

ASIAN DEVELOPMENT BANK

PPA: PHI 24220

PROJECT COMPLETION REPORT

ON THE

**EARTHQUAKE-DAMAGE RECONSTRUCTION PROJECT
(Loan No. 1053-PHI[SF])**

IN THE

REPUBLIC OF THE PHILIPPINES

January 1998

CURRENCY EQUIVALENTS

Currency Unit — Philippine Peso (P)

		At Appraisal	At Project Completion
P1.00	=	\$0.04	P33.15
\$1.00	=	P25.00	\$0.03

ABBREVIATIONS

AASHTO	-	American Association of State Highway and Transportation Officials
ADB	-	Asian Development Bank
ASEP	-	Association of Structural Engineers of the Philippines
BOM	-	Bureau of Maintenance
BRP	-	Bridge Retrofitting Program
CAR	-	Cordillera Administrative Region
COA	-	Commission on Audit
DBM	-	Department of Budget and Management
DECS	-	Department of Education, Culture and Sports
DPWH	-	Department of Public Works and Highways
IBRD	-	International Bank for Reconstruction and Development
IEE	-	Initial Environmental Examination
LCB	-	Local Competitive Bidding
LGU	-	Local Government Unit
NCR	-	National Capital Region
PATC	-	Philippine Applied Technology Council
PCU	-	Project Coordination Unit
PIU	-	Project Implementation Unit
PTFR	-	Presidential Task Force on Rehabilitation
RP	-	Reconstruction Proposal
SDR	-	Special Drawing Right
SOE	-	Statement of Expenditures
TA	-	Technical Assistance

NOTES

- (i) The fiscal year of the Government ends on 31 December.
- (ii) In this Report, "\$" refers to US dollars.

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BASIC DATA

A. Loan Identification

1.	Country	:	Philippines
2.	Loan Number	:	1053-PHI(SF)
3.	Project Title	:	Earthquake-Damage Reconstruction
4.	Borrower	:	Republic of the Philippines
5.	Executing Agency	:	Department of Public Works and Highways
6.	Amount of Loan	:	SDR69.697 million
7.	PCR Number	:	457

B. Loan Data

1.	Fact-finding		
	- Date Started	:	4 September 1990
	- Date Completed	:	24 September 1990
2.	Loan Negotiations		
	- Date Started	:	18 October 1990
	- Date Completed	:	19 October 1990
3.	Date of Board Approval	:	22 November 1990
4.	Date of Loan Agreement	:	22 November 1990
5.	Date of Loan Effectiveness		
	- In Loan Agreement :		20 February 1991
	- Actual	:	26 December 1990
	- Number of Extensions	:	nil
6.	Closing Date		
	- In Loan Agreement :		31 December 1994
	- Actual	:	15 October 1997
	- Number of Extensions	:	3
7.	Terms to the Borrower		
	- Service Charge	:	1 percent per annum
	- Maturity	:	35 years
	- Grace Period	:	10 years
8.	Terms of Relending	:	Same as the terms to the Borrower
9.	Disbursements		
a.	Dates		
	<u>Initial Disbursement</u>	<u>Final Disbursement</u>	<u>Time Interval</u>
	28 December 1990	15 October 1997	6 years, 10 months
	<u>Effective Date</u>	<u>Original Closing Date</u>	<u>Time Interval</u>
	26 December 1990	31 December 1994	4 years

b. Amount (\$)

	Category	Original Allocation	Last Revised Allocation	Amount Cancelled	Net Amount Available	Amount Disbursed	Undisbursed Balance
1A	Roads and Bridges	27,300,000	39,128,129	(14,618,009)	39,128,129	53,746,138	(14,618,009)
1B	Flood Control	12,200,000	13,436,827	10,999,567	13,436,827	2,437,260	10,999,567
1C	Water Supply	2,700,000	3,847,485	2,439,217	3,847,485	1,408,268	2,439,217
1D	Schools and Colleges	13,800,000	23,952,236	4,334,838	23,952,236	19,617,398	4,334,838
1E	Other Infrastructure	-	1,042,847	(2,122,051)	1,042,847	3,164,898	(2,122,051)
2	Consulting Services	4,000,000	14,968,725	1,091,331	14,968,725	13,877,394	1,091,331
3	Incremental Costs	300,000	1,055,756	(105,017)	1,055,756	1,160,773	(105,017)
4	Local Expenditures		NA ^a	NA ^a	NA ^a	NA ^a	NA ^a
4A	Roads and Bridges	12,400,000	0	0	0	0	0
4B	Flood Control	7,300,000	0	0	0	0	0
4C	Water Supply	1,200,000	0	0	0	0	0
4D	Schools and Colleges	10,700,000	0	0	0	0	0
4E	Consulting Services	7,100,000	0	0	0	0	0
4F	Incremental Costs	400,000	0	0	0	0	0
5	IDC	600,000	582,073	0	582,073	582,073	0
	Total	100,000,000	98,014,078	2,019,876	98,014,078	95,994,202	2,019,876^{b/}

^a Not applicable because as of January 1997, local expenditures under Category 4 were merged with foreign expenditures under Categories 1, 2, and 3.

^b After cancellation, there was no undisbursed balance under the loan.

10. Local Costs (Financed)

- Amount	:	\$38,344,960
- Percentage of Local Costs	:	48.35
- Percentage of Total Costs	:	28.00

C. Project Data

1. Project Cost (\$ million)

Item	Appraisal Estimate	Actual Cost
Foreign Exchange	60.90	57.65
Local Currency	62.10	79.31
Total Cost	123.00	136.96

2. Financing Plan (\$ million)

Item	Appraisal Estimate			Actual Cost		
	Foreign	Local	Total	Foreign	Local	Total
Implementation Costs						
Borrower-financed	00.00	23.00	23.00	0	40.97	40.97
Bank-financed	60.30	39.10	99.40	57.07	38.34	95.41
Subtotal	60.30	62.10	122.40	57.07	79.31	136.38
IDC Costs						
Borrower-financed	0.00	0.00	0.00	0	0	0
Bank-financed	0.60	0.00	0.60	0.58	0	0.58
Subtotal	0.60	0.00	0.60	0.58	0	0.58
Total	60.90	62.10	123.00	57.65	79.31	136.96

IDC= Interest during construction

3. Cost Breakdown by Project Component (\$ million)

Component	Appraisal Estimate			Actual Cost		
	Foreign	Local	Total	Foreign	Local	Total
(a) Roads and Bridges	27.30	22.30	49.60	37.26	42.73	79.99
(b) Flood Control	12.20	12.20	24.40	1.53	3.59	5.12
(c) Water Supply	2.70	2.30	5.00	0.97	1.11	2.08
(d) Schools and Colleges	13.80	16.90	30.70	11.04	16.66	27.70
(e) Other Infrastructure Facilities	0.00	0.00	0.00	1.97	3.15	5.12
(f) Consulting Services	4.00	7.80	11.80	3.94	11.26	15.20
(g) Incremental Costs	0.30	0.60	0.90	0.36	0.81	1.17
(h) Service Charge on Loan During Construction	0.60	0.00	0.60	0.58	0.00	0.58
Total	60.90	62.10	123.00	57.65	79.31	136.96

4. Project Schedule

Item	Appraisal Estimate	Actual
(a) Date of Contract with Consultants International Consultants Domestic Consultants	Aug 1990	Feb 1991 Sep 1990
(b) Completion of Design	-	-
(c) Civil Works Contracts Date of Award Completion of Work	Oct 1990 Dec 1993	Oct 1990 Jun 1997
(d) Start of Operations Completion of Tests and Commissioning Beginning of Start-up	- -	- -

D. Data on Bank Missions

Name of Mission	Dates	No. of Persons	No. of Person-days	Specialization of Members ^a
Fact-finding	4-24 Sep 1990	3	63	a, b, c
Inception	4-8 Mar 1991	1	5	a
Review 1	14-17 Oct 1991	1	4	a
Review 2	1-4 Jun 1992	1	4	a
Review 3	18-22 Mar 1993	1	5	a
Review 4	13-15 Dec 1993	1	3	a
Review 5	10-11 Aug 1994	1	2	a
Review 6	28 Apr-3 May 1995	1	6	a
Review 7	20-22 Nov 1995	1	3	a
Review 8	17-18 Jun 1996	1	2	a
Review 9	3 Oct 1996	1	1	a
Review 10	13 Mar 1997	1	1	a
Project Completion Review ^b	6- 10 Oct 1997	3	10	a, d, e

^a a-engineer; b-senior counsel; c-senior programs officer; d-consultant (civil engineer); e-senior assistant.

^b The Project Completion Review Mission comprised S. Wu, Project Engineer (Mission Leader); W. Howkins, Consultant; and N. delos Reyes, Senior Assistant.



I. PROJECT DESCRIPTION

1. On 16 July 1990, an earthquake registering 7.7 on the Richter Scale, with its epicenter in Nueva Ecija Province, devastated large areas of Regions I, II, III, and the Cordillera Administrative Region (CAR) and caused isolated structural damage in Metro Manila, National Capital Region (NCR) and Region IV (Map). Over 2,000 people were killed, about 4,000 injured, and nearly 150,000 made homeless. It was estimated that the earthquake adversely affected 1.6 million people. The worst hit region was CAR, and especially Baguio City, which suffered the highest casualties. In Regions I and III, there was widespread damage to infrastructure due to liquefaction of the soft alluvial sediments. Public infrastructure sustained severe damage, especially roads, bridges, schools, hospitals, Government buildings, flood control structures, and water supply systems. Excluding damage to privately owned buildings and facilities, and to agricultural infrastructure, the total rehabilitation cost was estimated at P15 billion.

2. Following the earthquake, the Government responded by providing immediate disaster relief, using regular budgetary resources and special relief funds. Subsequently, it announced a supplementary budgetary appropriation of P10 billion to be spent in 1990 and 1991 on reconstruction under the auspices of the Presidential Task Force on Rehabilitation (PTFR), and launched Reconstruction Bonds to finance such activities.

3. On 20 July 1990, the Government requested Bank assistance for financing a Reconstruction Program. In response, on 26 July 1990, the Bank approved technical assistance (TA No. 1342-PHI) of \$100,000 to assess the reconstruction cost of the earthquake-damaged infrastructure, and to prepare an investment program for the reconstruction works. On the basis of the TA recommendations, an emergency sector-type loan was prepared by the Bank to assist in the reconstruction program. The loan was approved by the Bank on 22 November 1990 in the amount of SDR69.697 million (\$100 million equivalent) from its Special Funds resources.¹

4. The main objective of the Project was to assist the Government in restoring or reconstructing public infrastructure facilities that had been damaged or destroyed by the earthquake to a condition where the risk of future damage would be minimized. Restoration of this infrastructure was considered to be of vital importance in rebuilding the economic, social, and physical systems in the regions affected; minimizing economic losses that might result from future natural calamities; and contributing to a broader program of externally-assisted reconstruction initiatives.

5. The Bank-financed Project consisted of three main components: (i) civil works for reconstruction of national, provincial, municipal and barangay roads and bridges; flood control facilities; water supply systems; and public buildings; (ii) consulting services for subproject preparation, construction supervision, and project coordination; and (iii) incremental administrative and operational support. The total Project cost was estimated at appraisal to be \$123 million, of which the Bank would fund 100 percent of the foreign exchange costs (\$60.9 million) and 63 percent of the local currency costs (\$39.1 million).

¹ In parallel with the Bank Loan, the Government also obtained a loan of \$125 million from the International Bank for Reconstruction and Development (IBRD), the largest component of which was used for the reconstruction of roads and bridges.

II. EVALUATION OF IMPLEMENTATION

A. Project Components

6. Immediately after the earthquake, PTFR started to coordinate the disaster relief work being undertaken by Department of Public Works and Highways (DPWH), regional, and district engineers, and local government units (LGUs)¹ and to collect damage assessments of the facilities destroyed or damaged. From these assessments, the Reconstruction Program of required works was drawn up, prioritized by DPWH, and approved by PTFR. Works under the Program included roads and bridges, flood control structures, public buildings, hospitals, schools, water supply systems, and irrigation infrastructure. The Executive Order, setting the regulations for implementation of Republic Act 6960² concerning the use of the P10 billion disaster relief funds allocated under the Act, categorized the works under the Reconstruction Program into three levels: (i) emergency repairs to be completed within 1-2 months, (ii) restoration of facilities/infrastructure to their previous condition within 6-24 months, and (iii) reconstruction to the original condition of the facility or infrastructure and whenever necessary, strengthening, improvement or relocation of the facility to make it resistant to natural calamities like earthquakes. Works under the first two categories were to be undertaken using Government funds, but assistance was requested from the Bank, the International Bank Reconstruction and Development (IBRD), and other aid agencies for the third category.

7. At the time of fact-finding, the list of subprojects to be included in the Program had not yet been finalized.³ Both the Bank loan and the IBRD loan were formulated as sector-type loans whereby subprojects were to be identified during implementation within the given categories. It was agreed that the two institutions would split the roads and bridges component, on a geographic basis, as proposed by DPWH (see the map). Regarding the other infrastructure facilities, it was agreed that the Bank would assist with flood control structures, water supply systems, schools, and other public buildings, and IBRD with hospitals, irrigation systems, and public housing. This Report addresses the Bank-financed Project within the broader context of the overall Reconstruction Program.

8. In addition to the abovementioned civil works, the Project comprised consulting services and the provision of incremental operational and administrative facilities. Consulting services were provided to assist with preconstruction activities (mainly subproject preparation and design), environmental assessment, construction supervision, quality control, coordination, and progress monitoring and reporting. The component for incremental operational and administrative facilities was to provide office equipment and supplies, vehicles and their operation, and additional Government staff for subproject implementation for the duration of the Project.

9. The loan stipulated certain criteria for subprojects to be considered for Bank financing: (i) they were required to be for the restoration of damaged infrastructure previously utilized satisfactorily; (ii) they should be environmentally sound; (iii) the works should be

¹ Regional and District Offices of DPWH, Provincial Governors, municipalities, and barangays.

² President Aquino signed Republic Act 6960 into law on 9 August 1990.

³ The deadline for identification of subprojects under Republic Act 6960 was 9 November 1990.

selected, designed, and approved by the Government before the end of 1991; and (iv) the subprojects should comprise works for which no other external funding was being received.

10. Excluding the emergency works completed within the first few months, about 5,300 subprojects were identified under the overall Program for implementation by DPWH and LGUs. Of these, 4,166 were implemented under the two loans: 3,002 received funding under the Bank loan and 1,164 under the IBRD loan. Of the total funds disbursed by the Bank, 62 percent was for roads and bridges, 5 percent for flood control, 2 percent for water supply, 26 percent for schools and 5 percent for other public buildings. The distribution of subprojects by region and type is given in Appendix 1. Appendix 2 lists the provinces and cities affected by the earthquake and shows the division of subprojects financed under the Bank loan and the IBRD loan. The scope of the works undertaken for each subproject category is summarized in Appendix 3.

11. The selection of subprojects was generally in line with expectations at appraisal, although the number of flood control and water supply subprojects funded under the loan was substantially reduced (para. 25). This was the result of the poor quality of construction carried out in the early stages of the Project, especially under the LGUs. Other subprojects were rejected due to a lack of documentation concerning contracts and payments. As the bridge component was also well advanced by the time new design guidelines were issued, some of the bridges had to be retrofitted (para. 12). Works on schools, colleges, and public buildings implemented under DPWH were mostly well managed and documented and complied with seismic-resistant requirements, and no difficulties were encountered in their approval. A subcategory for municipal and Government buildings, ports, wharves, and other public infrastructure facilities was added to the civil works after the commencement of the Project and these subprojects were completed satisfactorily.

12. The only significant change in the Project components defined at appraisal was the introduction of the Bridge Retrofitting Program (BRP). This change resulted from the need for the early design and construction of essential bridge repairs, carried out prior to the arrival of the international consultants for bridge engineering and geotechnical services. Although the late fielding of these experts, due to slow recruitment procedures, was unfortunate, the delay allowed a complete study and assessment to be made not only of the bridges under the Project, but also of other important bridges in Luzon that required seismic retrofitting. Under the BRP, as implemented between July 1994 and June 1997, over 300 bridges were screened, detailed field investigations were made on 162, detailed designs were done for 136, and retrofitting works were completed on 94. The remainder have been proposed for retrofitting or reconstruction under the next Bank loan.¹ Additional consulting services were approved in July 1991 to assess the damage caused by the June 1991 eruption of Mt. Pinatubo.

13. The selection of subprojects is considered to have been appropriate, and the Mission found the people in the regions visited to be highly satisfied with the help they received under the Project. The additional costs resulting from the retrofitting of new bridges constructed in the early stages of the Project are considered to have been more than offset by the benefits of having them open to traffic 1-2 years earlier than otherwise would have been

¹ Loan No. 1473-PHI: *Sixth Road Project*, for \$167 million, approved on 30 September 1996.

possible. An additional benefit resulting from the introduction of the BRP was the extension of the Project to cover bridges that were not damaged by the earthquake but were considered vulnerable to possible future earthquakes.

B. Implementation

14. Implementation arrangements were set up largely as appraised, and proved to be on the whole satisfactory. DPWH was the Executing Agency for the Project, with its Bureau of Maintenance (BOM) responsible for the overall implementation of the Project; the Director of BOM acted as Project Director. DPWH's regional offices in the Project area were responsible for implementation of most of the subprojects.¹ The overall administration of the Project is set out in the Organization Chart (Appendix 4). A chronology of major events is given in Appendix 5.

15. Immediately after the earthquake, DPWH's regional and district offices and the LGUs inspected, identified, and costed the damage inflicted and drew up lists of reconstruction subprojects. These lists were submitted to DPWH in Manila for technical evaluation, budgeting and screening. They were then passed on to the PTFR for consolidation and approval. The Master List of subprojects was updated as more detailed information became available and was finalized in early November 1990. The Master List was categorized by region, province, and type of infrastructure, such as road, bridge, flood control, or school building. As soon as the initial Master List was approved in October 1990, the Department of Budget and Management (DBM) released funds in tranches for Project implementation.

16. A Project Coordination Unit (PCU) was set up in DPWH to coordinate the activities of the various implementing agencies involved in the Project and to liaise with PTFR. In addition, a Project Implementation Unit (PIU) was established in DPWH to assist DPWH's regional offices, LGUs, and domestic consultants in the implementation of the civil works. Monthly meetings were held at DPWH, chaired initially by DPWH's Undersecretary and later by the Project Director, to review the status of implementation, identify problems, and agree upon the necessary actions to be taken. These meetings were attended by the Undersecretaries of the involved departments, representatives of PTFR and DBM, Regional Directors, the seven domestic consulting firms, the Program Advisor of the PCU, and the Program Coordinator of the PIU.

17. As decided by PTFR in October 1990, repair of most of the major school buildings was carried out under DPWH, while makeshift classrooms were constructed under the Department of Education, Culture and Sports (DECS). Fifty percent of school construction in the provinces was carried out by LGUs and 50 percent by DPWH. All school building reconstruction in the NCR was managed by DECS.

18. These implementation arrangements were as set at the time of appraisal but modified by the Government when required. Although they were found to be adequate for the most part, during the first year of Project implementation the LGUs did not follow the

¹ Other Implementing Agencies under the Project were the Department of Education, Culture and Sports and the Local Water Utilities Administration. Under the IBRD project were the Department of Health, the National Irrigation Administration, and the National Housing Authority.

procedures set forth by the Government in accordance with Bank requirements concerning the documentation of bid evaluations, contracts, and payment certificates.¹ This resulted in approval being withheld for Bank financing for most of the subprojects under the LGUs and caused delays in the liquidation of Bank funds in the imprest account. To avoid these difficulties, the Bank initiated disbursement by direct payment to consultants and BRP contractors rather than reimbursement through the imprest account.

19. The quality of the design and construction works was less than satisfactory during the first year of the Project. Strong concern was expressed by both the Bank and IBRD during Review Missions in 1991 about serious quality control problems that could, if not corrected, jeopardize the objective of mitigating damage caused by future earthquakes. To ensure that appropriate corrective action was taken, DPWH was requested to draw up an action plan to improve the quality of the works and submit it by the end of 1991. The measures proposed in this plan were not immediately effective, and a Bank Review Mission in June 1992 reported the status of implementation as still being unsatisfactory. Further actions were proposed to correct the deficiencies in design, construction quality, and procurement requirements to qualify deficient subprojects for Bank financing. These measures were gradually implemented, and the quality of the works improved. By the end of the Project, 3,002 subprojects had been approved for funding.²

20. Due to the aforementioned deficiencies leading to substantial underutilization of the loan proceeds, following a proposal submitted by DPWH in October 1992, the Bank agreed to use the surplus funds for retrofitting bridges on lifeline roads in the Project area under the BRP, covering both those bridges that had been reconstructed under the Project to the previous design codes and those that had not suffered damage from the earthquake (para. 12).

21. Part of the difficulties in achieving an acceptable standard of seismic-resistant design was due to the late recruitment of the international experts. By the time they were fielded in early 1991, much of the design work had been completed in accordance with DPWH's previous design standards. By the time the new design guidelines were issued (between May and September 1991), many of the subprojects were under construction, and DPWH was reluctant to adopt the improved design measures, which would cause overruns of subproject budgets. Furthermore, domestic consultants resisted making modifications to designs they had already completed to existing codes and standards.

22. Due to the delays in implementation and disbursement, the loan closing date was extended three times, first from 31 December 1994 to 31 December 1995, subsequently to 31 December 1996, and finally to 30 June 1997.

¹ LGUs received advances from DBM, which did not exercise adequate control over expenditures made against these advances and did not require proper documentation to be submitted. As LGUs received the funds in advance, they felt no incentive to respond to DPWH's subsequent requests for documentation to allow reimbursement to be claimed under the loan.

² Some of these subprojects, which had already been constructed prior to the issuance of the new design guidelines, were approved for funding provided DPWH carried out retrofitting at a later stage. Retrofitting designs for schools and public buildings were made under the Project.

C. Project Costs and Financing

23. The appraised and actual costs of the Project are given in Appendix 6. At loan closing, the total cost of the Project was \$137 million, about 11 percent above the appraisal estimate of \$123 million. The cost overrun, which was financed by the Borrower, was due to: (i) additional civil works being introduced under the BRP (7 percent increase), and (ii) increased consulting services and incremental facilities costs as a result of the extension of loan closing by 2.5 years.

24. As the loan was set up on an emergency sector basis, the allocation of funds for the various civil works categories was tentatively estimated at appraisal, with provision for revisions to be made during Project implementation in accordance with the subproject priorities set by DPWH, LGUs, and the PIU without formal approval by the Bank. As a result of these priorities and the noncompliance of a large number of subprojects with the loan criteria, the cost of the road and bridges component of the loan including the BRP was increased by 77 percent, the cost of flood control works was reduced by 76 percent, the cost of water supply was reduced by 57 percent, and the cost of schools and colleges remained virtually unaltered. The additional category for other infrastructure comprised 4 percent of the total civil works costs.

25. The significant number of subprojects that failed to meet Bank criteria resulted in an increased portion of the Project costs being financed by the Government. A large number of the flood control and water supply subprojects were either technically unacceptable or not properly documented and were therefore not eligible for reimbursement. This allowed reallocation of the loan proceeds from flood control and water supply to the BRP.

D. Project Schedule

26. Loan negotiations were completed on 19 October 1990, and the loan was approved on 22 November 1990. The Loan Agreement was signed on 22 November 1990 and became effective on 26 December 1990. The Project was originally scheduled to be completed over a three-year period ending 31 December 1993 with the loan closing date on 31 December 1994. However, the closing date was extended three times and finally set at 30 June 1997.

27. The implementation schedule is shown in Appendix 7. Except for the BRP, the Project, was completed on schedule. Selection of subprojects and design activities fell behind by about three months, but were completed by the end of 1991. The construction of subprojects was started in batches, as the designs became gradually available.

28. Work on the BRP started 23 months after the proposal was first made. This delay was mainly due to the drawn-out recruitment procedures for the domestic consultants, which took 18 months. Design work for the 136 bridges included in the BRP took longer than foreseen and continued until early 1997. Construction works were completed on 94 bridges by the end of June 1997.

29. The major cause of the loan extensions was attributable to the substantial change of the civil works component due to the addition of the BRP construction works to the original bridge rehabilitation. This change resulted from the early design and implementation of

the essential bridge repairs before the arrival of the international consultants for bridge engineering and geotechnical services. Here again, recruitment delays were caused by the drawn-out Government procedures. However, a positive impact of this delay was that a full study and assessment was made of 300 important bridges on lifeline routes throughout Luzon on which the BRP was based.

E. Engagement of Consultants

30. As stipulated in the Loan Agreement, domestic and international consulting services were engaged for preconstruction and design activities, construction supervision, quality control, Project coordination, and progress monitoring and reporting. In addition, the international consultants assisted with the assessment of damage and rehabilitation costs of public infrastructure caused by the eruption of Mount Pinatubo in June 1991. A list of the consultants engaged under the Project and their periods of service are given in Appendix 8.

31. The recruitment of domestic consultants was carried out following Bank-approved direct appointment procedures in view of the emergency nature of the Project. The seven consulting firms appointed by DPWH commenced their services in September 1990 and completed them by December 1993.

32. All international consultants were recruited by DPWH as individuals by evaluating the biodata of at least three candidates for each position. They comprised seven technical specialists, four implementation specialists, the PCU Advisor, and the PIU Coordinator.¹ All the international consultants were financed by the Bank loan except the Program Advisor, who was financed by IBRD. The international consultants were fielded between February and July 1991. Those engaged for the original scope of the Project completed their assignments between June 1992 and January 1994, while the BRP specialists and the PIU Coordinator continued until September 1997.

F. Procurement of Civil Works, Goods, and Services

33. To minimize the preconstruction period and to facilitate an early start of the reconstruction works, the Bank agreed that procurement of works, goods, and services below the set threshold (\$400,000) for each contract would be mainly through local competitive bidding (LCB) using Government procedures acceptable to the Bank, and force account subject to the Bank's approval.

a. Civil works

34. The civil works contracts were initially awarded through a simplified bidding procedure under which three prequalified contractors were invited to submit bids. Negotiations were held by the Implementing Agency with the lowest bidder. This procedure was permitted until February 1991 to enable reconstruction work to commence without delay. Thereafter, contracts were awarded following normal LCB procedures acceptable to the Bank.

¹ The TSs comprised two structural engineers, one bridge engineer, two geotechnical engineers, one environmentalist, and one seismologist. The four ISs were assigned to roads and bridges (two), flood control and water supply (one), and schools and other buildings (one).

35. For LCB, simultaneous bidding in the DPWH regional office concerned and the DPWH Central Office was initially permitted. Since problems were encountered in ensuring that bid opening occurred simultaneously at the two locations, the Bank expressed its reservations about this procedure, and bid opening was later changed to the regional offices only. The domestic consultants were required under their terms of reference to participate in the bid openings and evaluations, but this proved impractical in view of the large number of contracts and difficulties in informing them of the time of the bid openings.

36. In total, there were 3,002 contracts under the Bank-financed Project. Of 1,711 contracts over a value of P300,000 each for which funding was requested by DPWH, only 939 were approved by the Bank. The remaining contracts were not approved due to missing documentation, inadequate design standards, or unacceptable construction quality. For the subprojects approved for financing from the Bank loan, the standard of the works was satisfactory. The majority of contracts were for rehabilitation and repair of existing facilities that were not complicated in nature. Construction of works was supervised by DPWH regional and district staff, LGU technical staff, domestic consultants, and international consultants.

b. Equipment

37. Under Bank financing, 13 four-wheel-drive station wagons and some of office equipment¹ were purchased using international shopping procedures. The vehicles were distributed to the international consultants and BOM in Manila to facilitate Project supervision. Prior to the delivery of these vehicles, temporary rental was arranged for the international consultants. The purchase of some of the office equipment and furniture for DPWH, the PIU, and the PCU was made from the Program Coordinator's contract under the Bank loan.

G. Performance of Consultants, Contractors, and Suppliers

1. Consultants

38. The international consultants played a very important role in providing design advice and assistance in the implementation of civil works to DPWH, LGUs, and staff of the implementing agencies concerned. Of particular importance were their inputs in updating the standard design codes with the latest seismic technology in line with current US codes, and in training local Government staff and domestic consultants in their use. They also assisted Bank missions in assessing the damage and cost of rehabilitation of public infrastructure caused by the eruption of Mount Pinatubo in June 1991.

39. One of the most important inputs from the international consultants was their proposal for a three-stage program for the upgrading and retrofitting of the existing and repaired facilities. This program was designed to identify, program, and implement the retrofitting of bridges and Government buildings. As a result of these proposals, a comprehensive retrofitting program was undertaken for major bridges in Luzon, and identification of the needs was completed for major public buildings. In addition, through over

¹ Computers, plan reproduction, and storage equipment for the DPWH Bureau of Design.

40 seminars and in working with domestic consultants and DPWH staff, significant improvements were achieved in the knowledge of domestic engineers of state-of-the-art international seismic-resistant design and retrofitting standards and codes, which should be of benefit in the future.

40. The services rendered to the Project by the international consultants proved mostly to be very effective. They performed a key function in providing guidance during the design process, monitoring construction, assisting the domestic consultants and LGUs in technical and contractual matters, and setting up a system for reviewing the expenditures made by the Government. With the exception of the environmental specialist, their inputs are considered to have contributed significantly to the success of the Project. The performance of the environmental specialist was not satisfactory. The guidelines that he prepared at the start of his assignment did not include proposals for mitigating negative impacts from the works under the Project; his draft final report for Region I was not accepted by the Bank; and DPWH had to threaten legal action to force him to complete his assignment. His final reports were eventually submitted 30 months later than scheduled.

41. The domestic consultants were engaged for validation of subprojects, detailed design, preconstruction services, and construction supervision. Each firm rendered its services within a specified geographical area in Luzon. During the course of their work, various amendments were approved to extend their contracts as required to complete their construction supervision duties. One engineer from each firm was assigned to work with PTFR. The total services provided to the Project by all domestic firms amounted to more than 18 years of team time.

42. The performance of the seven domestic consulting firms was generally satisfactory, although there was some reluctance at the early stages to adopt the new seismic design standards. Once these had been accepted, the firms' designs were mostly of an acceptable standard. Although there was an initial lack of familiarity with the latest international retrofitting codes, this was acquired by the BRP consultant team with assistance provided by the international technical specialists.

2. Contractors and Suppliers

43. More than 100 individual contractors were involved in the works of over 4,000 subprojects in the Bank's and IBRD's programs. In cases where the quality and standard of the works were not satisfactory, contractors were required to repair the deficiencies at their own cost with no time extension. In extreme cases, contracts were terminated and the work was completed by the local project implementing agencies or through rebidding. About 70 smaller LGU projects were not completed due to the lack of funds. Suppliers performed in accordance with the requirements of their contracts.

H. Conditions and Covenants

44. As shown in Appendix 9, all loan covenants were complied with, except for (i) submission of the audited Project accounts within six months from the end of each fiscal year, (ii) submission of reconstruction proposals (RPs) for each municipality or city to be rehabilitated by 31 March 1991, and (iii) an initial environmental examination (IEE) to be made during the

subproject design stage, and works to be carried out in compliance with environmental standards and regulations. DPWH submitted the audited Project accounts for 1992-1995 at a much later time, the RPs were not submitted to the Bank until December 1991, and the environmental guidelines, which were part of the IEE, were not issued until most of the subprojects had been designed and some were even under construction (para. 49).

I. Disbursement

45. As of the closing date of 15 October 1997, \$95.994 million had been disbursed from the loan (SDR69.697 million), which was valued at \$100.00 million at the time of approval. Due to exchange rate fluctuations during the course of the Project, the actual amount available from the loan proceeds was \$98.014 million. The depreciation of the peso in July 1997¹ adversely affected the amount disbursed during the grace period; withdrawal applications totaling approximately P196 million were devalued by about \$0.89 million. The actual loan disbursements are given in Appendix 10.

46. In late December 1990, the Government opened an imprest account for the Project, to which the Bank made an initial advance of \$25 million. The imprest account was liquidated using the summary of expenditures (SOE) procedure and by submission of documents acceptable to the Bank confirming the expenditures on each contract separately. The imprest account was replenished from time to time. In total, \$64.94 million was disbursed through the imprest account and liquidated by the Government. The account was closed in August 1994. For the BRP disbursements, it was decided to use the direct payment procedure to facilitate disbursement of the balance of the loan proceeds. This change was made due to difficulties encountered in preparing adequate documentation of payments made from the account and the drawn-out Government procedures for obtaining reimbursement from the imprest account.

J. Environmental Impact

47. DPWH and the Implementing Agencies were required by the Loan Agreement Schedule 5, para. 6 to ensure that all rehabilitation and reconstruction works conformed to the Bank's and the Government's environmental guidelines. The Bank also required that the IEE be made during the design stage of subprojects to allow environmental measures to be included in the civil works contracts.

48. The international environmental specialist commenced his services in October 1991, about 12 months later than scheduled. Due to this delay, the environmental guidelines were not issued to domestic consultants and LGUs until April 1992, by which time the subproject designs were mostly completed and some subprojects were under construction. The guidelines, which were presented to the LGUs in a series of workshops in all the Project regions of Luzon, did not include special environmental mitigation measures, but dealt only with impact assessment methodology. The most important types of impact for a project of this nature were the dumping of slide debris in river beds and erosion control of cut slopes and river banks. The former occurred mostly during the emergency clearing of landslide debris during the initial stages prior to the Project. For the latter, measures taken to mitigate erosion

¹ From P26.5 to P31.0 to the dollar.

erosion of river banks close to rehabilitated structures and pilot slope protection projects were initiated using vetiver grass.

49. The final environment reports were not submitted until the end of May 1994, 30 months later than originally scheduled.¹ In view of the delay in issuance and the shortcomings of the guidelines and the delay in submission of the environmentalist's final reports, the environmental aspects of the Project are not judged to have been addressed satisfactorily (see also para. 45).

K. Performance of the Borrower and the Executing Agency

50. The Government should be credited with its rapid response to the disaster, which resulted in roads being opened and essential services being restored within a short time after the earthquake. The necessary institutional and funding arrangements were set up within one month of the earthquake under the coordination of PTFR. The work of PTFR and DPWH in selecting and coordinating the restoration works was done quickly and efficiently. However, some problems arose during the early part of Project; implementation that could have been avoided.

51. The cumbersome internal procedures for the recruitment of international consultants within DPWH had a serious impact on the Project, since a large part of the design works had been completed before the international consultants were mobilized, i.e., before the updated design standards incorporating the latest seismic codes could be prepared. Also the procedures for recruiting domestic consultants delayed the start of the BRP by over one year. During the first two years of the Project, DPWH had difficulties in achieving adequate technical and fiscal control of the hundreds of subprojects being carried out under the local PIUs (para.18). Performance was subsequently improved when DPWH implemented strict control and correction measures to ensure improved quality of designs and construction standards, following serious criticism about the management of the Project by both the Bank and IBRD. Despite these initial difficulties, DPWH should be given due credit for achieving the targets of the Project successfully.

52. The performance of the Implementing Agencies was less satisfactory. A substantial part of the works carried out under LGUs was rejected by the PIU due to technical inadequacies or lacking documentation and had to be funded fully out of Government resources. The lack of adequate documentation of disbursements from the imprest account during the initial stage of the Project delayed loan disbursements and led to difficulties in liquidating the imprest funds. This could have been avoided if DBM had exercised proper control of the initial funds advanced to the LGUs. For future emergency operations, there is a need for clearly spelled out guidelines/procedures for the flow of funds, as well as for their strict enforcement.

53. Another major issue was the delayed submission of audited project accounts, which was caused by inflexible Commission on Audit (COA) procedures. COA required that

¹ After constant reminders by the Bank and DPWH about the submission of these reports, the environmental specialist was finally threatened with legal action before he complied. The first of these reports, submitted in January 1994, was not accepted by the Bank and was sent back for revision.

subproject accounts be audited in the region concerned before the Department Auditor finalized the overall reports and submitted them to the Bank. Furthermore, local COA offices would not release the necessary SOE documents to DPWH, which were required by the Bank.

L. Performance of the Bank

54. The Bank responded very quickly during project preparation by approving a TA grant within ten days of the earthquake, and completing loan fact-finding within two months thereafter. The loan was signed three months after the earthquake occurred. The scope and objectives of the Project were appropriate and were largely achieved within the time frame allotted. The necessary flexibility was incorporated from the start, which allowed the Project to be adapted to the needs as they became apparent during implementation. This flexibility allowed the Project to be extended to include the BRP, which is considered to have been very successful in identifying a major technical issue with respect to design standards and the capabilities of the local consulting industry, and in taking steps towards remedying the situation.

55. The Bank's assistance in the Project was acknowledged by various Government officials during the Mission's visit to the Project area. The Project benefited by the Mission Leader for project preparation having been also responsible for the implementation phase. The supervision provided by the Bank contributed to the success of the Project, and the frequency of Project review missions and the close liaison with the PIU enabled timely action to be taken to resolve difficulties encountered in implementation. The close liaison the Bank maintained with IBRD was also an important factor in adopting a common approach to ensure that the objectives of the Project were met.

M. Project Benefits

56. No economic analysis was made during appraisal due to the emergency nature of the Project and the objective of restoring essential infrastructure to the condition it was in before the earthquake. However, during the Mission's visit to the Project area, interviews were held with local officials and Project beneficiaries. The general view of the officials and the local people was that the Government had acted promptly in restoring access, power, water and other utilities under the emergency repairs phase, and life returned to normal within a few months of the earthquake.

57. The major part of the Project was the restoration of roads and bridges following the emergency repairs, thereby restoring access to the areas affected. Of the 596 road and bridge subprojects carried out under the Project, 135 were restored or rebuilt bridges; the remainder of the subprojects comprised roadworks. From the Mission's interviews with local officials and private citizens, there was general consensus that the restoration of access was one of the most important undertakings of the Project.

58. The Mission also visited a number of the schools that had been restored or rebuilt. Over 2,000 schools and colleges were included in the Project, the restoration works and new buildings being constructed as permanent structures incorporating seismic-resistant design principles. The teachers interviewed were very appreciative of the assistance provided by the Project in this critical sector, and were satisfied with the scope of the works carried out.

The works had been undertaken in cooperation with school principals and scheduled in a manner to allow teaching to continue during construction. During the initial emergency stage, there had been a significant participation by parents in helping the schools resume teaching activities.

III. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

59. The Project contributed substantially to the restoration and rehabilitation of public infrastructure facilities damaged or destroyed by the earthquake, and largely achieved the objective of minimizing the risk of damage caused by a future earthquake. It was responsive to the needs of the regions affected and was successful in rebuilding the economic, social, and physical systems. The Project also helped with capacity building of Government staff in improving seismic design standards and hazard assessment for future construction and rehabilitation projects. Consequently, the Project is rated as successful.

60. The Government's response to the disaster was quick, and essential services were restored within a short time after the earthquake. The institutional framework set up to coordinate and implement the restoration work was good.

61. The Bank's speedy processing of the loan suited the emergency nature of the Project. The sector-type approach provided flexibility, which ensured the achievement of the Project objectives. The Bank's handling of the Project and the close cooperation with IBRD were good, and its initiative in introducing seismic retrofitting technology commendable.

62. After some initial shortcomings, DPWH generally performed satisfactorily in successfully completing this difficult Project. However, it should have exercised closer control over the quality of some of the earlier works and expedited the recruitment of the international consultants, as well as of the domestic consultants under the BRP. The involvement of other Government departments in the Project was less satisfactory.

63. The international consultants performed well, and were successful in ensuring the necessary quality control and in introducing and applying state-of-the-art seismic technology to the reconstruction works. However, if more emphasis had been put on hands-on training during design, a closer interaction with domestic consultants could have been achieved.

64. The services of the environmental specialist were not satisfactory. The initial guidelines were issued too late to be of much use, failed to focus on the key issues, and did not provide guidance for designing mitigation measures. The final reports were barely acceptable and were submitted 30 months late.

B. Recommendations

1. Project Specific

65. Some of the subprojects were approved on the understanding that seismic retrofitting would be carried out at a later stage so that they would comply with the loan covenants. This applies mainly to school and public buildings, for which retrofitting designs have now been prepared. Follow-up action is needed to ensure that this is done. The BRP should likewise be extended: further action is needed to implement bridge retrofitting on the North and South Luzon Expressways, as well as in other parts of the country.

66. Further training of domestic consultants and DPWH staff in seismic-resistant designs for bridges needs to be incorporated into future Bank projects in the Philippines. A further updating of the bridge design codes should be made in line with the latest international standards.

67. The seismic risk mapping completed for Luzon under the IBRD loan should be extended throughout the country.

68. The Government should be encouraged to update existing seismic design codes for buildings. There is an urgent need to undertake an assessment of the safety of and, where required, a retrofitting program for large school and hospital buildings, which was not completed under the Project. A similar need exists to assess the safety of high-rise buildings. Details of the status of implementation of seismic design codes are given in Appendix 11.

69. Slope stabilization by vegetation is a cost-effective way to reduce erosion on cut-and-fill slopes. Vetiver grass appears to be very promising, and the pilot program under DPWH should be continued.

2. General

70. Imprest account disbursement procedures do not work satisfactorily in the Philippines, as they fail to facilitate quick disbursement. Funds are not specifically allocated to the project for which they are intended and are therefore subject to the same budgetary controls as are imposed on normally disbursed funds. Direct payment to contractors by the Bank is much more practical.

71. Subprojects for emergency restoration loans tend to be very small and do not attract the larger experienced contractors from outside the disaster area. To do so, the majority of subprojects need to be packaged into larger contracts and/or bid in batches to encourage discounts on bids where several contracts are awarded to a single contractor.

72. For emergency projects, DPWH should waive the normal lengthy procedures for the recruitment of consultants. Even for normally scheduled projects, these procedures should be streamlined.

73. For future Bank projects in countries prone to severe earthquakes, and especially for Philippine projects in the foreseeable future, the Bank should require that

international consultants with specific seismic expertise be appointed to ensure the quality of designs of large bridges and other high-risk structures.

74. Bridge retrofiting is a cost-effective means of safeguarding a country's lifeline road network. The program started under this Project should be continued in the Philippines, and similar programs introduced in areas of high seismic risk in other developing member countries.

APPENDIXES

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FINANCING OF SUBPROJECTS
EARTHQUAKE-DAMAGE RECONSTRUCTION PROJECT
(costs in P'000)

Type of Project	Government		ADB		IBRD		TOTAL	
	No.	Cost	No.	Cost	No.	Cost	No.	Cost
Region I								
Roads & Bridges		382,232	180	500,167	663	1,128,792	843	1,628,960
Flood Control		13,321	28	66,607			28	66,607
Water Supply		5,794	69	28,971			69	28,971
Schools/Colleges		43,892	594	219,459			594	219,459
Other Infrastructure		16,553	25	82,765			25	82,765
Subtotal		461,792	896	897,970	663	1,128,792	1,559	2,026,762
Region II								
Roads & Bridges		107,047	99	535,233			99	535,233
Flood Control		576	1	2,878			1	2,878
Water Supply		0	0	0			0	0
Schools/Colleges		13,553	145	67,766			145	67,766
Other Infrastructure		1,993	3	9,966			3	9,966
Subtotal		123,169	248	615,843	0	0	248	615,843
Region III								
Roads & Bridges		177,164	244	529,236	165	285,226	409	814,462
Flood Control		13,992	11	69,959			11	69,959
Water Supply		2,768	12	13,839			12	13,839
Schools/Colleges		37,889	765	189,494			765	189,494
Other Infrastructure		3,928	13	19,639			13	19,639
Subtotal		235,740	1,045	822,165	165	285,226	1,210	1,107,391
Region IV A								
Roads & Bridges		6,225	39	31,058	1	54	40	31,112
Flood Control		742	8	3,711			8	3,711
Water Supply		0	0	0			0	0
Schools/Colleges		4,451	372	22,255			372	22,255
Other Infrastructure		80	6	401			6	401
Subtotal		11,499	425	57,426	1	54	426	57,480
CAR								
Roads & Bridges		202,319	27	127,289	322	707,445	349	834,735
Flood Control		769	9	3,845			9	3,845
Water Supply		2,225	3	11,123			3	11,123
Schools/Colleges		25,398	193	126,989			193	126,989
Other Infrastructure		3,119	7	15,595			7	15,595
Subtotal		233,830	239	284,842	322	707,445	561	992,287
NCR								
Roads & Bridges		24,497	7	58,903	13	50,867	20	109,769
Flood Control		0	0	0			0	0
Water Supply		0	0	0			0	0
Schools/Colleges		27,781	134	138,904			134	138,904
Other Infrastructure		3,077	8	15,386			8	15,386
Subtotal		55,355	149	213,193	13	50,867	162	264,060
TOTAL PROJECT								
Roads & Bridges		899,483	596	1,781,887	1,164	2,172,384	1,760	3,954,271
Flood Control		29,400	57	147,000	0	0	57	147,000
Water Supply		10,787	84	53,933	0	0	84	53,933
Schools/Colleges		152,963	2,203	764,867	0	0	2,203	764,867
Other Infrastructure		28,750	62	143,752	0	0	62	143,752
GRAND TOTALS		1,121,384	3,002	2,891,439	1,164	2,172,384	4,166	5,063,823

Note: This list does not include subprojects rejected by the Project Implementation Unit due to noncompliance with the Loan Agreement.

REGIONS, PROVINCES, AND CITIES AFFECTED BY THE EARTHQUAKE

	Road/Bridges Financed by
Region I	
Ilocos Norte	ADB
Ilocos Sur	ADB
La Union	IBRD
Pangasinan	IBRD
Dagupan City	ADB
San Carlos City	ADB
Region II	
Cagayan	ADB
Isabela	ADB
Nueva Vizcaya	ADB
Quirino	ADB
Region III	
Bataan	ADB
Bulacan	ADB
Nueva Ecija	IBRD
Pampanga	ADB
Tarlac	ADB
Zambales	ADB
Cabanatuan City	IBRD
Palayan City	IBRD
San Jose City	IBRD
Region IV-A	
Aurora	IBRD
Batangas	ADB
Cavite	IBRD
Laguna	ADB
Quezon	ADB
Rizal	ADB
Batangas City	ADB
San Pablo City	ADB
National Capital Region	
Metro Manila	IBRD
Cordillera Administrative Region	
Abra	ADB
Benguet	IBRD
Ifugao	IBRD
Kalinga Apayao	ADB
Mountain Province	IBRD
Baguio City	IBRD

CIVIL WORKS - TYPES OF REHABILITATION AND RECONSTRUCTION IMPLEMENTED

1. Roads and Bridges (ADB and IBRD-assisted)

Repairs of settled areas, damaged asphalt, and concrete pavements; reshaping of cut-and-fill slopes; repair of longitudinal and cross drainage; removal of slipped materials from carriageways; construction of stone masonry and gabion retaining walls; replacement of bridge bearings, repair of bridge decks and handrails; repair of steel trusses; replacement of Bailey panels; in certain cases, construction of new, replacement bridges, temporary road detours, and temporary bridges; repair and upgrading of bridge foundations, piers, and abutments, and associated scour protection works.

2. Flood Control (ADB-assisted)

Reconstruction of failed spur dikes, river banks, and bunds; construction of new river training works; clearing of channels filled with loose debris from unstable slopes.

3. Water Supply (ADB-assisted)

Cleaning, redrilling, and repairing shallow and deep hand wells; repair of water tanks, reservoirs, water treatment, and storage and distribution systems, including pipework.

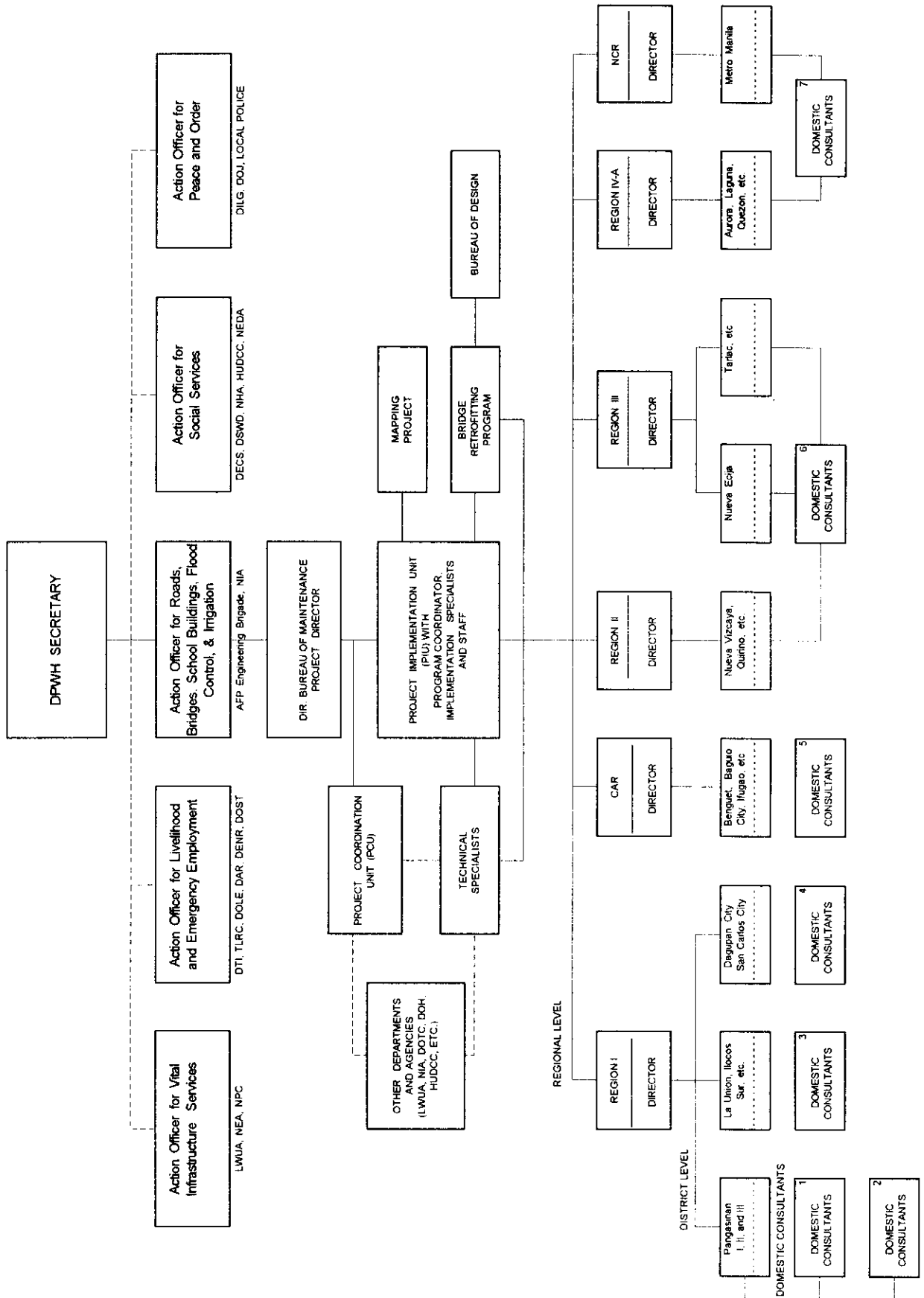
4. Schools and Other Government Educational Buildings (ADB-assisted)

Repair and strengthening of foundations; footings; floor slabs; columns; beams; ceilings; roofs; drainage; windows (including jalousies); internal and external walls; and electrical, mechanical, and water and sewerage systems.

5. Other Infrastructure (ADB-assisted)

Repairs to public buildings and markets, health centers, ports, and wharves.

DPWH ORGANIZATION FOR
EARTHQUAKE RECONSTRUCTION PROJECT



MAJOR PROJECT PROCESSING AND ADMINISTRATION EVENTS

- 16 Jul 1990 - Earthquake registering 7.7 on the Richter scale with epicenter in Nueva Ecija devastates areas of Regions I, II, III, IV, CAR, and NCR
- 19 Jul 1990 - Letter from the Bank to President Corazon Aquino offering Bank assistance for rebuilding damaged infrastructure caused by the earthquake
- 20 Jul 1990 - Bank receives request from Secretary of Finance for Bank assistance in financing reconstruction of both public infrastructure and private buildings
- 20 Jul 1990 - Memo from Programs Manager to Project Directors requesting nominations to the interdepartmental Task Force to coordinate the Bank's assistance
- 23 Jul 1990 - President Aquino asks Congress to approve a Bill allocating P10 billion for the restoration of earthquake damage in affected areas.
- 26 - 27 Jul 1990 - Meetings among the Government, Bank staff, and external aid agencies to discuss earthquake relief assistance
- 26 Jul 1990 - TA No.1342-PHI: Assessment of Reconstruction Costs of Earthquake-Damaged Infrastructure in Luzon approved in the amount of \$100,000.
- 1 Aug 1990 - President Aquino issues Memorandum Order 311 creating Presidential Task Force for Rehabilitation of areas affected by the earthquake.
- 9 Aug 1990 - President Aquino signs Republic Act 6960 into law with funding mechanism. Rehabilitation work officially begins.
- 9 Aug 1990 - IBRD Fact-finding/Appraisal Mission fielded
- 4 Sep 1990 - IBRD proposes loan of \$125 million for Emergency Earthquake Reconstruction.
- 4 - 24 Sep 1990 - Bank Fact-finding Mission fielded.
- 8 Sep 1990 - DPWH concludes negotiated agreements with seven domestic consulting firms and issues notice to proceed.
- 12 Sep 1990 - Meeting between the Bank and TA consultants held to discuss draft report.
- 9 Oct 1990 - Letter sent to DPWH advising recruitment of international consultants

- 9 Oct 1990 - IBRD loan for \$125 million approved.
- 11 Oct 1990 - Meeting of the Bank's Loan and Technical Assistance Coordination Committee
- 18 - 19 Oct 1990 - Loan negotiations held.
- 19 Oct 1990 - Draft negotiated contracts for the domestic consultants received
- 30 Oct 1990 - Draft Outline of the Design Guidelines prepared by IBRD consultant received.
- 5 Nov 1990 - Letter sent advising procurement of vehicles, office equipment, and staff under the Bank's advance action procedures/retroactive financing arrangements
- 12 Nov 1990 - Bank approved direct appointment of Program Coordinator.
- 21 Nov 1990 - Draft contract and evaluation report on ranking of shortlisted consultants received for (i) implementation specialist for national and barangay roads; (ii) implementation specialist for provincial and municipal roads; (iii) technical specialist for geotechnical/slope stability/pavement and materials; and (iv) technical specialist for structural/bridge engineering
- 22 Nov 1990 - Loan No. 1053-PHI: Earthquake-Damage Reconstruction Project approved in the amount of SDR69.697 million (\$100 million equivalent) from the Bank's Special Funds resources.
- 22 Nov 1990 - Loan Agreement signed.
- 23 Nov 1990 - Bank approved engagement of two implementation specialists for roads, and two technical specialists for geotechnical/pavement/materials, and for bridges.
- 26 Nov 1990 - Procurement of vehicles and office equipment approved.
- 17 Dec 1990 - Comments sent on the draft negotiated contracts for the domestic consultants
- 26 Dec 1990 - Bank loan declared effective.
- 26 Dec 1990 - Imprest account established in the Central Bank, into which \$25 million was deposited by the Bank
- 28 Dec 1990 - Value date of initial advance to imprest account for \$10 million and first replenishment of \$15 million
- 9 Jan 1991 - Draft contract for the Program Advisor approved.

- 18 Jan 1991 - Draft contract for the implementation specialist for national roads approved.
- 24 Jan 1991 - Draft contracts approved for (i) the implementation specialist for provincial roads; (ii) the technical specialist for geotechnical/pavement/materials and (iii) the technical specialist for bridge and structural design.
- 12 Feb 1991 - Engagement approved of (i) implementation specialist for schools and other buildings; (ii) implementation specialist for flood control, irrigation, and water supply; (iii) technical specialist for geotechnical/pavement/materials; (iv) technical specialist for buildings and bridges (II); (v) technical specialist for seismic engineering; and (vi) technical specialist for environmental aspects.
- 4 - 8 Mar 1991 - Inception mission fielded.
- 6 Mar 1991 - Bank concurred in the selection of Program Advisor under the IBRD loan.
- 20 Jun 1991 - Letter received from the Government requesting for four international consultants to appraise damage to infrastructure by Mt. Pinatubo eruption
- 27 Jun 1991 - Change in the Project scope to reassign the four international consultants to appraise damage by Mt. Pinatubo eruption approved.
- 22 Jul 1991 - Use of SOE procedures for liquidation of the imprest account approved.
- 4 Sep 1991 - Bank approved 254 subprojects for roads and bridges.
- 16 Sep 1991 - Bank requested EA to submit reconstruction proposals for four cities by the end of September 1991.
- 26 Sep 1991 - Letter advising on selection of the environmentalist and recruitment of seismologist received.
- 14 - 17 Oct 1991 - First Review Mission fielded.
- 17 Oct 1991 - Bank approved procurement of 13 utility vehicles.
- 5 -15 Nov 1991 - Second World Bank Review Mission fielded.
- 13 Dec 1991 - Contract for the supply of 13 Toyota Landcruisers received.
- 27 Dec 1991 - Reconstruction Proposals for Dagupan, Baguio, and Agoo received.

- 9 Jan 1992 - Second list of 183 subprojects for roads and bridges approved.
- 10 Jan 1992 - Action Plan for improvements in Project implementation received
- 27 Feb 1992 - Recruitment of the seismologist approved.
- 28 Feb 1992 - List of major road and bridge subprojects each costing P10 - 70 million received.
- 18 Mar 1992 - The road and bridge subprojects approved with minor modifications.
- 14 Apr 1992 - Direct payment of P213,991 for the cost of renovation of DPWH's extension office approved.
- 22 Apr 1992 - List of 379 subprojects for flood control, water supply, and irrigation received.
- 22 Apr 1992 - Revised Environmental Assessment Guidelines approved.
- 24 Apr 1992 - List of the reconstruction subprojects approved, except for irrigation works, which were covered under the IBRD loan.
- 19 May 1992 - Award of contract for construction of Magsaysay Bridge approved.
- 1 - 4 Jun 1992 - Second review mission fielded.
- 21 Jul 1992 - DPWH's request to raise the ceiling of SOE on individual contracts to P1.6 million each (about \$62,000) received.
- 19 Aug 1992 - Audited financial statements from Inception to 31 December 1991 received
- 7 - 11 Sep 1992 - Third World Bank Review Mission was fielded.
- 9 Sep 1992 - List of schools, colleges, and other buildings totalling 3,281 subprojects costing about \$67.1 million received.
- 23 Oct 1992 - New listing of 2,953 subprojects (including those under P300,000) with a total construction cost of P1,363 million received.
- 2 Nov 1992 - The revised list of subprojects for schools, colleges, and other buildings subject approved subject to appropriate design and construction practices being adopted and Bank requirements for procurement and documentation being followed.
- 4 Nov 1992 - Bank's comments sent on the proposed bridge retrofitting program (BRP)

- 1 Dec 1992 - Inclusion of other infrastructure facilities, with financing of 50 percent of foreign currency and 30 percent of local currency expenditures approved
- 14 Dec 1992 - Letter received regarding (i) reengagement of structural specialist for buildings and bridges; (ii) extension of services of specialists for bridge/structural design, geotechnical and pavements, building implementation, and environmental management; and (iii) engagement of a domestic firm for detailed design for the BRP
- 15 Jan 1993 - Reply sent to letter of 14 December 1992
- 5 Feb 1993 - Draft terms of reference received for the two specialists to be engaged for BRP (structural/ bridge engineer, geotechnical/foundation engineer)
- 22 Feb 1993 - Application for the second imprest account replenishment of \$25 million received
- 2 - 4 Mar 1993 - Fourth World Bank Review Mission fielded
- 18 - 22 Mar 1993 - Third Review Mission fielded
- 10 Mar 1993 - Value date of the second imprest account replenishment of \$17.734 million
- 12 Mar 1993 - Value date of the third imprest account replenishment of \$2.210 million
- 21 May
13 Jun 1993 - Fifth World Bank Review Mission was fielded
- 4 Jun 1993 - Assumption by the implementation specialist for national and barangay roads of the duties of the previous Program Coordinator approved
- 28 Jun 1993 - List of eight state colleges/universities for financing under the loan approved
- 23 Aug 1993 - Replacement for the technical specialist for buildings/structures approved
- 12 Sep 1993 - Request sent to CTDE for the fourth imprest account replenishment of \$10 million
- 16 Sep 1993 - Short-list and proposal invitation documents for the domestic consultants for BRP and list of bridges proposed to be included under the BRP received
- 4 Oct 1993 - Value date of fourth imprest account replenishment for \$10 million

- 7 Oct 1993 - Short-list and invitation documents for the domestic consultants for BRP approved
- 5 Nov 1993 - Sixth World Bank Review Mission fielded
- 13 - 15 Dec 1993 - Fourth Review Mission fielded
- 16 Dec 1993 - Value date of the fifth imprest account replenishment of \$10 million
- 4 - 15 Mar 1994 - A special loan disbursement mission fielded
- 8 Apr 1994 - Comments sent on the slope and river bank stabilization draft Action Plan
- 8 Apr 1994 - Auditor's Report received on the consolidated statement of sources and application of funds for 1992
- 18 - 27 May 1994 - Seventh World Bank Review Mission fielded
- 24 Jun 1994 - Evaluation of domestic consultants' proposals and draft negotiated contract for BRP approved
- 4 Jul 1994 - One-year extension of the loan closing date up to end 1995 requested by the Department of Finance (DOF); Bank approval given on 16 August
- 10 -11 Aug 1994 - Fifth Review Mission was fielded
- 26 Aug 1994 - Received prequalification documents for bridge retrofitting program
- 5 Sep 1994 - Letter sent approving draft prequalification documents of contractors for BRP
- 26 Oct 1994 - Prequalification of contractors for bridge retrofitting was advertised
- 27 Mar 1995 - Received Audited Statements of Expenditures for FY1993 under the Imprest Account
- 31 Mar 1995 - Prequalification of five contractors to bid for Packages A and B for BRP approved
- 25 Apr 1995 - Project Coordination Advisor's Service Completion Report received
- 28 Apr-3 May 1995- Sixth Review Mission fielded.
- 11 May 1995 - Draft tender documents for Package A of BRP received
- 19 May 1995 - Letter sent to DPWH advising that, subject to incorporation of the Bank's comments, tender documents for BRP may be issued to

prospective bidders; also, advised that there is no need for the Bank to review them for the other proposed packages, and only one further advertisement and prequalification exercise needs to be undertaken for the balance of civil works packages

- 19 May 1995 - Letter sent to DPWH requesting audited accounts for 1992, 1993, and 1994
- 29 May 1995 - Final environmental reports received
- 1 Jun 1995 - Copy of updated bridge list received
- 14 Jul 1995 - Audited Project accounts for 1993 received
- 1 Aug 1995 - Letter sent to DPWH advising that the audited accounts for 1993 did not correspond to the Bank's disbursement records; DPWH requested to collect supplementary documents
- 7 Aug 1995 - Second one-year extension of the loan closing date to end 1996 requested by the DOF
- 17 Aug 1995 - The second loan closing date extension approved
- 12 Sep 1995 - Bank concurs with PIU taking over the functions of the PCU
- 25 Oct 1995 - Audit Report for 1994 received
- 8 Nov 1995 - Award of contract for BRP, Package A, approved
- 20 - 22 Nov 1995 - Seventh Review Mission fielded
- 24 Nov 1995 - Received unaudited financial statements for 1993 and 1994 received
- 6 Dec 1995 - Comments sent on the unaudited financial statements for 1993 and 1994
- 28 Dec 1995 - Bid evaluation report and resolution on award of contract for BRP, Package B received
- 3 Jan 1996 - Award of contract for BRP, Package B approved
- 24 Jan 1996 - Prequalification evaluation report for Packages C-F of BRP received
- 29 Jan 1996 - 1994 Audit Report and Statement of Sources and Applications of Funds received
- Feb 1996 - Signed contract for BRP, Package A received

- 16 Feb 1996 - Commencement of contract for BRP, Package A
- 21 Feb 1996 - 1994 audited Project accounts approved
- 13 Mar 1996 - Prequalification of seven contractors for packages C-F of BRP approved
- 23 Apr 1996 - Revised audited Project accounts for 1993 in Bank's format received
- 3 May 1996 - Audited Project accounts for 1992 and 1993 approved
- 19 Jun 1996 - Third extension of the loan closing date to 30 June 1997 approved
- 17 - 18 Jun 1996 - Eighth Review Mission fielded
- 3 Jul 1996 - Award of contract Packages C and E approved
- 29 Jul 1996 - Bid opening for Package D
- 20 Sep 1996 - Commencement of Packages C and E
- 3 Oct 1996 - Ninth Review Mission fielded
- 17 Oct 1996 - Signed contracts for Packages C and E received
- 27 Nov 1996 - Award of contract for Package D approved
- 22 Jan 1997 - Audited Project accounts for 1995 received
- 25 Feb 1997 - Procurement of plan reproduction and storage equipment for BOD valued at about \$150,000 approved
- 13 Mar 1997 - Tenth Review Mission fielded
- 20 Mar 1997 - Interim Project Completion Report prepared by DPWH received
- 25 Mar 1997 - Award of contract for the supply of one copier and microfilming/document management equipment
- 23 Apr 1997 - Signed contract for Package D received
- 19 Sep 1997 - Final Project Completion Report received from DPWH
- 19 Sep 1997 - Final Report received from Program Coordinator
- 30 Sep 1997 - Received Audited Project accounts for 1996 received
- 6 - 10 Oct 1997 - Project Completion Review Mission fielded

LOAN NO. 1053-PH(SF)
DPWH COMPONENTS - PROJECT COSTS AND SOURCES OF FINANCING

Items/Categories	Details	Costs			Source of Financing				
		Appraisal Est. P million	Total		Loan Proceeds		Government		
			P million	\$ million	\$ million	P million	P million	\$ million	
CIVIL WORKS									
Categories 1A/4A	Roads and bridges	1,240.000	1,781.886	64.637	40.850	1,126.138	655.748	23.787	
Categories 1A/4A	Bridge retrofitting	-	411.362	15.345	12.897	345.733	65.629	2.448	
Categories 1B/4B	Flood control	610.000	147.000	5.117	2.437	70.016	76.984	2.680	
Categories 1C/4C	Water supply	125.000	53.933	2.073	1.408	36.624	17.309	0.665	
Categories 1D/4D	Schools and colleges	767.500	764.867	27.701	19.617	541.647	223.220	8.084	
Categories 1E/4G	Other infrastructure	-	143.752	5.125	3.165	88.768	54.984	1.960	
Subtotal		2,742.500	3,302.800	119.998	80.374	2,208.926	1,093.874	39.624	
CONSULTANT SERVICES									
Categories 2/4E	International and domestic consultants	295.000	401.616	15.208	13.877	365.089	36.527	1.331	
Subtotal		295.000	401.616	15.208	13.877	365.089	36.527	1.331	
INCREMENTAL COSTS									
Categories 3/4F	Support staff, vehicles computers, BOD equipment	22.500	30.792	1.171	1.161	30.490	0.302	0.010	
Subtotal		22.500	30.792	1.171	1.161	30.490	0.302	0.010	
SERVICE CHARGE									
Category 5	1% service charge	15.000	14.957	0.582	0.582	14.957	-	-	
Subtotal		15.000	14.957	0.582	0.582	14.957	-	-	
Total		3,075.000	3,750.165	136.959	95.994	2,619.462	1,130.703	40.965	

[illegible]

Projected at appraisal
Actual

DETAILS OF SERVICES OF INTERNATIONAL AND DOMESTIC CONSULTANTS

International Individual Consultants	Overall Period of Services	Total Person-Months Expended	Costs of Services (\$)
A. PROJECT IMPLEMENTATION UNIT (PIU)			
1. Isaac S. Shina (Shina & Assoc., Inc.) ^a Program Coordinator	January, 1991 - June, 1993	25.70	850,378
2. John M. Eddison Program Coordinator/ ^b Implementation Specialist National and Barangay Roads	February, 1991 - September, 1997	79.75	1,277,298
3. Sudhir Kumar (Upham Int'l Corp.) Implementation Specialist Provincial and Municipal Roads	February, 1991 - March, 1994	36.00	478,402
4. Frederick Stepanich Implementation Specialist Flood Control, Irrigation & Water Supply	April, 1991 - July, 1993	26.00	275,329
5. John H. Christianson (Rankine & Hill Ltd.) Implementation Specialist Schools and Other Buildings	August, 1991 - June, 1993	18.00	228,403
B. PROJECT COORDINATION UNIT (PCU)			
1. Frank Mandato Technical Specialist Structures/Bridge Design	February, 1991 - August, 1997	55.00	638,999
2. Vincent Porrazzo Technical Specialist, Geotechnical, Slope Stability/Pavement Material/Earthquake Engineering	February, 1991 - September, 1997	69.50	809,472
3. Vito Notarnicola (Renardet, SA) Technical Specialist, Geotechnical, Slope Stability/Pavement Material/Earthquake Engineering	April, 1991 - October, 1991	6.00	90,803
4. David Hopkins (KRTA Ltd) Technical Specialist Structures/Bridge Design	July, 1991 - December, 1992	14.00	187,273
5. Benjamin Gabriel Technical Specialist Environmental Impact	October, 1991 - January, 1994	23.00	96,078
6. Charles Thiel, Jr. ^c Technical Specialist Seismology	February, 1993 - December, 1996	5.11	97,827
7. Norman W. Lea (Connel Wagner) Technical Specialist Structures/Bridge Design	January, 1994 - June, 1994	5.23	66,331
8. Raul Fernandez/John Yen (Everest International) Technical Specialist Construction Supervision	April, 1996 - August, 1997	17.00	273,382
TOTAL		380.29	5,369,975

^a Contract terminated effective 30 June 1993

^b Took over concurrently duties of Program Coordinator on 1 July 1993.

^c Intermittent services

Domestic Consulting Firms	Area of Responsibility	Period of Service	Cost of Services	
			(P)	(S)
Original Project Scope				
1. Trans-Asia Consultants Group (TACG)	Region I (except Pangasinan, Dagupan City and San Carlos City	September 8, 1990 - August 31, 1993	32,771,416	1,243,311
2. Engineering & Development Corp. of the Philippines (EDCOP)	Dagupan City and San Carlos City	September 8, 1990 - August 31, 1993	226,506,607	992,464
3. DCCD Engineering Corporation	Pangasinan II, except Carmen Bridge	September 8, 1990 - October 31, 1992	21,221,307	805,257
4. TCGI Engineers	Pangasinan I, and Carmen Bridge	September 8, 1990 - June 30, 1993	30,443,814	1,149,045
5. Techniks Group Corporation	Regions IV-A and NCR	September 8, 1990 - August 31, 1992	10,849,911	409,029
6. Philipp's Technical Consultants, Inc.	Regions II and III	September 8, 1990 - December 30, 1992	32,490,373	1,239,205
7. Angel Lazaro and Associates, Inc. (ALAI)	Cordillera Administrative Region, CAR	September 8, 1990 - September 30, 1993	51,537,783	1,940,726
			405,821,211	7,779,037
Bridge Retrofitting Program (BRP)				
1. Angel Lazaro and Associates (ALA)	Design and Supervision of Construction of BRP, and Revision of Bureau of Design Standard Bridge Designs and Drawings	July 4, 1994 - September 15, 1997	46,193,339	1,637,879
TOTAL			452,014,551	9,416,916

**LOAN NO. 1053-PHI(SF): EARTHQUAKE-DAMAGE RECONSTRUCTION PROJECT
COMPLIANCE WITH LOAN COVENANTS**

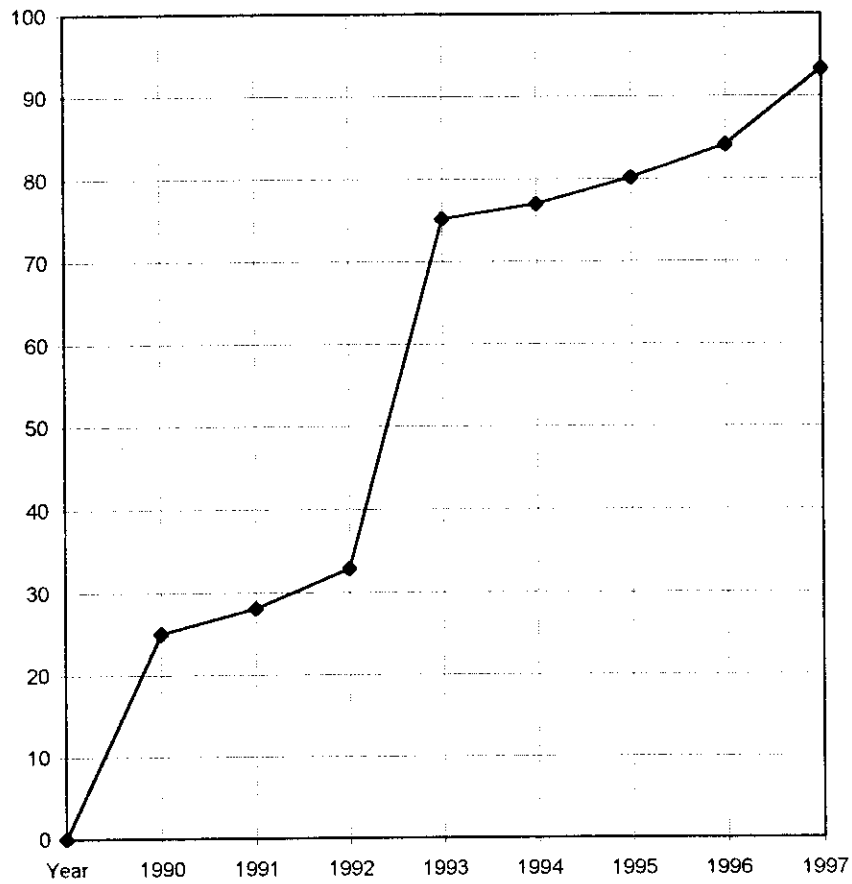
Covenant	Reference to Loan Documents	Status of Compliance
Project to be carried out diligently, efficiently and in conformity with sound administrative, financial, engineering and environmental practices.	Loan Agreement (LA), Article 4.01	Complied with, though not fully satisfactorily at the start of the Project
Borrower shall promptly provide funds, facilities, services, lands and other resources needed for the Project.	LA, Article 4.02	Complied with
Competent consultants and contractors to be employed in carrying out the Project.	LA, Article 4.03	Some consultants' knowledge of seismic design was limited, this being newly introduced to the country under the Project.
Borrower to ensure that activities of its departments and agencies with respect to the Project are soundly conducted and coordinated.	LA, Article 4.04	Not fully complied with in respect to documentation to support payments
Borrower to insure Project facilities consistent with sound practice.	LA, Article 4.05	Covered under the Property Replacement Fund funded by DBM and administered by GSIS
Audited Project accounts to be furnished to the Bank within six months of the end of each related fiscal year.	LA, Article 4.06	Delayed compliance
Progress reports to be furnished to the Bank quarterly and annually.	LA, Article 4.07	Complied with
Project completion report to be furnished to the Bank within three months of physical completion of the Project.	LA, Article 4.07	Complied with
Bank entitled to inspect the Project,	LA, Article 4.08	Complied with

Covenant	Reference to Loan Documents	Status of Compliance
and goods financed from the loan proceeds.		
Project facilities to be soundly operated and maintained.	LA, Article 4.09	Complied with
Loan to become effective within 90 days of loan signing.	LA, Article 5.01	Complied with
Retroactive financing permitted from 4 September 1990 to date of effectivity.	LA, Schedule 3 Para. 10	Not used
Borrower to establish an imprest account immediately after loan effectivity.	LA, Schedule 3 Para. 11	Complied with; later, DPWH and the Bank agreed to dispense with the account, as it played no part in making counterpart funds available.
International and domestic consultants' services to be utilized in carrying out the Project.	LA, Schedule 4 Para. 1	Complied with, but late recruitment of consultants had a serious impact on project implementation.
DPWH to be the Executing Agency.	LA, Schedule 5 Para. 1(a)	Complied with
Action Officer of DPWH to have overall responsibility for implementing the Project.	LA, Schedule 5 Para. 1(b)	Complied with
Program Coordination Unit under Action Officer responsible for monitoring, supervising on Project implementation.	LA, Schedule 5 Para. 1(c)	Complied with
Program Implementation Unit attached to BOM responsible for day-to-day implementation of the Project.	LA, Schedule 5 Para. 1(d)	Complied with

Covenant	Reference to Loan Documents	Status of Compliance
Program Management Offices responsible for identification, designs, estimates, procurement and supervision of subprojects.	LA, Schedule 5 Para. 2(a)	Complied with
Reconstruction Proposals for major municipalities and cities to be completed by 31 March 1991 unless otherwise agreed by the Bank.	LA, Schedule 5 Para. 2(b)	Rescheduled to 31 December 1991; complied with
Criteria to be used for selection of subprojects, and all subprojects to be selected and approved by the Borrower before 31 December 1991.	LA, Schedule 5 Para. 3	Complied with
All land needed for the Project to be acquired on a timely basis.	LA, Schedule 5 Para. 4	Complied with
All facilities reconstructed under the Project to be properly maintained.	LA, Schedule 5 Para. 5	Complied with
Initial environmental examination to be undertaken during preparation of subprojects.	LA, Schedule 5 Para. 6	Not fully complied with; initial guidelines were not issued until two of the subprojects had been designed/constructed; final reports were submitted, but 30 months after original scheduled date.

Loan Disbursements
(\$ million)

Year	Actual Amount	
	Annual	Cumulative
1990	25.000	25.000
1991	3.001	28.001
1992	4.817	32.818
1993	42.368	75.186
1994	1.789	76.975
1995	3.135	80.110
1996	3.997	84.107
1997	11.885	95.994



SEISMIC DESIGN CODES

A. Present Status

1. The National Building Codes used in the Philippines comprise two volumes; Volume I - Buildings, and Volume II - Bridges. They are compiled and updated by a committee comprising (i) Association of Structural Engineers of the Philippines (ASEP), (ii) United Architects of the Philippines, (iii) Department of Public Works and Highways (DPWH), and (iv) Association of Government Civil Engineers in the Philippines.

2. Shortly after the earthquake, Building Codes for buildings were introduced based on the US Unified Building Code published in the 1980s. These codes now need to be updated. Under the Project, guidelines were issued to domestic consultants to be adopted in the restoration of schools and other public buildings using a design ground acceleration of 0.4g, equivalent to an earthquake of magnitude 8.0 at a distance of 50 kilometers. In the Project area, these buildings were restricted to two or three storeys. An assessment was also made of retrofitting measures that need to be carried out in the near future for taller public buildings such as the major schools and hospitals, especially in the Manila area, where some of them are five or more storeys high.

3. The design codes for bridges were studied in 1972 under Bank-sponsored technical assistance carried out by J. P. Hollings, who based his guidelines on new response spectra and current US and New Zealand design criteria. This became known as the Hollings Report. In 1982, DPWH issued the Design Guidelines for Public Works and Highways (Volume II) which recommended the adoption of the Hollings Report as giving minimum criteria for seismic bridge design. Under the Bridge Retrofitting Program (BRP), it was noted that Philippine designers generally ignored the Hollings criteria and used instead the Standard Specifications for Highway Bridges, American Association of State Highway and Transportation Officials (AASHTO), 1973. This design code proved to be inadequate in the 1989 Loma Prieta and the 1994 Los Angeles earthquakes in California and, as was seen, in the 1990 Luzon earthquake.

4. Under the BRP, modern seismic design concepts were introduced based on the 1991 AASHTO Guide Specifications for Seismic Design of Highway Bridges and 1991 AASHTO Standard Specifications for Highway Bridges. The Technical Specialists updated all DPWH standard bridge designs following the codes and assisted ASEP in updating the seismic design codes for bridges, which will be published as Volume II of the National Building Code.

B. Implementation of New Codes

5. DPWH is in a position to enforce the implementation of the new ASEP codes for bridges when they are published and should do so by the necessary directives to consultants and Local Government Units (LGUs). However, a similar initiative needs to be implemented for updating the design codes and monitoring of construction of buildings. DPWH is responsible for the design and construction of public buildings but has no authority over the private sector and its high rise construction.

6. The Bank made a Regional Study on Disaster Mitigation in 1990 after the Luzon earthquake. In the Philippines Country Study, it was noted on pages 30-31 that:

"Some engineers who have the responsibility either in the structural design or supervision of construction are not as conversant as they ought to be with the latest National Building Code provisions especially those involving seismic requirements. Many engineers have not even read the Code.

Some building officials entrusted with the enforcement of the Code may not be too strict.

Some architects design buildings/structures then sign and seal building plans without the benefit of consultation with competent structural engineers on seismic resistance of these structures.

Inadequate quality control systems and methodology during the construction phase of the project are among the problems.

Seismic instrumentation requirements are not strictly followed if at all, probably due to the costs involved and, of course, laxity in enforcement. It is alleged that there is [sic] no implementing circulars or rules to do so."¹

7. Private building permits are issued by LGUs, and municipal engineers are responsible for the enforcement of building codes and safety, utility, and planning regulations. Property owners are responsible for seeing that competent engineers and architects are employed in the design and construction of their buildings, and drawings must be signed by registered members of the relevant professional bodies. These controls are clearly inadequate for high rise buildings, which may be designed using obsolete codes, as was seen with the collapse of the Hyatt Hotel in Baguio in the 1990 earthquake as well as many other building failures of a less dramatic nature. An initiative therefore needs to be taken by the Government to (i) update the building codes, (ii) set up a training program for engineers and architects in their use, and (iii) establish a regulatory body to review building designs and monitor construction. It is suggested that the Bank, in line with its development policies, could assist the Government in the preparation of modern seismic codes and in setting up suitable training programs.

8. During the past two years, the idea of establishing the Philippine Applied Technology Council (PATC) has been discussed to develop seismic design criteria that can be applied to the design of buildings and bridges. It is proposed that PATC would be set up under the auspices of ASEP as principal founder and the Philippine Institute of Civil Engineers as cofounder, with assistance from the Philippine Institute of Volcanology and Seismology, DPWH, and the Department of Science and Technology. Other associates would be the Philippine Contractors Association, and the Applied Technology Council of USA. The Bank has expressed support for the formation of PATC and recommended its involvement in future Bank projects. It is suggested the role of PATC could be expanded to act as a review body to approve the seismic design of buildings.

1

There is a requirement in the National Building Code for buildings over a certain size to be instrumented. In the National Structural Design Code, to which the Building Code refers, this instrumentation is only a suggested option.