

3. OUTLINE OF THE PROJECT

The outline of the whole project from Bardibas (MRM) to Banepa (Arniko Rajmarg) through Sinduhuli bazar is summarized below:

Section I - MRM - Sindhuli basar - 37 km. long

Section II - Sindhuli bazar - Banepa - 110 km. long.

Section I

DOR has already undertaken the Construction of this section in 1983 of gravel standard in Co-operation with the Government of Japan. These are sixteen river crossing bridges of more 50 meters length which are excluded in this phase of Construction.

However, the initial standard provided to this section seems to be low and bridges are excluded on that programme, therefore, it is desired to plan to upgrading the road length and the construction of sixteen bridges in order to realize all weather road link.

Section II

From Sindhuli bazar, the proposed road runs further northward through the hilly and mountainous terrain. The alignment can cross the mountain ridge of about 2,000 meters high from sea level and there reaches Sun Koshi valley. From this valley the road will change its direction towards North West passing through low terraces land of Sun Koshi river and reaches to Banepa on Arniko Rajmarg. This section of road link will also have the same standards of all weather road as those for Section I.

The location of the Project is shown in APPENDIX-A.

4. SCOPE OF THE STUDY

In order to achieve the objective of the Study, the Study Team will carry out the following.

(1) Traffic and Socio-Economic Studies

- a. Traffic data collection, traffic survey and analysis
- b. Socio-economic data collection and analysis
- c. Review of population and socio-economic conditions
- d. Review of current and future development plans and programmes
- e. Forecast of future agro-industry
- f. Forecast of future traffic demand

(2) Engineering Studies

- a. Preparation of topographic map by utilizing the existing aerial photos
- b. Engineering data collection and analysis
 - Soil and geological data
 - Hydrological and hydrographic data
 - Materials data
 - Meteorological data
- c. Survey
 - Soil and geological surveying including drilling and testing
 - Topographic survey and center line survey
 - Hydrographic survey
- d. Design criteria and standards
 - Geometric design standards
 - Structural design standards
 - Pavement design standards
- e. Engineering works
 - Alternative route study
 - Preliminary design
 - Cost estimate consisting of land acquisition cost, construction cost and maintenance cost

- Construction programme consisting of construction method, construction schedule and construction plant and equipment

(3) Economic Evaluation

- a. Estimate of benefit
- b. Estimate of NPV (net present value), IRR (internal rate of return) and B/C ratio (benefit cost ratio)
- c. Sensitivity analysis

(4) Implementation Programme

- a. Estimate of budgetal and financial schedule
- b. Implementation programme

The previous reports and maps related to the Study are listed as per attached in APPENDIX-B.

5. TIME SCHEDULE AND REPORTING

The tentative schedule of the feasibility study is shown in the attached table. The Study Team shall prepare and submit the following reports to the Department of Roads of the Ministry of Works and Transportation.

- a. An Inception Report (30 copies) within the first month from the start of study in Nepal
- b. Progress Reports (30 copies) in every 3 months during the course of study in Nepal
- c. Interim Report (30 copies) at the end of study in Nepal
- d. Draft Final Report (30 copies) within 12 months from the starting date
- e. Final Report (50 copies) within 2 months after the comments on the Draft Final Report by the Department of Roads.

6. GOVERNMENT UNDERTAKINGS

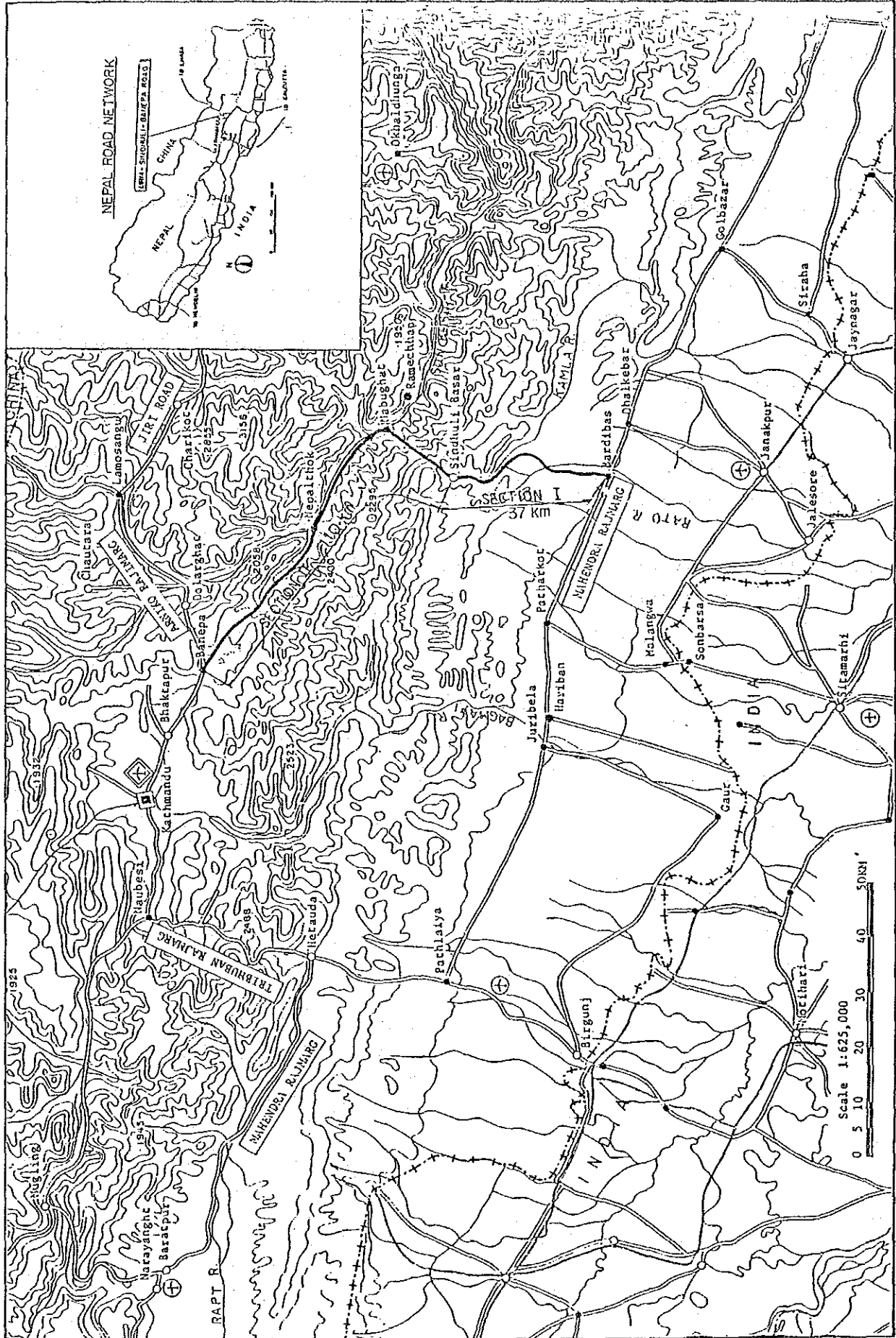
The H.M.G. shall accord privileges, immunities and other benefits to the Japanese study team and, through the authorities concerned, take necessary measures to facilitate the smooth implementation of the Study.

(1) The H.M.G. shall make necessary arrangements for the following;

- a. To secure the safety of the Study team
- b. To permit the members of Japanese study team to enter, leave and sojourn in Nepal for the duration of their assignment therein, and exempt them from alien registration requirements.
- c. To exempt the members of Japanese study team from taxes, duties and other charges on equipment, machinery and other materials brought into Nepal for the implementation of the Study.

- d. To exempt the members of Japanese study team from taxes, duties and other charges on equipment, machinery and other materials brought into Nepal for the implementation of the Study.
 - e. To permit the members of Japanese study team to use wireless telephone system in order to facilitate communication between Kathmandu and survey team.
 - f. To exempt the members of the Japanese study team from income tax and other charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese study team for their services in connection with the implementation of the Study.
 - g. To provide the necessary facilities to the Japanese study team for the remittances as well as utilities of fund introduced into Nepal from Japan in connection with the implementation of the Study.
 - h. To provide the medical services as needed and its expenses will be chargeable on the members of the Japanese study team.
 - i. To secure permission to take all data and document related to the Study out of Nepal to Japan by the Study team.
- (2) DOR shall, at its own expense, provide the Japanese study team with the following, in cooperation with other organizations concerned;
- a. Available data and information related to the Study.
 - b. Counterpart personnel
 - c. Suitable office with necessary furniture, telephone, air-conditioner or ceiling fan and cabinets.
 - d. Credentials or identification cards

- (3) The H.M.G. shall bear claims, if any arises against the members of the Japanese study team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the members of the Japanese study team.



PREVIOUS REPORTS AND MAPS

The previous reports related to the Mahendra Rajmarg - Sindhuli - Banepa Road are listed below.

- (i) H.M.G and UNDP " Reconnaissance Survey, Nepal Road Feasibility Study "
(December 1970)
- (ii) H.M.G and UNDP " Nepal Road Feasibility Study, Part A: Economic,
Part B: Engineering " (June 1972)
- (iii) International Engineering Consultants Association, Japan " Reconnaissance Report on Present Transportation Infrastructure in Nepal "
(January 1984)
- (iv) Engineering Consultanting Firms Association, Japan " Reconnaissance Survey, North - South Road in Nepal " (November 1984)

The following maps and aerial photos will be available for the feasibility study on the Mahendra Rajmarg - Sindhuli - Banepa Road.

- (i) Aerial Photos : Scale 1/50,000
- (ii) Geological Map : Scale 1/125,000
- (iii) Land System and Land Capacity : Scale 1/50,000
- (iv) Tectonic Map of the Nepal and Himalayas : Scale 1/500,000
- (v) Nepal Road Network 1982 : Scale 1/1000,000

TENTATIVE WORK SCHEDULE OF FEASIBILITY STUDY
ON MAHERA RAJNANG - SINDHULI - BANEGA ROAD

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
WORK IN NEPAL																	
WORK IN JAPAN																	
REPORT PRESENTATION																	
		Ic/R		P/RI			P/RII			I/R			D/F			F/R	

Notes :

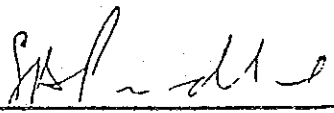
- Ic/R..... Inception Report
- P/RI..... Progress Report (I)
- P/RII..... Progress Report (II)
- I/R Interim Report
- D/F Draft Final Report
- F/R Final Report

2. コンタクトミッション議事録


SCOPE OF WORK
FOR
FEASIBILITY STUDY
ON
SINDHULI ROAD CONSTRUCTION PROJECT
IN
KINGDOM OF NEPAL

AGREED UPON BETWEEN
HIS MAJESTY'S GOVERNMENT OF NEPAL
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Kathmandu : July 15, 1986



Shiva Bahadur Pradhanang
CHIEF ENGINEER
DEPARTMENT OF ROADS
MINISTRY OF WORKS AND TRANSPORT
HIS MAJESTY'S GOVERNMENT OF NEPAL



Naotada Isami
LEADER OF THE MISSION
JAPAN INTERNATIONAL COOPERATION
AGENCY

I INTRODUCTION

In response to the request of His Majesty's Government of Nepal (hereinafter referred to as "HMG/N"), the Government of Japan decided to implement the Feasibility Study on Sindhuli Road Construction Project in the kingdom of Nepal (hereinafter referred to as "the Study"), in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programme of the Government of Japan, will undertake the Study, in close cooperation with the authorities concerned of HMG/N.

The present document sets forth the Scope of Work for the Study.

II OBJECTIVE OF THE STUDY

The objective of the Study is to carry out the feasibility study on the construction of Sindhuli Road. The Study will include the following sections;

Section I : improvement of the existing road and construction of bridges between Mahendra Rajmarg at Bardibas and Sindhuli bazar,

Section II: construction of the road between Sindhuli bazar and the place nearby Banepa on Arniko Rajmarg (Kavre)

III STUDY AREA

The study area will cover the section I and II mentioned above and their environs.

IV SCOPE OF THE STUDY

In order to achieve the objective mentioned above, the Study shall cover the following items.

(1) Socio-economic Surveys

1) Collection and review of existing data

2) Interviews with relevant Government Departments and Agencies

g/f

- 3) Review of population, socio-economic conditions and current and future development plans/programmes
 - 4) Review of sectoral and regional development plans/programmes
 - 5) Review and forecast of sectoral and regional development activities
- (2) Traffic Surveys
- 1) Collection of data, survey and analysis of traffic conditions
 - 2) Traffic counts on selected roads
 - 3) Origin-destination surveys on selected roads
 - 4) Determination of existing, diverted, generated and development traffic
 - 5) Other traffic studies to determine existing traffic patterns and to establish traffic desire lines
 - 6) Future traffic demand forecast
- (3) Engineering Studies
- 1) Preparation of topographic map
 - a. Mapping of study area using the existing aerial photographs
 - b. Mapping of study area using aerial photographs (to be taken) if necessary
 - 2) Collection and study of basic engineering data
 - a. Soil and geological aspect
 - b. Hydrological aspect
 - c. Meteorological aspect
 - d. Materials aspect
 - e. Construction method
 - f. Construction plant and equipment
 - g. Other studies (safety of road, failure of slope, etc.)
 - 3) Study of a preferred route and design
 - a. Alternative routes study
 - b. Preliminary study of a preferred route
 - c. Design standards and criteria (geometry, structure and pavement)
 - d. Preliminary design
 - e. Maintenance and management plan
 - f. Estimation of costs for land acquisition, construction and maintenance

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- (4) Economic Analysis
 - 1) Estimation of benefits
 - 2) Net present value for the project
 - 3) Cost/Benefit Ratio
 - 4) Internal Rate of Return
 - 5) Sensitivity analysis

- (5) Project Evaluation and Recommendation
 - 1) Project evaluation
 - 2) Recommendation

V STUDY SCHEDULE

The whole study will be carried out in accordance with the tentative study schedule attached.

VI REPORTS

JICA shall prepare and submit the following reports in English to HMG/N.

1. Inception Report

Thirty (30) copies at the beginning of the field survey.
2. Progress Report I

Thirty (30) copies
Within five (5) months after submission of the Inception Report.
3. Progress Report II

Thirty (30) copies
Within three (3) months after submission of the Progress Report I
4. Interim Report

Thirty (30) copies.
Within seven (7) months after submission of the Progress Report II
5. Draft Final Report

Thirty (30) copies.
Within three (3) months after submission of the Interim Report.
HMG/N will provide JICA with its comments within three (3) weeks after the receipt of the Draft Final Report.

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6. Final Report

Fifty (50) copies

within three (3) months after receipt of the comments of HMG/N
on the Draft Final Report.

VII UNDERTAKINGS OF HMG/N

1. To facilitate smooth implementation of the Study, HMG/N takes necessary measures;
 - (1) to secure the safety of the Japanese study team,
 - (2) to permit the members of the Japanese study team to enter, leave and sojourn in the kingdom of Nepal for the duration of their assignment therein and exempt them from alien registration requirements and consular fees,
 - (3) to exempt the members of the Japanese study team from taxes, duties and any other charges on equipment, machinery and other materials brought into the kingdom of Nepal for the conduct of the Study,
 - (4) to exempt the members of the Japanese study team from income taxes and other charges of any kind imposed on or in connection with any emolument or allowance paid to the members of the Japanese study team for their services in connection with the conduct of the Study,
 - (5) to bear claims, if any arises against the members of the Japanese study team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the members of the Japanese study team,
 - (6) to secure permission for entry into private properties or restricted areas for the conduct of the Study,
 - (7) to secure permission for the study team to take all data and documents (including positive films and prints of 1/50,000 scale aerial photographs and original one inch one mile maps) related to the Study out of the kingdom of Nepal to Japan,
 - (8) to provide the medical services as needed (Its expenses will be chargeable on the members of the Japanese study team),

SAP

(9) to provide, at its own expense, the Japanese study team with the followings;

- 1) available data and information related to the Study,
- 2) Counterpart personnel,
- 3) suitable office space with necessary telephone and furniture in HDO at Kathmandu and project sites,
- 4) A helicopter with pilots and vehicles with drivers,
- 5) Credentials or identification cards,
- 6) Permission for use of radio communication (Walkie-Talkie)

2. The Department of Roads will act as the counterpart agency to the Japanese study team and also as the coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

VIII UNDERTAKINGS OF JICA

For the implementation of the Study, JICA shall take the following measures;

- 1) to dispatch, at its own expense, study teams to the kingdom of Nepal,
- 2) to pursue technology transfer to HMG/N's counterpart personnel in the course of the Study,
- 3) to provide the equipment and machinery for the conduct of the Study, which will remain the property of JICA unless otherwise agreed upon.

IX MUTUAL CONSULTATION

JICA and Department of Roads consult with each other in respect of any matter that may arise from or in connection with the Study.

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Tentative Schedule

Month	1	2	3	4	5	6	7	8	8	10	11	12	13	14	15	16	17	18	19	20	21	22
Work in Nepal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Work in Japan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Report Presentation	Inception Report			Progress (I) Report				Progress Report			Progress (II) Report		Interim Report		Draft Final Report					Final Report		

(A.P.)

LIST OF PARTICIPANTS

Japanese Team

1. Mr. Naotada Isami
(Team Leader)
Deputy Director, Road Division,
Chubu Regional Construction Bureau,
Ministry of Construction

2. Mr. Yasuyuki Koga
(Road Planning)
Head, Soil Dynamics Division,
Construction Method and Equipment Department
Public Works Research Institute,
Ministry of Construction

3. Mr. Toshihiro Meta
(Bridge Planning)
Senior Civil Engineer,
Concrete Engineering Division, Laboratory,
Japan Highway Public Corporation

4. Mr. Nobuo Nagai
(Survey Planning)
Head, Geographical Research Division,
Geographical Department, Geographical
Survey Institute,
Ministry of Construction

5. Mr. Takeshi Nakano
(Coordinator)
Deputy Head, First Development Survey Div.
Social Development Cooperation Department
Japan International Cooperation Agency

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Nepalese Team

1. Mr. Shiva Banadur Pradhanang Chief Engineer,
Department of Roads,
Ministry of Works and Transport

2. Mr. Angur Man Tuladhar Superintendent Engineer,
Department of Roads,
Ministry of Works and Transport

3. Mr. Basanta Narshing Pradhan Project in charge,
Department of Roads,
Ministry of Works and Transport

JICA Nepal Office

1. Mr. Mitsukuni Sugimoto Assistant Resident Representative
JICA Nepal Office

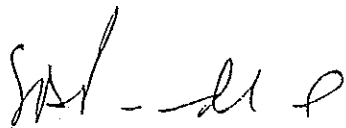
JSR

3. Terms of Reference

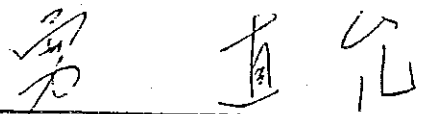
MINUTES OF MEETING

FEASIBILITY STUDY ON SINDHULI ROAD CONSTRUCTION

Kathmandu : July 15, 1986



Shiva Bahadur Pradhanang
Chief Engineer
Department of Roads
Ministry of Works and Transport
His Majesty's Government of Nepal.



Naotada Isami
Leader of the Mission
Japan International
Cooperation Agency.

3. Minutes of Work

MINUTES OF MEETING

The Japanese Preliminary Survey Team (hereinafter referred to as "Japanese Side") and the Nepalese counterpart of the Department of Roads (hereinafter referred to as "Nepalese Side") held a series of discussions during 8 July to 14 July, 1986 concerning the Implementation Arrangement for the study of Sindhuli Road Construction Project.

The following minutes were prepared to confirm the main issues discussed and matters agreed upon by both sides in connection with the Scope of Work of the Study.

1. The Study is expected to start as early as possible. The both sides shall make the best effort on whatever possible in the preparation of the Study before the commencement of the Study.
2.
 - a. The Nepalese side shall take the necessary action in time to make available the positive films and prints of 1/50,000 scale aerial photographs and original one inch one mile maps of the study area.
 - b. The Nepalese side shall take the necessary action in time to obtain the approval to take the new aerial photographs of the study area.
3. The Japanese side shall inform of the specification of the radio communication facilities which will be used as the branch stations of the Department of Roads. (Frequency 5580 or 6785 MH) The Nepalese side shall take the necessary action in time to obtain the approval for their use.

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4. The Nepalese side stated that for the 1986/87 fiscal year, provision of the helicopter and vehicles might be difficult due to the fact that the budget for the year has been already set aside and that, however, for the 1987/88 fiscal year, the Nepalese side shall make the best efforts to provide these facilities at their own expenses.

5. The Nepalese side requested that the following items be brought into Nepal in addition to the survey equipment. The Japanese side noted the request.
 - a. Four-wheel driving vehicles for Field Survey.
 - b. Micro-Computers for Traffic Analysis and others.
 - c. Photo-Copy Machines
 - d. Words Processors
 - e. Electric Typewriters.

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4. Scope of Works

THE SHINDULI ROAD CONSTRUCTION PROJECT

QUESTIONNAIRE

NOVEMBER, 1985

CONTACT MISSION

THE JAPAN INTERNATIONAL COOPERATION AGENCY

The Contact Mission is dispatched to the Kingdom of Nepal to collect the information on the Shinduli Road Construction Project. All information collected and analyzed by the Mission will be brought to the Japanese Government and screened for the execution of further study. Therefore, at the present time, the study by the Mission does not directly link to the realization of the grant aid.

You are kindly requested to answer the following questions, considering the above proposition:

A. General Questions

Kindly requested to explain the followings;

1. the reasons why the Nepalese Government employed the Shinduli Road as the most suitable route. Please explain the other routes, if any, and why they were denied.
2. the relationship between this project and the comprehensive development plans prepared by the Nepalese Government.
3. the relationship between this project and the comprehensive transportation master plan of Nepal.
4. expectable economic impacts (effects) given by the Shinduli Road. (ex. agriculture, transportation, etc.)

Kindly requested to provide the following materials:

5. custom, transportation, agricultural reports etc.
6. population distribution map of Nepal.
7. population increase rates of the major cities.
8. industry distribution map.

9. hydrological and topographical data such as river flow, rainfall, etc.
10. the drawings and the latest progress reports of the road construction executed by the Nepalese Government in Shinduli.

B. Technical Questions concerning Bridge Construction

1. the bridge design standards to be employed.
2. contents and costs of the bridge construction projects recently completed.
3. recent cases of bridge failure, and their costs and terms to recover.
4. geological maps of the deemed sites of the Shinduli Road.

C. Technical Questions concerning Road Construction

1. the road design standards to be employed.
2. contents and costs of the road construction projects recently completed.
3. recent cases of road failure, and their costs and terms to recover.

D. Technical Questions concerning the current Mahendra and Muglin³Roads

1. average trip times between following cities;
 - a) Kathmandu - Naubesi,
 - b) Naubesi - Muglin.
 - c) Muglin - Hetauda,
 - d) Naubesi - (Tribuvan Road) - Hetauda,
 - e) Hetauda - Pathlaiya,
 - f) Pathlaiya - Bardibas.

2. maximum capacity (size) of trucks used for the transportation from Kathmandu to Bardibas via each route.
3. longitudinal section of each route.
4. the points on each route where the collapse of precipice often occurs. (also rainfall & boring data at such points.)
5. the largest gradient pitch on each route.
6. At what gradient pitch do cars usually get troubled?
7. current number of lanes and width of each route.
8. the points on each route where roads often freeze.
9. other dangerous points on each route.

E. Questions concerning Land Surveying

1. maps of the deemed sites of the Shinduli Road.
2. Which authority of the Nepalese Government is responsible for taking and maintaining of the aerial photos and control stations?
3. Can such aerial photos be taken out of the country?
4. Are there any restrictions on using wireless telephones during the field survey?
5. Is a helicopter available for field work?

5. Minutes of Meeting

Record of Discussions

1. The Japanese Survey Team organized by the Japan International Cooperation Agency, headed by Mr. K. Kano visited the Kingdom of Nepal from 27th November to 7th December 1985 in connection with the project of Banepa-Sindhuli-Bardibas Road (herein after referred to as "the Project").
2. The Team, together with concerned officials of the Government of Nepal, made an aerial inspection of the deemed site to get the general idea of topographical and geological condition of the site.
3. The Team also made a field trip to Sindhuli district and drove the whole way of Bardibas-Sindhuli road now under construction.
4. In a series of discussions between the officials of the Government of Nepal and the team, the former expressed its views that the Project would greatly contribute to the economic and social development of Nepal; considering that;
 - (1) it will shorten all the eastern traffic coming to Kathmandu, including traffic from Calcutta Port which is serving about 95% of Nepalese overseas trade, and, therefore decrease the transportation cost and the time required.
 - (2) It will ensure faster and easier transportation of agricultural goods produced in Terai to Kathmandu Valley.
5. The Nepalese officials reconfirmed that the project should serve not only as the short and reliable link between Kathmandu Valley and Terai Plain but also for the development of the regions alongside of and neighboring to the Project and that in this respect, the route should inevitably pass Sindhuli bazar.
6. The team took note of the views mentioned above and, expressing its opinion that among others road is the most important and basic infrastructure for economic and social development of a nation, understood the utmost importance of the Project for the development of the Kingdom of Nepal.
7. The team showed its views that further study would be needed for the examination of the route and its alignment.

8. The Government of Nepal, referring to a very high priority given to the project in its seventh five year plan beginning from this year, reiterated its strong wishes to have the cooperation of the Japanese Government for the early implementation of the Project.
9. The team promised to report its finding to the Government of Japan and to convey the wishes of the Nepalese Government to the Government of Japan.

December 4, 1985



Ken-nosuke Kano
The Leader
Japanese Survey Team



S. B. Pradhanang
Chief Engineer
Department of Roads
Ministry of Works & Transport

6. 収集資料リスト

(1) コンタクトミッション収集資料

1. 地形図

1インチ1マイル図(1:63,360)を5万分の1に拡大した青焼図 6枚

$\left[72 \frac{1}{3}, 72 \frac{E}{10}, 72 \frac{E}{11}, 72 \frac{E}{12}, 72 \frac{E}{15}, 72 \frac{E}{16} \right]$

2. 空中写真

5万分の1～6万分の1 47枚

$\left[\begin{array}{l} 7929 \text{ の } 82 \sim 88 \\ 7925 \text{ の } 98 \sim 113 \\ 7919 \text{ の } 93 \sim 105 \\ 7925 \text{ の } 25 \sim 37 \end{array} \right]$

3. 地質図 4枚

$\left[\begin{array}{ll} 1:125,000 & 72 E-A, 72 E-B, 72 E-D \\ 1:1,000,000 & \text{Geology of Nepal} \end{array} \right]$

4. Statistical Pocket Book Nepal 1984
5. Nepal Road Statistic 1984 Dep. of Road
6. Nepal Road Standards (2027) "
7. Sindhuli District (抜粋)
8. Ramechhap-Sindhulimadi-Nepalthok-Dhulikhel Road Min. of Supply
9. Nepal Road Network 1984 (地図)
10. U.N-H.M.G. Nepal Road Feasibility Study Part B. Engineering
- Project 6 June 1972
11. Department of Roads, Standard Designs Jan 1978
12. Climatological Records of Nepal
 1971 ~ 1975, Vol. 1
 1976 ~ 1980 "
 1981 & 1982 "
13. Surface Water Records of Nepal Dep. of Irrigation, Hydrology &
 Meteorology
 NO 1 (1966) ~ NO 7 (1972)
 NO 9 (1974) ~ NO11 (1976)
14. Compilation of Surface Water Records of Nepal Through Dec. 31
 1965

(2) S/Wミッション収集資料

収集資料リスト

地域	アジア	調査団	ネパール国シンズリ
国名	ネパール	等名称	道路建設計画調査

調査の種類	事前(S/W)	作成部課	社. 開一
現地調査期間	61年7月6日～61年7月17日	担当者氏名	福田 義夫

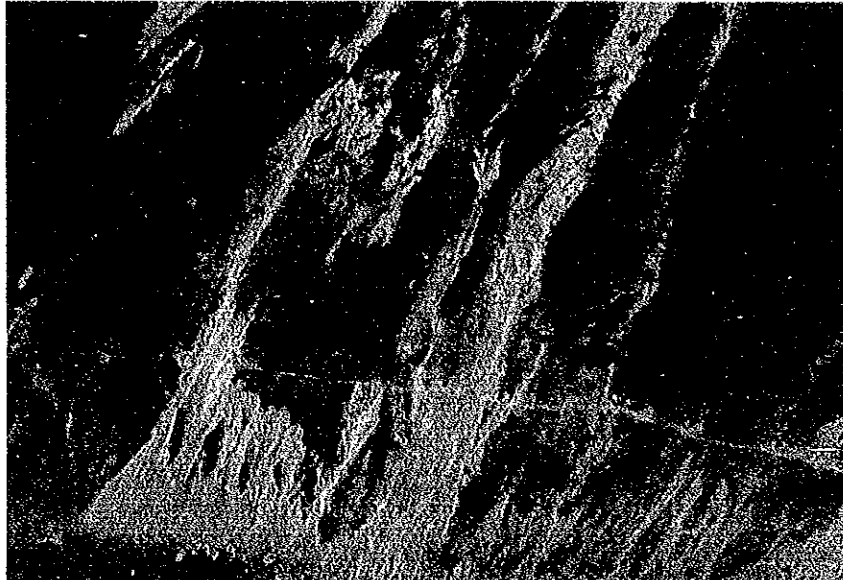
序号	資料の名称	形態	枚数	ページ数	オリジナル/コピー別	冊数
1	Map Sheet Layout 1:50,000 Scale			1		6
2	Nepāl (physiographic) 1:2,000,000			1		1
3	Nepāl (relief) 1:2,000,000			1		1
4	Nepāl (administrative) 1:2,000,000			1		1
5	Minerals of Nepal 1:1,000,000			1		1
6	Geology of Nepal 1:1,000,000			1		1
7	Climates of Nepal 1:1,000,000			1		1
8	Nepāl (Eastern Sheet) 1:500,000			1		1
9	Nepāl (Central Sheet) 1:500,000			1		1
10	Nepāl (Western Sheet) 1:500,000			1		1
11	Nepāl 1:1,000,000			1		1
12	Nepāl Land Systems Map 1:50,000					
	(72 $\frac{E}{16}$ ~ $\frac{E}{16}$, 72 $\frac{1}{2}$ ~ $\frac{1}{4}$)			1		1
	(72 $\frac{E}{6}$, $\frac{E}{10}$ ~ $\frac{E}{12}$, $\frac{E}{14}$ ~ $\frac{E}{16}$, $\frac{F}{13}$, $\frac{1}{3}$, $\frac{1}{4}$)			1		1
13	Nepāl Land Utilization Map 1:50,000					
	(72 $\frac{E}{6}$, $\frac{E}{10}$ ~ $\frac{E}{12}$, $\frac{E}{14}$ ~ $\frac{E}{16}$, $\frac{F}{13}$, $\frac{1}{3}$, $\frac{1}{4}$)			1		1
14	Nepāl Land Capability Map 1:50,000					
	(72 $\frac{E}{6}$, $\frac{E}{10}$ ~ $\frac{E}{12}$, $\frac{E}{14}$ ~ $\frac{E}{16}$, $\frac{F}{13}$, $\frac{1}{3}$, $\frac{1}{4}$)			1		1
15	Nepāl Geological Map 1:125,000					
	(72E-A, B, C, D, 72F-B)			1		1
16	Kāthmāndou 1:10,000			1		1
17	Central Kāthmāndu 1:5,000			1		1

ネパール王国シンズリ道路

建設計画調査事前調査報告書

写 真 集

(コンタクトミッション、S/W ミッション)



(写-1) 人肩運搬用の小道、巾 1.0 m ~ 2.5 m で非常に危険である。急傾斜
樹木なし。〔写-1から写-9までは調査対象地域の写真〕



(写-2) 雨期に崩壊した小道：斜面に樹木のない事に注意。



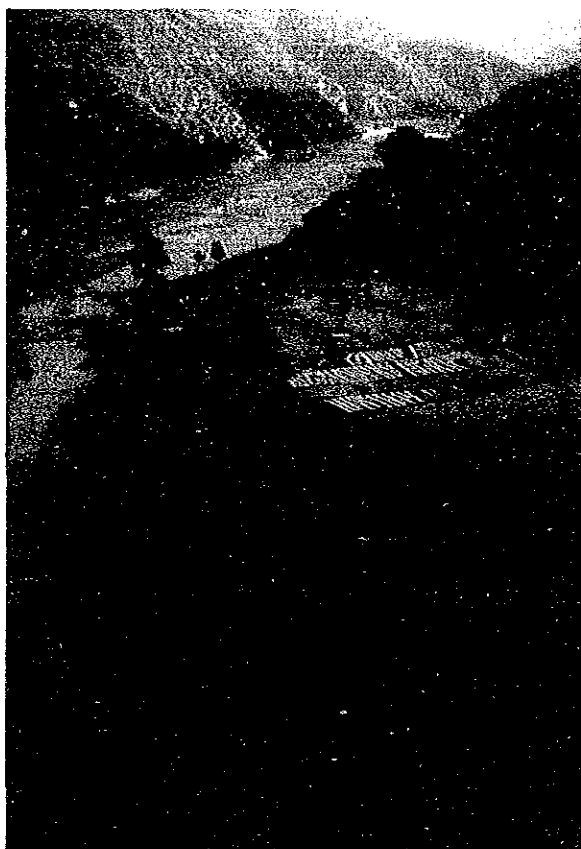
(写-3) 山岳地の水田、山頂まで耕されている。



(写-4) 山岳地の水田、斜面崩壊が見える。



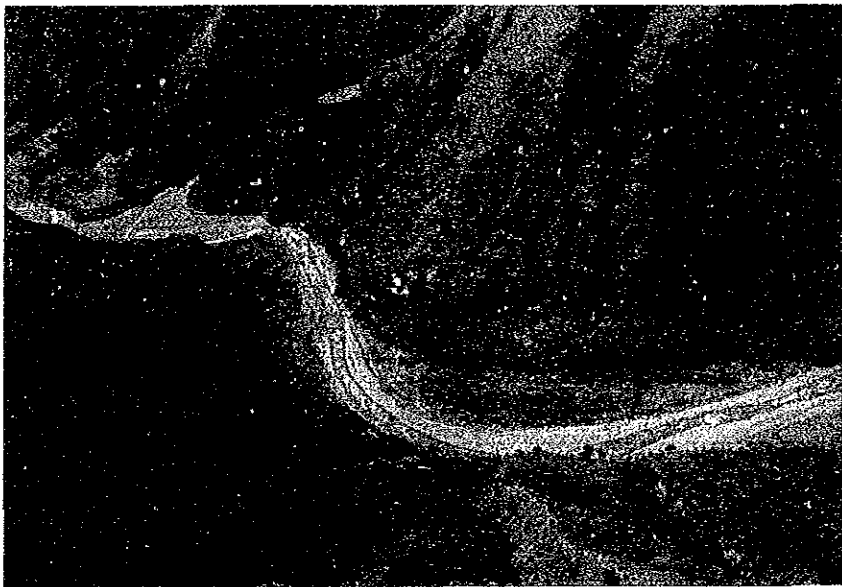
(写 - 5) 丘陵地の水田



(写 - 6) バネバ側ロシ河沿いの水田



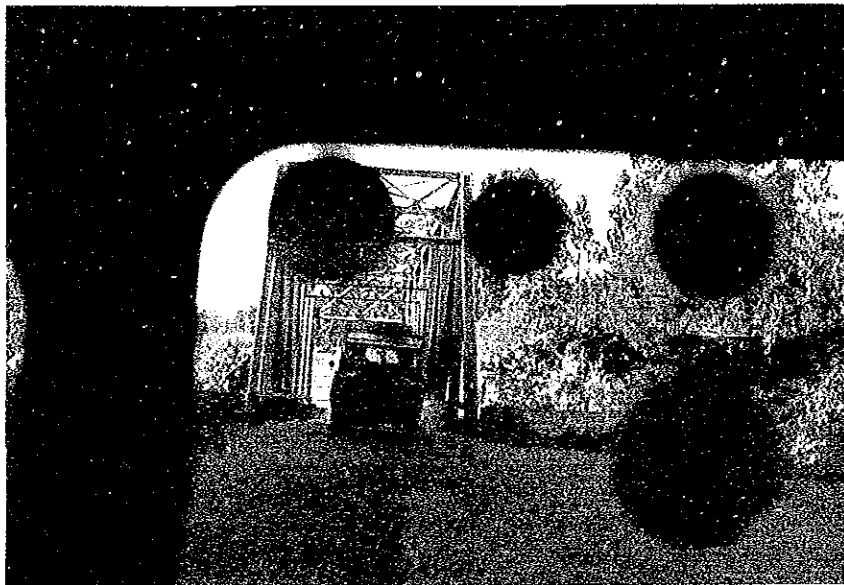
(写-7) バネパ～シズリ間 (その1)



(写-8) バネパ～シズリ間 (その2)



(写-9) バネバ〜シズリ間 (その3)



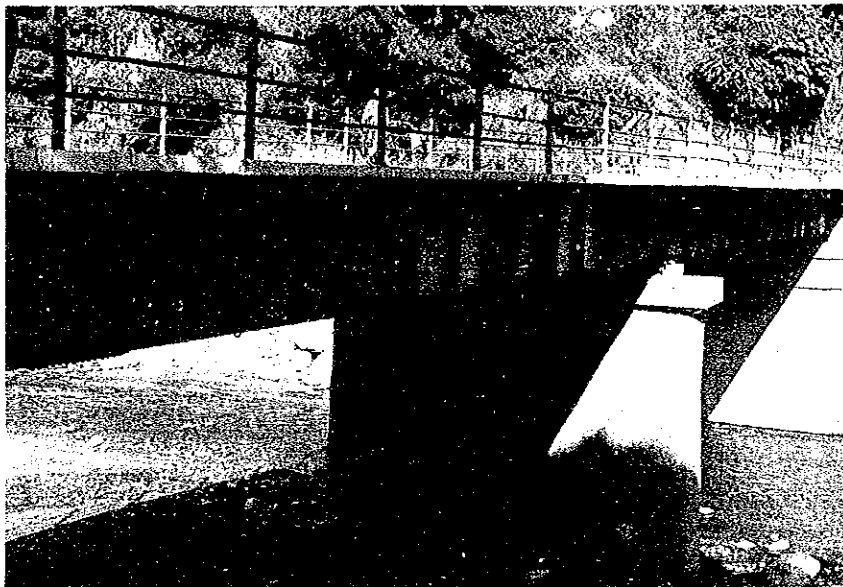
(写-10) 第1幹線であるムグリン道路の橋梁の標準タイプ、これでは重量車は通行不能、すれ違い不可。



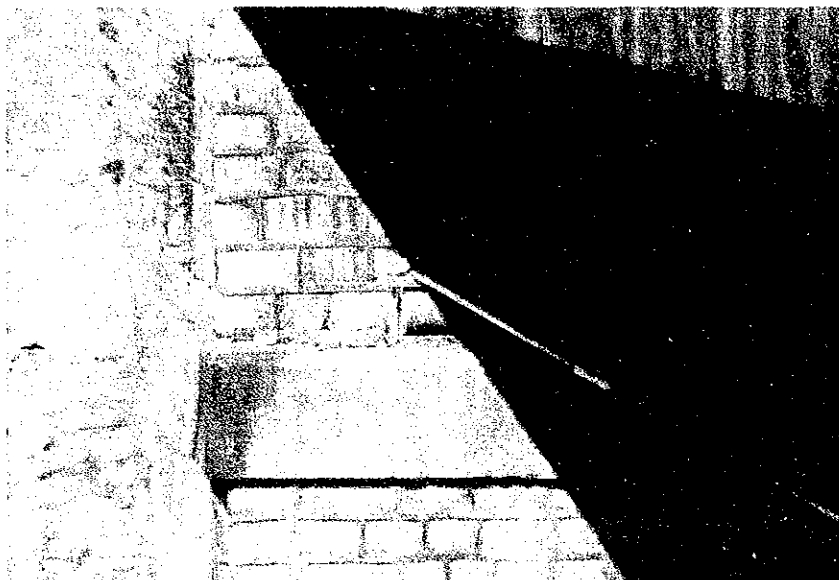


(写-11) ムグリン道路の橋梁、重量制限は9t、貨物がコンテナ化したら架替えが必要。

非公式にはトリブバン道路	荷重制限	車両	5t	積荷状態計	10t
ムグリン道路	"	"	7t	"	計15t



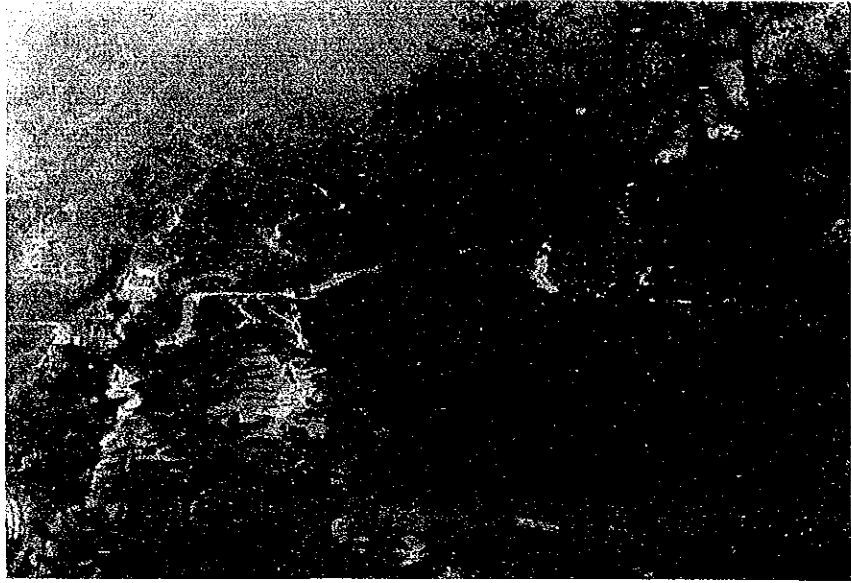
(写-12) 1984年に流出したムグリン道路に架かる橋梁の復旧後、この橋梁の流出はカトマンズを完全に孤立化させた。セメント及び鋼板製作、加工共ネパール製である。



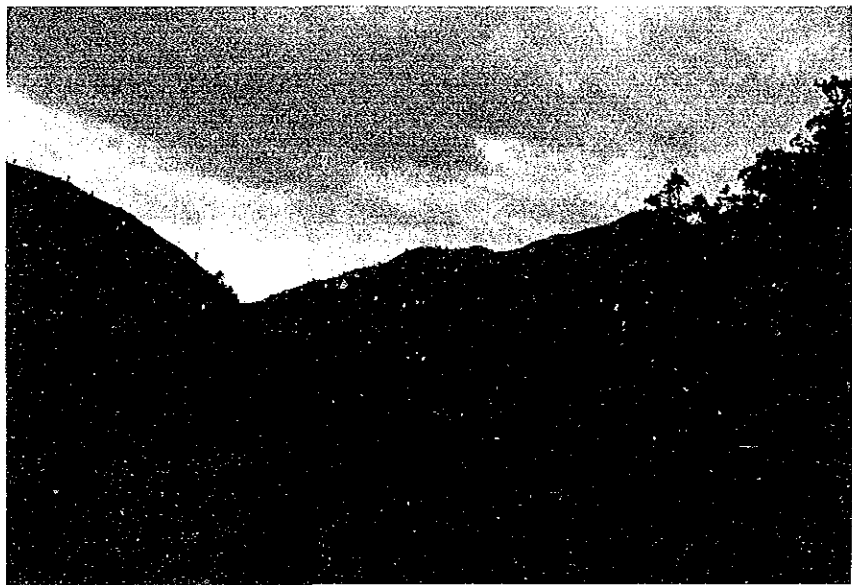
(写-13) 沓に注意、(写-12)の復旧橋梁も同じであるが、この様な設計では洪水が橋桁を越流すれば再度流出するおそれがある。



(写-14) シンズリ道路起点側、土工事完成。視線誘導用ポスト(デリニエーター)が見える。



(写-15) カトマンズへ通じるムグリン道路、これでは長いトレーラーは通行不能。場所により巾員 5.5 m、舗装巾 3.5 m。



(写-16) ムグリン道路 (中国により建設)。橋梁は、コンクリート アーチ橋が多い。



(写-17) トリブバン道路。地形がきびしく、拡巾には、かなりの困難がある。



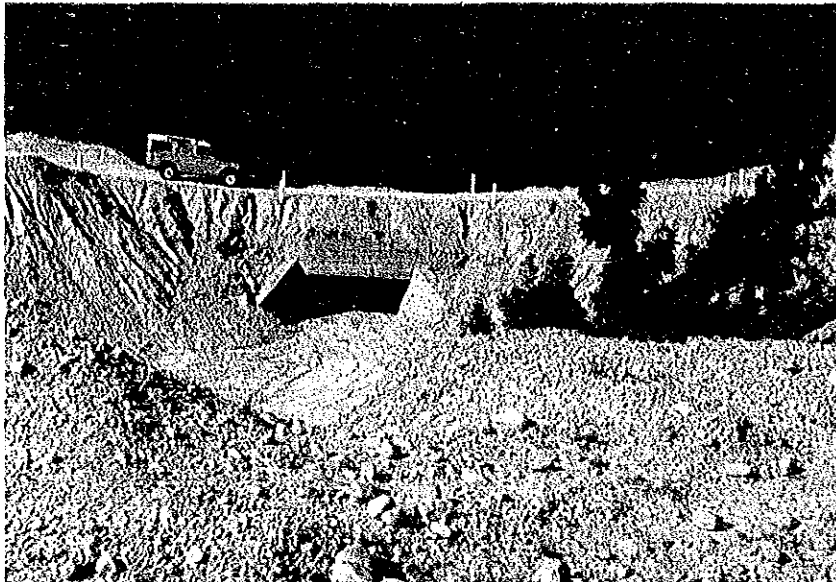
(写-18) トリブバン道路での斜面崩壊。この道路に限らず、山岳道路においてはこのような崩壊がずい所に見られる。



(写-19) ネパール政府により建設中のシンズリ道路。河川横過等の架橋地点で寸断されている。橋梁工事は、ネパール政府にとっては困難なようである。



(写-20) シンズリ道路の山岳部。法面保護は全くなされず、切土は河川へそのまま捨てられている。



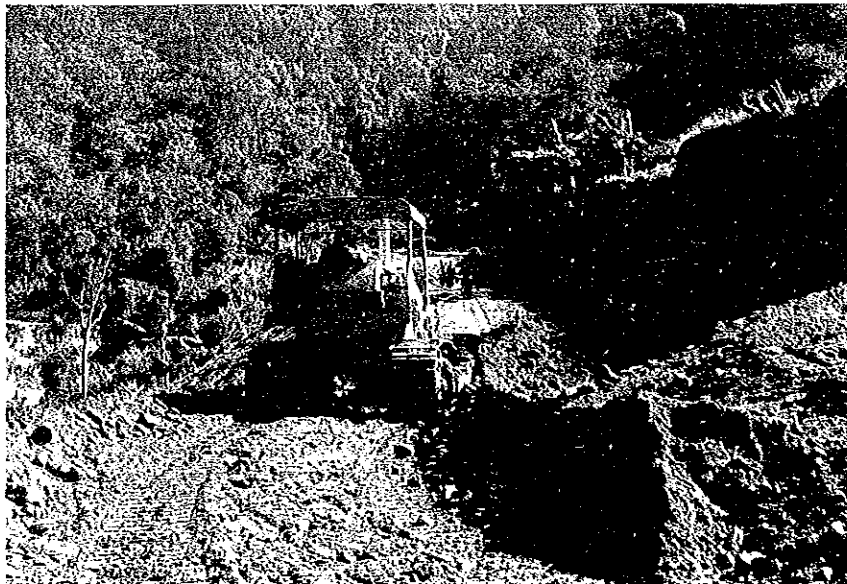
(写-21) 工事中のシズリ道路、函梁完成。



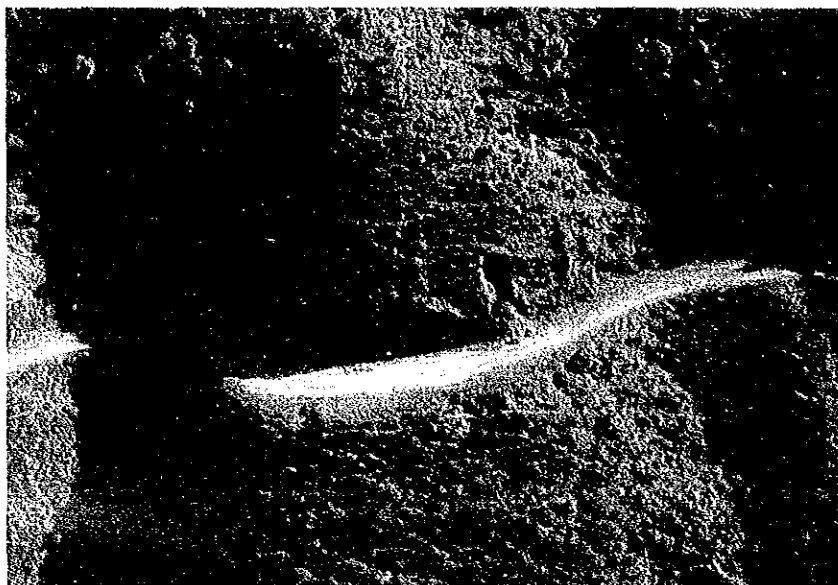
(写-22) 工事中のシズリ道路の仮橋用橋脚。布団庵工程度の橋脚では水深によっては、次の雨期に流出してしまう可能性がある。



(写-23) 工事中のシンズリ道路。この地方は樹木が多い。



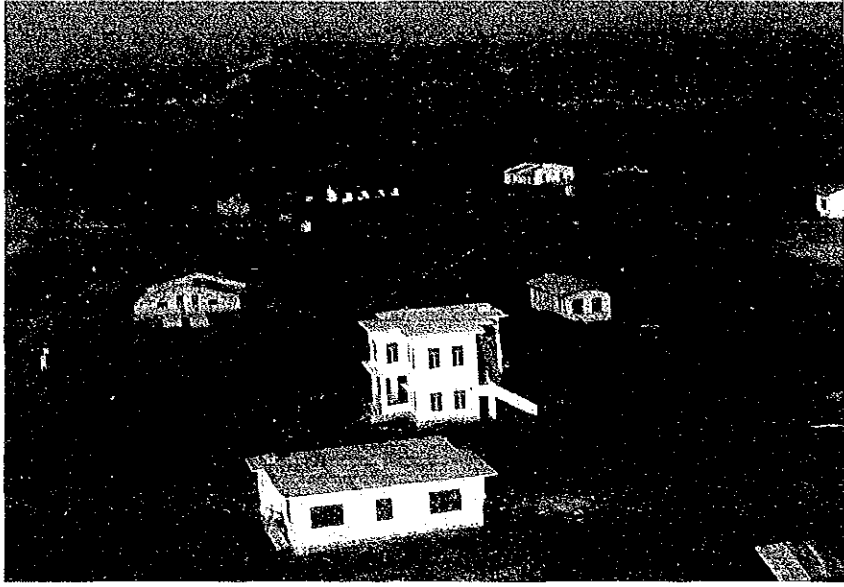
(写-24) 工事中のシンズリ道路。日本供与の建機である。



(写-25) 工事中のシズリ道路。



(写-26) 工事中のシズリ道路。橋梁がなく雨期には通れない。



(写-27) シンズリ道路工事用基地の1つ。

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