

ASIAN DEVELOPMENT BANK

TECHNICAL ASSISTANCE TA 901 - VAN

SOUTH PACIFIC REGIONAL

Contract CAS/S/88-112

SANTO PORT PROJECT

FINAL REPORT

SINCLAIR KNIGHT & PARTNERS  
Consulting Engineers

NOVEMBER 1991

**I. Introduction**

ADB has provided loan funds, ADB 843-VAN (SF) for the construction of a new wharf in Luganville, the principal town on Espiritu Santo. As a result of difficulties encountered in the pile foundations additional financial support for this wharf project was provided through a Supplementary Loan ADB 1080-VAN(SF).

To complement this planned major construction work, a technical assistance grant, ADB TA901-VAN has been provided for support of PWD and to act as an advisor to the Project Manager, Santo Port Project. The aim is to strengthen the technical capacity of Public Works Department to manage large construction contracts and continue engineering works for infrastructure restoration after major cyclone damage.

The Post Assignment questionnaire has been completed and forwarded directly to the ADB Central Projects Services Office, Consulting Services Division. In view of the categorization of the form as 'Confidential' the completed information is not necessarily included verbatim herein.

**II. Staffing**

The consultant travelled to Vanuatu on 31 July <sup>1988</sup> ~~1998~~ to commence duty and has remained on duty throughout the period up to 12 November 1991. Leave has been taken for recreation, major injury and to undertake necessary personal matters in Australia in view of the several extensions made to the project. Leave periods comprised:

17 July to 21 July 1989	Local leave in country
27 October to 18 November 1989	sick leave for injuries from motor accident
January 1990	medical checkup in Australia
2 May to 26 May 1990	Recreation leave then extension to consultancy
4 July to 6 July 1990	Local leave taken.
16 November to 21 November 1990	Medical checkup in Australia.
28 January to 11 February 1991	Leave taken while a contract extension negotiated.
2 May to 10 May 1991	Visit Australia to arrange education for eldest son.
29 July to 2 August 1991	Leave in Australia for personal legal business.

Five extensions of term or variations to the contract have been made by ADB in response to the Vanuatu Government's continuing need for assistance. These variations comprised:

Variation 1 :- increase in budget for internal travel with  
9 Dec 1988 inclusion of costs for operation of motor vehicle.

Variation 2:- extension of eight(8) months service with  
27 Apr 1990 corresponding increased budgets for other components, minor adjustment of rates. The variation responded to delays in approval of construction and delays from piling problems encountered by Fletcher Construction Co.

Variation 3:- approval of break in service 16 to 21 November  
28 Nov 1990 1990.

Variation 4:- extension of seven(7) months up to 14 September  
28 Jan 1991 1991 considered as part of request for Supplementary Loan for construction and approved without provision of home leave travel and miscellaneous expenses.

Variation 5:- extension of one(1) month up to 11 October 1991  
4 Oct 1991 provided to cater for addition to Terms of Reference of preparation of the Project Completion Report from the Borrower and delays to completion of final repairs by the Contractor.

Variation 6:- extension of approximately one month up  
1 Oct 1991 to 12 November 1991 to provide engineering review of proposed repairs recommended by Santo Port Supervision Consultant following damage to reclamation from slippage and erosion, provide advice to Vanuatu Government on design issues of safety of wharf and long term options. Provide engineering advice to PWD in place of Principal Design Engineer who has departed the country following contract expiry.

A copy of the implementation schedule for the Santo Port Project is provided as Figure 1 to show the slippage in timing that occurred between Appraisal Mission scheduling and Implementation Schedule actually achieved for the project.

### III. Office Services

The Consultant commenced service with PWD in the Old Pompidou Hospital Offices which were converted from hospital buildings surplus to needs following Independence. Accommodation was poor and overcrowded as a consequence of extensive damage and loss weatherproof areas in cyclone UMA (Feb 1987). In August 1989 the PWD relocated to temporary leased premises to allow for reconstruction of new office building sponsored by AIDAB. PWD relocated into their new office complex in February 1991. The Consultant was provided with a separate room rather than sharing facilities as in the past. In early July 1991 this happy circumstance was reversed by Ministerial order to vacate the upper floor of offices so as to accommodate ministerial staff and the President of Vanuatu in the new building.

The office accommodation for the final nine(9) months of the consultancy was co-located with the main office of PWD. As equipment was upgraded with relocation to the new building general office services of telephone, secretarial, photocopying, facsimile service and stationary supplies were available in house, of a satisfactory standard and reliable.

### IV. Santo Project Issues

#### A. Activities in Period

During the consultancy the Consultant was involved with the Executing Agency in all facets of the Santo Port Project. The range of issues dealt with are presented below by listing activities performed for PWD. Some milestones in construction are included, capitalised, to provide some chronological reference as to construction progress.

Prepare and despatch contract for Consulting Services for construction supervision to Cameron McNamara.

Review Tender and contract documents issued for prequalified bidders, provide comments for addenda to the Consultants.

Make arrangements for and take part in Tenderer's Meeting and site visits with interested tenderers.

Assist Director of Works with Tender Opening on 22 November 1988 and prepare Government report of opening to the Bank.

Review lowest tender for conditions, alternatives offered and explore possible cost savings. Coordinate with Supervision Consultant and prepare and despatch Tender Report to the Bank.

Activities continued..

Prepare basic training plan, then instruct laboratory technician in some basic skills and make arrangements for his further training with work in laboratory of the Supervising Consultant in Australia.

Prepare briefing for Project Manager assigned to the project and make administrative arrangements for his attendance at ADB Project Management Course in Manila, Philippines.

Arrange approval of tender award from Vanuatu Council of Ministers and then approval of any expenditure by Ministry of Finance. Follow up with advice to the Supervision Consultant and the Cocontractor on 14 April 1989.

Periodic visits to construction site, generally bimonthly, responding on minor technical issues, scope of work and submitting progress reports to PWD and ADB.

*PILE DRIVING COMMENCED ON SITE IN NOVEMBER 1989 AND REVEALED LOW RESISTANCE.*

Prepare certification for payments to Fletcher Construction Co, the Contractor, and Cameron McNamara Pty Ltd, the Supervising Consultant. Prepare documentation for all withdrawals of payments through period from ADB Loans.

Technical review and preparation of advice to Government on problems with piling and proposed modification.

Interpretation of pile load testing results, Successful tests were completed on 26 February and 13 June 1990.

*PRECASTING OF CONCRETE UNITS FOR WHARF DECK COMMENCED IN APRIL 1990 WITH THE FIRST INSITU CONCRETE PLACED ON PILES AND PRECAST UNITS IN AUGUST 1990.*

Review of design of wharf and overall safety and slope stability. Presentation of report to Director of Works for consideration of options for claim of damages for extra cost. Documentation made available to ADB Staff Consultant in June 1990.

Discussions with ADB Staff Consultant, Professor Shimano Yano, who was engaged to review design revision proposals and cost estimates as prerequisite for consideration of Supplementary Loan funding by the Bank.

Prepare chart presentations of progress both by measuring Permanent Works completed by the Contractor and also by Payments authorised.

**Activities continued..**

Review training and work standards of Laboratory Technician and Assistant Inspector on site in Santo Port. Discuss and initiate arrangements for their longer term training and employment.

Prepare reviews of the Contractor's claim for damages and additional costs from changes to design of piling, abortive piling, delays and loss of productivity because of failure of piling to support loads as designed. Participate in negotiations between Borrower, Contractor and Supervision Consultant for settlement of claim.

Inspect and report on collapse to surface of old wharf Santo in December 1990. Damage believed to be erosion following on from large earthquake reported in July 1990.

Assist Loan Administration Team from ADB with data collection, review of contracts and costs together with estimated costs to complete project for consideration of the application for Supplementary Funding .

*BASIC STRUCTURE OF THE WHARF INCLUDING ALL PILING AND CONCRETE IN THE DECK WAS COMPLETED BY MAY 1991.* This was some six months longer than the program submitted by the Contractor in his tender submission.

Reviews have been undertaken periodically to identify items remaining for completion.

Prepare and circulate draft reports for comment. These include a Project Management Manual for PWD and a Project Completion Report by the Government of Vanuatu to the Bank. These were distributed in August and September respectively.

Prepare technical evaluation of reported damage to wharf, explanations received from the Contractor and Consultant. Critically review options presented to Government to restore damaged areas. Investigate previous design reports and documentation to advise Government on potential recovery of damages.

Prepare payment documentation for restoration work and additional inspections by the Consultant.

## **B. Internal Procedures**

The consultant established a project filing system for the PMO independent of the main PWD system. As well, a mail book recording all outwards correspondence was put into operation for the Engineering Group including the PMO. This ensured that the PMO has a full record of contractual correspondence with variations for the construction contract and the supervision consultancy together with all payments authorized and forwarded to the Borrower for processing and despatch to the Bank for withdrawal from the Loan.

## **C. Project Accounting**

The Loan Agreement between ADB and the Borrower required the Vanuatu Government to establish a separate accounting system for expenditure on this project. Official Vanuatu Government accounts are kept, in arrears, by the Office of the Accountant General. Separate chapters were created to conveniently record payments for civil works construction to Fletcher Construction Company Limited and payments to Cameron McNamara Pty Ltd for construction supervision with separation of payments made by funds of the ADB and of the Borrower. Separate recording is also made of local costs of supervision such as wages, overtime, travel and housing for staff on the Santo Port Project.

PWD computer network-based accounting system began to include separate recording of commitments for payments by both Vanuatu Government and Withdrawal Applications to ADB in mid 1990. This system has the advantage of recording action by PWD as a committal to expenditure which is much less affected by lag time than the official government accounts.

The operation of Direct Payment procedures in five currencies seemed difficult for the Vanuatu Government official accounting system and to be prone to numerical errors, unexplained delays and documentation losses in transit.

Future projects in Vanuatu would enjoy better handling of withdrawal applications if contractual payments are restricted to one currency whether Vatu, the currency of the Contractor's domicile or United States Dollars rather than each monthly payment involving up to five(5) sets of documents for payments in each currency.

## **D. Consultant Participation**

Throughout the period the Consultant has, subject to the requirements of the Director of Works acted as the Project Management Office for Santo Port Project.

This has included advising on technical issues arising from reports, dealing with recommendations and correspondence from the Supervision Consultant, preparation of general correspondence and certification for withdrawals of direct payments from the Principal Loan 843-VAN and the Supplementary Loan 1080-VAN , preparation of quarterly reports on the Technical Assistance Consultancy and progress reports to the Bank and Vanuatu Government Coordination Committee, filing and distribution of progress reports from site, preparation of payment advice to the Contractor and the Supervision Consultant together with preparation of Withdrawal Applications to assist the Accountant General's office.

Commitment and expenditure reviews for the Construction contract, the Supervision consultancy, and the Technical Assistance have been submitted to ADB and the Borrower from time to time. Assistance was provided to extract and collate statistical data and cost estimates required for ADB Mission undertaking appraisal of the request for Supplementary Loan funding.

Assistance has been given to the Executing Agency in the management of Santo Port Project with technical reports, identification of supplementary works items, and submissions of notes on design consultant liability to Project Coordination Meetings and preparation of correspondence to the Attorney General of Vanuatu.

Engineering assistance given to outside projects is described in Section VI below. As well the Consultant prepared tender documents for school buildings in Pentecost (ADB Multiproject - Vanuatu) and operated as the Project Manager Multiproject during five months when Tony Lee the nominated Manager Multiproject was acting as Director/Deputy Director of Works and took three months leave in early 1989.

In June 1991 preparation for the Opening Ceremony for the wharf involved liaison with the Contractor, Consultant and Vanuatu Government officials. A speech was prepared for the Minister of Transport and Public Works to use. The opening as scheduled was for 1 July 1991 but political uncertainty in Vanuatu caused deferral. No decision on a revised timetable for the ceremonial action has been made yet.

## E. Counterparts & Training

The Santo Port Project Manager, Mr Johnson Binaru Iauma was initially on duty in the island of Tanna at commencement of the consultancy, then after a brief period in Vila office for briefing was relocated in a Regional Office in Luganville, 100 miles from PWD headquarters the site of PMO.

JB Iauma attended two training courses sponsored by ADB: a Residential course of three(3) weeks duration in Manila on Construction Project Management; and a second course on Procurement held in Port Vila, Vanuatu.

Because of the severe staff shortages in PWD, JB Iauma was transferred to the Luganville Office. This was expected to facilitate direct participation in the supervision process and to gain understanding of large construction project organisation and management. However, his role there involved supervision of road and airfield construction on islands north of Santo so his actual contact with the project, technically or administratively, was limited. When scheduling permitted, on-the-job briefing and training of the Project Manager was undertaken by attendance at meetings on site between the supervision team and the contractor, inspection of work in progress and preparations of formal certificates and payment authorisation systems.

Since the Project Manager did not have the opportunity to perform actively on the project, as originally planned, the Consultant had more involvement in day today management of project in conjunction with the Project Director(Director PWD).

Rowland Baniki the laboratory technician was assigned to the Supervising Consultant in Luganville from 4 January 1990 up to end September 1991. Two laboratory assistants were supplied by the Contractor for inspection duties and collection of samples. Through this period Rowland has gained experience of routine project testing such as: concrete sampling and testing; testing of aggregates for concrete and bitumen; testing of fill materials; monitoring for moisture contents; and testing of compaction of reclamation fill, sub basecourses and pavements.

Rowland Baniki was shown the use of a personal computer for engineering data storage, calculation and report presentation. Rowland is re-establishing testing equipment to the site laboratory after reerecting at the PWD compound, Luganville and he will return to Port Vila to operate the PWD central testing laboratory.

Clifford Wilbur has been engaged by PWD and supplied to Cameron McNamara as an assistant Inspector on the project. He is receiving on-the-job supervision and training in construction project supervision duties. He progressed well with a strong desire to learn, willing to take responsibility, able to set out works and levelling and acquired skill with spreadsheets and CAD software on the site office computer.

Cliff has been offered and accepted a permanent position with PWD as an Engineering Assistant in Santo. Further formal training sponsored by the Department is considered a possibility.

No Technical Assistant as described in the Ban's TOR was provided to the PMO. Consequently, the no training for this position, as envisaged, was provided. All preparation of documentation for payments and Withdrawal Applications for payments by ADB were done directly by the Consultant. The need for technical assistance was brought out in quarterly reports on the TA to ADB-SPRO and to the Department of Public Works.

#### V. Project Management Manual

In the Consultant's Terms of Reference it was required to produce a PWD Construction Project Manual. Material was developed specifically for Vanuatu and integrated with other text previously used in similar guides to construction departments. A draft was first circulated in Department of Public Works in October 1990 and comments received after three months. The draft manual was edited and extended with a second simplified manual as requested for use in Vanuatu field offices and reissued for comments again. Comments were only received from ADB-SPRO in August 1991 basically seeking more details of assessment of the needs for training and requesting circulation to the Borrower as well as the EA.

This was done and no further comments were received. Discussions were held with Director and Section Leaders in PWD on staff structure and needs for training and localisation. The replies are incorporated in the Public Works Department of Vanuatu, Project Management Manual, Volume A while the more practical, basic manual for local reference is provided as Volume B.

## **VI. Other Activities**

### **A. Other Construction Projects**

During the first eighteen months of the consultancy part time assistance was provided to Director of PWD for cyclone reconstruction projects. This involved general construction management, calling of tenders, reporting on tenders submitted, inspections of work, certifying payments for contractors, and final inspections, certification and payment of retention deposits. Building projects included reconstruction of the Supreme Court Building, and replacement of roofing blown away from Radio Vanuatu buildings, George Pompidou Offices and Ecole Publique school. Advice was given to a US Navy Seebees group working on school repair and construction.

The most interesting project was the reconstruction of a ship navigation light tower on Hat Island (also known as Eretoka Is) which is approximately 2 miles offshore from the north west coast of Efate. This tower is located on top of a 300' high bluff on a small island with no harbour. Steel framing of the lower panels of the original steel tower buckled in winds of cyclone Uma (February 1987). Final inspection of the works made in November 1990 after early inspections indicated same areas required replacement of the coating system because of corroded paint areas.

## **VII. Rate of Progress**

The rate of progress achieved by the Contractor, Fletcher Construction Company Limited, has been reviewed by comparison with the detailed programmes supplied by the Contractor following award. Revised predictions from programmes dated October 1989, August 1990 and November 1990 have been considered which lead to a completion date of 26 July 1991. Progress on execution of Permanent Works and Certified Expenditure from monthly certificates prepared by the Engineer are compared with planned programmes.

Two charts are provided give historical information of Payments Certified PMO (Figure 2) and the value of Permanent Works completed (Figure 3). The actual quantities are shown as an underlying bar chart with a line graph drawn to represent the planned progress.

**A. Payments**

The payments made to the Contractor are presented on the chart, **Figure 2**, which shows the payments certified by the Supervising Consultant versus the planned cumulative payments .

This chart shows rates of payment higher than those planned through early 1990 because guarantees were substituted in place of retention sums and materials on site were also incorporated in the value for intermediate payments. Also, repayment of advances was retarded by a slow rate of construction. In the first half of 1991 the trend of payments certified had risen to meet the planned payments. This occurred because the dominant items in the Bill of Quantities, piling and concrete in the deck were being constructed rapidly.

**B. Permanent Works**

The progress of construction of the wharf was measured with the value of permanent works completed on each progress certificate. Permanent Works were defined to exclude materials on site and the 'Preliminaries' sections of the Bill of Quantities. In the chart presented in Figure 3 the planned cumulative value, monthly, is presented as a line while the value of Permanent Works certified by Supervising Consultant are graphed as a series of bars.

The chart shows the start of construction to be delayed and slow construction from problems in piling causes a widening gap between the planning and the actual permanent works completed. In early 1991 the slope of the line of the planned rate of completion is generally parallel with actuality indicated by bars. This shows that in the final stages of pile and deck construction planned rates of construction were at last being achieved.

### VIII. Revised Programme for TA Consultant

In late, August 1991 the consultant under this Technical Assistance, Geoffrey Slack-Smith, responded to written instructions on reports required to be completed and that one additional report, the Borrower's Project Completion Report (PCR), was required to be prepared by the Consultant. A revised program extending up to 30 October 1991 was submitted with request for extension of the consultancy. At that time four monthly claims from Cameron McNamara were overdue and not yet submitted, further invoices from Cameron McNamara Pty Ltd were anticipated before the project was finished, the claim from the Contractor up to end of July was not available plus a final certificate of payment with inspection by the Supervision Consultant scheduled for 30 September 1991 remained outstanding for the future. The Bank approved Variation 5 which extended the TA Consultancy by one month to 11 October 1991.

In the course of finalising reports of Project Management Manual, Project Completion Report and the Consultant's Final Report advice was received on 6 September 1991 of serious erosion under the pavement behind the wharf. This necessitated a visit to the site and some days considering the issues for a preliminary report.

The Supervising Consultant is to report on the problems and recommended repair methods with cost estimates. This consultant considers that thorough review of these submissions, re-appraisal of design data on the project, preparation of a briefing paper for Government on responsibilities and possible legal action may require three to four weeks in addition to requirements for completion of reports and payment documentation.

ADB-SPRO, on 11 October 1991, advised of approval to Variation 6 to the TA extending consultant input to 12 November 1991. This extension has been provided to allow review of the design details of the wharf, assess potential repair measures and to finalise payments to the parties involved and also to provide general engineering advice to PWD following departure of the Principal Design Engineer.

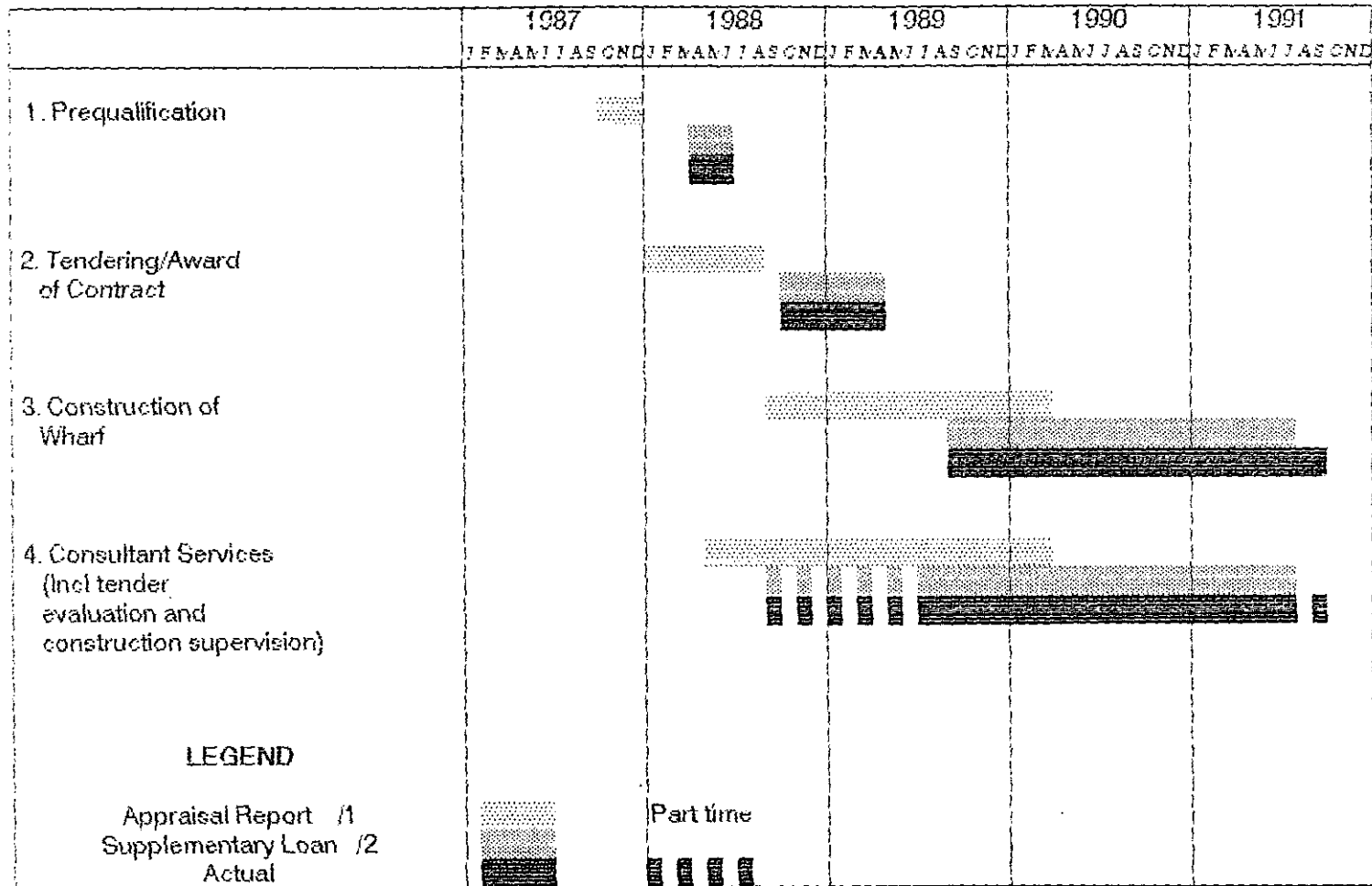
Geoffrey Slack-Smith  
TA Consultant

**SINCLAIR KNIGHT GROUP**

29 October 1991

SANTO PORT PROJECT, REPUBLIC OF VANUATU

IMPLEMENTATION SCHEDULE



Notes: /1 ADB Report on Appraisal of the Santo Port Project in Vanuatu. September 1987  
 /2 ADB Report to the President on Supplementary Loan for the Santo Port Project, February 1991

Figure 1:

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# SANTO PORT CHART OF EXPENDITURE

## Planned Payments VS Certified Payments

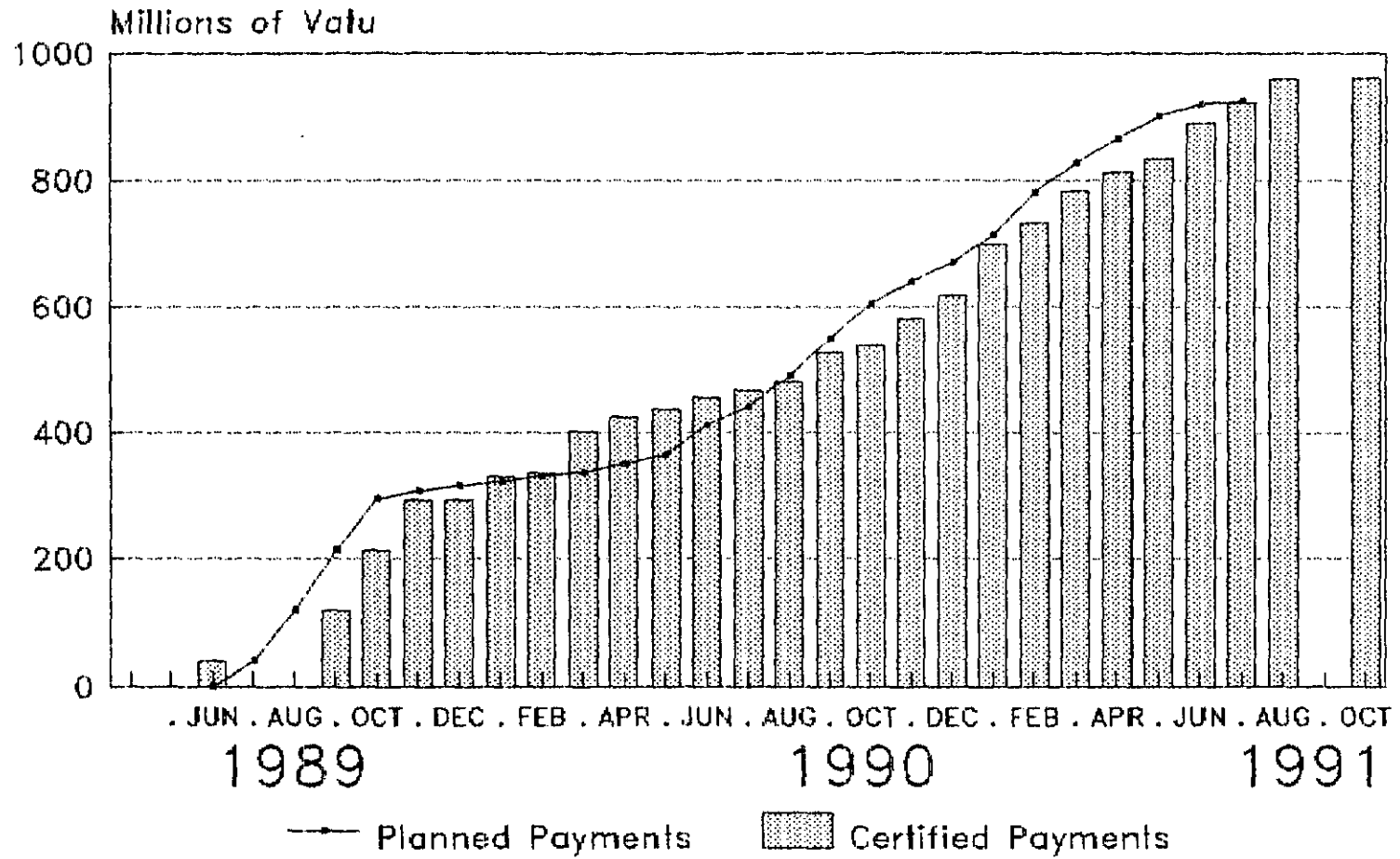


Figure 2:

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# SANTO PORT PERFORMANCE INDICATORS

## Planned VS Certified Permanent Works

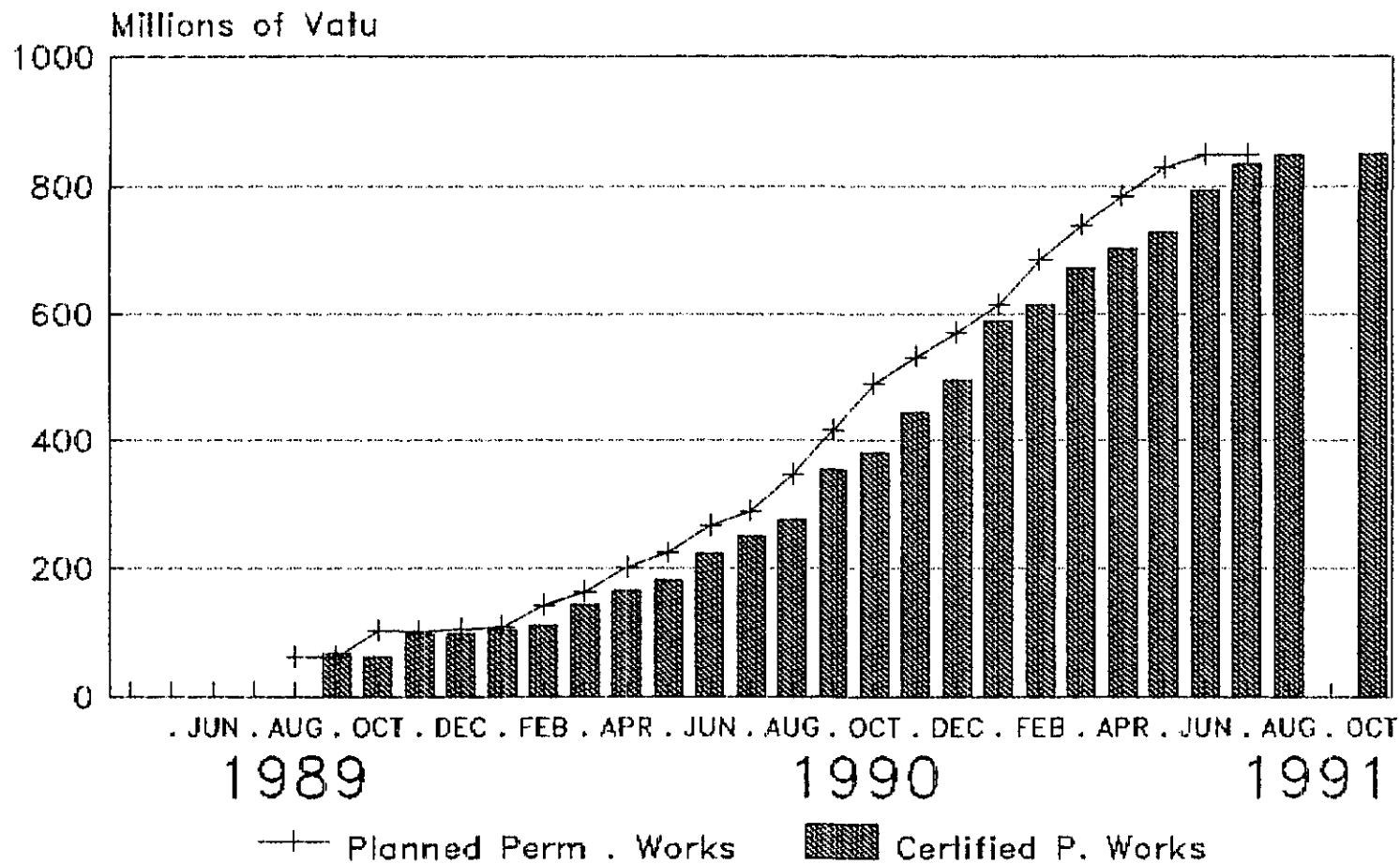


Figure 3:

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