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PROJECT COMPLETION REPORT

PANAMA

HIGHWAY MAINTENANCE PROJECT (LOAN 1565-PAN)

June 22, 1984

Latin America and the Caribbean
Regional Office

PANAMA

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PROJECT COMPLETION REPORT

TABLE OF CONTENTS

PREFACE

The following is a Project Completion Report on Panama's Highway Maintenance Project for which Loan 1565-PAN in the amount of US$12.0 million was approved by the Executive Directors on May 11, 1980. The loan was 100% disbursed, effective March 15, 1984.

This Completion Report was prepared by the Bank's Latin America and the Caribbean Regional Office and is based on information obtained from the Minutes of the Board Meeting, LAC Information Center, Project Appraisal Report No. 1891-PAN, staff supervison reports, and data on project costs collected from the Ministry of Public Works.

In accordance with the revised procedures for project performance audit reporting, this Completion Report was read by the Operations Evaluation Department but the project was not audited by OED staff. The draft completion Report was sent to the Borrower; however, no comments were received.

BASIC DATA SHEET

Key Project Data

Item	Original Plan	Actual
Total Project Cost (US$million)	12.91	12.92
Overrun (%)	-	0
Disbursement	12.00	12.00
Economic Rate of Return (%)	above 50	- 1/
Date Equipment Procurement Completed	07/79	3/84
Proportion of Time Overrun (%)	-	100
Financial Performance	-	good
Institutional Performance	-	fair

Other Project Data

First Mentioned in Files	06/17/76
Appraisal	11/77
Negotiations	03/27-31/78
Board Approval	05/11/78
Loan Agreement Date	06/30/78
Effectiveness Date	10/02/78
Closing Date	12/31/83
Borrower	Republic of Panama
Executing Agency	Ministry of Public Works through its National Directorate of Highway Maintenance
Fiscal Year of the Borrower	01/01-12/31
Follow-on Project	
Name	Road Rehabilitation Project
Loan Number	2020-PAN
Amount (US$million)	19.0
Loan Agreement Date	07/24/81

1/ See text, paragraphs 5.01 and 5.02

MISSION DATA

Type	Month/Year	No. of Staff	No. of Weeks	Staff/Weeks	Date Report
Identification	11/76	1	1	1	12-27-76
Preparation	03/77	5	1.5	7.5	04-08-77
Pre-Appraisal	07/77	4	2.5	10	09-09-77
Pre-Appraisal 1/	09/77	1	1	1	10-05-77
Appraisal	10/77	3	2.5	7.5	04-20-78
Supervision	08/78	1	1	1	09-12-78
Supervision	01/79	2	1	2	02-26-79
Supervision	05/79	3	1	3	07-06-79
Supervision	10/79	2	1.5	3	11-21-79
Supervision	03/80	3	2	6	04-07-80
Operational	02/81	1	0.5	0.5	03-11-81
Ltd. Supervision 1/	10/81	1	0.5	0.5	02-19-82
Supervision 2/	11/81	2	1	2	02-23-82
Supervision 2/	04/82	1	1.5	1.5	05-25-82
Supervision 2/	10/82	1	2	2	11-24-82
Ltd. Supervision 1/	12/82	1	1	1	01-10-83
Supervision 2/	2/83	2	2	4	03-11-83
Supervision 2/	9/83	2	1.5	3	09-30-83

Total Supervision Effort

	FY1978	FY1979	FY1980	FY1981	FY1982	FY1983	FY1984
Staff Weeks	0.9	14.6	10.0	4.8	5.4	12.5	3.2

1/ Training component only
2/ Included supervision of Loan 2020-PAN

HIGHLIGHTS

The project partially achieved its objective of building within the Ministry of Public Works the necessary capacity to carry out the schedule of maintenance activities prescribed in its four-year highway maintenance program. To that end, the project included funds to finance equipment and spare parts purchases and technical assistance in the areas of maintenance and equipment management.

Although achievements under the project were below appraisal expectations, the project was successful in laying the groundwork for the continuous and systematic implementation of maintenance activities in Panama. These efforts are being continued under the follow-on Road Rehabilitation Project (Loan 2020-PAN).

Project execution was hampered by difficulties in hiring qualified individual consultants (after the Government's decision that contracting foreign firms was too costly), frequent changes of Ministers that led to changes in MOP staff and changes in perceived priorities, cumbersome procedures for equipment and spare parts procurement and competing demand for maintenance resources emanating from town and city streets in need of rehabilitation and not included in the original maintenance program.

Important elements of the institution-building components of the project (i.e., training) have reached only an embryonic stage but are expected to be fully developed under Loan 2020-PAN. As a result, a project, comparable in the economic sense to the one defined at appraisal, is expected to be completed under the ongoing Road Rehabilitation Project, and a meaningful quantitative evaluation of the Road Maintenance Program has been postponed until the completion of that project.

The Project Completion Report identifies two lessons to be learned from the project:

(a) Future project design should consider all related sources of demand for resources. In this project, the lack of provision for establishing control over maintenance of city and town streets proved troublesome; and

(b) The difficulty in obtaining final approval of contracts in Panama should be dealt with in a country context, and not in the framework of individual project lending.

PANAMA

HIGHWAY MAINTENANCE PROJECT (LOAN 1565-PAN)

PROJECT COMPLETION REPORT

I. INTRODUCTION

1.01 Panama is divided lengthwise by a mountain range and across by the Panama Canal. As a result, the country has developed on two main axes: one north-south along the Panama Canal, and the other east-west along the Pacific Coast in the south of the country and west of the Colon-Panama City Corridor. Except for the relatively unexplored and sparsely populated Darien Province, where air travel and coastal shipping are almost the only means of transportation available, road transport is the basic mover of domestic freight and passengers. The development of road transport followed the improvement and extension of the highway network. The network consists of some 8,900 km, of which about 2,800 km are paved, 3,700 km have gravel surface and about 2,400 km are earth feeder roads. Although some expansion and upgrading, especially of secondary and feeder roads, would be necessary to meet growing requirements and to give access to still isolated and undeveloped areas, maintenance and rehabilitation of the existing network are the highest priorities in the subsector.

1.02 To date, the Bank's involvement in the road subsector has consisted of four projects and the provision of technical assistance as executing agency for the UNDP-financed 1974 National Transport Survey (NTS). The First Highway Project (Loan 123-PAN, US$5.9 million, July 1955) was for highway rehabilitation; the Second Highway Project (Loan 264-PAN, US$7.2 million, August 1960), was for feeder roads; the third project, the Highway Maintenance Project (Loan 1565-PAN, US$12.0 million, June 1978), is thesubject of this report; the fourth project is the ongoing Road Rehabilitation Project (Loan 2020-PAN, US$19.0 million, July 1981). Although the Bank did not finance any highway projects between 1960 and 1978, it substantially appraised two projects in 1966 and 1975. In the first case, the Government withdrew the loan application, while in the second, financial constraints resulted in the allocation of Bank funds to another project in Panama of higher priority. The Highway Maintenance Project re-established a working relationship between the Ministry of Public Works (MOP) and the Bank.

1.03 This completion report is based on information obtained from the Minutes of the Board Meeting, the LAC Information Center, Project Appraisal Report No. 1891-PAN, staff supervision reports, and data collected from MOP on project costs.

II. PROJECT PREPARATION, APPRAISAL AND NEGOTIATIONS

2.01 The UNDP-financed NTS, carried out by a Canadian consulting firm and completed in 1974, identified high priority projects in the transport sector and instigated important institutional improvements, particularly the

establishment of a separate Road Maintenance Department (DNM) within MOP. With regard to highways, the NTS recommended that much greater emphasis be placed on road maintenance and that a systematic program to prevent highway deterioration be developed and implemented. The program, covering the four-year period 1979-1982, was formulated by MOP's Department of Planning and DNM. The basis of the maintenance program was a summary road condition inventory carried out in 1976 by DNM with the assistance of Mexican consultants.

2.02 The project was defined with the objective of building within MOP, over a four-year period, the necessary capacity to carry out annually a program of scheduled maintenance activities prescribed in DNM's highway maintenance manual. To that effect, the project included the replacement and overhaul of existing maintenance equipment, the provision of spare parts necessary to overhaul salvageable units, and technical assistance in the areas of (a) maintenance organization and management, (b) annual maintenance programing, (c) equipment and workshop management, (d) administration and accounting, (e) personnel training, and (f) identification of rehabilitation requirements.

2.03 The project was appraised in December 1977. Since the appraisal mission's recommendation did not differ substantially from the approach agreed within the Bank prior to appraisal, no Decision Meeting was held, and a combined Issues Paper/Decision Memorandum was issued on December 13, 1977. The paper dealt mainly with the timing of the approval of a new Organic Law formalizing the functions of the four directorates within MOP, and with seeking agreement with the Government on a timetable for implementing vehicle weight regulations.

2.04 Negotiations were conducted in Washington, between March 27 and March 31, 1978, and a loan amounting to US$12.0 million was approved by the Executive Directors on May 11, 1978.

2.05 The approved project elements and their estimated costs, as given in the appraisal report, are shown on the following page. All project elements were expected to be completed by December 1982 and the loan closing date was set at March 31, 1983.

III. PROJECT EXECUTION

3.01 Technical assistance by consultants to help MOP plan and implement management improvements for road maintenance and related equipment force account operations was fundamental to the basic project concept. Financing for new equipment, spare parts, workshop improvements and staff training was to provide resources needed for maintaining the roads efficiently.

	US$ Millions			Estimated Foreign Exchange Component %
	Local	Foreign	Total	
(a) Equipment and Spare Parts				
(i) Road Maintenance Equipment	0.35	7.23	7.58	95
(ii) Initial Stock of Spares for New Units	0.04	0.85	0.89	95
(iii) Spare Parts for Overhauls	0.07	0.43	0.50	85
(iv) Workshop Tools and Equipment	0.01	0.10	0.11	90
Subtotal	0.47	8.61	9.08	
(b) Technical Assistance	0.28	1.41	1.69	
Base Cost	0.75	10.02	10.77	83
(c) Contingencies				
Physical (10% of (a) (iii) and (iv))	0.01	0.05	0.06	
Price Escalation (about 19% of Base Cost plus Physical Contingencies)	0.15	1.93	2.08	
Total Project	0.91	12.00	12.91	93

Technical Assistance

3.02 Outline terms of reference for technical assistance in highway maintenance and equipment management, by a consulting firm, as well as outline job descriptions for the two key MOP counterparts, i.e., (i) the Senior Maintenance Engineer, in charge of program coordination, and (ii) the Equipment Fleet Manager, were agreed at the time of negotiations. The appointment of these two counterparts, a condition for loan effectiveness, was made in June, 1978, and proposals for providing technical assistance from a short list of four foreign consulting firms were received in August 1978.

3.03 The evaluation of the proposals and the selection of a firm were interrupted by a cabinet reshuffle which changed the Minister of Public Works. The new cabinet decided that contracting a foreign firm was too costly and proposed, instead, to contract individual consultants, with preference to be accorded to qualified Panamanian engineers. In January 1979, the Bank and MOP reached an agreement to try this alternative with the provision that, if suitably qualified free agents could not be engaged within a reasonable period of time, MOP would contract staff from specialized firms; it was also agreed that, if the results of this technical assistance proved unsatisfactory, a firm of consultants would be contracted, at a later date,

to complete the services. In addition, it was agreed that MOP would engage a local consultant as coordinator to provide direction and management to the consulting team effort, as well as liaison with MOP's management.

3.04 Locating and engaging suitably qualified staff was not easy. Bank missions provided assistance in framing individual terms of reference and conditions of contract for both foreign and local specialists. The coordinator and an expatriate road maintenance management advisor initiated the services in August 1979, joined in less than a month by the equipment and workshop management advisor (also an expatriate). Initial contracts were for 18 months of service with a provision for extension. Two field specialists (Panamanians), to work in the provinces with the road maintenance and workshop staff, joined the group in November, 1979. Another two Panamanian specialists started shortly thereafter, one working on improving purchasing and supply procedures and the other introducing the use of computer systems. No suitable Panamanian candidates were found to provide assistance in management accounting or staff training. MOP, however, agreed to seek candidates through specialized international firms.

3.05 The presence of a relatively highly paid expatriate civil engineer among the technical assistants (all contracts are published in the press) raised bitter opposition from the Panamanian Society of Civil Engineers and Architects (PSCEA) and became a "cause celebre" in the Panamanian news media. Although MOP obtained support from the Association of Consulting Engineers, the PSCEA challenged the legality of the contracting procedure on the grounds that efforts had not first been made to find qualified Panamanian engineers for the job. The situation developed into a standoff but, without doubt, contributed to the decision by MOP not to extend the services of the two expatriates at the end of their contracts (January and February 1981).

3.06 Cabinet changes in January 1981 led to a second change of the Minister of Public Works. An extension of the technical assistance financed under Loan 1565-PAN had just been agreed between MOP and the Bank, in parallel with the negotiations for the Road Rehabilitation Project (Loan 2020-PAN) which provided additional and expanded technical assistance in equipment and workshop management as well as for carrying out training once a satisfactory program had been decided. The new Minister replaced most of the Panamanian professionals on the technical assistance teams with engineers of his choosing, once the first-phase contracts expired. Since the new candidates were sufficiently experienced and had the confidence of the Minister, the Bank agreed to the changes. Moreover, the consultant coordinator and field workshop specialist remained unchanged and provided some continuity. Specialist contracts were again typically for periods of 18 months or less, with provision for extension. With these staff changes came a new orientation of the services with greater emphasis on "troubleshooting" (not exclusively for road maintenance problems).

3.07 During the 1980/81 period, several ways of obtaining specialist help in establishing a training unit and in management (cost) accounting were explored. Tentative discussions concerning training were started with two foreign firms. This idea was dropped in favor of procuring assistance through a local center for vocational training (SENAFORP) established under the Ministry of Labor and supported by ILO. A tentative agreement between the two ministries was signed in late 1980, and a more detailed agreement,

dividing the services into program preparation (financed under Loan 1565-PAN) and execution of the agreed program (financed under Loan 2020-PAN), was signed in January 1982.

3.08 Less progress was made in obtaining management accountancy assistance. Locally established, internationally recognized auditing firms were invited to informally submit detailed terms of reference and proposals for services, but this line of action was not followed up after the second change of MOP management.

3.09 A third change in the Minister of Public Works accompanied the change in the Presidency in July 1982. This time, the coordinating consultant was replaced, and the staffing for a third and final phase of technical assistance was agreed between MOP and Bank missions. The staffing plan for this phase considered that the equipment and workshop management assistance services, provided for under Loan 2020-PAN, would start in January 1983. In fact, the start of this assistance was delayed until June 16, 1983.

Project Implementation

Road Maintenance Program

3.10 Implementation of improved systems in programing, executing and controlling road maintenance activities was pioneered in two pilot provinces, Panama (West) and Los Santos (Map IBRD No. 15638 (PCR)). These provinces were selected to provide experience with different geographic locations and roadnet characteristics, representative of a range of conditions, in terms of traffic volumes, logistic and support problems as well as other variables which could affect maintenance implementation in the remaining provinces.

3.11 Systems development took place during 1980 within the context of limitations on available workforce, equipment and budget. MOP could make available additional workers who were being laid off from "emergency" programs but could not engage new workers; also, pending the arrival of new equipment purchased under the project, transfers of additional equipment from adjacent provinces were not judged politically possible; however, newly overhauled equipment was sent to the pilot areas. In both pilot provinces, aged paved roads of obvious priority and urgently in need of rehabilitation or strengthening consumed disproportionate amounts of maintenance effort to keep them in acceptable condition. This action limited maintenance work on roads representing more "normal" circumstances. Increasing the allocation of maintenance funds to pilot provinces at the expense of other provinces was not deemed possible. In addition, 1980 was an election year, and pre-election projects diverted resources from the maintenance program, leaving a heritage of fuel shortages which forced rationing of fuel in the last quarter of the year. Nonetheless, sufficient progress was made to justify an expansion of the program to all other provinces in 1981, coinciding with distribution of newly delivered equipment financed under the project. The pilot provinces then served as demonstration and training nuclei and were expected to continue innovation, development and fine tuning of further improvements in maintenance activities.

3.12 Of particular success during this pilot phase was the establishment of Programing, Evaluation and Control (PEC) units in MOP Headquarters and at the pilot provincial level. These units began to provide basic data as well as relatively accurate records of the cost of road repair work actually performed. The role and responsibilities of the newly created position of provincial maintenance engineer was also developed and tested in the pilot provinces. Both record-keeping and the use of the information by the Road Maintenance Directorate (DMV) are still being developed. For instance, there are no records of how much work was done on specific roads (data are recorded by province) nor of the annual programing and budgetary process utilizing the available data on past performance. The pilot experience also made it evident that provision of high caliber management staff at all levels of the new Equipment and Workshop Directorate was critical to continued improvement of road maintenance operations. Intensified technical assistance to the Directorate, including local, management caliber staff to assist in developing managers, was included in the Road Rehabilitation Project (Loan 2020-PAN).

3.13 The change in MOP management in early 1981 led to markedly greater priority being given to road repair and rehabilitation of Panama City and provincial town streets, work which had not originally been included when determining the equipment and budget requirements of the Highway Maintenance Project. The appointment of provincial maintenance engineers and the creation of PEC units in the non-pilot provinces proceeded on schedule, but much of this effort was diverted to meeting the new MOP priorities.

3.14 The new minister, with a few aides, assumed almost personal control of MOP force account operations. Road maintenance and equipment funds, previously managed by the responsible Directorates, whose headquarters were in David, were placed under central control, pooled with all other recurrent budget funds and spent as directed by the minister. One positive effect of the new management was the repair of a considerable length of town streets as well as an increased tempo in highway pavement repair. On the negative side, preventive maintenance was largely disregarded, and the Maintenance Directorate was virtually disbanded as its staff was transferred or reassigned to production tasks. The Maintenance Director had been replaced at the time the new minister had been appointed; his successor was discharged after a few months, and, for a considerable time, the position remained unfilled. Expansion of the coverage given by the maintenance program to the roadnet and improvement of the resource and operational management systems slowed or halted. Some of the equipment intended for use by the provinces was reassigned to Panama City. Systematic programing and control were downplayed, and physical production at almost any cost was given paramount importance.

3.15 Some progress was made, however, in starting periodic maintenance work and in bringing non-pilot provinces into the program. In mid-1982, the Bank agreed that the town streets, including those of Panama City, be brought into the scope of the project in an attempt to introduce more order into the operations of these areas of relatively high activity; little progress has been made, however, because of a shortage of staff to develop the work standards.

3.16 The third and latest change of Ministers of Public Works occurred in August 1982, after the new President assumed office. Under this management, a process of restaffing the Directorate of Maintenance has taken place. Provincial and regional maintenance engineers have been appointed to vacancies that developed. Insofar as possible, staff previously involved in, and familiar with, the program have been recalled from other assignments. Emphasis is again being given to improving management in order to increase crew productivity, work quality and equipment utilization. However, inaction on the part of the cabinet, followed by weeks of waiting for executive approval, delayed the start of the technical assistance contract for strengthening equipment and workshop management (under Loan 2020-PAN) by six months. Improvement in these areas remains crucial for continued improvement of road maintenance performance.

Equipment Procurement

3.17 Preparation of specifications and bidding documents for acquisition of maintenance equipment took place during the second and third quarters of 1979, largely without consultant assistance. Bids were taken for 416 units of equipment and vehicles (in 33 lots) on January 30, 1980. Five lots received insufficient offers to be legally acceptable.

3.18 Bid evaluation, awards and formalizing of supply contracts took over six months. The evaluation committee, composed of seven MOP staff (four technical and three legal or administrative) as well as two Government representatives, one from the Ministry of the Interior and one from the Controller General's office, completed their recommendations before the end of March 1980. A major delaying factor was the lack of understanding of the system of "lowest evaluated bid" on the part of Government officials and the cabinet, outside of MOP, which also had to approve the contract awards. This misunderstanding led to lengthy reviews and explanations by MOP of the departure from "lowest price" criteria. Eventually, four additional lots were declared void for lack of sufficient responsive bids. Contracts for 24 lots of equipment were signed and approved in the June to August 1980 period. Eight lots were rebid with bids taken in July 1980 (one lot had been discarded because the equipment was judged too expensive).

3.19 Equipment deliveries started in November 1980 and continued through June 1981. Because of delays in awarding contracts, cost increases affected eleven lots, increasing foreign costs about 5% to about US$8.4 million. Table 1 summarizes the equipment acquired.

3.20 Orders for fast-moving spare parts for this new equipment were placed separately, over a span of two years. The spare parts requirements were carefully studied with the help of equipment experts from the technical assistance. A hiatus in preparing and placing orders occurred between late 1981 and early 1982 when the then remaining equipment specialist was seriously injured in an automobile accident. The process of parts procurement was also delayed by cumbersome Government procurement controls.

3.21 Training for mechanics and in equipment operation was provided by all suppliers; however, in some cases, the level was too superficial to

ensure that operators could really put the equipment to use under field conditions. Further assistance in training is currently being provided under Loan 2020-PAN.

Equipment Overhaul

3.22 Concurrently with the acquisition of new equipment, a program for rehabilitating broken down MOP equipment was started in late 1979 and early 1980. Identification, screening and selection of equipment and vehicles were conducted with consultant assistance. In general, a limit on spare parts costs of 25% of equipment replacement value, a criterion which had been agreed with Bank missions, was applied during the screening process and confirmed before part orders were placed, after the equipment had been subjected to close inspection in one of the shops.

3.23 Progress on equipment overhaul was always far slower than programed. Constraints included lack of space in the workshop and shortages of really qualified mechanical staff (both also needed for repairs of operational equipment and vehicles). The main causes for delay, however, were time-consuming procedures and controls on placing spare part orders. To accelerate approvals and reduce re-typing of lists of spare parts, MOP arranged to have representatives of other Ministries, involved in the approval process, posted to MOP. Placing an order now takes about three to four weeks, compared to several months in some of the earlier instances.

3.24 Aggravating the slow process of equipment overhaul was the continued cannibalization of partly overhauled equipment awaiting parts deliveries, to keep working units operational. This reflects the lack of an urgently needed spare parts storage/distribution system and of Government financial arrangements to keep such a system operational. Introducing spare parts management is one of the objectives of the recently started technical assistance financed under Loan 2020-PAN.

3.25 Of 112 units originally selected for overhaul, 42 were dropped from the program because of the high costs of spare parts needed, 53 units had been overhauled, and 17 more were still under repair at the time the loan closed. The total disbursed for spare parts is about US$0.7 million.

Equipment Renewal and Disposal

3.26 In order to clear space in MOP's workshops, a program for identifying and scrapping useless equipment was initiated in 1979. Removal of scrap equipment from provincial yards to several old quarries was arranged with the Ministry of Interior in 1980. After this single effort, the scrapping program came to a standstill. The Panama City MOP workshop, one of the three large shops in the country, was never cleared.

3.27 No program of systematic equipment renewal has been prepared. Lack of qualified staff to prepare and implement such a program, as in most matters relating to equipment and workshop management, has been the primary cause of delay, which has been aggravated further by the delay in starting

additional technical assistance under Loan 2020-PAN. The preparation of a renewal program is becoming more urgent every year as the existing fleet ages.

Workshop Tools

3.28 About US$140,000 for mechanic tools was also financed under the loan. These tools were received in early 1982 and progressively distributed to provincial workshops once an adequate toolroom and tool control system was in place.

Vehicle Weight Control

3.29 Controlling of overweight vehicles was re-established in a two-step process. In 1979, vehicle weighing was resumed at the four existing stations. Overweight vehicles received warnings, and MOP contacted shippers who repeatedly dispatched overweight trucks. In 1980, overweight trucks began to receive summonses. However, the existing law regulating truck weights does not prescribe sanctions, and fines levied by traffic judges have been too light to discourage overloading. MOP has prepared a draft of a new law, which is under consideration by the Government, specifying stiffer penalties and has begun a program to inform the public,police and traffic judges of the damage caused by overloading. Loan 2020-PAN provides financing for constructing and equipping four new fixed stations and equipment for several mobile weight control teams.

Road Rehabilitation Program

3.30 The project called for identification of road rehabilitation priorities since the highway maintenance program was not dimensioned to provide the resources for rebuilding pavements. In early 1980, MOP prepared a first list of roads which had perceived priority to be rehabilitated. With help of the technical assistance consultants and the Bank, a more comprehensive screening program was undertaken during 1980, resulting in a condition inventory and assessment of rehabilitation requirements on all roads with daily average traffic volumes greater than 100 vehicles.

3.31 Evaluation of these rehabilitation data, again with Bank assistance, served as the basis for preparing the Road Rehabilitation Project (Loan 2020-PAN, July 24, 1981). To improve MOP's pavement evaluation capability, purchase of a Maysmeter was financed under the Loan to permit the use of pavement roughness measurements in confirming perceived priorities during the second and subsequent years of the rehabilitation program. Technical assistance was also financed to help calibrate the equipment and train MOP staff in its use and in utilizing the Bank's HDM model. The latter phase of this assistance was also delayed until mid-June 1983 while awaiting Government approval of the consultants' second phase contract with MOP. The consultants did not actually provide the second phase services until December 1982. The delay in this case was initially attributable to waiting for MOP to complete the collection of field data and arrange for access to a suitable computer after which there was a wait until the consultant's staff could again be made available.

IV. COST ESTIMATES AND DISBURSEMENTS

4.01 A summary comparison between appraisal estimates and final costs is shown in Table 2. The final total cost of the project was US$12.92 million, essentially the same as the appraisal estimate of US$12.91 million. The hiring of individual consultants resulted in savings that were utilized to purchase additional spare parts.

4.02 The allocation of loan funds was formally revised once, in September 1981, to cover increases in the cost of road maintenance equipment (Category I). As of January 1, 1983, the uncommitted balance of loan funds was about US$710,000. MOP and the Bank agreed on the use of the remaining funds for (i) purchase of two vehicles for use in the training program (US$16,000), (ii) completing the purchase of fast-moving spare parts for new equipment financed under the project (about US$130,000), (iii) purchase of additional spare parts for equipment overhaul (about US$330,000), (iv) additional workshop equipment (about US$30,000), and (v) the remaining technical assistance services (about US$205,000). The original, revised and expected final allocations are shown below:

Category	Original Allocation	Revision 09-30-81	Final Allocation
1. Road Maintenance Equipment	7,230,000	8,375,000	8,555,000
2. Spare Parts Inventory for New Equipment	850,000	850,000	1,292,000
3. Spare Parts for Overhauls	473,000	473,000	839,000
4. Workshop Tools and Equipment	110,000	110,000	137,000
5. Technical Assistance	1,410,000	1,410,000	1,177,000
6. Unallocated	1,927,000	782,000	-
	12,000,000	12,000,000	12,000,000

4.03 Because of the substantial delays experienced in project implementation, disbursement lagged considerably behind appraisal estimates, as shown below. Disbursement against procured goods was set at 100% of the foreign expenditures for direct imports, or 85% of the total expenditures for imported but locally procured equipment and parts. In the case of technical assistance, disbursements were 100% of foreign expenditures, or 83% of total expenditures.

Fiscal Year	Appraisal Estimate		Actual	
	Amount	% of Total	Amount	% of Appraisal Estimate
1979	5.3	44	0.0	0
1980	10.8	90	0.1	0.1
1981	11.2	93	7.9	71.0
1982	11.8	98	10.6	90.0
1983	12.0	100	11.3	94.0
1984			12.0	100.0

4.04 The original closing date of March 31, 1983 was extended once, to December 31, 1983.

V. ECONOMIC REEVALUATION

5.01 As explained in previous chapters, the 1978-1982 Highway Maintenance Program was not fully implemented as envisaged in the project appraisal. Delays in equipment procurement and difficulties in hiring the appropriate consultants postponed the initiation of the project. In addition, resources were partially shifted toward the maintenance of town and city streets, many in need of rehabilitation but not included in the original program. With the implementation of the ongoing Road Rehabilitation Project, some current, heavy demands for maintenance resources will be reduced. Also, the inclusion in the maintenance program of town and city streets should lead to improved management of available resources, permitting the planning and execution of maintenance operations to improve. Furthermore, important elements of the institution-building components of the project have presently reached only an embryonic stage, but are expected to be fully developed under Loan 2020-PAN. As a result, a project, comparable in the economic sense to the one defined at the time of appraisal, is expected to be completed under the ongoing Road Rehabilitation Project, and a meaningful quantitative evaluation of the Road Maintenance Program has been postponed until the completion of that project.

5.02 The preceding discussion exemplifies the difficulties inherent in carrying out a quantitative evaluation of a road maintenance project in which the institutional building objectives play a paramount role, but are very rarely achieved in the context of one Bank project. The continued implementation under the Road Rehabilitation Project of critical technical assistance components, especially equipment management and Phase II of the training program, provides an opportunity to strengthen MOP's maintenance management and capacity as envisaged at appraisal. Furthermore, under Loan 2020-PAN, efforts would be made to improve relevant data collection substantially in order to make possible the quantification of costs and benefits of different maintenance operations with a methodology similar to the one used in the appraisal.

VI. INSTITUTIONAL DEVELOPMENT AND PERFORMANCE OF THE BORROWER AND THE TECHNICAL ASSISTANCE

Institutional Development

6.01 The passage of the law in 1978 that sanctioned a new MOP organization provided a reasonable basis for institutional development; however, performance in this respect fell short of potential. Each of the three changes of Minister of Public Works (1978, 1981 and 1982) 1/ led to changes in MOP directors and some organizational modifications which often seemed motivated

1/ Another change of Ministers took place in September 1983, which has had little effect on the project.

by suiting jobs to selected managers and the Minister's management style. Although some of the changes resulted in improved or equal alternatives, modifications of rudimentary changes have prevented the new institutional framework from taking root so that the internal organization, staffing and procedures within the various directorates could be fully developed.

6.02 The 1978-81 MOP administration adhered quite closely to the organization contained in the 1978 law. MOP headquarters was divided into two divisions, administrative and engineering, the latter consisting of eight technical directorates. The field organization comprised nine provincial directorates and two metropolitan offices (one each for streets and public buildings). During 1980, MOP headquarters was consolidated from four offices, in different parts of Panama City, into a complex of buildings reverting from the former Canal Zone. However, the Road Maintenance (DMV) and the newly created Equipment Workshop (DET) Directorates remained based in David (near the Costa Rican border), where most of the administrative and support staff for force account operations (except for supply functions) were located. With assistance from project consulting staff, PEC units were established both at headquarters and in the field as the backbone for program and project management. Three regional offices were also created to help manage the use of equipment and periodic maintenance crews in several adjacent provinces.

6.03 The MOP administration which took office in early 1981 reorganized three of the headquarters directorates and centralized control of Road Maintenance, Equipment and Workshops and of the budgets for these operations in Panama (but left the administrative staff in David). The DMV in David was depleted of technical staff without providing for its functions in Panama City, and the Panama City workshop became the de facto equipment and workshops center, without being organized for this dual role. Not until late in 1982 was the decision taken to utilize Agua Dulce, in Cocle province, as the management and support center for provincial shops in order to separate this role from the daily activities of the equipment fleet working in Panama City. Little attention was given to improving systems and control, while emphasis was placed on ad hoc, spur of the moment problem-solving, not conducive to institutional development.

6.04 The current MOP administration has moved to restore institutional order and has reestablished the Road Maintenance Directorate and the maintenance field organization, although the final decision on the maintenance headquarters location is still pending. Workshops and Equipment have been split into two directorates, raising potential problems of coordination.1/

6.05 DET has been the most serious institutional problem throughout. Created by the 1978 law (equipment and workshop units had previously been part of the National Directorate for Maintenance), it was never provided with the line managers and mechanical staff needed. On the basis of an internal organization which was approved in 1980, MOP's 1981 budget provided an additional 169 staff positions to meet DET needs. Loan 2020-PAN includes

1/ A position of coordinator was established in December 1983.

technical assistance consultants to help DET and provides financing to contract experienced local staff in order to set up the organization and train junior MOP staff in equipment management. Although consultants were selected in mid-1982, contracting has been held up because inefficient bureaucratic procedures delayed the start of their services to June 1983.

6.06 In the provinces, the separation of road maintenance activities from other force account work had, to a limited extent, been realized by having non-maintenance work recorded separately from maintenance work. Since the same crews and equipment are used, most other work is performed at the cost of not performing some sort of maintenance. Fortunately, the amount of other work has, in general, been small except for urban street rehabilitation.

6.07 The exclusion of maintenance of provincial town streets and of Panama City streets from the program, as it was appraised, led to a continuous problem of competition for the same resources, staff and often budget. MOP's Provincial Engineers are responsible for the town streets, and MOP has a unit responsible for Panama City streets. The implementation of maintenance programs which did not provide for street maintenance soon encountered problems on this account, the more so since street maintenance was increasingly given high priority. MOP is presently engaged in expanding the maintenance programing and control systems to include streets.

Training

6.08 Another factor which limited institutional development, was the late start of the training program. Besides the training of skilled workers and foremen, training of junior and middle managers as well as clerks and support staff is necessary when new procedures and systems are introduced. The only significant training of this kind was given, with assistance from the consultants, to the staff of the PEC units. Training of skilled workers and foremen is currently being started.

Performance of the Borrower

6.09 MOP's performance in implementing the project depended upon the Minister in charge and his perception of maintenance. All have supported the concept that priority be given to maintenance, but the importance given to developing and introducing management systems as a means to improve performance and quality has varied considerably. In general, MOP has tried to comply with the loan covenants, has succeeded in reestablishing the process of identifying overweight vehicles, and presently is engaged in expanding a weight control program, in introducing effective sanctions and in orienting the public, truckers, police and traffic judges on the need for such controls. Budget preparation has been improved, and measures are under way to improve accounting practices and financial control. The PEC system has established the basis for eventual improvement of control of force account work.

6.10 The Government's performance in matters relating to procurement (purchasing and contracting) has consistently been unsatisfactory. Time consuming verifications and approvals by the Ministry of Planning and Economic Policy, by the Cabinet Council, and by the Controller General's Office, capped by the need for presidential signature endorsing what should be routine decisions, have resulted in long delays. Each Minister appears to have the power to interfere with the approval of contracts with other ministries. The delays inherent in contracting works undoubtedly contribute to the tendency to use force account whenever speed or certainty are of importance. Equipment procurement, financed by the loan, was delayed by questioning, after awards had been made, of the "lowest evaluated bid" criteria which MOP had accepted. This delay resulted in cost increases of about 5%. Spare parts procurement has been handled, on the whole, in an even worse manner, delaying equipment overhaul. Initially, approvals of price quotations took so long that parts prices had changed and the whole process had to be repeated. The situation was improved by having representatives of approving agencies posted in MOP in order to avoid each agency working in sequence and retyping lists prepared previously. Approval to purchase spare parts now takes about 21 days when actively followed up. Contracting of consulting firms for major contracts has, to date, always been subject to delay in gaining official approval, although individual consultants, for whom amounts involved are smaller, were contracted relatively quickly. The real value of importing expertise in order to be able to introduce improvements rapidly is not sufficiently appreciated and the perceived higher costs of consultants, compared to MOP staff, tend to encourage the seeking of in-house solutions.

6.11 The inability of MOP to provide qualified staff and counterparts in DET has delayed and limited improved performance in the critical equipment/workshop sector. In consequence, compliance with the substance and intent of covenants relating to: (i) instituting an equipment scrapping and renewal program; (ii) satisfactory maintenance of equipment; and (iii) developing equipment availability data, has only been partial. Noncompetitive salaries are a part of the problem, but lack of recognition within MOP of the need for non-civil engineering technical staff also affects job attractiveness. The size of the country and the nature of private sector activity also severely limit opportunities for Panamanians to acquire relevant experience in managing anything comparable to MOP's fleet of about 2,000 units and the supporting workshop system. These problems were recognized by MOP and the Bank in providing for a far stronger technical assistance effort under the Road Rehabilitation Project, Loan 2020-PAN. However,there have been two years of delay in starting this technical assistance.

6.12 Provision of adequate budgets for road maintenance has also proved to be a problem, in particular the budgets for spare parts, fuel and lubricants, and materials. In most years, the Government provided supplementary mid-year allocations to cover budget inadequacies, but, in mid-1982, the mid-year modification reduced the maintenance budget. Effective maintenance requires timely release of funds, and uncertainty regarding the eventual size of the available budget complicates effective management. The commitment of

the Government to fully fund maintenance needs at the expense, if necessary, of the investment budget is evidently still lacking.

Performance of Consulting Services

6.13 Technical assistance by individually contracted consultants rather than a firm has had both positive and negative aspects. Administratively, it proved more difficult to locate and engage staff with previous technical assistance experience, particularly with the strong pressure for giving preference to Panamanian professionals. Consequently, for most staff, the role was novel, and everything had to be developed from scratch. Delays in engaging consultants for training and in accountancy, as well as lack of MOP counterparts, especially in mechanical matters, left gaps in the assistance needed to develop and establish an integral system.

6.14 The consultants' terms of reference provided for coordination through regular monthly meetings of all individual consultants and their counterparts, at which progress and problems could be discussed, recommendations presented and decisions taken. It was understood, with MOP, that minutes of such meetings could serve as progress reports. These proposals were never implemented: meetings were generally held by smaller groups on particular problems, and effective progress reporting was almost nonexistent. In spite of constant prompting, reports received by the Bank were usually delayed and not very informative.

6.15 Integration of the technical assistance into MOP operations was far above normal to the extent that most experts became part of the MOP staff. However, this situation resulted in some diffusion of effort from purely project matters. In some cases, this had positive effects on MOP's overall performance while, in others, it led to neglect of some project objectives.

6.16 A consulting firm could have been expected to provide a much more rapid startup by introducing and adapting systems developed in other countries through the employment of staff with previous technical assistance experience. Also, delays in mobilizing parts of the total group and changes in staff would probably have been avoided. A firm may have been able to exert more pressure on MOP to provide lacking resources and counterpart staff, since the perception of its own performance would have been at stake. Such an arrangement could, however, also have led to more confrontation. The use of individual consultants, most of them Panamanian, and their integration into MOP activities led to a relatively high participation by regular MOP staff in developing and introducing new procedures. The full effect of MOP's junior and mid-level staff involvement in road maintenenance may not be seen for several years.

VII. ROLE OF THE BANK

7.01 The Bank contributed significantly to project identification and provided direct assistance to MOP in project preparation. The type of project was well chosen and addressed priority needs in the road subsector. However, the exclusion of the maintenance needs of the Panama City street system and of the resource requirements for provincial town street maintenance, in the interests of simplicity and of lack of data, resulted in complications during implementation.

7.02 The project was within MOP's capacity to carry through, except in respect to the number of available, qualified mechanical service staff. When this deficiency became evident, the Bank participated significantly in providing additional assistance under the followup Road Rehabilitation Project as part of a number of measures intended to complement the ongoing road maintenance program. Unfortunately, delays in implementing these measures have continued to slow the pace of improvement under the two projects.

7.03 The Bank displayed understanding and flexibility in accepting a fundamental change in the manner in which technical assistance would be procured and, subsequently, in helping MOP to adjust the technical assistance under the project to meet changed priorities and delays in portions of the project. Substitution of individual consultants for a specialized firm has had both positive and negative effects, as discussed previously. In the context of Panamanian conditions and perceptions, the Bank's acceptance has probably proved to be the right choice and has provided the opportunity for sustaining a dialogue with several consecutive MOP administrations. The ministry has only itself to blame for slow or unsatisfactory progress in attaining project goals and no consulting firm as a scapegoat. In consequence, each new management has had to consider its own course of action in improving maintenance performance.

7.04 Bank staff assisted MOP considerably in preparing terms of reference for all technical assistance services and in drafting equitable contract terms for such services. The position of coordinator was created at the Bank's request. This post has proved most important in keeping vital issues before MOP management, even though satisfactory decisions were not always forthcoming as a consequence.

7.05 Bank supervision was generally adequate and included support as well as supplementary technical assistance to the program by providing experts on equipment and training as participants on a number of missions.

7.06 In addition, Bank missions assisted MOP staff and the technical assistance coordinator in organizing the preparation of the study of road rehabilitation requirements which served as the basis for Loan 2020-PAN. As part of this work, the Bank financed additional technical assistance to train MOP staff in gathering and interpreting road roughness data to introduce one of the inputs in starting a systematic pavement management system.

VIII. CONCLUSIONS

8.01 Although the objective of providing MOP with the capacity to carry out an agreed program of maintenance operations over the national highway network, together with related organizational improvements, has only partially been met, significant progress was made and the foundation for continued progress has been established. The orientation of MOP maintenance staff toward work programing as a basis for control and the separation of recurrent and cyclical maintenance from improvement projects should have a lasting effect.

8.02 Institutional improvement has also progressed, although organizational stability is still tenuous in the light of the recent history of frequent cabinet changes. However, internally, MOP's own perception of the need for further improvement in areas such as procurement, equipment and workshop management, staff training, pavement management systems and vehicle weight control have been heightened in spite of the difficulties encountered in trying to make such improvements.

8.03 One particular lesson which can be learned concerns project concept and design. Any proposed project which has improved resources management as an objective must consider and provide for all competing demands for the resources, even though the project may focus on supporting one of them in particular. In this project, the lack of provision for establishing control over maintenance of city and town streets proved troublesome. Similarly, ignoring the presence of non-maintenance force account operations, instead of providing for controlling them, could have proved more troublesome than it did had more funding been made available for these non-maintenance activities.

8.04 A second lesson which can be learned concerns the difficulty in obtaining timely approvals of contracts in Panama. This problem lies outside the authority of a single ministry such as MOP, but has been the core problem which delayed implementation of this project, and it continues to delay complementary measures under the subsequent project, Loan 2020-PAN. Even though provision exists in the budget, the work is within estimated cost, and approvals are forthcoming from the Ministry of Planning and Economic Policy and from the Controller General, the Minister still does not have the authority to proceed without cabinet approval and eventual Presidential signature. This is a matter which needs to be dealt with in a country context, and not in the framework of individual project lending.

TABLE 1

PANAMA

HIGHWAY MAINTENANCE PROJECT (LOAN 1565-PAN)

PROJECT COMPLETION REPORT

Equipment Purchased Under the Project

Equipment	N° of Units	Total Cost (US$) 1/
Pick-ups	24	153,700
Land cruisers	22	158,300
Light trucks	94	838,100
Water tank trucks	12	428,200
Dump trucks	50	1,880,000
Stake trucks	5	163,900
Mobile greasing units	4	218,200
Trucks for bridge painting	4	229,900
Tow trucks	2	207,200
Asphalt distributors	5	260,000
Graders	25	1,349,500
Pneumatic rollers	12	417,000
Vibrating rollers	9	208,800
Tandem rollers	8	295,800
Front end loaders	12	543,800
Backhoes	6	170,200
Grass cutters	7	178,000
Aggregate spreaders	1	54,200
Industrial motors	12	179,800
Air compressors, 350 cfm	2	77,500
Plate compactors	36	85,700
Pedestrian rollers	36	137,900
Asphalt kettles, towed	19	69,900
Air Compressors, 175 cfm	7	70,500
Centrifugal pumps	7	3,300
Mechanical sweepers	5	91,500
Asphalt mixing plants	7	83,700
Total		8,554,600

1/ Includes only foreign cost, which represents about 96% of the total cost.

TABLE 2

PANAMA

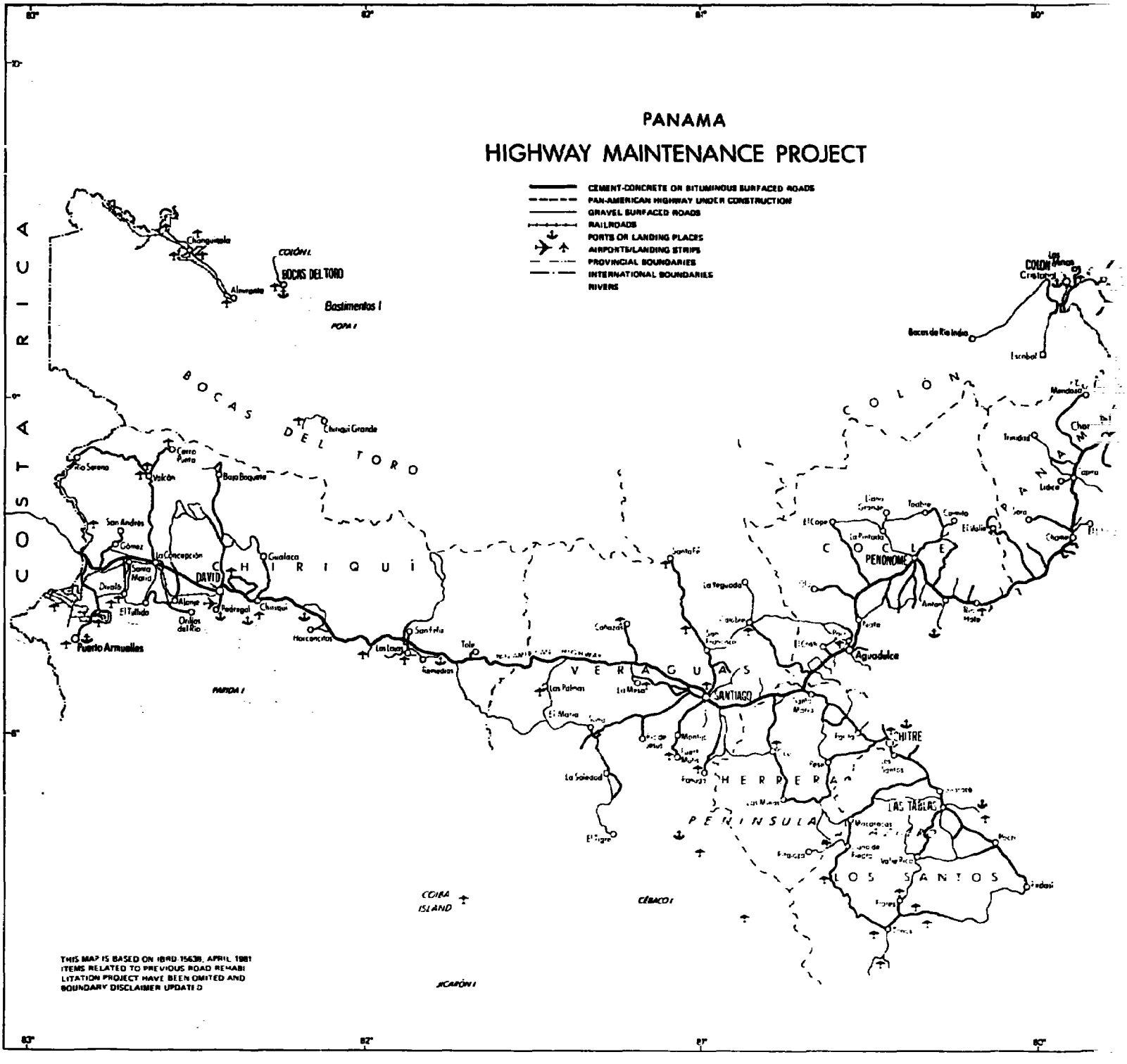
HIGHWAY MAINTENANCE PROJECT (LOAN 1565-PAN)

PROJECT COMPLETION REPORT

Project Cost
(US$ Million)

	Appraisal Estimates 1/	Estimated Final Cost 2/	% Variation
A. Equipment and Spare Parts			
(i) Road Maintenance Equipment	9.04	9.00	0
(ii) Initial Stock of Spares for New Units	1.06	1.36	+28
(iii) Spare Parts for Overhauls	0.66	0.99	+50
(iv) Workshop Tools and Equipment	0.14	0.15	+ 7
Sub-total	10.90	11.50	+6
B. Technical Assistance	2.01	1.42	-29
Total	12.91	12.92	0

1/ Including price and physical contingencies.
2/ Based on the same ratio of local cost to foreign cost as was used at appraisal.



THIS MAP IS BASED ON IBRD 15638, APRIL 1981
ITEMS RELATED TO PREVIOUS ROAD REHABILITATION PROJECT HAVE BEEN OMITED AND BOUNDARY DISCLAIMER UPDATED

IBRD-15638(PCR)