

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
NATIONAL ROAD NO.8 CONSTRUCTION COMPANY  
MINISTRY OF COMMUNICATION, TRANSPORT, POST AND CONSTRUCTION  
LAO PEOPLE'S DEMOCRATIC REPUBLIC

**BASIC DESIGN STUDY REPORT**  
**ON**  
**THE PROJECT FOR PROVISION**  
**OF**  
**ROAD CONSTRUCTION EQUIPMENT**  
**IN**  
**LAO P. D. R.**

MARCH 1993

CONSTRUCTION PROJECT CONSULTANTS, INC.

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国際協力事業団

25506

## PREFACE

In response to a request from the Government of Lao People Democratic Republic, the Government of Japan decided to conduct a basic design study on the Project for Provision of Road Construction Equipment for National Road No.8 and entrusted the study to the Japan International Cooperation Agency (JICA).

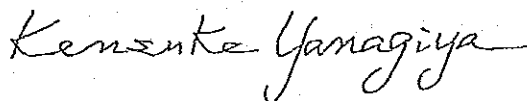
JICA sent to Lao P.D.R. a study team headed by Mr. Tadashi YOSHIDA, Deputy Director, Construction Equipment Division, Economic Affairs Bureau, Ministry of Construction and constituted by members of Construction Project Consultants, Inc., from 19th January to 10th February, 1993.

The team held discussions with the officials concerned of the Government of Lao P.D.R. and conducted a field study at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of Lao P.D.R. for their close cooperation extended to the team.

March, 1993



Kensuke YANAGIYA  
President  
Japan International Cooperation Agency





March, 1993

Mr. Kensuke Yanagiya  
President  
Japan International Cooperation Agency  
Tokyo, Japan

Letter of Transmittal

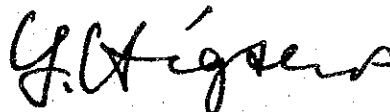
We are pleased to submit to you the basic design study report on the Project for Provision of Road Construction Equipment for National Road No.8 in Lao P.D.R.

This study has been made by Construction Project Consultants, Inc. based on a contract with JICA, from 19th January to 26th March 1993. Throughout the study, we have taken into full consideration of the present situation in Lao P.D.R., and have planned the most appropriate project in the scheme of Japan's grant aid.

We wish to take this opportunity to express our sincere gratitude to the officials concerned of JICA, the Ministry of Foreign Affairs and the Ministry of Construction. We also wish to express our deep gratitude to the officials concerned of the Ministry of Communication, Transport, Post and Construction, National Road No.8 Construction Company, and Embassy of Japan in Lao P.D.R. for their close cooperation and assistance during our study.

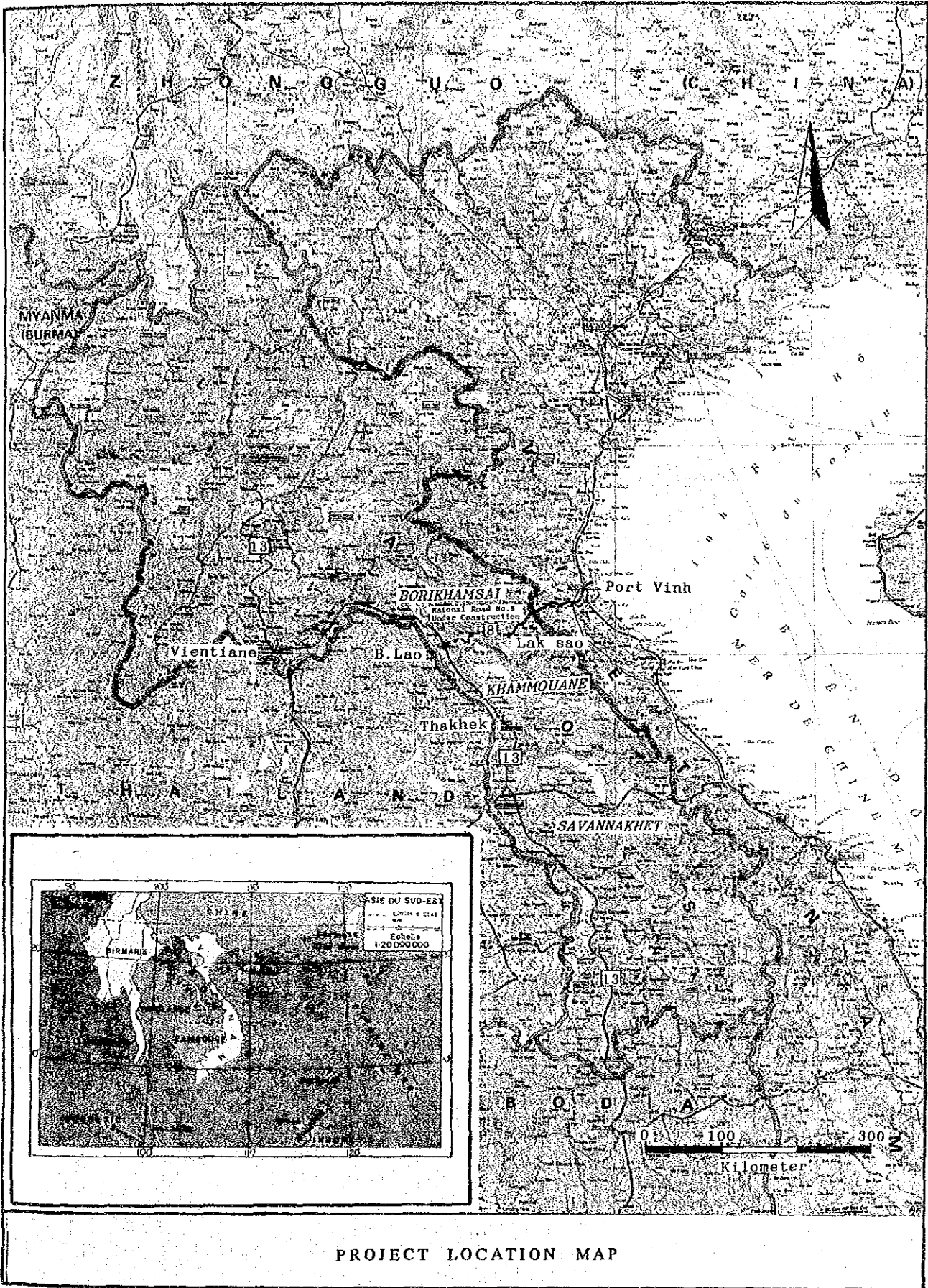
As last, we hope that this report will be effectively used for the promotion of the project.

Very truly yours,



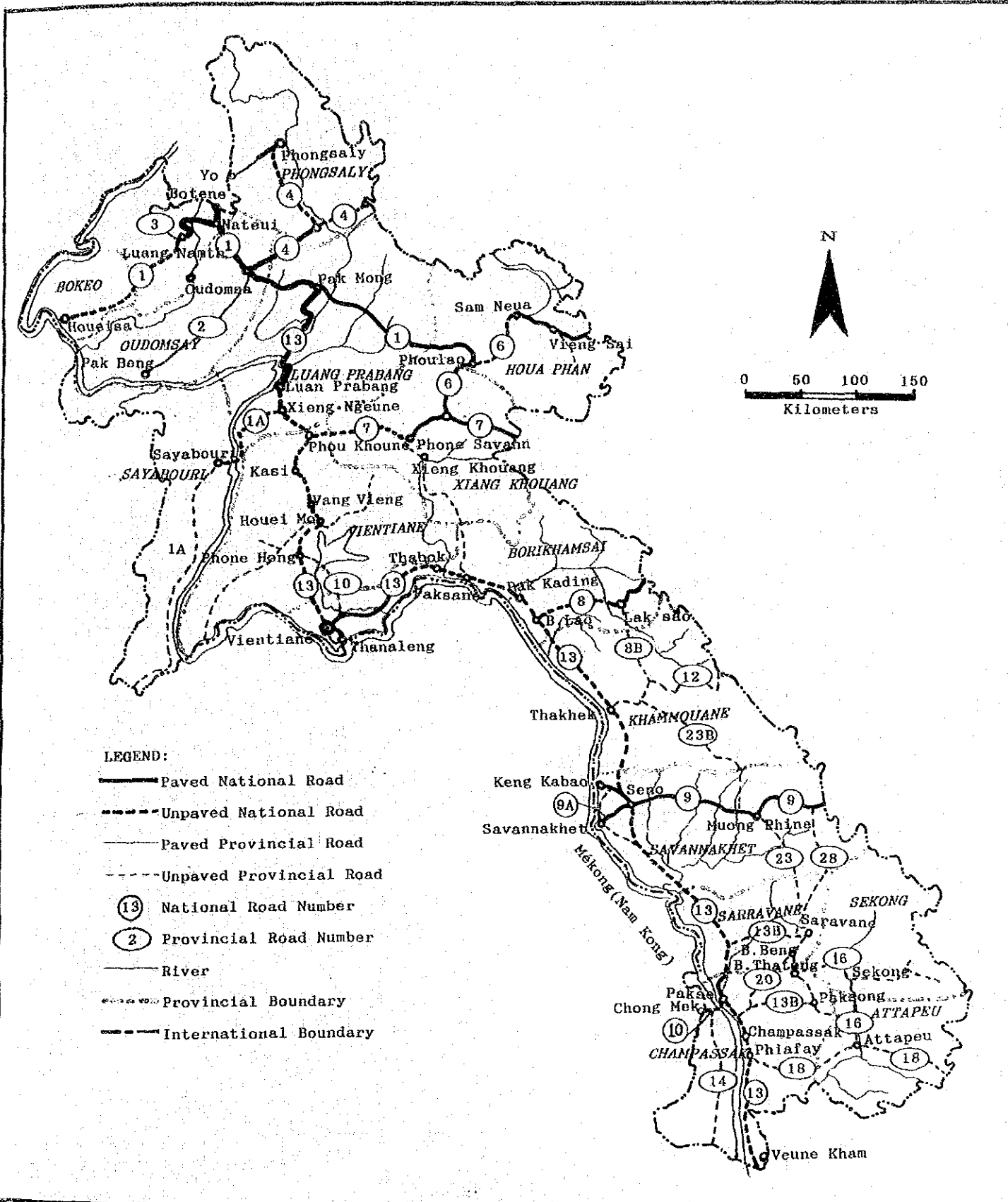
Project Manager, Yoichi HIGAKI  
Basic Design Study Team on the Project for  
Provision of Road Construction Equipment  
for National Road No.8  
Construction Project Consultants, Inc.





PROJECT LOCATION MAP

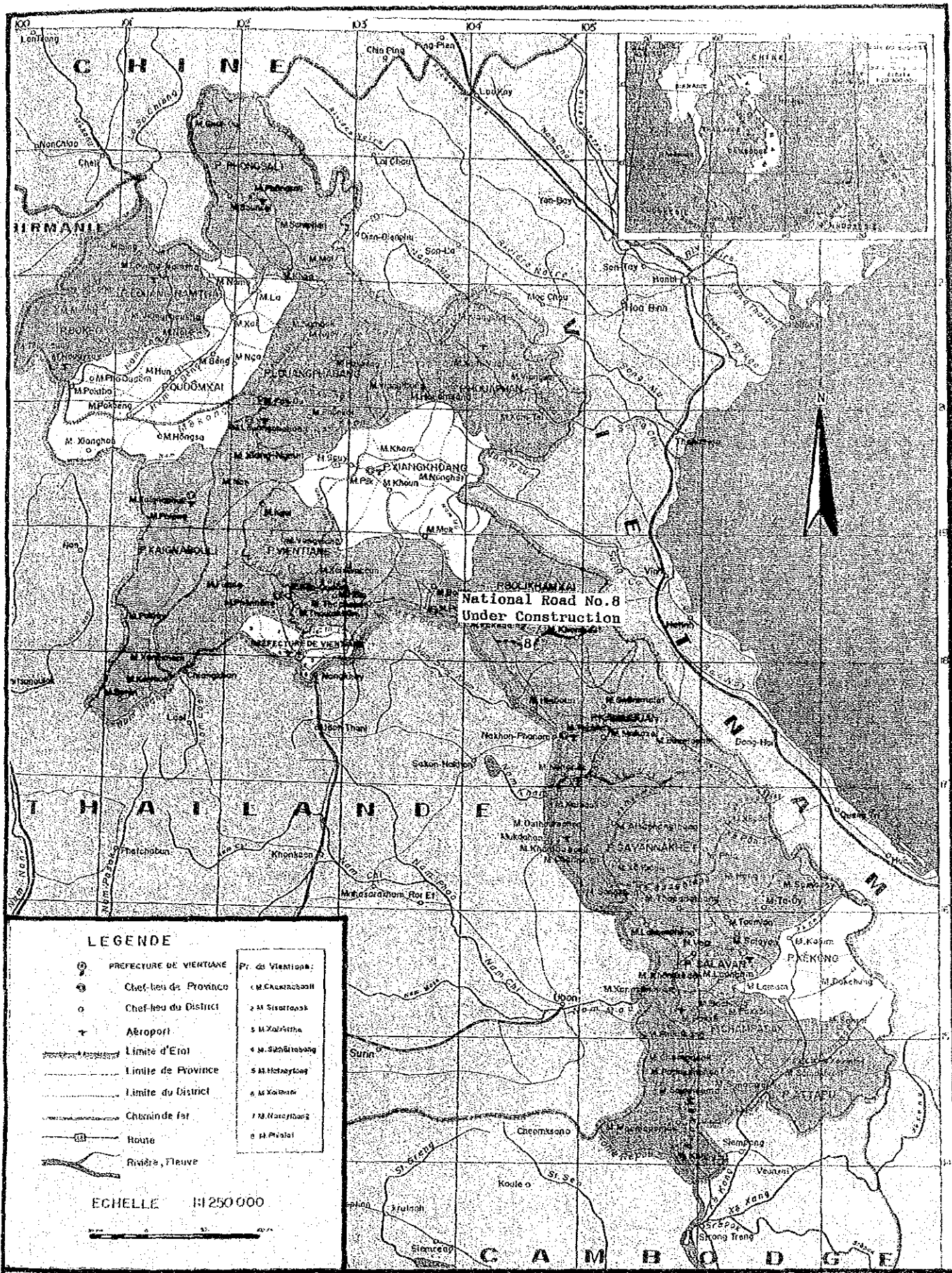




- LEGEND:**
- Paved National Road
  - - - Unpaved National Road
  - Paved Provincial Road
  - - - Unpaved Provincial Road
  - ⑬ National Road Number
  - ② Provincial Road Number
  - River
  - - - Provincial Boundary
  - - - International Boundary

LAO PEOPLE'S DEMOCRATIC REPUBLIC  
ROAD NET WORK





**LEGENDE**

- |     |                         |                   |
|-----|-------------------------|-------------------|
| ⊙   | PREFECTURE DE VIENTIANE | Pr. de Vientiane: |
| ⊙   | Chef-lieu de Province   | 1 M. Casarabouli  |
| ○   | Chef-lieu du District   | 2 M. Sisattanak   |
| ✈   | Aéroport                | 3 M. Xaybouli     |
| —   | Limite d'Etat           | 4 M. Soudetouang  |
| --- | Limite de Province      | 5 M. Hattayouang  |
| --- | Limite du District      | 6 M. Xayburi      |
| —   | Chemins de fer          | 7 M. Nongbong     |
| —   | Route                   | 8 M. Phouai       |
| —   | Rivière, Fleuve         |                   |

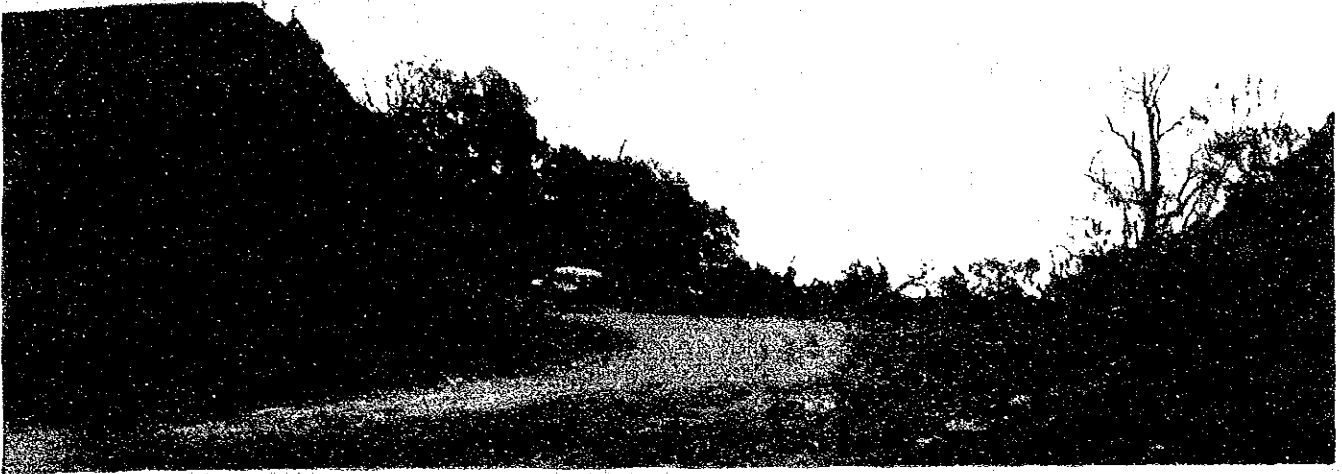
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**LAO PEOPLE'S DEMOCRATIC REPUBLIC  
ADMINISTRATIVE DIVISIONS**





PHOTOS



National Road No.8  
Rocky terrain, excavated (Sta. 33 Km)



Rocky terrain, further excavation by blasting will be required. (Sta. 34 Km)

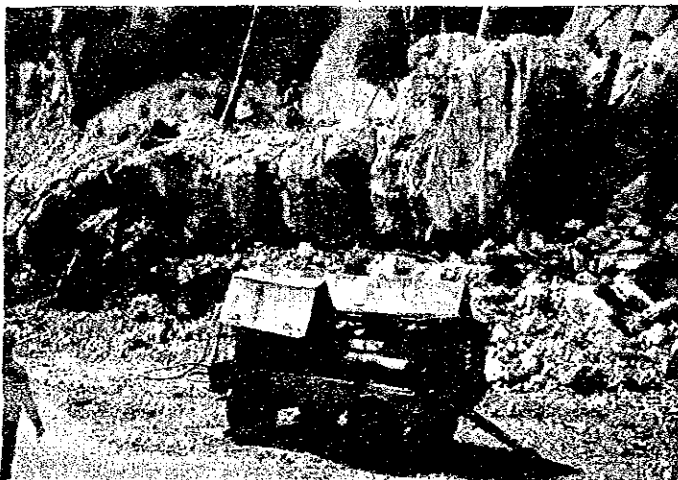


Drilling hole for the blasting by Jack Hammer





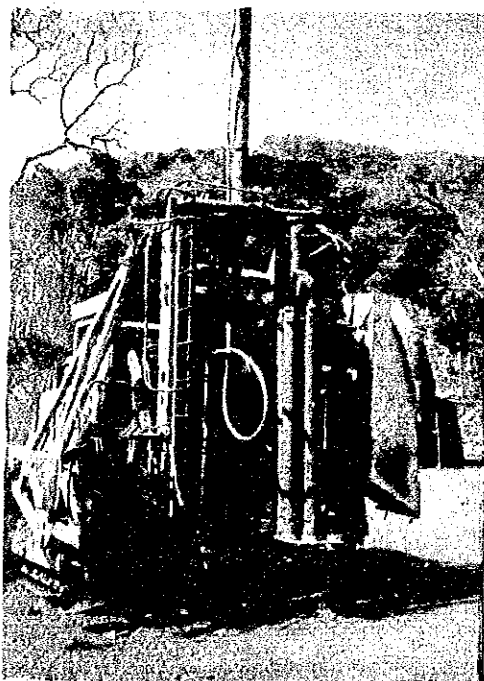
National Road No.8  
Drilling hole for the blasting by Drilling Machine



Air Compressor used for drilling blasting hole



Pick hammer

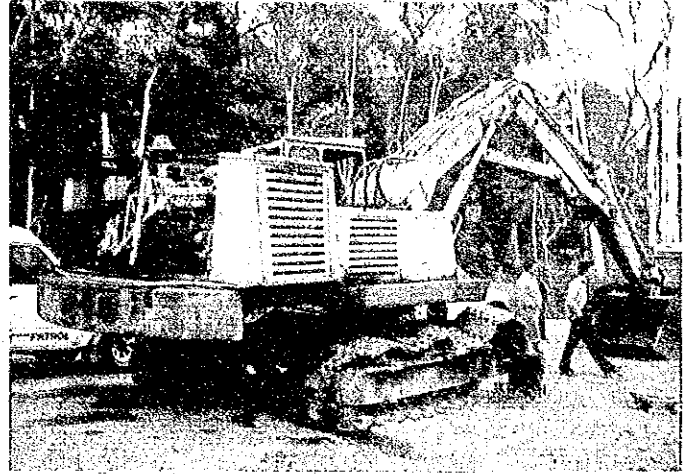


Drilling Machine made in then USSR, mounted on bulldozer

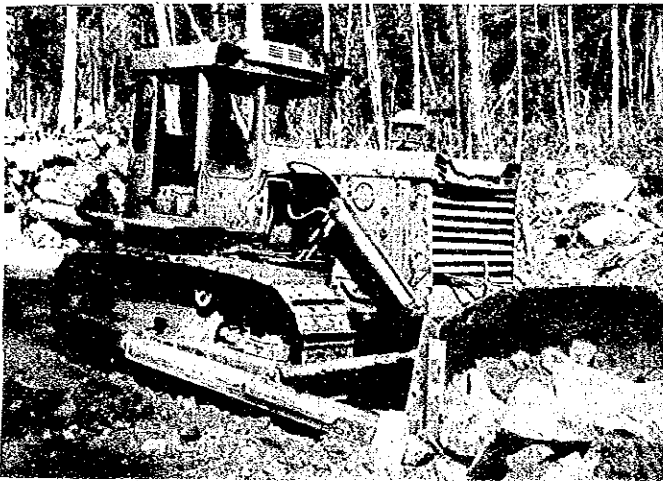




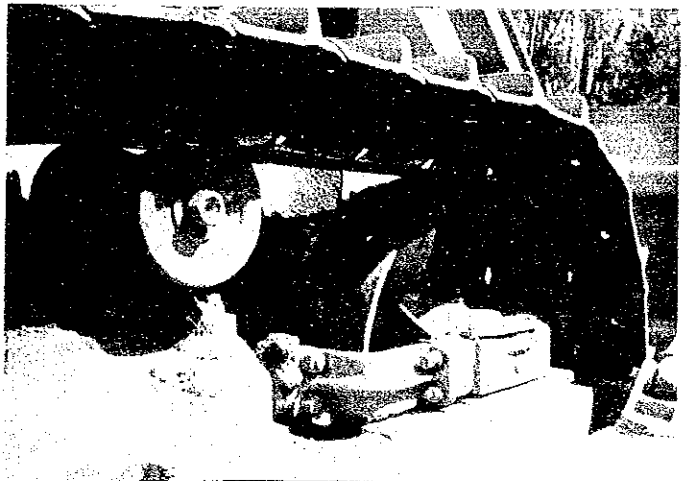
Bulldozer made in USSR, undercarriage is already weared.



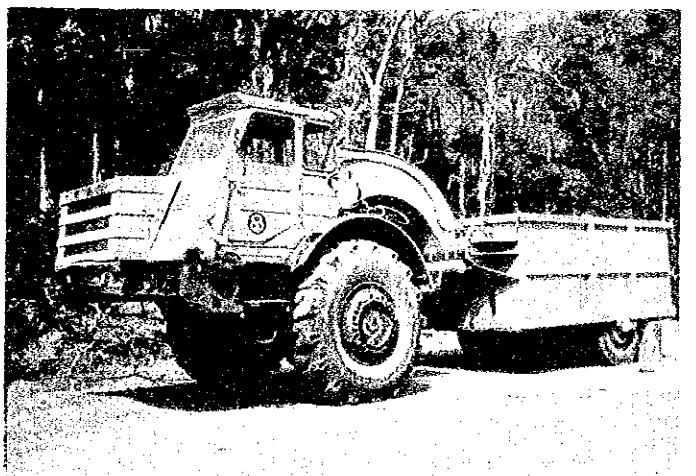
Hydraulic excavator made in then USSR, undercarriage is weared.



Bulldozer under operation, idler is weared.

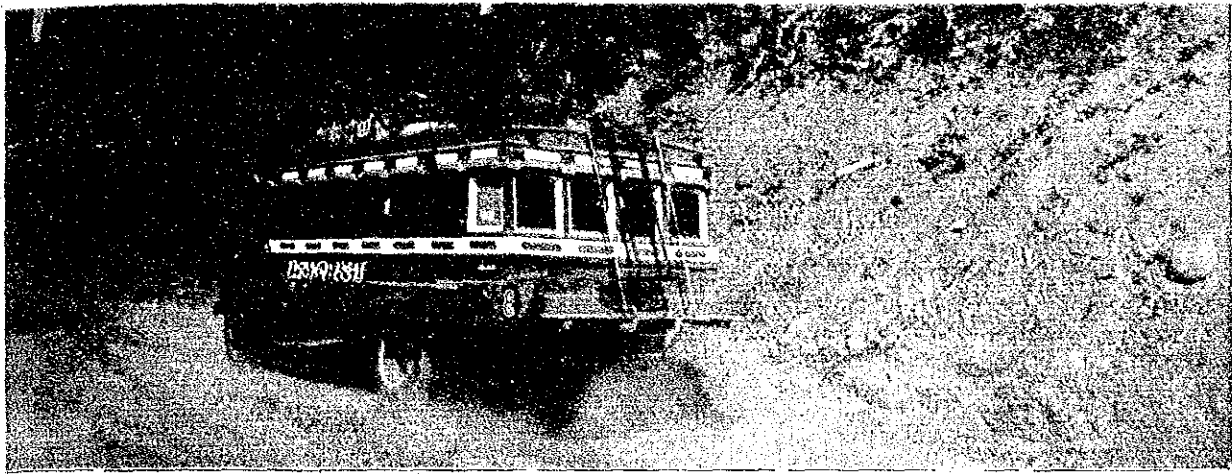


Wheel Loader made in then USSR



Tire Roller made in then USSR, tire is punctured.





Regular Bus between Paksane and Lak Sao, running on the National Road No.8 under constructions



Old National road No.8 Crossing with the New Road under constructions near the Mt. Hai.

The old National Road is an earth road from the beginning, and is at present covered by bush and is impassable for Vehicle.





## **SUMMARY**



## SUMMARY

Lao People's Democratic Republic is a landlocked country located in the Indochina Peninsula. It is bordered by Thailand, Myanmar, China, Cambodia and Vietnam. The area is 236,800 Km<sup>2</sup> (nearly as large as Honsyu Island in Japan), extending 950km north to south and 250km east to west. Administratively it is divided into 16 provinces and one autonomous municipality (Vientiane City). The population is estimated at 4,170,000 as of the end of 1990. Main products are timber produced in the mountainous regions, rice in the plains, coffee in plateau, and electricity produced at Nam Gum Power Plant (surplus electricity has been exported to Thailand).

In 1949 Laos became independent as a member of the French Union. However, due to the long internal hostilities which were caused in the resistance against France with rising nationalism, the economy of the country has been declined gradually. In particular, a socialist economic system introduced by the government in 1975 decelerated the economic and social development in Laos.

In 1986 the Government introduced the New Economic Mechanism (NEM) incorporating market economy and trade liberalization. Under the NEM, aimed at realizing a socio-economic reform based on the principle of liberal economy, the Government started the Second Five Year Development Plan (1986-1990). Main thrusts of existing Third Five Year Development Plan (1991-1995) entail an increase of food production, environment preservation, development and conservation of agricultural and forest resources, and increase of export in line with the political reform. Especially, emphases are placed on the reconstruction and rehabilitation of the existing road network and improvement of transport services. Since then improvement of the trunk roads inclusive of the bridges are being undertaken with assistances of international aid organizations.

Laos has a road network covering total length of 13,971, of which 3,346 km is asphaltic paved roads, 4,775 km lateritic surfaced roads and other 5,850 km unpaved and earthen tracks. Road density is limited to 0.06 km per sq.kilometer, and the ratio of paved road to the total length accounts for only 24%.

Maintenance of the existing road network shall be essential for the socio-economic development of Laos, because transport services of the country depend almost all on this sub-sector.

Under the circumstances, rehabilitation and maintenance of road network have been taken up as priority projects among the transport investment programme comprised in the current Third Five Year Development Plan.

Among the projects, improvement of National Roads No. 13 and No.8 are accorded the highest priority as these roads play vital roles to the expansion of international trade. The former is a north to south backbone running along Mekong River providing access to Thailand Bay, and the latter is an east to west artery accessible to China Sea.

The Project road, National Road No.8 joins immediately Ban Lao on National Road No.13 to Lak Sao which is the most essential urban area in the east region of Laos. It shall also be the shortest route which connecting Vientiane Municipality to the Vinh Port complex in Vietnam. After National Road No.8 is completed it will provide Laos with an important link to China Sea, and will also serve as a corridor for international traffics.

The construction of National Road No.8 was started in 1988 by the Road No.8 Construction Company (hereinafter referred to as "the Company") under the jurisdiction of Ministry of Communication, Transport, Post and Construction (hereinafter referred to as "MCTPC"). Of a total length of 132 km, the 81 km section between Lak Sao and Vietnamese frontier was constructed with asphaltic pavement in terms of assistances of Vietnam, and remaining 51 km of the project section is under construction. Purpose of this Basic Design Study has been directed to the remaining section.

The construction of the project section has faced various questions, i.e. tremendous volume of rock excavation in the mountainous area which needs blasting works, huge amount of cut and fill earthwork necessary for almost all the sections through mountainous terrains, and fatally poor condition of the deteriorated construction equipment that had been transferred from National Road No.9 construction project, and general and absolute lack of appropriate type and number of equipment.

Under these constructional conditions, the Government of Lao P.D.R. made a request to the Government of Japan for the procurement of the road construction equipment to be used for the completion of National Road No.8. The Government of Japan decided to conduct a study, and Japan International Cooperation Agency (JICA) sent the study team to Laos from January 23 to February 10, 1993.

Through site inspection by the study team it was found that the lives of most equipment of the Company's fleet which has been used for past several years is nearly exhausted.

The remaining work estimated in the study comprises: 131,400m<sup>3</sup> of hard rock excavation requiring blasting operation, 415,300 m<sup>3</sup> of earthwork with plenty of boulders, 354,600 m<sup>2</sup> of pavement work including double surface treatment, base course and sub-base course, and etc.

Inspection of actual condition of existing fleet of the Company shows: Out of 114 units of equipment possessed by the Company, only 23 are operational (20.2%), and 102 (90%) which are of then USSR origin, seem almost scrap. Also, supply of spare parts for those equipment has now become practically impossible. USSR equipment procured in 1990 through 1992 counts only 13. The study team reviewed and prepared an execution plan and worked out the remaining work volume according to the designs recently improved by the MCTPC, hereunder calculated the type and number of the equipment required for the project road. In conclusion, the study team advises completion of the project road can be secured by means of renewing and reinforcing the equipment fleet possessed by the Company.

The equipment schedule recommended by the study team includes those for earthwork (Group I), material transport (Group II), and miscellaneous works (Group III) which are obtained by analyzing the existing capacity of the existing fleet of the Company.

## EQUIPMENT SCHEDULE

Equipment	Recommended Model	Recommended Nos.
<b>Group I (for Earthwork)</b>		
1) Bulldozer	225 HP.	3
2) Hydraulic Excavator	19 t, 0.7m <sup>3</sup>	3
3) Vibration Roller	11 t	1
4) Vibration Roller	9.5 t	2
5) Tyre Roller	9 t	2
6) Motor Grader	155 Hp, 3.7m	4
7) Wheel Loader	110 Hp, 1.5m <sup>3</sup>	4
8) Spare parts of the above	equivalent for two years use	
<b>Group II (for Material Transport)</b>		
1) Dump Truck	8 t, 4x2	17
2) Flat bed Truck	2-3 t	1
3) Pick up	double cabin	2
4) Water Tanker	6000 lts.	2
5) Fuel Tanker	4000 lts.	1
6) Tractor Trailer	30 t, 280 HP	1
7) Spare parts of the above	equivalent for two years use	
<b>Group III (Ancillary and Miscellaneous Works)</b>		
1) Air Compressor	7.5 m <sup>3</sup> /min	2
2) Air Compressor	17.0 m <sup>3</sup> /min.	1
3) Vibration Roller	hand-guided, 600kg	2
4) Drilling Machine	Crawler type, 7.0m <sup>3</sup> /min.	1
5) Jack Hammer	sinker, handy, 10 kg	5
6) Concrete Mixer	0.3 m <sup>3</sup>	4
7) Concrete Mixer	0.5 m <sup>3</sup>	2
8) Asphalt Distributor	8000 lts.	1
9) Mobile Workshop	with welding machine	1
10) Mobile Maintenance Vehicle	5 t, flat bed truck	1
11) Vibrating Screen for Crushing Plant	25-35 t/h, with belt conveyor	1
12) Generator	100 kva, 220v	1
13) Hydraulic Crane	15 t - 20 t	1
14) Survey Equipment	theodolite x2, level x2	1
15) Soil and Concrete Testing Equipment	standard type	1
16) Tool Set	heavy duty	1
17) Spare parts of the above	equivalent for two year's use	sum

It has been assured that the equipment to be procured under the Japanese Grant Aid be allocated to, used and managed properly by the Company under the responsibility of MCTPC and that the Equipment be transferred to the Construction and Extension Project of National Road No.1 programmed by MCTPC after the completion of National Road No.8.

The Company lies under the direct control of MCTPC, which administrative direction flows the stream of the Minister- Vice Minister -Director of the Department of Communication -the Chief Director of the Company-Superintendent of Construction of the Project Road. Organization under the Superintendent of Construction comprehends General Construction Manager, Chief Accountant, Equipment Maintenance Chief, Personnel Section Chief, and Engineers of the Earthwork, Structures, Concrete Mixing Plant, Transport, and Stone Crushing Plant Sections, etc.

Maintenance and Repair of the equipment to be procured under the Japanese Grant Aid shall be executed in five stages (1-5). The Company's site workshop will cover the 1-3 stage of maintenance services, which include replacement of parts, reproduction of minor parts, equipment assembly and minor repair works, while the 4-5 stage of maintenance services which comprise major repair works like engine overhaul will fall into the MCTPC's Vehicle Service Shop private or Lao-Australian Heavy Duty Workshop, etc.

The Government has firm intention to complete the construction as early as possible and allocated a budget amounting to US\$ 5.03 million for the Project road. It is assured that this amount can cover the maintenance cost of the equipment to be procured under the Project.

Time required for the implementation of the Japanese Grant Aid Project will be: some 3 months for detail design and some 10 months for the procurement of equipment covering tender, contract, procurement, delivery, and initial operation and training process of the Equipment.

The Japanese Grant Aid will strengthen the executing capacity of the Company's fleet as follow so that the Project road be completed by the end of 1996.