CHAPTER 10 PROJECT IMPLEMENTATION

CHAPTER 10 PROJECT IMPLEMENTATION

10.1 IMPLEMENTATION SCHEDULE

As experienced in the past, the three study sections, (hereinafter referred to as the Stage II Sections) being situated within the Pacific typhoon belt, might suffer destructive damages again by a large scale typhoon, resulting in prolonged traffic interruption and paralyzing socio-economic activities of their respective influence areas. The project should be implemented as soon as possible in due consideration of implementation schedule of the three sections studied under Stage I Study, namely the Dalton Pass Section, the Mahaplag-Sogod Section and the Kennon Road (hereinafter referred to as the Stage — 1 Sections).

The Stage I Sections and the Stage II Sections should be implemented successively. Construction work of the Stage I Sections was targeted to be completed in 1990. In view of this, it is recommended that construction work of the Stage II Sections be started in 1990. The recommended implementation schedule is as follows:

- Preparation of the Project Funds 1986-1987
- Detailed Engineering Study 1988-1989
- Tender 1989
- Construction 1990-1991

10.2 PREPARATION OF PROJECT FUNDS

Total fund requirement broken down into foreign and local currency components is shown in Table 10.2-1. Total fund requirement was estimated at 74.50 million pesos, of which foreign currency component at 45.74 million pesos and local currency component at 28.76 million pesos, all in November 1984 prices.

TABLE 10.2-1 TOTAL FUND REQUIREMENT

Unit: Million Pesos

	October 1983 Price			Current Price		
	Foreign	Local/Tax	Total	Foreign	Local/Tax	Total
Detailed Engineering	2.97	1.60	4.57	3.98	2.97	6.95
Construction	39.80	25.56	65.36	59.18	53.27	112.45
Construction Supervision	2.97	1.60	4.57	4.43	3.34	7.77
Total	45.74	28.76	74.50	67.59	59.58	127.17

As discussed in the financial analysis, financial assistance from a foreign country or international financing institution is recommended. Negotiation of loans equivalent amount of foreign currency portion of the project (45.74 million pesos in November 1984 prices) should be made during the period from 1986 to 1987. The local currency portion amounting at 28.76 million pesos (in November 1984 prices) should be made available by the Government.

Annual fund requirement broken down into foreign and local currency portions is shown in Table 10.2-3.

TABLE 10.2-2 ANNUAL FUND REQUIREMENT

Unit: Million Pesos

		November 1984 Prices			Current Prices		
		Foreign	Local/Tax	Total	Foreign	Local/Tax	Total
Detailed	1988	1.19	0.64	1.83	1.54	1.14	2.68
Engineering	1989	1.78	0.96	2.74	2.44	1.83	4.27
Sub-Total		2.97	1.60	4.57	3.98	2.97	6.95
Construction	1990	25.66	16.29	41.95	37.27	33.03	70.30
And							
Supervision	1991	17.11	10.87	27.98	26.34	23.58	49.92
Sub-Total		42.77	27.16	69.93	63.61	56.61	120.22
Total		45.74	28.76	74.50	67.59	59.58	127.17

10.3 DETAILED ENGINEERING STUDY

The detailed engineering study will need about 10 months to complete in view of the extensive sub-surface investigations required and topographic surveys of complicated mountainous terrain.

All slopes should be re-investigated and spots with disaster potential must be identified. This is required because slope conditions would be drastically changed by typhons and identified spots under this Study as well as new spots would become more critical in terms of disaster potential. Therefore, thorough investigations of all slopes must be conducted. Utilization of aerial photographs is recommended as an aid in identifying disaster spots.

Geological and underground water conditions should be thoroughly studied prior to selection of countermeasures. Extra care should be paid to design of drainage facilities to drain surface water as well as underground water in due consideration of the rainfall intensify of the respective area.

Experiences in the construction of the Stage I Sections should be fully reflected on detailed design and tender documents.

10.4 CONSTRUCTION

The construction period will required 20 months.

As the slope conditions during the detailed engineering study might be greatly changed by typhoon damages, construction should start soon after the completion of the detalled engineering study.

The construction supervisors who have enough experience in this sort of projects should be employed, since decisions on modification of designs must be made at the construction site to cope with new findings of geological and underground conditions during construction. Changes in the design and quantities should be made as flexible as possible to cope with changing slope conditions during construction.

10.5 SUMMARY

The implementation schedule and annual financial requirements are summarized and shown in Figure 10.5-1.

		1985	1986	1987	1988	1989	1990	1991
Construction of Stage - I Sections								
Feasibility Study (This Study)								
Financial Arrangement for Implementation								
Detailed Engineering Study (10 months)								
Tender (6 months)								
Construction (20 months)								
Construction Supervision (20 months)								
Financial Requirement - November 1984 Price - (Unit : Million ₱)	Foreign Component				1.19 (1.54)	1.78 (2.44)	25.66 (37.27)	17.11 (26.34)
	Local/Tax Component				0.64 (1.14)	0.96 (1.83)	16.29 (33.03)	10.87 (23.58)
	Total				1.83 (2.68)	2.74 (4.27)	41.95 (70.30)	27.98 (49.92)

Note: Figure in ( ) shows financial requirement in current price.

Annual escalation rate (%)

Year	1985	1986	1987	1988	1989～1991
Foreign Component	7.5	7.0	6.0	6.0	6.0
Local Component	25.0	15.0	12.0	10.0	7.0

FIGURE 10.5-1 IMPLEMENTATION SCHEDULE

CHAPTER 11 SPECIAL PROPOSITION

CHAPTER 11 SPECIAL PROPOSITIONS

In view of the received urgency of the Project and on the basis of the findings of the Study, special propositions are profounded for the development of sound engineering practices and methods on road disaster prevention in the country.

Realizing the fact that road disasters are potential and likely to be grave and severe if no countermeasures are adopted, it is recommended to develop and work out ways not only in the search of immediate solutions, but in the longer term, a more systematic approach in considering the solutions to the problems.

11.1 SHORT TERM MEASURES

1) Recording of Road Disasters

The recording of disasters should be more comprehensively and systematically compiled. The information to be covered should include topography, geology, type, size and causes of road disaster, precipitation and influence of water.

These records can provide the basic engineering data to analyze in the identification of disaster spots, the frequency of the occurance of disasters and even the selection of the appropriate countermeasures.

2) Identification of Disaster Potential Spots

All spots where failures are likely to occur should be investigated and recorded by the agency concerned. The types, size and damage of roads due to failures should be identified and the potential disaster intensity of each spot should be assessed.

The availability of data will enable to prepare and install appropriate warning signs at strategic locations for the information of the road users, well ahead of the disaster potential areas. Moreover, with the availability of such records, the engineering approach to the solution of the problem can be developed and corresponding preventive measures can be formulated.

3) Provisional Remedial Measures

It can be safely concluded through the Study that the main cause of road disaster, without exception, is the effect of water, and therefore, the provisional remedial measures recommended to control water include:

—Provision of side and cross drainage pipe
—Vegetation on slopes
—Utilization of gabion whenever applicable
—Provision of closed conduits for groundwater and spring water

11.2 LONG TERM MEASURES

1) Development of Techniques of Road Disaster Prevention

The Study has been carried out mainly based on techniques of road disaster prevention experienced in Japan. Time constraint and limited study area coverage of the trunk road has not permitted to allow the Study to generalize the findings on the projects which can be adopted on a nationwide scale. In addition, road disaster prevention in this country must be carried out in a stern environment. In most parts of the country, the topography is mountainous with rugged terrain and the geology is generally of a fragile structure of the tertiary period. Furthermore, the geographical location of the country lies in the South Pacific typhoon belt where typhoon-bearing heavy rains passes the country's area of responsibility nineteen times or more each year on the average.

In view of the fact that such natural conditions in the Philippines are generally more stern than that in Japan, it is recommended that a disaster prevention system and technology suitable and adaptable to environmental characteristics of the country should be developed.

2) Road Planning

The Philippines' Fault Line traverses the archipelago from north to south. Secondary faults and holds resulting from this major fault are observed in all region. Where road run parallel to those faults, large scale slope failures are likely to occur. The typical example is the failure of some sections on the Maharlika Highway which runs along the Philippine Fault.

In the planning of new road alignment, therefore, a more comprehensive route study is suggested to avoid such cases. Alternative routes should be evaluated taking into full consideration the extent of disaster control works as well as road functions and costs.

3) Road Design and Construction

In designing new roads, a complete and detailed investigations related to road disasters should be carried out. A general policy to include the design of slope protection works and countermeasures for road disasters, is suggested whenever any road improvement is planned.

In such cases, a thorough study for selection of proper countermeasures should be made taking into account the class of road, traffic demand, future development of the area and the like.

4) Disaster Beyond the Scope of Highway Work

There exists a considerable number of spots which were seriously damaged due to scouring by sea wave, meadering of river, and the like. Countermeasures to solve these types of problems normally involve large scale riparian works which are all beyond scope of highway works.

In such cases, it is recommended that coordination with various sectors and/or agencies concerned be initiated to prevent further damage on the road sections.

ATTACHMENT:
SUPPLEMENT TO "AN APPROACH ON ROAD DISASTER PREVENTION"

ATTACHMENT: SUPPLEMENT TO "AN APPROACH ON ROAD DISASTER PREVENTION"

The report entitled "An Approach on Road Disaster Prevention" was prepared during the Stage I Study. In the course of the Study at this stage, the report was again reviewed through discussions with engineers of the Philippine Government concerned and also based on the new findings of the Study.

I COMMENTS FROM THE PHILIPPINE GOVERNMENT

(1) Bureau of Construction

1) The methods/procedures of the various types of work involved therein are found highly acceptable and recommendable.

(2) Region II (Cagayan Valley Region)

1) In the list of countermeasures recommended by the consultants, the driving of sheet piles at sections, usually located along river bends, and which are susceptible to scouring by swift river currents, is not recommended. It was noted in Volume V of the JICA report that for structural work, they have recommended the construction of retaining wall (stone masonry, gravity type, supported type, and gabion); and for foot protection, they have recommended the construction of concrete and gabion foot protection, while the use of steel sheet piles was not mentioned.

2) The actual implementation of the appropriate countermeasures to prevent costly road disasters will not be hampered by constraints, financial or otherwise.

(3) Region III (Pampanga)

1) "An Approach on Road Disaster Prevention" can be utilized whenever applicable to Region III.

2) Some disasters not covered here are flooding due to monsoon rains and typhoons wherein approaches to bridges are washed out. During flood, debris like huge trunks of trees hit bridge piers which eventually cause the collapse of some.

(4) Region IV-B (Southern Tagalog)

1) Proposed schemes of road disaster prevention are generally feasible and applicable.

2) There is apprehension that the use of such materials as anchor wire net, catch fence, etc. in the protection works would subject the finished structures to such pilferages which would result to total damage or very high maintenance costs. It is suggested that the protection schemes should include provisions to prevent or minimize such occurances. The Report should include an Information Program to educate the Public of the functions and importance of such projects.

3) Detailed engineering for urgent works should be presented.

(5) Region VII (Cebu)

1) Proposed preventive measures are more than adequate.

2) The construction procedures must be described in detail and the corresponding appropriate Work Item Title Designation and Number must be established and incorporated in the MPWH Standard Specification Manual/Book as basis in the prosecution of such activities, and as basis in future Infrastructure Contract/Agreements.

3) It is suggested that the corresponding specifications, particularly the choice of the construction materials to be used, shall be clearly defined for purposed of effective implementation of the countermeasures.

(6) The Chief Civil Engineer, Baguio City

Subject: An Approach on Road Disaster Prevention

Comments:

1) The Feasibility Study of Philippine Road Disaster Prevention is very informative and timely as well as necessary.

2) Volume V of the study "An Approach on Road Disaster Prevention" is an excellent reference manual in the Planning, Design and Construction of Roads.

Suggestions:

1) Construction of the appropriate and necessary countermeasures for identified potential disaster spots along Marcos Highway, Kennon and Naguilian Road will preclude/or control the occurrence of road disasters thereat.

2) A practical guideline in the identification and evaluation of potential disaster spots for Field Maintenance Personnel be formulated.

3) Identification of other potential disaster spots periodically along the entire road network by applying the criteria and methodology of the studies.

II SUGGESTIONS FROM THE STUDY TEAM

The report was based mainly on techniques of road disaster prevention experienced in Japan. The report may, therefore, contain some deficiencies, particularly on the following:

i) Not all types of road disasters have been considered
ii) Items to be checked for the evaluation of potential disaster areas may not necessarily be sufficient, and
iii) Applicability of recommended countermeasures have not been verified.

It is, therefore, recommended that disaster prevention technology suitable and adaptable to the environmental characteristics of the country should be developed, taking into full account the fact that natural conditions in the country are generally more stern than in Japan.

In the technical discussions described in the report, special items which should be urgently reviewed and developed by Filipino engineers, in view of the above, include, among others the following:

(1) Evaluation Method of Disaster Potential

The evaluation method of disaster potential recommended in the report was proposed based on the method established by the Ministry of Construction of Japan with slight modifications which were believed to be suitable to the natural conditions in the Philippines.

However, the evaluation method should be established reflecting not only natural conditions but also other factors such as class of road, traffic volume, development policy and economic condition in the country. A practical guideline in the identification and evaluation of potential disaster spots for Field Maintenance Personnel should be formulated, as suggested by the Chief Civil Engineer of Baguio City.

Therefore, this should be studied by Filipino engineers concerned.

(2) Grass for Vegetation

Vegetation is a simple, economical but effective measure as slope protection work. And it provides green to a slope and creates a pleasing sight in harmony with nature.

However, the kind of grass that is suitable, especially for seed mud spraying is yet unknown and the said type of seed may not yet be produced locally.

Therefore, it is recommended that a study on grass suitable for slope protection and its production should be undertaken immediately.

(3) Stone Masonry and Stone Pitching

Stone masonry retaining wall and stone pitching are well known methods as "Rip-rap" in the country and widely used to protect slopes.

However, it was observed at many spots that stone masonry retaining walls were destroyed and left unrepaired. These may have been caused by some deficiencies in design and construction. The thickness and gradient of wall and thickness of backfilling material should be designed in accordance with the height of the wall. The reasonable size of stone should be placed in order and properly mixed with stuffing concrete. Weep holes should not be neglected.

It is, therefore, suggested that detailed specification for stone masonry retaining wall and stone pitching should be immediately prepared considering the available size of stones in the country.

(4) Pilot Works of Recommended Countermeasures

Countermeasures for road disasters listed in the report are those which are commonly used in Japan. However, there are misgivings somewhat on the applicability and durability of countermeasures because of severe weather involving extremely high rainfall intensity.

Therefore, pilot application of the following slope protection works, which may be often used in this country in the near future, is suggested to check their durability and develop appropriate design criteria:

- Surface and Subsurface Drainage
- Vegetation
- Concrete Spraying
- Sprayed Concrete Crib
- Anchor Wire Net

(5) MPWH Specification/Manual for Road Disaster Prevention

As mentioned in the Comments from Region VII and the chief civil engineer of Baguio City, MPWH specification/manual for road disaster prevention is recommended to be prepared covering Work Item Title Designation and Number, construction procedure, and construction materials. A practical guideline in the identification and evaluation of potential disaster spots for Field Maintenance Personnel should also be formulated.

(6) Disasters Beyond the Scope of Highway Works

As pointed out in the comments from Regions II and III, the scouring of road slope due to sea-wave and swift river currents is likely to cause the serious damages to the road, not to mention, the inconvenience due to traffic interruptions caused by the totally impassable road sections.

Countermeasures to solve these problem normally involve large scale riparian works which are all beyond the scope of highway works. Sheet piling is widely used for this type of failure.

In such cases, the systematic coordination with various sectors is recommended to totally prevent further damages on road sections.

(7) Administration

In the report, the administrative strategies in managing road disasters were discussed and has given emphasis to actions to be taken in two phases: one is the action prior to the occurrence of disaster (Daily Activities) and the other during and after the occurrence (Emergency Activities).

The former includes the periodic inspection of slope, the identification of disaster prone spots, installation of pluviometers and the like. The latter, on the other hand, involves traffic control, an information system, and the remedial work for damages, among others.

These actions should be discussed not only on the engineering view point but systematically supported by the specially assigned members and teams under the organization of the Ministry of Public Works and Highways and other concerned agencies.

JICA