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Report No. 6209

PROJECT COMPLETION REPORT

RWANDA

FOURTH HIGHWAY PROJECT

(CREDIT 769-RW)

May 21, 1986

Transportation Division  
Eastern and Southern Africa Regional Office

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### COUNTRY EXCHANGE RATES

Appraisal year average	1977	US\$ = 1.0 FRW	92.84
Intervening year average	1978		92.84
	1979		92.84
	1980		92.84
	1981		92.84
	1982		92.84
	1983		98.54
Completion year average	1984		104.36
Final disbursement year	1984		104.36
Average for Project Implementation Period (1978-1984)			95.0

### ABBREVIATIONS AND ACRONYMS

ADT	Average Daily Traffic
ERR	Economic Rate of Return
FRG	Federal Republic of Germany
FRW	Rwandese Franc
ICB	International Competitive Bidding
IDA	International Development Association
LCB	Local Competitive Bidding
PCR	Project Completion Report
PPAR	Project Performance Audit Report
RB	Road Branch
UNDP	United Nations Development Program
VOC	Vehicle Operating Costs
VPD	Vehicles per Day
WFP	World Food Program

Office of Director-General  
Operations Evaluation

May 21, 1986

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

SUBJECT: Project Completion Report on Rwanda  
Fourth Highway Project (Credit 769-RW)

Attached, for information, is a copy of a report entitled "Project Completion Report on Rwanda Fourth Highway Project (Credit 769-RW)" prepared by the Eastern and Southern Africa Regional Office. Under the modified system for project performance auditing, further evaluation of this project by the Operations Evaluation Department has not been made.

A handwritten signature in dark ink, appearing to be 'A. P. ...', is written over the signature line.

Attachment

PROJECT COMPLETION REPORT  
RWANDA  
FOURTH HIGHWAY PROJECT  
CREDIT 769-RW

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PROJECT COMPLETION REPORT  
RWANDA  
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PREFACE

1. IDA provided US\$15.0 million for the financing of the Fourth Highway Project. The Credit Agreement (Credit 769-RW) was signed on April 25, 1978 and became effective on August 4, 1978. The project was implemented in six years instead of four, due to delays in procurement of equipment and construction of the training center. The closing date of the Credit Agreement was extended from July 1, 1982 to June 30, 1984 to accommodate the two-year delay in project execution. The credit was fully disbursed.
2. This Project Completion Report (PCR) was prepared by the Transportation Division of Eastern and Southern Africa Projects Department, on the basis of the appraisal report, project files, supervision missions reports, and Government's project evaluation report prepared by consultants.
3. The project was cofinanced by the Government (US\$6.76 million), UNDP (US\$1.3 million), FRG (US\$2.32 million), Belgium (US\$460,000), and WFP (US\$1.94 million). The total external financing covered 100% of the foreign costs and about 18% of the local costs of the project. The remaining 82% of the local costs were financed by the Government. The Government also met the recurrent costs of road maintenance amounting to US\$10.75 million for the six-year project implementation period.
4. In accordance with the revised procedures for project performance audit reporting, this Project Completion Report was read by the Operations Evaluation Department (OED) but the project was not audited by OED staff. Copies of the draft report were sent to the Borrower and Co-financiers for comments. The Co-financiers' comments are shown as Annexes IX and X.

PROJECT COMPLETION REPORT

RWANDA

FOURTH HIGHWAY PROJECT

(CREDIT 769-RW)

BASIC DATA SHEET

KEY PROJECT DATA

<u>Item</u>	<u>Appraisal Expectation</u>	<u>Actual or Current Estimates</u>
Total Project Cost (US\$ million)	23.7	27.8
Overrun (%)	---	17.0
Credit Amount	15.0	15.0
Disbursed (12/31/81)	15.0	9.9
(06/30/84)	---	15.0
Cancelled	---	---
Date Physical Components Completed	12/81	12/83
Proportion Completed by:		
Appraisal Completion date (%)	100	70
Actual Completion date (%)	---	95
Economic Rate of Return (%)		
a) Improvement Program	195	147
b) Rehabilitation and Upgrading	35	163
Overall (a + b)	+100	155

OTHER PROJECT DATA

<u>Item</u>	<u>Original Plan</u>	<u>Actual or Est. Actual</u>
First Mention in Files or Timetable		04/17/74
Government's Application	---	---
Negotiations	11/14/77	12/22/77
Board Approval Date		02/21/78
Credit Agreement Date		04/25/78
Effectiveness Date		08/04/78
Closing Date	07/01/82	06/30/84
Borrower	Republic of Rwanda Ministry of Public Works	
Fiscal Year of Borrower	January 1 - December 31	
Follow-on Project Name	Fifth Highway Project	
Credit Number	1250-RW	
Amount (SDR million)	23.3	
Credit Agreement Date	June 9, 1982	

MISSION DATA

A. Preparation and Appraisal

<u>Item</u>	<u>Month Year</u>	<u>Weeks</u>	<u>Number of Persons</u>	<u>Man Weeks</u>	<u>Date of Report</u>
Preparation	8/74 <u>1/</u>	1.4	1	1.4	09/25/74
Preparation	6/76 <u>2/</u>	1.7	2	3.4	06/24/76
Appraisal	2/77	<u>3.0</u>	2	<u>6.0</u>	02/06/78
Subtotal		6.1		10.8	

B. Supervision

Supervision I	04/78 <u>3/</u>	2.4	2	4.8	05/01/78
Supervision II	06/78 <u>4/</u>	1.2	1	1.2	07/12/78
Supervision III	12/78 <u>4/</u>	1.2	1	1.2	02/02/79
Supervision IV	03/79 <u>4/</u>	2.6	2	5.2	05/18/79
Supervision V	06/79 <u>4/</u>	1.6	1	1.6	07/30/79
Supervision VI	10/79 <u>4/</u>	1.8	1	1.8	12/18/79
Supervision VI <sup>1</sup>	02/80 <u>5/</u>	1.6	3	4.8	03/26/80
Supervision VIII	06/80 <u>6/</u>	1.0	1	1.0	06/26/80
Supervision IX	06/81 <u>6/</u>	1.6	1	1.6	07/24/81
Supervision X	02/82	1.0	1	1.0	03/31/82
Supervision XI	12/82 <u>6/</u>	1.4	1	1.4	01/26/83
Supervision XII	07/83 <u>7/</u>	1.4	1	1.4	09/12/83
Supervision XIII	03/84	<u>1.0</u>	1	<u>1.0</u>	04/23/84
Subtotal		19.8		28.0	
Total		25.9		38.8	

- 
- 1/ In conjunction with the Highland Crop Improvement and Development Project and Settlement/Mixed Farming Project Preparation.
  - 2/ In conjunction with supervision of the First, Second and Third Highway Projects and preparation of the Transport Sector Memorandum.
  - 3/ Combined supervision of First, Second and Third Highway Projects.
  - 4/ Combined with supervision of the First Highway Project (Cr. 196-RW).
  - 5/ Combined with supervision of First Highway Project (Cr. 196-RW) and Preparation of Fifth Highway Project (Cr. 1250-RW).
  - 6/ Combined with preparation of Fifth Highway Project.
  - 7/ Combined with the Fifth Highway Project and Cr. 1283-RW, Feeder Road Component.

PROJECT COMPLETION REPORT  
RWANDA  
FOURTH HIGHWAY PROJECT  
CREDIT 769-RW

HIGHLIGHTS

1. The Fourth Highway Project was the second IDA financed road projects to emphasize road maintenance. It was designed to sustain the efforts begun under the Second Highway Project (Credit 299-RW) - the first phase of road maintenance program - to expand and strengthen maintenance operations and the capabilities of the Road Branch (RB). To achieve these objectives the project included:

- (i) a four-year road maintenance program consisting of: (a) betterment works on about 500 km of gravel roads; (b) rehabilitation and upgrading works on about 1000 km of earth roads to gravel standards; (c) resealing of about 100 km of paved roads; and (d) routine maintenance on about 3,500 km earth and gravel roads and 350 km of paved roads;
- (ii) strengthening and expansion of RB's capacity by providing equipment, spare parts, materials, supplies, tools, workshops and technical assistance; and
- (iii) a four-year training program for maintenance personnel at all levels.

2. The implementation of the road maintenance program was carried out by force account. The execution of the program was carried out in six years instead of four due to delays in procurement of road maintenance equipment (para. 3.03). Despite these delays, 100% of the betterment works were properly completed; 70% of the rehabilitation and upgrading and 90% of the resealing works were acceptably completed, and labor-intensive routine maintenance works ("cantonnage") were carried out and continue to be carried out satisfactorily (para. 3.05).

3. The overall ERR for the betterment and rehabilitation and upgrading programs, is about 155%, compared with the appraisal estimate which is in excess of 100%. If a sensitivity analysis with a reduction in benefits of 50% is carried out, the recalculated ERR would be about 80% which is still satisfactory (para. 5.12). The results of the first year returns show that these operations were overdue and points to the importance and urgency of having undertaken the maintenance works in these roads much earlier (para. 5.14).

4. The training program was completed two years behind schedule due to delays in construction of the training center (para. 3.07). The training program succeeded in training lower level technicians, but no managers (para. 3.08), with a consequence that technical assistance is still needed in the medium term to carry out effective road maintenance operations.



5. Despite the two-year delay in project completion, the actual costs, US\$27.78 million, only moderately increased by 17%, compared to appraisal estimates of US\$23.7 million. These cost overruns were financed by a greater participation of the Government, US\$6.76 million instead of the original pledge of US\$2.6 million. The financing of the remaining costs was shared by IDA, US\$15.0 million; UNDP, US\$1.3 million; FRG, US\$2.32 million; Belgium, US\$460,000; and WFP, US\$1.94 million. The disbursement of the IDA credit closely followed project execution and was thus totally disbursed in six years instead of four.

6. The project succeeded in strengthening the road maintenance organization, institutionalizing the labor-intensive "cantonnage" works and establishing training on a permanent basis as part of RB's regular operations. The project, however, fell short of training goals as only lower level technicians were trained and no managers (para. 3.08).

7. The performance of the Government and IDA contributed to the achievement of the project objectives. Both institutions collaborated in designing and executing a project which emphasized improvement of road conditions and strengthening of RB's capacity to carry out proper road maintenance operations. However, the Government could have been firmer in managing the construction of the training center (para. 3.07).

8. The Government complied with most of the major credit covenants, in particular, the institutional organization and provision of adequate funds for recurrent costs of road maintenance operations (para. 4.02). However, the traffic regulations and safety were not complied with and the Government is preparing appropriate legislations to comply with this covenant (para. 4.02).

PROJECT COMPLETION REPORT  
RWANDA FOURTH HIGHWAY PROJECT  
(Credit 769-RW)

I. INTRODUCTION

1.01 Rwanda is a small, densely populated land-locked country, bounded by Burundi, Tanzania, Uganda and Zaire. The main transport flows are between the capital Kigali and the exterior and between Kigali and regional centers. External transport is assured essentially by two main surface transport corridors to the Indian ocean ports and to a much lesser degree air transport between Kigali and Mombasa. The Northern Corridor (1,740 km) which comprises the all-road and road/rail routes via Kampala and Nairobi to Mombasa, and the central corridor (1,720 km) which consists of the road/lake (Tanganyika)/rail via Bujumbura and Kigoma to Dar-es-Salaam. External transport, however, has been unreliable, slow, and expensive because these routes have been subjected to many problems, the most important of which have been political upheavals in Kenya, Tanzania and Uganda and traffic congestion in Mombasa and Dar-es-Salaam ports. Also the rugged topography of the country makes road construction and maintenance costly. Rwanda has concentrated its efforts in improving to paved standards the major road links between Kigali and neighboring Uganda, Burundi, and Tanzania, and between its major regional centers; the Government has also started to pay more attention to improving the maintenance of the road network and its organization.

1.02 The present transport system consists of:

- (a) about 4,060 km of classified roads of which 627 km are paved, and 274 km are being improved from earth and gravel roads to paved standards;
- (b) about 6,000 km non-classified earth and gravel communal and feeder roads;
- (c) Lake Kivu for local transport between Gisenyi, Kibuye and Cyangugu; and
- (d) an international airport at Kigali, a regional airport in Cyangugu, and four grass airports in the interior to handle small aircrafts.

There are no railways or navigable rivers.

1.03 Bank Group lending to the road subsector has amounted to US\$71.4 million for five projects. The objectives of these projects have been to assist this land-locked country in: (i) improving major road connections with its neighbors and between its regional centers and the capital and (ii) improving its institutional capabilities to carry out efficient road maintenance operations.

1.04 The First Highway Project (Credit 196-RW, US\$18.8 million, 1970), the Third Highway Project (Credit 475-RW, US\$6.3 million, 1974) and the Fifth Highway Project (Credit 1250-RW, US\$25.9 million, 1982) primarily financed road construction. They contributed respectively to improvement to paved standards of the Kigali-Gatuna road (80 km), the Ruhengeri-Gisenyi road (60 km), and the Butare-Kitabi road (53.5 km). Excessive delays and

cost overruns occurred in the construction of the Kigali-Gatuna and Ruhengeri-Gisenyi roads. The difficulties were due to inadequate engineering and construction techniques, and political instability in Uganda causing interruption in the supply of equipment and materials. The PPAR of both projects (dated June 13, 1979), however, concluded that the improvement works on both roads were still justified, as the increases in construction costs were offset by higher than anticipated traffic growth and greater savings in vehicle operating costs. The Kigali-Gatuna road has deteriorated to the point where reconstruction is necessary; some maintenance works to keep it passable are being carried out under the ongoing Fifth Highway Project, and reconstruction works would be carried out under the proposed Sixth Highway Project. In view of the difficulties encountered in the first two road construction projects, the improvement of the Butare-Kitabi road (Fifth Highway Project) was designed with particular attention to soil conditions, alignment, grades and drainage; contractors were prequalified carefully and the supervision team was provided with an expert in soils engineering. Construction of this road is progressing satisfactorily and within estimated costs.

1.05 The Second Highway Project (Credit 299-RW, US\$5.4 million, 1971) and the Fourth Highway Project (Credit 769-RW, US\$15.0 million, 1978) contributed to improvement of road maintenance operations and institution building. The Second Highway Project provided equipment, materials, supplies, rehabilitation of workshops, technical assistance and training of personnel. It was designed to carry out periodic and routine road maintenance operations on the entire road network. At the closing of the Credit, on December 31, 1978, only about 50% of targeted works were completed successfully. The PPAR (dated June 13, 1979) concluded that, although the targets set at appraisal were overly optimistic, the project objectives were largely achieved. The RB organization was improved, technical personnel increased, training of personnel initiated, workshops and offices constructed and equipped, road maintenance equipment purchased and deployed, and maintenance operations were improved and better road conditions achieved.

1.06 The Fourth Highway Project was thus designed, taking into consideration the limitations of RB, to consolidate and expand the achievements of the Second Highway Project.

## II. PROJECT IDENTIFICATION, PREPARATION AND APPRAISAL

2.01 The Fourth Highway Project was a second phase of an 8-year highway maintenance program designed in 1971. The first phase, the Second Highway Project, Credit 229-RW, was completed in December 1977 (PPAR dated June 13, 1979).

2.02 The project was prepared in November 1976 to January 1977 by the Government, assisted by FRG consultants. It was appraised by the Association from February 26 to March 19, 1977, and the Credit was negotiated in Washington from December 12 to 15, 1977. The Credit Agreement was signed on April 25, 1978.

2.03 The project, consisted of:

- (i) a four-year (1978-1981) periodic road maintenance program to be executed by force account including: (a) betterment of about 500 km of gravel roads (Annex I(a)); (b) rehabilitation and upgrading of about 1,000 km of earth roads to gravel standards (Annex I(b)); and (c) the resealing of about 100 km (Annex I(c)) of paved roads;
- (ii) a four-year (1978-1981) routine road maintenance program including routine maintenance of 3,500 km of earth and gravel roads, and 350 km of paved roads; the works were to be carried out by labor-intensive methods, "cantonnage";
- (iii) strengthening and expansion of RB capacity including (a) procurement of equipment (Annex II), machine and hand tools, spare parts, materials and supplies; (b) extension and improvement of the central workshop in Kigali and construction of two small workshops in Butare and Cyangugu; (c) provision of technical assistance (607 man-month) to assist in the management and execution of works, maintenance of equipment and training of personnel; and (d) transforming RB's Workshop and Warehouse Department into a division of RB's Works Department; and
- (iv) a four-year (1978-1981) training program to train RB maintenance personnel at all levels including: (a) a gradual staffing of RB with sufficiently qualified local personnel to replace the extensive technical assistance (iii (c) above); (b) class-room instruction, on-the-job training and scholarships for the training of about 300 road workers, 60 mechanics, 30 administrative staff and 20 traffic counting technicians; (c) construction of class-rooms and procurement of teaching aids, materials and supplies; and (d) provision of 84 man-months of consultants services for class-room instruction.

### Project Cost Estimates and Financing

2.04 The total project capital costs, net of taxes but including physical and price contingencies, were estimated at US\$23.7 million (detailed in Annex III), with a foreign cost component of US\$17.6 million

(74%) and a local cost component of US\$6.1 (26%). The Government exempted the project from all taxes and duties. The recurrent costs of the four-year road maintenance program were estimated at US\$6.7 million.

2.05 The external sources of financing were to provide US\$21.1 million or about 90% of the estimated total costs, of which US\$17.6 million were to cover 100% of the estimated foreign costs and US\$3.5 million to cover about 57% of the estimated US\$6.1 million local costs; the Government was to provide US\$2.6 million or 43% of the total local costs. The US\$21.1 million of external financing were to be provided by IDA: US\$ 15.0 million (Credit 769-RW); UNDP: US\$1.3 million; FRG: US\$2.3 million; Belgian Aid: US\$0.5 million; and WFP: 2.0 million for food for road workers and trainees. As one condition of effectiveness of the IDA Credit, the Government had to secure the financing of the other donors. The recurrent costs were to be borne by the Government. To ensure the financing of recurrent costs the Government was to provide not less than US\$1.8 million during FY1978 as one condition of Credit effectiveness, and for the subsequent years at least US\$1.6 million annually as a major covenant of the Credit Agreement (para 4.02, Annex V).

### III. PROJECT IMPLEMENTATION AND COSTS

#### A. Credit Agreement

3.01 The Credit Agreement, which was signed on April 25, 1978, became effective on August 4, 1978, only 10 days past the original deadline of July 25, 1978. The Government fulfilled the general conditions and all additional conditions, including the efficient reorganization of RB (para. 3.06), securing financing from other donors and providing required FY 1978 funds for the routine operations of road maintenance (para. 2.05).

3.02 During the project execution, the Credit Agreement was amended only once. The closing date was extended from July 1, 1982 to June 30, 1984 to accommodate a two-year delay in project execution (para. 3.05).

#### B. Procurement of Equipment, Spare Parts, Materials and Supplies

3.03 The project provided for equipment (Annex II) to replenish and expand the equipment fleet provided under the first phase of the road maintenance program (the Second Highway Project, Credit 299-RW). The delivery of this equipment took longer than was foreseen at appraisal. This was principally due to delayed preparation of bidding documents by consultants and delay in contract awards because of complaints by suppliers on Government's bid evaluation. Bids were called on May 30, 1978 and suppliers were given 107 days to prepare the bids. Bids were opened on September 15, 1978. The bid analysis and award were completed by November/December 1978, and 22 separate contracts were approved between January and December 1979; the bulk of the equipment was delivered by end of March 1980. The equipment procured under the project was augmented by Japanese aid (Annex II). The procurement of materials and supplies followed local competitive bidding procedures (LCB), and spare parts, fuel and bitumen were provided by established suppliers on the basis of negotiated and competitive prices as allowed by the Credit Agreement. The delivery was made on schedule except for two periods, February - March 1978 and February - May 1979, when the delivery of fuel was interrupted by political instabilities in Uganda. With consultants assistance, the inventory of spare parts was carried out, identifying necessary stocks to maintain the equipment fleet, thus rationalizing procurement and minimizing waste and pilferage.

#### C. Execution of Road Maintenance Works

3.04 The execution of works was carried out by force account as planned with: (i) two brigades for betterment works on about 500 km of gravel roads on which base courses were to be rebuilt, grades of about 12% reduced, dangerous curves widened, and drainage improved; (ii) two brigades for rehabilitation and upgrading of about 1000 km of earth roads on which regravelling and improvement of drainage structures were to be carried out; (iii) one brigade for resealing about 100 km of paved roads which were more than 10 years old and carried out traffic volumes of about 500 vpd; and (iv) 256 "cantonnage" teams (road gangs) composed each of one foreman and twelve laborers for labor-intensive routine maintenance on the 3,500 km of earth and gravel roads and 350 km of paved roads. Due to delays in

procurement of equipment, only the two brigades for betterment works, one brigade for rehabilitation and upgrading and the 256 cantonnage teams operated in 1978 and 1979. All brigades became fully functional by mid 1980. The brigades were staffed by local personnel, and managed by consultants. Consultants were assigned local counterparts for training (para. 3.08).

3.05 Due to delays in procurement of equipment, works were completed in December 1983 instead of December 1981, thus two years later than planned. At the completion of the project, about 100% of betterment works had been properly completed, 70% of rehabilitation and upgrading and 90% of resealing works acceptably completed, while cantonnage teams did and continue to do very satisfactory routine maintenance works. This labor-intensive effort is keeping the road network passable all year round. The original road itineraries (Annex I) were modified with IDA agreement to reflect the evolution of traffic and economic development in different regions of the country. An impediment to the performance of the brigades was the lack of good construction materials within the roads' right-of-ways, the existing borrow pits having been exhausted. To alleviate this problem, the Government's soils laboratory was requested, and did carry out soils surveys well in advance of the brigades to identify borrow pits which could be readily exploited. To better manage the works, the consultants introduced cost accounting procedures as a road improvement and maintenance tool.

#### D. Improvement of Workshops

3.06 The project provided for the improvement and expansion of the central workshop in Kigali and the constitution of two small workshops in Butare and Cyangugu. Works on the central workshop were carried out by force account, and satisfactorily completed in December 1982. Following a review of the expansion of the road network and the equipment fleet, it was found superfluous to build the two small workshops in Butare and Cyangugu. It was thus agreed to build only one, but in Kibuye. The construction contract was awarded to a local contractor following LCB. The works started in August 1983, and were satisfactorily completed in April 1984. With the rational system of procurement of spare parts put in place by consultants (para. 3.03), the equipment was properly maintained in the field and workshops in Kigali, Kibuye and Ruhengeri. Also the Workshop and Warehouse Department, which had been too autonomous and poorly managed was placed under the authority of RB for efficiency in carrying out road and equipment maintenance operations.

#### E. Training

3.07 To carry out the training program, the project provided for, inter alia, the construction of classrooms and procurement of equipment and tools. The equipment and tools were procured at the same time as the equipment, materials and supplies for road maintenance (para. 3.03). The construction of the classrooms, however, was completed only in March 1981 or two and one half years behind schedule compared to appraisal estimates. The delay was caused by the lack of performance of one local contractor. Following LCB, this local contractor won the contract and started the works in September 1977. He could not complete the construction in February 1979

as planned, and abandoned the site on April 11, 1980, due to financial difficulties. The Government cancelled the contract and rebid the works. Another local contractor was awarded the contract. He started the works in November 1980, and satisfactorily completed the construction of the training center in March 1981.

3.08 Due to the delays in the construction of the training center, the training started in temporary shelters. It was carried out at only about 60% of the anticipated rate for the first two and one half years, and was completed in December 1983, two years later than planned. On-the-job training was carried out in the central workshop in Kigali and in field brigades. Training was carried out by consultants (para. 3.09). At the conclusion of the program, about 410 technicians (same number as planned but of different qualifications) had been trained. The trained personnel includes: 40 foremen, 135 equipment operators, 5 workshop superintendents, 20 store keepers, 15 electricians and 195 mechanics. Of the trained technicians, 54 best qualified have left the Government services for the private sector. The program also trained three instructors, including one mechanic, one equipment operator and one office specialist. However, the project did not succeed in training higher level technicians and managers. The lack of training of higher level staff was due to (i) consultants concentrating more on the execution of works; (ii) lack of qualified candidates; and (iii) qualified local staff preference to work for the private sector where pay and conditions are much better. 1/ Although Government assigned counterparts to consultants, the results are not encouraging as exemplified by the fact that during the 1984/1985 road maintenance season, when the consultant's contract ran out, the operations of the road maintenance brigades deteriorated.

#### F. Technical Assistance

3.09 To carry out the road maintenance program, the maintenance of the equipment fleet and the training program, the Government was assisted by technical experts. FRG provided 227 man-months of technical assistance services for the management and the execution of workshop operations. Belgium provided 43 man-months of technical assistance for road design and management of workshop and warehouse operations. To compensate for the two-year delay in project execution, technical assistance provided by IDA and UNDP was increased from 348 man-months to 524 man-months for the execution of the road maintenance works, and from 84 man-months to 137 man-months for training. The FRG consultants who provided services for the execution of the road maintenance under the Second Highway Project (Credit 299-RW) continued to provide the same services under this project. Swiss consultants provided assistance for the training program as subcontractors to FRG consultants. The consultants satisfactorily assisted RB in carrying out the road improvement and maintenance program, the maintenance of equipment and the training of low level technicians. However they did not succeed in training high level technical staff and managers (para. 3.08) with the result that technical assistance is still needed in the medium term to carry out effective road maintenance operations.

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1/ The training program for the proposed Sixth Highway Project has been designed with these lessons in mind.



### G. Project Costs, Financing and Disbursement

3.10 The actual capital cost of the project was US\$27.78 million (Annex III) with foreign costs component of US\$19.56 million (70%) and a local costs component of US\$8.22 million (30%). These costs are about 17% more than the appraisal estimates of US\$23.7 million including contingencies. These costs overruns were due to the two-year delay in the execution of the road maintenance and training programs. The recurrent costs were US\$10.75 million for the six year period (1978-1983).

3.11 The external sources of financing provided US\$21.02 million or about 76% of the costs, of which US\$19.56 million covered 100% of the foreign costs and US\$1.46 million covered about 18% of the US\$8.22 million local costs; and the Government provided US\$6.76 million or 82% of the local costs. The Government participation thus increased from US\$2.6 million as originally pledged, to US\$6.76 million. The greater Government participation thus absorbed the project's cost overruns. The IDA (US\$15.0 million) and UNDP (US\$1.3 million) contribution were sufficient to complete the project. FRG (US\$2.32 million), Belgium (US\$460,000) and WFP (US\$1.94 million) contributed to the financing of the project. The Government also provided the US\$10.75 million equivalent for recurrent costs of routine maintenance operations or about US\$1.8 million yearly, (FY78 to FY83) about 13% more than the US\$1.6 million requested by the Credit Agreement (para. 4.02). The financing details are in Annex III. The credit disbursement (Annex IV) followed the pace of project execution, reflecting its two-year delay. The credit was thus totally disbursed in six years instead of four as originally projected.

### H. Performance of Consultants, Contractors and Suppliers

3.12 Consultants financed by IDA and UNDP satisfactorily assisted the Government in the execution of the road maintenance operations and the training of low level staff. However they did not succeed in training high level staff and managers. The reasons for this failure are given in paragraph 3.08. With regard to technical assistance, it is clear that giving consultants responsibility for both operation and training resulted in their giving inadequate priority to higher level staff training. This lesson has been taken into account in designing future training programs.

3.13 Two local contractors satisfactorily completed the construction of the Kibuye workshop and training center respectively. While one local contractor, the first lowest bidder for the training center, caused a two-year delay in the construction of this facility due to financial difficulties (para. 3.07).

3.14 Suppliers satisfactorily delivered on time and at contracted reasonable prices, the equipment, materials and supplies.

#### IV. INSTITUTIONAL DEVELOPMENT

##### A. Institutional Performance

4.01 As a second phase of the road maintenance program, the Project consolidated the initial institutional achievements of the Second Highway Project (Credit 299-RW). The road organization was strengthened by placing the Workshop and Warehouse Department, which had been too autonomous and poorly managed, under the authority of RB. The brigades and teams were expanded and strengthened, and most of all, the labor-intensive "cantonage" organization was put in place and has succeeded in maintaining the road network passable all year round. Also the Project put in place a permanent training organization, which succeeded in training low level technical staff. However one of the aims of the project - to put local staff in responsible positions - was not achieved, as high level staff and managers were not trained (para. 3.08). The result is that technical assistance is still needed in the medium term to carry out effective road maintenance operations. Under the proposed Sixth Highway Project, a training program will be implemented to allivate this deficiency.

##### B. Compliance with Credit Covenants

4.02 The experience with credit covenants has been satisfactory (Annex V). The Government complied with the the major covenants. In particular the revised organizational improvements were put in place early by Presidential decree; and the Government provided as required resources for prompt execution of the project including, funds, facilities and services. Its yearly budgetary allocations were 13% more than required by the Credit Agreement or US\$1.8 million versus US\$1.6 million. However, traffic regulations and road safety were not enforced, even when weighing scales were procured under the ongoing Fifth Highway Project (Credit 1250-RW). One impediment has been the lack of adequate unified traffic laws. The Government has prepared a new traffic code covering vehicle weight and dimension regulations which are in line with the design specifications of roads built in recent years as well as the regulations in force in neighboring countries, primarily Kenya and Uganda, the major transit countries for this land-locked country. The Government has agreed during the negotiations of the proposed Sixth Highway Project that this traffic code will become law by December 1985, and to start its enforcement in early 1986.

## V. ECONOMIC REEVALUATION

5.01 According to the appraisal report, "the objective of this project is to continue improvement of road betterment and maintenance operations throughout the country and to strengthen the capabilities of the Road Branch". The two programs for which a rate of return had been calculated at appraisal were: (a) betterment of about 500 km of gravel roads; and (b) rehabilitation and upgrading of about 1,000 km of earth roads to gravel standards. "The aims of these programs are to improve interregional connections in Rwanda and to develop a network of efficient and reliable routes for the transport of imports since the monetary part of the economy is very dependent on external trade. The principal beneficiaries are expected to be the producers in the agricultural sector, which by reducing transport costs are expected to stimulate production, and so generate greater returns."

5.02 The economic reevaluation was done comparing the 'with' and 'without' the project scenarios. The analysis is based on findings of the final and economic reevaluation reports prepared by the Government as well as data included in the buff cover SAR of Rwanda Sixth Highway Project. The economic reevaluation was done in 1984 prices, using an early 1984 exchange rate of 97 FRW to the US dollar. The appraisal report used 1977 prices and an exchange rate of 92 FRW to the US dollar.

5.03 The reevaluated project components are:

- (a) betterment of 495 Km of gravel roads (compared with 490 km planned at appraisal);
- (b) rehabilitation and upgrading of 682 Km of earth roads to gravel standards (compared with about 1,000 Km planned at appraisal); and
- (c) resealing of 87 Km of paved roads (compared with 100 Km planned at appraisal).

5.04 The quantified benefits used in the reevaluation, are vehicle operating cost (VOC) savings (Annex VI) and maintenance costs savings (Annex VII). Actual costs were used for the recalculated ERR. Vehicle operating cost unit savings were computed for two types of vehicles: light and heavy, following the presentation of the appraisal report.

5.05 At appraisal the traffic growth rate assumed during project implementation was 5%, and 4% thereafter. The Government's report in its economic reevaluation used a 10% growth rate. However, a comparison of traffic growth rate between 1976 and 1983 for the roads mentioned at appraisal and which were also kept in the implementation stage shows that for the appraised roads where betterment and rehabilitation and upgrading works were carried out, the weighted average growth rate was about 7%. For the purpose of the present analysis a more conservative growth rate of 6% was applied to all roads. The economic life of the betterment program is

considered to be 10 years as assumed in the text of the appraisal report (see Annex VII), while 7 years has been assumed for both the rehabilitation and upgrading, and the resealing programs.

5.06 On the basis of the inputs mentioned above the ERR for the individual components is as follows:

#### Betterment

5.07 The reevaluated ERR for this component is about 147%, as compared with about 195% at appraisal. The discrepancy between the ERR at appraisal and the reevaluated ERR could be explained by the higher cost of works. A comparison between estimated and actual direct costs shows that for the betterment works the average cost per Km is about 29% higher than the appraisal estimate.

5.08 Although the investment for this component is expected to last at least until 1993 it is still possible that the expected benefits may not fully materialize. Therefore, if in the sensitivity analysis an unlikely reduction in traffic of 50% is applied, it still would yield an ERR of about 74%, which is considered satisfactory (Annex VII). Reducing the benefits by 90%, yields a threshold of 17 vpd, and an ERR of 12% which is equal to the assumed opportunity cost of capital, still making the program economically justifiable. Kirambo-Kidaho is the road with the lowest economic rate of return: 57%. An unlikely reduction in benefits of 50% would yield an ERR of 28%.

#### Rehabilitation and Upgrading

5.09 The original road itineraries were modified with IDA's agreement during the execution of the project to reflect the evolution of traffic and economic development in different regions of the country. The ADT thus changed from 44 vpd in 1976 to 159 vpd in 1983, or an increase of about 260%. The reevaluated ERR for this component is about 163% as compared with 35% at appraisal. The discrepancy between the ERR at appraisal and the reevaluated ERR could be explained by the fact that the increase in actual average cost per km of about 39% was totally offset by the 260% traffic increase. Also the growth rate of the traffic is higher than assumed at appraisal (see para. 5.05).

5.10 Although the investment for this component is expected to last at least until 1990, it is still possible that benefits may not fully materialize. A sensitivity analysis assuming an unlikely reduction in traffic of 50%, provides a reevaluated ERR of about 85%, which would still make this component economically justified (Annex VII). Reducing the traffic by about 90%, yields a threshold of 16 vpd and an ERR of 12% which is equal to the assumed opportunity cost of capital, still making this program viable. Munyinga-Gasoro and Gisha-Gishyita are the roads with the lowest ERR: 69%. An unlikely reduction in benefits of 50% would yield an ERR of 32%.

### Resealing

5.11 This component was not evaluated at appraisal. However, an attempt has been made to quantify it using an economic life of 7 years. The traffic level excludes urban roads and the road to the airport. The ERR for this component is about 150% or 78% if benefits are reduced by 50% (Annex VII). Reducing the benefits by 90% yields a threshold of 89 vpd and an ERR of 12% which is equal to the assumed opportunity cost of capital still making this program viable. Kigali-Rusumo is the road with the lowest ERR: 111%. An unlikely reduction in benefits of 50% would yield an ERR of about 55%.

### Conclusions

5.12 The overall ERR for the betterment and rehabilitation and upgrading programs, excluding resealing, is about 155%, compared with the appraisal estimate which is in excess of 100%. If a sensitivity analysis with a reduction in benefits of 50% is carried out, the recalculated ERR would be about 80%, which is still satisfactory.

5.13 Regarding the rehabilitation and upgrading program, the fact that after appraisal many roads with low level traffic were excluded and other roads with higher traffic were included, does not allow us to directly compare the reevaluated ERR with the appraisal data, because the reevaluated program is substantially different from the one described at appraisal. Nonetheless the program, if anything has improved by these shifts from low to high volume roads.

5.14 Regarding the timing of the project the first year returns of the three reevaluated components exceed the assumed opportunity cost of capital of 12% (Annex VII) which indicates that these works were overdue, and points to the urgency and importance of having undertaken the maintenance works on these roads much earlier.

5.15 Notwithstanding certain limitations of the recalculation, such as the economic life of the project that has not yet been completed, the project is still well justified.

## VI. THE ROLE OF THE GOVERNMENT

6.01 The Government performance contributed to the achievement of the project objectives. It promptly complied with credit conditions of effectiveness, put in place organizational improvements resulting in better managed road operations, and promptly provided as needed funds, facilities and services for the execution of the road maintenance operations. The Government has been commendable in organizing, operating and maintaining labor-intensive operations "cantonnage" which are keeping the road network passable all year round. It succeeded in establishing training as one of the permanent functions of RB. But only its lower level staff were trained, as consultants concentrated their activities more in execution of works than training, and Government could not induce or recruit high level staff to be trained as managers to replace the extensive technical assistance. The Government also could have been more diligent in the preparation of bidding documents, evaluations and awards of contracts for the procurement of road maintenance equipment; it could also have been more forceful in the implementation of the contract for the construction of training center. This laxity caused a two-year delay in the implementation of the project.

## VII. THE ROLE OF IDA

7.01 IDA contributed to the development of the road subsector. Particularly, a road maintenance program which took into consideration the country's limitations in skilled personnel and financial resources was prepared. It succeeded in focussing the Government's attention more on road maintenance, resulting in establishment of better organized road maintenance operations and improvement of road conditions. Its insistence on labor-based maintenance operations induced the Government to put in place, and on a permanent basis, a very efficient labor-intensive (cantonnage) organization for routine road maintenance operations which is keeping the road network passable all year round. It also assisted in establishing training as a permanent feature of RB operations.

## VIII. CONCLUSIONS

8.01 The project was a logical continuation of the efforts started under previous projects to improve the road network and the road maintenance organization and operations. The project was properly designed, taking into consideration RB's limitations in qualified personnel, the country's financial constraints, and conditions of the road network.

8.02 Although originally planned to cover a four-year road maintenance and training programs (1978-1981), it actually was executed in six years (1978-1983), mainly due to a two-year delay in procurement of road maintenance equipment and construction of the training center. This delay caused US\$4.1 million cost overruns; but did not totally compromise the project execution as financing was adequate to allow the project achieve its objectives reasonably well.

8.03 The project satisfactorily achieved its physical objectives as 100% of betterment works were properly carried out, 70% of rehabilitation and upgrading and 90% of resealing works acceptably completed, while the road gangs ("cantonnage") did and continue to do very satisfactory works which are keeping the road network passable all year round. The training program succeeded in training lower level staff, but did not train managers, with a consequence that technical assistance is still needed in the medium term to carry out effective road maintenance operations. This concern will be properly addressed under the proposed Sixth Highway Project.

8.04 The overall ERR for the betterment and rehabilitation and upgrading programs, is about 155%, compared with the appraisal estimate which is in excess of 100%. The results of the first year returns show that these operations were overdue and point to the importance and urgency of having undertaken the maintenance works on these roads much earlier (para. 5.14).

8.05 Under the project, the road maintenance organization was consolidated and labor-intensive routine maintenance operations institutionalized. The Government and IDA performances contributed to a better design of the project and its implementation. However, both institutions could have been more diligent in processing procurement of the equipment, and the Government firmer in managing the construction of the training center, thus avoiding two years delay in project execution.

8.06 The project achieved its objectives in improving the conditions of the road network, and increasing RB capacity to plan, execute and control proper road maintenance operations. The project achievements constitute a basis for the implementation of the third phase of road maintenance program, the proposed Sixth Highway Project, which will assist this land-locked country in pursuing its double objective of: (i) improving major road connections with its neighbors and between its regional centers and the capital and (ii) improving its institutional capabilities to carry out efficient road maintenance operations. The Sixth Highway Project will put priority on training in general and in particular the training of managers to gradually replace the extensive technical assistance provided to RB. To avoid the shortcomings highlighted in this report (paras 3.08 and



3.12), the program will set specific targets to train managers, and will be carried out by consultants whose sole job will be training. In addition to the training program itself, a number of accompanying measures would be taken to firmly establish training and manpower development within RB. These include the strengthening of RB's Personnel Bureau, the setting up of a Training Unit and of a Training Coordination Committee to provide a functional link between training and personnel management on the one hand and training and the technical services on the other.

PROJECT COMPLETION REPORT

RWANDA FOURTH HIGHWAY PROJECT  
(Credit 769-RW)

Road Maintenance Program

A. <u>Betterment</u>	<u>Road</u>	<u>Planned</u> (Km)	<u>Executed</u> (Km)	<u>Traffic</u>	
				(1976)	(1983)
1.	Kicukiro-Burundi border	52			
2.	Gikongoro-Butare	28			
3.	Cyangugu-Ntendezi	31	Butare-Cyangugu		
4.	Ntendezi-Gikongoro	95	200	121	250
5.	Ngiri-Gisha	27	27	178	150
6.	Gisha-Rubindo	10	10	98	100
7.	Giturama-Nyakabanda	54	61	86	140
8.	Cyuru-Nyarubungo	37	-		
9.	Nyabisindu-Ruragwe	78	-		
10.	Gahiro-Kayanza	58	58	65	150
11.	Gishyita-Bumba	20	-		
12.	Gitarama-Kibuye	-	93		100
13.	Ntendezi-Kibuye	-	9		80
14.	Kirambo-Kidaho	-	37		60
	("Circuit des Lacs")				
	Total	490	495		
B. <u>Rehabilitation and Upgrading</u>					
1.	Nyakabanda Road (Ruhengeri-Gisenyi)	61	257	461/	1,450
2.	Rugere-Ruraga	105	-		
3.	Kibuye-Ntendezi	34	-		
4.	Kibuye-Ntendezi	66	-		
5.	Rubango-Rugabagoba	56	-		
6.	Kibugabaga-Manyinya	42	-		
7.	Ruraga-Kibuye	12	Improved		
8.	Manyinya-Gasoro	19	9	30	50
9.	Manyinya-Kinazi	18	-		
10.	Gisha-Gishyita	8	8	53	50
11.	Gishyita-Kirambo	37	-		
12.	Kirambo-Kidaho	41	85	38	60
13.	Kirambo-Rukoji	26	-		
14.	Kiganda-Cyakabiri	92	-		
15.	Gishyita-Bumba	14	-		
16.	Bumba-Mushangi	44	-		
17.	Nyarubungo-Gahiro	23	-		
18.	Nyarubungo-Ntoma	58	-		
19.	Ntoma-Kagitumba	18	18	52	60
20.	Ntoma-Gahiro	44	22	49	100
21.	Rumagana-Nshili	45	-		
22.	Rutikwye-Thema	30	20	59	90
23.	Karambi-Rutovu	65	-		
24.	Karambi-Byimana	21	-		
25.	Pindura-Burundi border	33	-		
26.	Rubindo-Ruhengeri	-	119	-	350
27.	Gitarama-Nyakabanda	-	14	-	140
28.	Nyakabanda-Ruhengeri	-	16	-	100
29.	Kayanza-Kigitumba	-	114	-	120
	Total	1,012	682		
C. <u>Resealing</u>					
1.	Kigali-Karukombe	10	10	1,596	12,000
2.	Cyangugu-Bugarama	38	-		
3.	Kigali-Gatuna	52	22	406	900
4.	Gisenyi-Ruhengeri	-	20		1,200
5.	Kigali-Rusumo	-	19		550
6.	Kigali Street	-	16		10,000
	Total	100	87		

1/ A new estimate for 1977, of 850 vpd is presented in the Rapport Final, 4<sup>e</sup> Projet routier IDA, Deuxieme phase du Projet Entretien des Routes, Republique Rwandaise, Ministère des Travaux Publics et de L'Energie, Direction Generale des Ponts et Chaussées, Kigali, December 1984, p. 33.

PROJECT COMPLETION REPORT

RWANDA FOURTH HIGHWAY PROJECT

CREDIT 769-RW

Procurement of Equipment

<u>Type</u>	<u>Quantity Planned</u>	<u>Quantity Acquired</u>
Bulldozer - Type DC6	1	1
Bulldozer - Type DC8	3	-
Loader	2	1
Grader	2	-
Automotive Compactor	1	-
Towed Vibrating Compactor	5	4
Excavator	1	1
Tractors	6	16
Low Bed Trailer	1	-
Towed Aggregate Spreader	2	2
Manual Asphalt Spreader	2	2
Automotive Asphalt Spreader	1	1
Compressor	1	-
Dump Truck	50	25
Dump Trailer	-	26
Fuel Truck	3	3
Workshop Truck	1	-
Maintenance Truck Crane & Trailer	1	1
House Trailer	4	4
Pick-up Truck	24	22
Maintenance Trailer	5	5
Fuel Truck	4	4
Water Truck	4	4
Concrete Mixer	2	2
Vibrator	6	6
Pneumatic Hammer Drills	6	8
Motor Pump	6	6
Radio Equipment	6	6
Pavement Marker	-	1
Bicycles	150	120

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PROJECT COMPLETION REPORT

RWANDA FOURTH HIGHWAY PROJECT

CREDIT 769-RW

Procurement Equipment

Japan Contribution

<u>Type</u>	<u>Quantity Planned</u>
Bulldozer - Type DC8	3
Loader	1
Grader	2
Automotive Compactor	1
Low Bed Trailer	1
Compressor	1

**PROJECT COMPLETION REPORT**  
**RWANDA FOURTH HIGHWAY PROJECT**  
**(Credit 769-RW)**  
Costs and Financing

PROJECT ITEM	COST			(US\$ '000)			FINANCING (AMOUNTS IN US\$ '000)					
	AT APPRAISAL			ACTUAL			IDA	UNDP	FRG	BELGIUM	WFP	GVT.
	LOCAL	FOREIGN	TOTAL	LOCAL	FOREIGN	TOTAL	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
<b>ROAD MAINTENANCE</b>												
a) Equipment	77	3,303	3,380	103	3,527	3,360	3,527				1,944	103
b) Operational Costs	3,676	7,569	11,245	5,542	8,314	13,856	5,973					5,939
<b>WORKSHOPS</b>												
a) Construction	169	368	537	53	125	178	165					13
b) Equipment and Tools	3	157	160	4	179	183	179					4
<b>TRAINING PROGRAM</b>												
a) Construction of the Training Center	47	103	150	48	101	149	101					48
b) Training Equipment	1	64	65	0	42	42	42					
c) Scholarships	0	79	79	0	0	0						
d) Trainees Salaries	631	0	631	650	0	650						650
<b>TECHNICAL ASSISTANCE</b>	1,485	5,935	7,420	1,819	7,275	9,094	5,013	1,300	2,319	462		
<b>TOTAL</b>	6,089	17,578	23,667	8,219	19,563	27,782	15,000 (15,000)	1,300 (1,300)	2,319 (2,300)	462 (500)	1,944 (2,000)	6,757 1/ (2,600) 2/

1/ The Government also provided US\$10.75 million equivalent to cover the recurrent costs of maintenance operations.

2/ Figures in parentheses are amounts pledged by various agencies at the start of the project.

PROJECT COMPLETION REPORT

RWANDA FOURTH HIGHWAY PROJECT  
CREDIT 769-RW

Credit Disbursements

ACCUMULATED DISBURSEMENTS IN THOUSAND  
OF U.S. DOLLAR EQUIVALENT

<u>IBRD/IDA</u> <u>FISCAL</u> <u>YEAR AND</u> <u>QUARTER</u>	<u>ACTUAL</u> <u>DISBURSEMENT</u> <u>1</u>	<u>APPRAISAL</u> <u>ESTIMATE</u> <u>2</u>	<u>ACTUAL DISBURSEMENT AS A</u> <u>PERCENTAGE OF APPRAISAL ESTIMATE</u> <u>(1 : 2)</u>
<u>1978/1979</u>			
September 30, 1978	0,270	2,300	12
December 31, 1978	0,340	4,300	8
March 31, 1978	0,390	6,300	6
June 30, 1978	2,270	7,700	29
<u>1979/80</u>			
September 30, 1979	2,960	8,600	31
December 31, 1979	4,180	9,500	44
March 31, 1980	4,890	10,300	47
June 30, 1980	6,500	11,100	59
<u>1980/81</u>			
September 30, 1980	7,490	11,800	63
December 31, 1980	7,970	12,500	64
March 31, 1981	8,150	13,200	62
June 30, 1981	9,040	13,900	65
<u>1981/82</u>			
September 30, 1981	9,560	14,500	66
December 31, 1981	9,910	15,000	66
March 31, 1982	10,860		72
June 30, 1982	11,450		76
<u>1982/83</u>			
September 30, 1982	11,960		90
December 31, 1982	12,570		84
March 31, 1983	12,990		87
June 30, 1983	13,480		90
<u>1983/84</u>			
September 30, 1983	14,000		93
December 31, 1983	14,420		96
March 31, 1984	14,690		98
June 30, 1984	15,000		100

PROJECT COMPLETION REPORT  
**RWANDA FOURTH HIGHWAY PROJECT**

CHAPTER 106-8W

Status of Compliance with Credit Covenants

<u>Covenants</u>	Section of Credit Agreement 4.02 (a)	<u>Action Taken</u>
Place and maintain the existing Workshop and Warehouse Department of the Road Branch under the authority of the Roads Department as a Division.	4.07 (b)	By Presidential Decree of June 7, 1978.
Take such measures as shall be appropriate to give Road Branch such authority as shall be required for the carrying out of its responsibilities, including authority to: (1) hire, supervise and dismiss vehicle drivers and equipment operators; (41) simplify Road Branch's procedures to process purchase orders, and payment of invoices and staff salaries.	4.02 (a)	In operation since early 1981.
Not later than December 31, 1978, establish and maintain in the Road Branch a cost accounting system satisfactory to the Association.	4.03 (b)	Complied with.
Adequately maintain all of its highway maintenance equipment and make all necessary repairs and renewals thereof, all in accordance with sound engineering practices.	4.03 (a)	Complied with.
Establish and maintain satisfactory workshops and inventories of spare parts as required for the foregoing.	4.03 (d)	Complied with.
Provide promptly as needed, the funds, facilities, services and other resources required for carrying out the action specified in paragraph (a) of this Section, including adequate budget allocation of not less than \$1,600,000 equivalent every calendar year during the execution of the Project, starting with the year 1978.	4.03 (a)	Complied with. Plans were exchanged during each project supervision mission.
By October 31 in each year, starting with the year 1978, during the execution of the Project, exchange plans with the Association on the adequacy of the amounts specified above taking into account such factors as inflation, price variation, and changes in traffic patterns and volume.  The Borrower shall take all measures reasonably required to ensure that the dimensions and axle-loads of vehicles using its national highway network shall not exceed limits consistent with the design standards of such roads.	4.04	In the past, vehicle dimension and axle-load limits were not enforced, but roads were not affected since overloading prevented by the steep gradients of most roads and the stringent restrictions of axle-loads in Uganda through which such of Rwanda's heavier traffic passes. However, heavier trucks are now being used on the roads, and overloading is becoming a problem. Therefore, under the Fifth Highway Project, weighing scales are being procured for enforcement. They are scheduled to become operational in early 1986.

PROJECT COMPLETION REPORT

RWANDA FOURTH HIGHWAY PROJECT

CREDIT 769-RW

Average Vehicle Operating Cost Savings  
by Type of Program  
US\$(\$/km)

Betterment

<u>Type of Vehicle</u>	<u>Appraisal 1/</u>	<u>PCR 2/</u>	<u>% Change</u>
Light	0.23	0.22	-4.0
Heavy	0.81	0.81	-

Rehabilitation and Upgrading

Light	0.19	0.22	+4.0
Heavy	0.62	0.81	+31.0

Resealing

Light	N.A.	0.10	-
Heavy	N.A.	0.21	-

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Sources: 1/ Appraisal of Fourth Highway Project Table 14, in 1977  
prices. Exchange rate: US\$1 = 92 FRW.

2/ Rwanda Sixth Highway Project Draft Buff Cover Staff Appraisal  
Report. Annex 3.2 (Data adjusted to 1984 prices). Exchange  
rate: US\$1 = 97 FRW.



PROJECT COMPLETION REPORT  
RWANDA FOURTH HIGHWAY PROJECT  
CREDIT 769-RW

Economic Reevaluation

US\$ (000) 1984 Prices

	<u>Betterment 1/</u>			<u>Rehabilitation and Upgrading 2/</u>			<u>Resealing 3/</u>		
	<u>Betterment Cost</u>	<u>Maintenance Cost Savings</u>	<u>VOC Savings</u>	<u>Upgrading Cost</u>	<u>Maintenance Cost Savings</u>	<u>VOC Savings</u>	<u>Resealing Cost</u>	<u>Maintenance Cost Savings</u>	<u>VOC Savings</u>
1978	1,661	0	0	1,656	-	-			
79	1,333	0	2,555	510	0	2,502	422	0	0
80	1,488	6	4,213	2,013	7	3,471	618	0	578
81	1,758	22	5,245	1,835	30	7,114	675	8	1,514
82	1,043	58	8,841	1,121	73	10,858	731	28	2,645
83	2,280	102	10,774	1,555	115	13,650	0	64	3,998
84	0	138	14,684	0	190	17,602	0	89	4,240
85	0	138	15,564	0	190	18,660	0	117	4,493
86	0	138	16,499	0	190	16,017	0	117	4,763
87	0	138	17,488	0	190	15,747	0	117	4,180
88	0	138	18,538	0	190	11,526	0	117	3,076
89	0	138	15,074	0	190	7,230	0	117	1,695
90	0	138	13,285	0	190	4,446	0	0	0
91	0	138	10,895	0	0	0	0	0	0
92	0	138	7,571	0	0	0	0	0	0
93	0	138	5,513	0	0	0	0	0	0

ERR = 147

Benefits -50% = 74

FYR = 104%

B ratio 6.4:1  
C

ERR = 163%

Benefits -50% = 85%

FYR = 136%

B ratio 5.6:1  
C

ERR = 150

Benefits -50% = 78

FYR = 127%

B ratio 5.7:1  
C

Overall ERR

Betterment/Rehabilitation and Upgrading

ERR = 155%

Benefits -50% = 80%

1/ As stated in the text of the appraisal report (page 23), it assumes an economic life of 10 years for betterment.

2/ As stated in the text of the appraisal report (page 23), it assumes an economic life of 7 years.

3/ Assumes an economic life of 7 years.

PROJECT COMPLETION REPORT

RWANDA FOURTH HIGHWAY PROJECT

CREDIT 769-RW

Comparison of Rates of Return  
(%)

	<u>Appraisal</u>	<u>PCR</u>
a) Improvement	195	147
b) Rehabilitation	35	163
c) Resealing	N.A.	150
Overall (a + b)	+100	155

# Kreditanstalt für Wiederaufbau

Kreditanstalt für Wiederaufbau  
Palmengartenstraße 5-9

Postfach 11 11 41  
6000 Frankfurt am Main 11

The World Bank  
Mr. Yukinori Watanabe  
Director  
Operations Evaluation Department  
1818 H Street, N.W.  
Washington, D.C. 20433

Palmengartenstraße 5-9  
Postfach 11 11 41  
6000 Frankfurt am Main 11  
Telefon (06 11) 7431-0  
Telex: 411352  
Telegrammadresse:  
Kreditanstalt Frankfurt/Main

Ihre Nachricht  
your letter  
votre lettre  
su carta

Ihr Zeichen  
your sign  
votre référence  
su referencia

Bearbeiter  
officer in charge  
employé compétent  
funcionario encargado

Unser Zeichen  
our sign  
notre référence  
nuestra referencia

Durchwahl  
extension  
extension  
extensión

Datum  
date  
date  
fecha

Baumann

Bam/Do

2123

26-3-1986

Re: L II a/2 - Project Completion Report on Rwanda  
Fourth Highway Project (Credit 769-RW)

Dear Mr. Watanabe,

We thank you for sending us a copy of your project completion report on Rwanda Fourth Highway Project. We read the copy with great interest and its content is of great value to us. The report is very comprehensive and we have no additional remarks.

For the Rwanda Sixth Highway Project (1986 - 1989) we suggested to the Rwandese Ministry of Public Works and Energy to improve the cooperation between the resealing units on paved roads which are financed by your institution and KfW.

World Bank and KfW should continue their mutual information on their activities in the sector; in this connection we will stay in contact with your transport division 1, Eastern and Southern Africa projects.

Sincerely yours  
KREDITANSTALT FÜR WIEDERAUFBAU



MINISTERIE VAN BUITENLANDSE ZAKEN,  
BUITENLANDSE HANDEL  
EN ONTWIKKELINGSSAMENWERKING

MM Algemeen Bestuur  
van de Ontwikkelingssamenwerking

ALGEMENE DIRECTIE  
BELEIDSVOORBEREIDING EN EVALUATIE

- 27 -

1050 Brussel,

"A.G." Building

Marsveldplein 5 - Bus 57 - Tel. (02) 513 90 60  
513 93 60

ANNEX X

15.04.1986

To Mr. Yukinori Watanabe  
Director  
Operations Evaluation Department  
World Bank  
Washington

Verw. : D10-93 / 937  
bij antwoord te vermelden  
Bijlage(n) :

110079

Dear Sir,

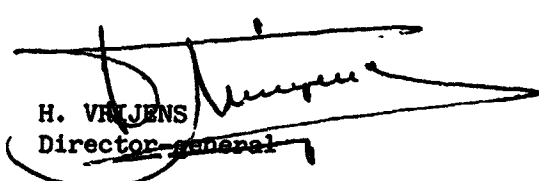
Re : Project Completion Report on Rwanda Fourth Highway Project

I herewith acknowledge receipt of your letter dd. February 20, 1986 and thank you for the report attached thereto on the completion of the Fourth Highway project in Rwanda.

As you reminded us, this project was actually cofinanced by AGCD, although on a very informal basis. AGCD happened to finance the cost of two experts, long term technical assistants to the Rwandese Directorate general of Ponts et Chaussées and its workshop for mechanisation. We understand that their services were appreciated during the implementation of the project.

We look forward to receiving also the final project completion report.

Sincerely,

  
H. VRIJENS  
Director-general

APR 22 1986

