a positive contribution to the project by encouraging the Government to: select components of high economic priority; employ consultants for technical assistance; maintain the professional standard and strength of the highway administration; and introduce economic criteria into the selection of investments for the 1969-73 Highway Development Plan.

In retrospect, however, it seems that the Ambilobe-Ambanja Road, should not have been included in view of its low expected rate of return (8%) and the risk associated with the project. The audit rate of return is about 8% for this road, which accounts for 54% of the project investment, only under very optimistic assumptions. Given the scarce resources available for investment, a more detailed study of alternatives should have been explored. Construction should have been postponed or the design standards should have been revised.

The project's impact could have been improved if the systems effects of the Fanjakamandroso-Tsiroanomandidy Road had been considered in more detail, if transport regulation problems had been investigated fully,

and if more IBRD/IDA supervision had been provided in the early stages of implementation when design and construction problems arose and throughout implementation for the institutional aspects.

PROJECT PERFORMANCE AUDIT MEMORANDUM

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT - LOAN 570-MAG/CREDIT 134-MAG

BACKGROUND

Since independence in 1960, the Government of the Malagasy Republic has been endeavoring to develop viable connections between regions and between widely separated economic and social centers. Development has been impeded, however, by the low population density and early stage of economic development, as well as by high construction costs due to rugged topography and scarcity of suitable construction materials due to difficult geological conditions. Only earth roads, impassable in rainy weather, have joined the northern and part of the western regions with the rest of the country, and mere trails have linked these regions with the south (see map). The Government has been increasing road investments and maintenance expenditures since 1964. But only a few sections of the primary road network have been brought up to modern standards while inland connections remained poor, road alignments located badly, and structures obsolete.

The Government wished to improve this situation by providing a primary road network to connect the main economic and social centers. Therefore, it decided that roads and bridges should be constructed in the northern, central, and eastern regions where population density as well as agricultural output and potential were highest. In 1966, the Government asked the IBRD/IDA for assistance in preparing a project that would represent the IBRD/IDA's second investment in Malagasy highways. The project was identified by the Permanent Mission in Eastern Africa and

comprised construction and paving of two road sections; construction of seven bridges; detailed engineering of four road sections; and feasibility studies of three road sections. In 1967, the Government submitted an application to the IDA for a credit to help finance the project.

Between November 1966 and December 1967, three missions from the Permanent Mission in Eastern Africa visited the country to assist in preparation and to assess the applications. As a result, the Government withdrew applications for three bridges because of insufficient economic justification and initiated a feasibility study for a fourth bridge, to be financed under the existing First Highway Project (Credit 90-MAG, August 2, 1966). In addition, the Government decided that detailed engineering should be carried out on only one of the original four road sections.

In February 1968, a mission from headquarters visited the country to appraise the revised project proposal. Components would be (a) construction and bituminous paving of the Fanjakamandroso-Tsiroanomandidy Road (55 km) and Ambilobe-Ambanja Road (91 km); (b) construction of the Onibe, Fanandrana, and Ambanja Bridges; (c) detailed engineering of the Analavory-Arivonimamo Road; (d) feasibility studies of the Lac Alaotra-Vavatenina Road; Moramanga-Tamatave Road, and Tananarive-Fianarantsoa Road; and (e) consultants' services for construction supervision of the Ambilobe-Ambanja Road and the three bridges. Supervision of the Fanjakamandroso-Tsiroanomandidy Road would not be included in the project. It would be carried out by the Government's Central Technical Service, assisted by the Public Works Laboratory, which the appraisal mission stated was adequate to carry out the assignment.

The road sections and bridges would be constructed on existing primary roads. The Fanjakamandroso-Tsiroanomandidy Road was a section of National Road 1 (RN 1). Construction would improve connections between Tananarive, the capital, and Tsiroanomandidy, an important marketing center in the agriculturally rich midwest. The Ambilobe-Ambanja Road was a section of National Road 6 (RN 6), and construction would improve links with the north, western shore, and central plateau. Both roads would be paved with bitumen, although the traffic level on only the former one justified this high standard, because sufficient natural surfacing material was not available.

The Onibe and Fanandrana Bridges would be constructed on National Road 2 (RN 2), linking the main port of Tamatave with areas to the north and south along the eastern coast. The bridges would improve road connections of the port with the hinterland by eliminating bottlenecks because ferries were the only means of crossing the Onibe and Ivondro Rivers. The Ambanja Bridge would be constructed on RN 6 to eliminate the bottleneck at the Sambirano River resulting from use of a collapsible wooden bridge in the dry season and a ferry in the wet season.

Negotiations were held in September 1968. Financing was discussed in detail because IDA replenishment had been delayed and sufficient IDA funds were not available for the project. Therefore, a joint loan/credit was proposed unless timely replenishment occurred. The Malagasy delegation

accepted the blend so that the project would not be delayed, but asked that IDA funds be disbursed before IBRD funds. The delegation further obtained an assurance that a proper balance of IBRD/IDA lending would be restored for future projects if and when IDA were replenished.

As a consequence of the change in financing, the delegation requested that the costs of detailed engineering (one road section) and feasibility studies (three road sections) be deleted from the project. The Government intended to approach the UNDP for funds, or, if the UNDP refused, to provide them itself.

In addition to covenants on financing, uses of consultants and contractors, design standards, and vehicle dimensions and axle loads, covenants on highway maintenance and administration were discussed. Regarding the maintenance covenant, the Transportation Projects Department supported a detailed clause. But the Working Party discussed similar cases and decided that a general clause would be sufficient.

Regarding administration, the IBRD/IDA concluded that considering the good performance of the Malagasy highway services the draft loan and credit agreements would not contain a provision on strengthening of highway administration. Instead, a supplemental letter would provide that the professional standard and strength of highway administration should be maintained at appropriate levels by increasing the number of nationals in professional positions and other technical positions. The letter also would provide that national talent should be developed by promoting technical education and training as well as career incentives.

Finally, another supplemental letter would require the Government to undertake to introduce economic criteria into the selection of investments for the Five-Year Highway Development Plan of 1969-73.

The agreed components of the Second Highway Project are shown in Table 1. Their cost was estimated at US$11.5 million (FMG 2,843 million), including contingencies. The foreign exchange component was estimated at 70%, or US$8 million (FMG 1,990 million). An IBRD loan of US$3.5 million and an IDA credit of US$4.5 million were provided to cover the foreign cost. The loan was for a 30-year term, including 10 years of grace, at 7% interest, and the credit was for the usual terms. Lending documents were signed on November 12, 1968. The loan/credit became effective on April 1, 1969 after an extension from February 1 to allow time for the IBRD/IDA to obtain clarification of the legal opinion from Malagasy authorities.

IMPLEMENTATION

Bids for construction of the roads were received in August 1968 and for the bridges in October 1968. Contracts for these works and for consulting services were signed in April 1969. Contracts for the Onibe and Fanandrana Bridges were signed in September 1969 and for the Ambanja Bridge in October 1969. The long time span between receipt of bids and signing of contracts was because of the Government's delay over studying the bids. Construction was completed in December 1972. The closing date of December 31, 1972 was met for the credit, but extended one year for the loan as loan disbursements could not begin until credit disbursements had been completed. At appraisal, construction contracts had been expected to be awarded around the end of 1968 and work to be started in April 1969

and completed by the end of 1971. The names of firms selected as well as estimated and actual completion dates are shown in Table 1.

Fanjakamandroso-Tsiroanomandidy Road (RN 1)

The contractor, who had a good reputation, had to overcome difficulties with construction on National Road 4 (RN 4) under the First Highway Project before starting construction of this road in November 1969. Construction was to be completed within two years, however, in accordance with the original completion date of April 1971. A field laboratory, financed under the loan/credit, was operated by Government staff to test building materials and soils for this road. Tests on base materials proved them to be of lower quality than expected, and the pavement structure had to be redesigned. Consequently, the contract was amended in June 1970 to include the new design and to reflect a cost increase of about 15%.

Construction was completed satisfactorily in December 1973. Although the last supervision mission stated that construction quality was adequate and no failures were apparent, settlement of the embankment adjacent to the bridge abutments has become evident due to the design of the abutments, which is very economic but requires frequent maintenance. Cars must reduce to 20-30 km/h and certain goods, especially cattle, must travel even more slowly.

Ambilobe-Ambanja Road (RN 6)

Construction of this road began in October 1969. In March 1970, a study by the Public Works Laboratory found that local materials were of much lower quality than expected and were not suitable for use as originally designed. Consequently, new materials were investigated and the pavement structure for different road sections was redesigned. Earthworks for some sections also were redesigned as a result of unfavorable

climatic conditions during construction. Work was completed satisfactorily in December 1972 after the contractor had mobilized sufficient new construction equipment. The original contractual completion date had been June 1971, but in light of the design changes the date was revised to August 1972.

The quality and finish of the bituminous surface is unsatisfactory. Some potholes have appeared and need to be repaired before becoming worse. An August/September 1974 mission of the IBRD/IDA asked the Government to investigate the reasons for the failures, to make the necessary repairs promptly, and to watch closely the performance of the road.

Bridges

Onibe and Fanandrana (RN 2). Three construction alternatives were considered for the two bridges. A two-lane bridge at Onibe and a one-lane bridge at Fanandrana were selected as the most economical solutions. The supervisory consultants analyzed bids for the bridges. After reviewing the analysis with the Government, the IBRD/IDA concurred with the consultants that the contract should be awarded to the lowest bidder.

Construction began on the Onibe Bridge in July 1969 and on the Fanandrana Bridge in January 1970. During construction, imperfections appeared in the quality of the concrete in some prestressed beams (porosity near the cables) and of the bituminous pavement. The imperfections were corrected by the contractor. With these exceptions, construction quality and finish are satisfactory. Construction of the Onibe Bridge was completed in July 1971 and of the Fanandrana Bridge in July 1972, instead of March 1972 as estimated at contract signing.

Ambanja (RN 6). Bidding was on a design-construction basis. Bids were received for truss-type and suspended span-type bridges. Costs were lower for the suspended-span type than for the truss-type, however, the latter was selected because the former was technically unacceptable. The supervisory consultants also analyzed the bids for this bridge. Construction began in May 1970. Delays occurred because the consultants had to redesign the steel structure to meet wind loading requirements and because changes in the European steel market resulted in slow supply. In June 1971, the contract was amended, extending the completion date from June 1971, estimated at contract signing, to August 1972. Work was completed in September 1972. Construction quality and finish are satisfactory.

Consulting Services

According to supervision reports, the quality of construction supervision of the Fanjakamandroso-Tsiroanomandidy Road by Government staff was satisfactory as were the quality, qualifications, and experience of the consultants supervising construction of the Ambilobe-Ambanja Road and Onibe, Fanandrana, and Ambanja Bridges. The consultants' cooperation with Government staff was good. Due to construction delays on the Ambilobe-Ambanja Road and on the Ambanja Bridge, the contract for consulting services was extended from October 1971 to November 1972. Services were completed in December 1972.

COSTS

The actual project cost of US$15.2 million (FMG 3,676 million) represents an increase of 32% in foreign currency terms and 29% in local

currency terms over the US$11.5 million (FMG 2,843 million) appraisal estimate. The difference is the result of fluctuations in the exchange rate of the United States dollar against the Malagasy franc. To avoid complications due to these fluctuations, estimated versus actual project costs are shown in local currency in Table 1.

Of the 29% overrun in local currency terms, 15% can be attributed to quantity increases and 14% to price increases. In regard to quantity increases, redesign was required and construction delayed of the Ambilobe-Ambanja Road and Ambanja Bridge. Also consulting services were extended to cover the longer construction period. In regard to price increases, the total over the construction period was FMG 578 million, or more than three times the FMG 135 million appraisal estimate based on increases of 5% on all costs.

The cost overrun was financed in large part by the Government, but savings from the First Highway Project of US$303,643.40 (FMG 63,153,786) also contributed to the financing.

ECONOMIC ANALYSIS

Economic justification of the Second Highway Project at appraisal had been based on considerable reductions in transport costs and generation of important developmental benefits. The justification was revaluated for this audit using actual construction costs, actual traffic figures,[1/] and savings in vehicle operating costs as derived by BCEOM in 1972.[2/] Savings in vehicle operating costs when passing from an earth road to a paved road as a percentage of vehicle operating costs on an earth road as estimated at appraisal and derived by BCEOM in 1972 are given in Table 2. Available data allows comparison of percentage savings for only light vehicles, which were in line, and for 5-and 8-ton trucks, which were overestimated at appraisal by 62%.[3/]

The proportion of the total investment devoted to each project component and a comparison of rates of return as estimated at appraisal and at audit are:

1/ Future traffic development has been assumed to continue at the same growth rates as stated in the appraisal report. Benefits to normal traffic have been valued at 100% of road user savings and benefits to induced traffic at 50% of road user savings.

2/ BCEOM, Feasibility Study of the Antsohihy-Ambanja Road, July 1972. In connection with this study, a major empirical study was made of road user operating costs in the country taking into account traffic composition, load factors, vehicle lifetime, insurance premiums, etc.

3/ This underestimation of the savings at appraisal as compared with the BCEOM study is explained by a 19% overestimation of the vehicle operating cost on earth roads at appraisal and a 6% underestimation of the vehicle operating cost on paved roads also at appraisal.

Project Component	Proportion of Total Investment %	Rate of Return Appraisal Estimate %	Rate of Return Audit Estimate %
Fanjakamandroso-Tsiroanomandidy Road	28	13	21
Ambilobe-Ambanja Road	54	8	6 - 8
Onibe Bridge	) 12	16	) 13
Fanandrana Bridge	)	12	)
Ambanja Bridge	6	9	4

Cost overrun percentages are shown in Table 1 and average daily traffic in 1972 and 1973, in Table 3.

The economic rate of return for the Fanjakamandroso-Tsiroanomandidy Road estimated at audit (21%) is well above that at appraisal (13%) because the cost overrun (11%) was compensated by a substantial traffic increase (437 vehicles per day (vpd) in 1972 versus 140 vpd projected at appraisal).1/

On the Ambilobe-Ambanja Road, the range of the audit rate of return (6%-8%), as compared with the appraisal estimate (8%), is the consequence of higher oil prices and of traffic increases that will probably follow improvement of the southern link from Ambanja to Antisohihy. If these factors are not taken into account, the substantial cost overrun (52%) together with the traffic level close to appraisal expectations (201 vpd in 1972, only slightly above the 195 vpd appraisal estimate), results in a rate of return of only 6%. But if these factors are taken into account, the rate of return rises to 8%.

1/ The difference between actual and projected traffic is probably due to the fact that existing traffic on the road was underestimated at appraisal, as indicated by more elaborate traffic counts now available.

For the Onibe and Fanandrana Bridges, the audit estimate of a 13% combined rate of return on construction is in the range of the appraisal estimates of 16% and 12%, respectively. This was because the combined cost overrun (28%) was largely offset by traffic increases (in 1972, on Onibe Bridge, 306 vpd versus 260 vpd projected and on Fanandrana Bridge, 173 vpd versus 120 vpd projected). The estimated return of 4% at audit on construction of the Ambanja Bridge is considerably below the 9% at appraisal because the actual cost was more than double the estimate (211%) whereas traffic increased only slightly (in 1972, 147 vpd versus 135 vpd projected).

In 1973, about two-thirds of traffic on the project roads and bridges was composed of cars and buses and one-third, pickups and trucks (Table 4). For the Fanjakamandroso-Tsiroanomandidy Road, this conflicted with appraisal expectations that cattle production would increase significantly and that large cattle trailers would comprise an important share of new traffic from Tsiroanomandidy to market in Tananarive. These expectations were not realized because cattle production did not increase as

expected due to new cattle diseases and government restrictions on cattle export and, therefore, trailer traffic could not develop. In 1972, of the 58,400 cattle transported from Tsiroanomandidy to Tananarive, 35,400 were on hoof for the entire distance, 22,400 on hoof part of the distance and in trailers for the rest, and 600 in 10-ton trucks for the entire distance.

The preponderance of cattle transport on hoof between Tsiroanomandidy and Tananarive has resulted because of the freight rate structure and the poor condition of the Analavory-Arivonimamo section, which was not improved under the project. Freight rates are structured so that truck transport is profitable only if return freight from Tananarive to Tsiroanomandidy can be guaranteed. With transport heavily in the direction of Tananarive, many small firms cannot guarantee return freight and are charged one-way rates that are 60%-70% higher than return rates. Consequently, the freight rate charges make truck transport of cattle from Tsiroanomandidy to Tananarive unprofitable. As to the condition of the Analavory-Arivonimamo section, its narrow and winding alignment prohibits use by cattle trailers. Only 10-ton trucks operating at slow speed and high cost can maneuver on it. This section has been included in the Third Highway Project (Loan 876-MAG/ Credit 351-MAG, January 17, 1973).

In regard to the appraisal expectation that the project roads and bridges would contribute to the economic development of the

areas in which they were located, population and production have increased in those areas. But the amount of the increases attributable to the investments is difficult to identify precisely. Another important contribution of the roads and bridges has been to provide social and administrative links on a year-round basis between areas of the country that had been seasonally isolated, an impact reflected in the larger than expected growth in car and bus traffic.

Although the distribution of project benefits could not be investigated thoroughly due to the limits of the audit, indications are that part of the benefits from the investments have not been passed on to producers and consumers. This is as a result of a system of fixed transport rates, introduced in April 1969 by the Government in the Province of Diego Suarez (site of the Ambilobe-Ambanja Road and Ambanja Bridge). Under this system, freight rates and passenger fares on paved roads were set 20% and 33% lower, respectively, than on earth roads. But these differentials are much lower than the savings in vehicle operating costs under the same circumstances (Table 2). As a consequence, transport enterprises pass on only part of the savings to producers and consumers. In addition, transport enterprises prefer contracts along paved roads, to the detriment of producers and consumers along unpaved roads.

ROLE OF THE IBRD/IDA

The IBRD/IDA played an important role in the Second Highway Project. It encouraged the Government tc select components of high economic priority

for financing with scarce resources and to postpone others. It also convinced the Government to supplement the capacity of the Roads Department with consulting services, which provided technical assistance. In addition, it encouraged the Government to maintain the professional standard and strength of the highway administration by increasing the number and training of nationals. Finally, the IBRD/IDA influenced the Government to introduce economic criteria into the selection of investments for the 1969-73 Highway Development Plan.

In retrospect, however, the IBRD/IDA should have paid closer attention to transport regulation in the country. A study should have been made of the establishment of the structure of rates and fares applied in the Province of Diego Suarez. This is particularly significant now because the Government is thinking of imposing fixed rates throughout the country. If the rates are similar to those in Diego Suarez, they could result in an important misallocation of resources. Also, the IBRD/IDA could have looked in more detail into the transport problems in the Tsiroanomandidy-Tananarive corridor, where the Tsiroanomandidy-Fanjakamandroso and Analavory-Arivonimamo sections are located. Preparation of detailed engineering for the latter was included in the original proposal by the country, but withdrawn when not enough IDA funds were available. The work was finally done, and the section included in the Third Highway Project four years later.

Eight supervision missions were mounted between loan/credit signing and the final closing date, or an average of one every nine months. Given the IBRD/IDA's awareness that investment in the project was risky, more frequent supervision would have been expected, especially in 1970 and 1971 only (one visit was made in each of these years when major design and construction problems occurred). This probably would have resulted in more advice being provided, which could have reduced delays in contract awards and construction, as well as more on-site inspections being made, which could have identified potential construction problems. One aspect of the project that supervision missions apparently did not follow up thoroughly was the Government's progress in increasing technical education and training programs as well as career incentives in highway administration.

CONCLUSION

Construction of the roads and bridges under the Second Highway Project has been successfully completed, but with a 29% cost overrun in local currency terms due to design difficulties, construction delays, and price increases. These elements as well as changes in traffic from expectations are reflected in the discrepancy between the range of the rates of return on the individual components at audit (4%-21%) and at appraisal (8%-13%). The cost overrun demonstrates that the 5% allowance at appraisal for price increases was inadequate. In retrospect, it seems that the Ambilobe-Ambanja Road should not have been included in view of the low expected rate of return (8%) and the risk associated with the project. As it turned out, the audit rate of return is about 8% for this road, which accounts for 54% of

the total project investment, only under very optimistic assumptions. Given the scarce resources available for investment, a more detailed study of alternatives should have been explored. Construction should have been postponed or the design standards should have been revised.

The systems effects of the Fanjakamandroso-Tsiroanomandidy Road also should have been considered in more detail as a means of improving the project's impact. In addition, transport regulation problems should have been investigated fully as existing regulations will already reduce the potential impact of some of the investments. Finally, more supervision should have been provided by the IBRD/IDA, particularly in the crucial early stages of implementation and in the institutional aspects.

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT - LOAN 570-MAG/CREDIT 134-MAG

Project Costs, Completion Dates, and Contractors/Consultant

Project Component	Cost /1 Estimated /2 (FMG million)	Cost /1 Actual (FMG million)	Cost /1 Overrun %	Completion Date Estimated at Contract Signing	Completion Date Actual	Contractor/Consultant
Construction and Bituminous Paving: Fanjakamandroso-Tsiroanomandidy Road	907	1,006	11	April 1971	December 1972	Société des Grandes Travaux de l'Est (SGTE) and Nationale de Terrassements, Routes et Ouvrages d'Art (CITROA)
Ambilobe-Ambanja Road	1,239	1,881	52	Original Contract: June 1971 Amended: August 1972	December 1972	Murri Frères
Construction:						
Onibe Bridge	171)	)	)	March 1972	July 1971	SGTE
	) 324	) 416	)28			
Fanandrana Bridge	153)	)	)	March 1972	July 1972	SGTE
Ambanja Bridge	92	194	111	Original Contract: June 1971 Amended: August 1972	September 1972	Société de Construction des Batignolles
Consultants' Services	146	179	23	Original Contract: October 1971 Amended: November 1972	December 1972	Rhein - Ruhr Ingenieurs Gesellshaft MBH
Price Contingency	135	-	-			
Total	2,843	3,676	29			

/1 Shown in local currency only to eliminate the influence of exchange rate fluctuations.
/2 Physical contingencies have been added to the estimated cost of each component.

Sources: Ministry of Public Works, Directorate of Public Works, Central Technical Service, Progress Reports, and IBRD/IDA Supervision Reports.

TABLE 2

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT - LOAN 570-MAG/CREDIT 134-MAG

Savings in Vehicle Operating Costs When Passing from an Earth Road to a Paved Road

Type of Vehicle	Second Highway Project	BCEOM, 1972
	% per vehicle	
Light Vehicles	40	39
Buses	--	44
Pickups, 1 ton	--	26
Trucks, 3.5 tons	--	
Trucks, 5 tons	50	36
Trucks, 8 tons		
Trucks, over 10 tons	--	--
Trucks plus Trailers	--	--

Note: -- means cannot be calculated because of insufficient statistics.

Sources: Statistics for the Second Highway Project were provided by BCEOM and the Ministry of Equipment and Communications, Statistics for BCEOM, 1972 were included in BCEOM, Feasibility Study of the Antsohihy-Ambanja Road, July 1972.

TABLE 3

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT - LOAN 570-MAG/CREDIT 134-MAG

Average Daily Traffic, 1972 and 1973

Project Component	1972 Estimated	1972 Actual	1973 Actual
	vehicles per day		
Fanjakamandroso-Tsiroanomandidy Road (RN 1)	140	437 /1	437
Ambanba-Ambilobe Road (RN 6)	195	201 /1	201
Onibe Bridge (RN 2)	260	306	347
Fanandrana Bridge (RN 2)	120	173	170 /2
Ambanja Bridge (RN 6)	135	147 /1	147

/1 Traffic counts were made on RN 1 and RN 6 in 1971 and 1973. The figures shown for 1972 are from the 1973 count. They were not reduced by an annual growth factor because traffic in 1971 was higher than in 1973.

/2 Post No. 17A.

TABLE 4

MALAGASY REPUBLIC SECOND HIGHWAY PROJECT - LOAN 570-MAG/CREDIT 134-MAG

Traffic Composition, 1973

Project Component	Cars	Buses	Pickups 1-3.5 tons	Trucks 3.5-10 tons	Trucks Over 10 tons	Trailers	Total
	%						
Fanjakamandroso-Tsiroanomandidy Road	35	32	16	17	0	0	100 /1
Ambanja-Ambilobe Road	42	21	21	13	1	2	100 /2
Onibe Bridge	59	8	18	9	3	3	100 /3
Fanandrana Bridge	35	23	21	21	0	0	100 /4
Ambanja Bridge	63	12	17	6	0	2	100 /5

/1 Based on figures of first and second traffic counting campaign and extrapolated from previous years for the third campaign.

/2 Post No. 8D, halfway between Ambilobe and Ambanja.

/3 Post No. 9A, the first counting post north of the bridge.

/4 Post No. 17A.

/5 Post No. 12D, the first counting post south of the river.

MALAGASY REPUBLIC
HIGHWAY SYSTEM
AFRICA
MALAGASY
DIEGO SUAREZ
HELL-VILLE
Ambanja
Vohemar
Sambava
Andapa
Bealanana
Antalaha
ANTISOHIHY
Befandriana
Maroantsetra
MAJUNGA
Port Berge
Mitsinjo
Soalala
Mandritsara
Mananara
Besalampy
Ambato Boeni
Mampikony
Maevatanana
Tsaratanana
Andilamena
Soanierana-Ivongo
Lac Alaotra
FENERIVE
Vavatenina
Morafenobe
Maintirano
Kilometer point 165
Ambatondrazaka
TAMATAVE
Ankazobe
Anjozorobe
AREA OF MAP 2
Antsalova
FANANDRANA
TANANARIVE
BRICKAVILLE
TSIROANOMANDIDY
FANJAKAMANDROSO
MORAMANGA
Manjakandriana
Andramasina
Vatomandry
Belo-Sur-Tsiribihina
Faratsiho
Ambatolampy
Anosibe
Betafo
ANTSIRABE
Mahanoro
Morondava
Mahabo
Fandriana
Marolambo
Ambatofinandrahana
Ambositra
Nosy Varika
Ambohimahasoa
Ifanadiana
MANANJARY
Mania
FIANARANTSOA
Morombe
Beroroha
Ambalavao
Fort Carnot
Ankazoabo
Ihosy
Ivohibe
Manakara
Vohipeno
Vondrozo
FARAFANGANA
Betroka
TULEAR
Vangaindrano
Midongy-du-Sur
Betioky
Bekily
Ampanihy
Ambosary
FORT DAUPHIN
Ambovombe
Indian Ocean
FIRST HIGHWAY PROJECT
CONSTRUCTION
ENGINEERING
SECOND HIGHWAY PROJECT
CONSTRUCTION, ROADS
CONSTRUCTION, MAJOR BRIDGES
BITUMINOUS SURFACED ROADS
ALL WEATHER ROADS
NON PERMANENT ROADS
RAILROADS
PRINCIPAL CIVIL AVIATION AIRPORTS
MILES
KILOMETERS