

TRAIL SUSPENSION BRIDGE STUDY

CONDUCTED FOR

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT, NEPAL

PN-116-1152

PART C ANNOTATED BIBLIOGRAPHY AND GENERAL INFORMATION ON TRAIL BRIDGES AND TRAILS IN NEPAL

FINAL REPORT

JUNE 1978

NO. 6 OF 60

 EAST

CONSULTING ENGINEERS, KATHMANDU

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FINAL SUSPENSION BRIDGE STUDY

Report contains seven volumes in three different parts as follows :

A : Effects of Trail Bridges

Vol: 1 Introduction, Summary and Recommendations

Vol: 2 Case History, Analysis and Findings (Bridges Studied in CDR)

Vol: 3 Case History, Analysis and Findings (Bridges Studied in WDR)

Vol: 4 Case History, Analysis and Findings (Bridges Studied in FWDR)

Vol: 5 Case History, Analysis and Findings (Bridges Studied in EDR)

B : Baglung District Bridge Construction Study

C : Annotated Bibliography and General Informations on Trails and Trail Bridges in Nepal.

FINAL REPORT 1978



Consulting Engineers is an independent private firm established in 1973, with the objective of providing different kind of consultancy services to seek various agencies in development and research works. It is a group of competent local talents to carry out project planning, feasibility studies, engineering surveys and design and research works.

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ANNOTATED BIBLIOGRAPHY

- Annotated Bibliography on Trail Bridges and Trails in Nepal

Bezruchka, Stephen. A Guide to Trekking in Nepal. 3d. ed.

Kathmandu, Sahayogi Prakashan, 1976. Pp. 230. Maps,
col. photographs.

Includes Helambu-Langtang, Pokhara-Kathmandu,
Solukhumbu, Namche-Darjeeling, Rolwaling and treks
in Western Nepal with description of the treks as
easy, moderate or difficult, time required and height
of the trails including the crossings and bridges on
the trails.

Devakota, Binod. 'The need of suspension bridges in Nepal
and their development'. Gorakhpatra, October 13,
1977. P. 4.

An article in Gorakhpatra, a Nepalese daily
newspaper, mentioning various planned targets and
achievements in suspension bridge construction
program; text is in Nepali language, entitled
"Nepalma Jholunge Pul ko Awashyakta Ra Bikas."

German Consult. Inception Report on Trail Suspension Bridge Feasibility Study, by consultant German Consult and Executive Partner Dr. Ing. Walter KG-DIWI, Essen, West Germany, 1976, Pp. 27. Map, 4 col. photographs

Descriptive report on first findings of the Study Team submitted in January 1976; includes details on contacts with local authorities, first field investigation and planning of field work. Periodic progress reports, as mentioned in the Terms of Reference of contract document, have been submitted separately - First progress report in March 1976, Second progress report in May 1976, Third one in July 1976 and so on.

German Consult, Trail Suspension Bridge Feasibility Study, Nepal, Final Report (Draft) prepared by consultant German Consult and Executive Partner Dr. Ing. Walter KG-DIWI, Essen, West Germany, 1976. 5 Vols; 4 Technical Appendices; 1 Supplementary Report; Drawings for each bridge site all in 4 Bands, and a separate volume 'Economic Study Field Reports.'

A study carried out between November 1975 and October 1976, by Gorman Consult for His Majesty's Government of Nepal with UNDP finance, and in which IBRD acted as participating and executive agency. The study contains designs and feasibility studies for 42 bridges in different parts of Nepal. Band I and 2 contain text of the study in 5 volumes and 4 appendices and 1 supplement; Band 3 and 4 contain detailed drawings and designs. A separate volume includes edited version of 'Economic Study Field Reports.'

Contents - Band I: V. 1. Summary - V. 2 Bridge Sites Studied. Part A. Bridge Site no. 3 to 27B. - Part B. Bridge Site no. 28 to 58. - Band II. V. 3 Bridge Design and Costs - V. 4. Economic Analysis of Bridge Projects. - v. 5. Methods of Implementing Bridge Construction Programme. APPENDIX: I. Structural Design. - II. Foundation Design. - II. Soils and Geology. - IV. Model Tender Documents. - Supplementary Report on Alternative Bridge Cable Technology. - Band III and IV. Drawings of Bridges. - A Separate Volume: Economic Study Field Reports.

Summary. Vol. 1 of Trail Suspension Bridge

Feasibility Study, Nepal. Pp. 26 + 3. App. Map.

Contains the objectives of the study and a summary of the whole five volume study; includes a map locating the bridge sites studied.

Bridge Sites Studied (in two parts). Vol. 2 of Trail Suspension Bridge Feasibility Study, Nepal.

Part A. Pp. 236. Part B. Pp. 237 - 457. Design, maps, photographs, tables.

Part A of the volume contains details of bridge sites no. 3 to 27B and details of bridge sites no. 28 to 58 are continued in Part B. The details include location, engineering investigations and traffic and economic surveys; several photographs, figures and bridge site designs are illustrated.

Bridge Design and Consts. Vol. 3 of Trail Suspension

Bridge Feasibility Study, Nepal. Pp. 83 + App. in v.p.
Designs, photographs, tables.

Contains HMG's standard design for suspension bridges; a short history of bridge construction in Nepal; consultant's improvements and additions to HMG's standard design; also includes bridge construction cost details both economic and financial; appendices present details of materials, equipment, transport, erection and labor costs.

Economic Analysis of Bridge Projects. Vol. 4 of Trail Suspension Bridge Feasibility Study, Nepal.
Pp. 57 + 10. App. Tables, maps.

Presents the background and results of the economic and financial analysis of the bridge projects selected for final design and feasibility study; the bridge projects have been ranked in the light of the results of the sensitivity analysis and the projects are finally ranked in order of priority and by major geographical area. The appendices include population growth and traffic forecasts and examples of the economic and financial analysis of a bridge project.

Methods of Implementing Bridge Construction Programme, Vol. 5 of Trail Suspension Bridge Feasibility Study, Nepal, Pp. 24

The type of construction projects to be implemented as a follow up to the Feasibility Study is discussed with recommendations; alternative methods of project implementation have been investigated and the project management aspects mentioned.

Structural Design. Technical Appendix I of Trail Suspension Bridge Feasibility Study, Nepal, Pp. 25.
Charts, designs.

Contains examples of structural analysis for suspension and suspended bridges and standard design data of HMG/N.

Foundation Design. Technical Appendix 2 of Trail Suspension Bridge Feasibility Study, Nepal, Pp. 56.
Diagrams.

Describes methods of determining the permissible bearing pressure values of soils, calculation method for anchorage blocks and summary of anchorage types.

Soils and Geology. Technical Appendix 3 of Trail Suspension Bridge Feasibility Study, Nepal. Pp. 128. Diagrams.

Contents. - Foundation conditions at bridge sites, laboratory test results of soil and rocks, geology and soils of Nepal, seismic refraction survey, investigation of geological joints and results of investigations.

Model Tender Documents. Technical Appendix 4 of Trail Suspension Bridge Feasibility Study, Nepal. Pp. 15 + 57.

Contains draft 'Model Tender Documents for International Tendering' comprising tender notice, instructions, form of tender bond, agreement, conditions of contract and specifications.

Alternative Bridge Cable Technology. Supplementary
Report forming a part of Trail Suspension Bridge
Feasibility Study, Nepal. Pp. 17 + 4. App. Diagrams,
tables.

Contains description, fabrication and
application of Parallel Wire Cluster (PWC) cables
for bridge construction.

Economic Study Field Reports. A separately
published part of Trail Suspension Bridge Feasibility
Study, Nepal. Unpaged.

This part presents the originals of the
edited versions of economic study field reports of
the Feasibility Study Project which include brief
socio-economic descriptions of the Bridge Sites
no. 3 to 58.

Gorkhapatra. 'Trail bridge construction in Baglung.'

Gorkhapatra, March 29, 1978. P.4.

An editorial comment published in Gorkhapatra, a Nepalese daily newspaper, commending the local cooperation and participation in bridge construction programmes in Baglung district. Out of 62 bridges to be constructed in Baglung, 35 have already been completed and the popular participation and enthusiasm in the construction activities have become exemplary, the editorial says in the context of a news published in Gorkhapatra, March 28, 1978, p. 1, which describes the achievements in trail bridge construction at various places in Baglung district. The editorial title reads in Nepali language as 'Baglungma Jholungo Pul Nirman.'

Hagen, Toni. Nepal: The Kingdom in the Himalayas. 3d ed. New Delhi, Oxford and IBH Publishing Co. 1971. Pp. 180. Col. photographs, maps, tables.

Contains a very comprehensive account of Nepal including its socio-economic, cultural and geographic features with illustrations, colored photographs and maps. A chapter on 'The Transport Problem' on Pp. 149-155 describes traffic volume,

trails and suspension bridges in brief. Plates no. 69 to 73 show interesting pictures of suspension bridges.

Hagen, Toni. Observations on Certain Aspects of Economic and Social Development Problems in Nepal, a report prepared for the Government of Nepal by Toni Hagen, appointed under the United Nations Programme of Technical Assistance. New York, U. N. Commissioner for Technical Assistance, Department of Economic and Social Affairs, 10 July, 1959. Pp. 90 + 101, Fig., maps, photographs (Report no. TAO/NEP/1).

Presents various observations on the general nature of the country, the ethnology and life of the people, and the economy and the potentialities for development; chapters VII to XI (Pp. 42-57) contain accounts and comments on transport system, main trade routes, main transit routes, trails and bridges; useful observations on suspension bridges on Pp. 53-57; map locating the sites of urgently needed bridges shown in figure 65; some photographs of bridges and various interesting photographs of Nepalese life-style.

Hayes, John L. Trekking North of Kathmandu. Kathmandu, Peter Purna Banks Avalok, Feb. 1976. Pp. 52. Photographs, map. (Nepal Trekking Guide Book Series no. 3).

This booklet primarily describes the major trekking routes from Kathmandu to Helambu and Langtang; describes direction and conditions of trails including trekking time, required equipment, elevation, suggested overnight stops and information on local food and accommodation facilities.

Hayes, John L. Trekking North of Pokhara. Kathmandu, Peter Purna Banks Avalok, Feb. 1976. Pp. 70. Photographs, maps. (Nepal Trekking Guide Book Series no. 2).

This booklet is a collection of detailed information about the major Pokhara based trekking routes, giving special attention to the two most popular trails to Jomosom and the Annapurna sanctuary. It describes the directions, conditions, trekking time, elevations, suggested overnight stops, required

equipment and information on local food and accommodation facilities.

Hayes, John L. Trekking to Mt. Everest and Solukhumbu.

Kathmandu, Peter Purna Banks Avalok, 1975. Pp. 69.

Photographs, map. (Nepal Trekking Guide Series no. 1)

This booklet primarily presents an account of the major trekking routes in Solukhumbu and two most important east-west trails connecting Khumbu with the Araniko Highway and a series of side tracks, their conditions, and existing bridges on trails. These descriptions are designed to provide unguided trekking groups with essential trail information and directions including trekking time, required equipment, elevations, suggested overnight stops and information on local food and accommodation facilities.

India. Surveyor General. Nepal: One Inch to a Mile Map.

Published under the authority of Brigadier Gambhir Singh, Surveyor General of India and printed at the Survey of India Offices. First ed. 1962.

One inch sheets compiled from 1 inch, 2 inch and 1:45,000 vertical air photographs taken during different years from 1947 to 1958 and combined and supplemented in 1959-60. Among various details the map shows all types of road, track, bridge, ferry, inhabited area, stream, river etc. Contours with sub-features and grid references are given.

IBRD. Contract for Consultants' service Between IBRD and German Consult. (for Nepal Trail Suspension Bridge Feasibility Study). Washington D.C., IBRD, 1975. Pp. 19 + App.

Contract between IBRD (as participating and executing agency) and German Consult to undertake feasibility studies of 58 trail suspension bridges in different parts of Nepal as mentioned in the Fifth Plan 1975-80, following HMG/N. request for assistance from UNDP. Contract signed in Washington D.C. on November 11, 1975.

Jonathan, Lindell. 'Kathmandu to Palpa-main route'.

Swatantra Bishwa, Vol. 13; no. 2 Pp. 25-33.

Photographs.

Gives an imaginary account of trekking from Kathmandu to Palpa based on 150 years old historical background; text is in Nepalese language, entitled "Kathmandu Dekhi Palpa-Moolbato". Swatantra Bishwa is a bi-monthly Nepali publication of USIS/ Nepal.

Joshi, Prakash C. Natural Gravels, an Economical and a Better Substitute to Crushed Stones in Concrete Making for Trail Suspension Bridges in Nepal. Kathmandu, April 28, 1975. Pp. 5.

The author, Civil Engineer in the Roads Department, HMG/N. states that 'the use of natural gravel will save nearly half the cost of concrete in the construction of most of the suspension bridges without imparting any detrimental effect on the strength of concrete'. He has substantiated this fact with comparative illustration of the cost and the findings of tests conducted in this regard.

Keshar Lal. 'Trekking in Nepal'. Swatantra Bishwa, Vol. 14:
no. 1. Pp. 32-40. Photographs.

Briefly describes the trails connecting
Kathmandu with Gosainkunda, Langtang, Jomoson,
Machhapuchhre, Annapurna, Namche and a few others,
condition of trails and trekking season; text is in
the Nepali language, entitled "Nepalna Padyatra".
Swatantra Bishwa is a bi-monthly Nepali publication of
USIS/Nepal.

Kleinert, Christian. Nepal-Trekking. Munich, Rudolf Rother
GmbH, n.d. v.p. Maps.

A trekking guide pocket-book containing
16 sheets which describe tours and trips in the Nepal
Himalaya indicating the degree of difficulty in
trekking, time required and height; the trekking
routes included are Helambu-Langtang, Kathmandu-
Solu, Lukla and Mt. Everest region, Rolwaling,
Arun Valley, Pokhara, Manaslu, Annapurna and
Dhaulagiri region, Rara-Chaidhabise and Dolpa.

N.D. Lea and Associates Ltd., Canada. Proposal for Consulting Services for the Hill Trail Suspension Bridge Programme. Kathmandu March 1974. Pp. 64. 5 charts.

A proposal submitted to HMG/N Roads Department by N. D. Lea and Associates Ltd. Canada, in association with EAST Consulting Engineers of Nepal for Consulting services for the Hill Trail and Suspension Bridge Programme in Nepal.

Nepal. Centre for Economic Development and Administration Regional Development Study (Nepal). Kathmandu, July 1975. 4 parts. Tables, maps, diagrams, includes bibliography.

A study sponsored by the IDRC, Canada, Nepal National Planning Commission and CEDA with an objective 'to comprehend the types of economic forces and their levels of interaction in the regional economy where the regional knowledge-gap has been incredibly wide'. Part I, Pp. 47-57 contains transportation problems in the study areas; part II

A, Pp. 118-312; part II B, Pp. 313-377; part A, Pp. 378-626, and part III B, Pp. 627-803 discuss the transport system in the regions studied, including brief accounts on foot-trails in Far Western Region and Kosi Zone.

Contents. - Part I. General Report. -
Part II A. Far Western Development Region. -
Part II B. Rural Development Package Programme -
Dailekh. - Part III A. Kosi Zone. Part III B.
Rural Development Package Programme-Khandbari.
Part IV. Maps and Diagrams.

Nepal. Industrial Services Centre. Khumbu Region Tourism
Study Report (Phase II A). Kathmandu, June 1977.
4 Vols. Maps, tables.

A feasibility study on developing Khumbu region for touristic purposes providing basic facilities to trekkers in Khumbu region and enhancing the attractiveness of the region through various means; Vol. I, Pp. 43-53 contains a summary description of main trekking trails in the region.

under the title "Trekking in Khumbu Region", Pp. 55-57 contain a brief note on transport and communication Vol. II Pp. II-44 to II-113 contains a full chapter on 'Transport and Communication' in Khumbu region with a description of the main trails, river crossings and required suspension bridges and their improvement and maintenance along with the cost estimate. This part of the study 'Transport and Communication' was conducted by EAST Consulting Engineers, Kathmandu for the Industrial Services Centre, and the whole Khumbu Region Tourism Study Project was sponsored by the World Bank and Department of Tourism, HMG/N.

Contents. - V.1. Summary and Conclusions.

- V.2. Investment Proposals. - V. 3. Demand, Economic and Financial Analysis. - V.4 Drawings.

Nepal. National Planning Commission. Fifth Plan (2032-2037). Kathmandu 2032. Pp. 601. Text in the Nepalese language.

This fifth Plan document (1975-1980) includes the programme of surveying and constructing suspension bridges and hill-trails in different parts of Nepal, Pp. 308-311 in chapter 17 deal with roads and other transportation.

Nepal. Roads Department. Planning Section. Reconnaissance Survey of the Link Road Connecting Prithvi Bazaar and Manang. Kathmandu, Oct. 1973. Pp. 59. Tables, maps. (Text in the Nepali language).

A survey report prepared by Mr. Laxman P. Ghimire on the feasibility of Dumre-Manang road network and priority; discusses the needs and benefits of Dumre-Besishahar-Bahundada-Chamo road, geological and technical details and cost estimate for the construction of roads and bridges in the network; recommends the construction of Besishahar-Bahundanda-Chamo-Manang trails and mulo-tracks mentioning the social benefits, cost estimates and cost for constructing eight suspension bridges at different sites over Marsyangdi river and Khudi Khola.

Nepal, Roads Department and SATA. Final Report, by H. Aschmann (on his assignment as suspension bridge expert in SATA). Kathmandu, SATA, 1975. Pp. 20 + VIII. App. Charts, Photographs.

This report submitted by Mr. Aschmann on completion of his assignment on a SATA suspension bridge project in October 1975, contains the general details of suspension bridge construction activities during the Fourth Plan period including the problems encountered and possible suggestions for future projects.

Nepal. Roads Department and SATA. Manual for Trail and Suspension Bridge. Kathmandu, September 1975. V. P. Photographs, designs, charts.

A manual containing the types of trail and suspension bridges, bridge design, statistical calculations of bridges, survey of bridge sites, construction work, bridge erection, suspension bridge and trail improvement and maintenance; includes the tables and formulas which help the

surveyer to work-out the calculation on the site itself; discusses the problems encountered and possible suggestions for the Fifth Plan (1975-1980) of Nepal; second edition appeared in March 1977.

Nepal. Roads Department and SATA. Some Comments on the Construction of Local Bridges. Kathmandu, August 19, 1977. Pp. 11. Illustrations, tables.

Local initiative is most important factor in suspension bridge construction and the Local Development Department of HMG/N should help sustain and encourage this; an inventory of local bridges should be compiled noting the types and methods of construction and the names of local leaders and craftsmen; local bridge construction practices in Baglung is described and encouragement of similar practices in other places recommended; division of work between the Local Development Department and the Suspension Bridges Division of the Roads Department suggested.

Nepal. Roads Department and SITA. Standard Trail Suspended and Suspension Bridges; second enlarged ed. Kathmandu, 1977. 2 Parts. Drawings, photographs, tables.

A manual containing details of methods of surveying, calculation and design execution and maintenance procedures of bridges. First edition appeared in September 1975 and this revision in March 1977. Contents: Part A. Planning, Design and Survey - Part B. Execution and Maintenance.

Nepal. Roads Department and SITA. Traditional Trail Suspended Bridges in Baglung District, Technical report by Robert Groeli. Kathmandu, SITA, 1977, Pp. 23. Drawings, photographs, map of Dhaulagiri Zone.

Technical aspects of traditional suspended bridges built in Baglung district have been analysed and explained with photographs. Mr. Groeli strongly recommends that the traditional methods of bridge construction in Nepal should be encouraged adjusting some inconsistencies with relatively simple technical

means without changing the general method of construction. The report was brought out jointly by the Suspension Bridge Division of Roads Department and SATA in July 1977.

Nepal. Roads Department and SATA. Trail Suspended and Suspension Bridge Programme 1975/1977, final report, by Hans Pfaffen. Kathmandu, SATA, May-June 1977. Pp. 50. Charts, diagrams, map, photographs.

Describes the bridge construction work of the last two years and points out the construction work for the coming construction seasons; the contents include traditional bridge construction, foreigners' contribution in trail bridge construction, the organizational structure of the Suspension Bridge Division of the Roads Department, HMG/N and its planning and design activities relating to site selection, choices of bridge type, designs, comparison of prices, and execution work from 1975 to 1977 etc.

Pradhan, Prachanda. Research in Rural Needs for Development
in Nepal. Kathmandu, CEDA, 1977. Pp. 8.

Contains a short description about the
traditionally developed technology for the construction
of suspended bridges in Baglung district.

The Rising Nepal. '12 Mule tracks to be built in Far Western
Dev. Region'. The Rising Nepal. January 25, 1978.
Pp. 1 and 8.

A brief news in The Rising Nepal, an English
daily newspaper, quoting the Local Development Depart-
ment, LMG/N on the construction of 12 mule tracks
connecting different places, two in Dolpa, three each
in Mugu and Bajhang and one each in Humla, Jumla,
Kalikot and Bajura Districts; and three bridges at
different locations and one suspension bridge over
Tila river on the way to Humla district headquarters
will be built in the fiscal year 1977/78.

Rice, Herbert. Photographic Report of Another Season of Bridge Building, by a Foreigner in Nepal. Kathmandu, September 1975. Pp. 35. Photographs.

A report containing about 32 photographs of bridge sites, river banks and suspension bridges in Lamjung district with brief descriptive notes; the bridges included are Beshi Shahaar Bridge, Khudi Bridge, Nagdi Khola Bridge, Bhulbhule Bridge, Tarku Ghat Bridge; also includes a short comment on "Pukka" and "Kuccha" bridges. The author was a Peace Corps Volunteer in Nepal from 1965-68. This report was prepared on his assignment in Suspension Bridge Division, Roads Department, HMG/N in 1975. Mr. Mitra Lal Upadhyaya, engineer-in-charge of Beshi Shahaar Bridge, was his counter-part. (Source of the Report: Peace Corps Office, Kathmandu).

SATA/Nepal. Suspension and Suspended Bridge Programme. Notes for a Simplified Design on Foot Bridges of Short Spans, by Hans Pfaffen. Kathmandu, December 1976. Pp. 11. Illus., photographs.

Presents a comparative analysis on whether foot bridges of spans from 12 to 24m should be built of wood or of steel; Mr. Pfaffen, Project Manager, stresses that although constructions made of steel are between 10 and 30 times more expensive (depending on the specific site) than bridges made completely of wood, the steel bridge will protect the country's forest resources and be safer and less expensive in the long run.

SATA/Nepal. Suspension and Suspended Bridge Programs. Some Thought of Planning and Building Unstiffened Suspension Bridge. Taking Into Consideration the Simplest Production and Construction Methods as For Example Nepal, by Hans Pfaffen. Kathmandu, May 1976. Pp. 17. Photographs, charts.

It describes how to plan pedestrian bridges in inaccessible areas, using the simplest production and construction methods in Nepal.

Sharma, Chandra K. River Systems of Nepal. Kathmandu, Mrs. Sangeeta Sharma, 1977. Pp. 224. Maps, photographs, tables, illus.

Presents comprehensive descriptions on the origin, development, characteristics and use of water resources of rivers in Nepal; includes chapters on inventory of the rivers, nature of the river channels, meandering, shift and fan deposit, directions and density of drainage and seismicity.

U.S. Peace Corps/Nepal. Nepal Survey Manual. Kathmandu, n.d.
v.p. App. Diagrams, tables.

Includes contributions on simple span bridges, suspension bridges design and construction by William Gierasch, Stanley Yamanaka and Will Newman, PCVs in Nepal; Chapters written by different contributors on reconnaissance and preliminary surveys, project organization, cost analysis and road construction are included. (Manual prepared for PCVs assigned to road/bridge construction projects in Nepal.)

USAID/Nepal. End of Tour Report, by George E. Bell. Kathmandu,
1970 Pp. 8.

Contains brief accounts by Mr. Bell, General Engineer on various project activities under the Capital Projects and Engineering Division of USAID/N, covering the period Aug. 19, 1968 to Aug. 21, 1970; few lines on suspension bridges refer to the problems and progress of the project- lack of adequate staff, lack of interest, coordination and communication within HMG/N are mentioned as main problems.

USAID/Nepal. End of Tour Report, by Pal A Lincoln. Kathmandu, 1965. Pp. 3.

A brief report by Mr. Lincoln on his assignment as Bridge Engineer covering the period 29 July 1963 to 10 May 1965. Contains favorable and unfavorable factors encountered during his work, and his recommendations; lack of sufficient equipments, technicians, low wage rates and delay on the part of HMG/N have been mentioned as a bottleneck for the project.

USAID/Nepal. End of Tour Report, by George B. Weaver, Kathmandu, 1965. Pp. 9.

A brief report by Mr. Weaver, Transportation Operations Advisor, covering the period 10 Oct. 1962 to 11 Nov. 1964; the report covers the project activities such as Ropeways, Suspension Bridges, Aviation and Tele-communications. Common problems associated with the implementation of these projects have been outlined with recommendations.

USAID/Nepal. Nepal Audit Report No. 7-367-72-35. Suspension Bridges Project no. 367-11-312-095 (a memorandum to NESA/CDE - Mr. Theodra Lusting from AA/NESA - Edward Mr. Vinson). December 29, 1971. v.p.

Cyclical audit report covering about 18 months period ending June 30, 1971; includes earlier audit reports and recommendations and copies of project agreements.

USAID/Nepal. Project Appraisal Report on Suspension Bridges Project (Project no. 367-11-390-095). Kathmandu, 1969. Pp. 10.

Outlines the overall progress of the project mentioning the conditions of 17 bridges constructed and planned within the project activity; problems such as staffing and low salary and allowances have been mentioned as delaying factors; prescribes the target should be 3 or 4 bridges per year instead of 6; FY 1969 progress mentioned as satisfactory.

USAID/Nepal. Suspension Bridges Project. Draft for Reply to AIDTO A-120 on 39-AC Suspension Bridges Project. Kathmandu, September 30, 1963. p. 1.

A brief note by the Project Mission on the availability of local technicians, equipment procurement and government interest in the project.

USAID/Nepal. Suspension Bridges Project. Excerpts from Monthly Reports to the Director (Draft). Kathmandu, February 24, 1965. Pp. 12.

Excerpts from the monthly reports on suspension bridge project submitted to the USAID/W Director; sites like Kagune, Chepe, Darondi have been mentioned.

USAID/Nepal. Suspension Bridges Project. Project Data Summary - AID Dollar Costs (Project no. 367-11-312-095). Kathmandu. 1968.

Project data summary and expenditures on suspension bridges Project (formally named as Rural Transportation Project) starting from 1958 to 1968; progress report in the bridges and funding for the year 1969 mentioned in brief.

USAID/Nepal. Suspension Bridge Project. Quarterly Reports on Suspension Bridge Project (Rural Transportation Project No. 367-095), drafted by Tim de Jong. Kathmandu, June 10, 1965. Pp. 5.

A progress report covering the period Oct. 1964 through June 10, 1965 on suspension bridges and

STOL airstrips; the memorandum refers to several other reports maps and designs enclosed with the report and submitted to Mr. Henry Waeglein, Transportation Officer, NEPA/ENGR (Reference - To AID A-215).

USAID/Nepal. Suspension Bridges Project. Report of Field Trip, submitted by Tim de Jong, Civil Engineer Rural Development Division, USAID/Nepal. Kathmandu, Feb. 12, 1965. Pp. 9.

This field trip Report (Jan. 21 to Jan. 31 and Feb. 1-3, 1965) describes the construction progress on Chepe, Darondi, Leguwaghat Bridges and Tumlingtar STOL Field; also indicates the potential bridge sites at Bhingri and Barighat and potential STOL Field at Bhingri, Kuncha and Dhathum.

USAID/Nepal. Suspension Bridges Project. Report of Field Trip, submitted by Tim de Jong, Civil Engineer Rural Development Division USAID/Nepal. Kathmandu, March 12, 1965. Pp. 4.

Contains the follow-up progress reports on Dhankuta STOL airfield, Tumlingtar Air field, Leguwaghat Cableway, Leguwaghat STOL, field transport of materials to Leguwaghat, Darondi, Chepe, Bhingri suspension bridge site and Darondi STOL Field.

USAID/Nepal. Suspension Bridges Project. Rural Transportation (Suspension Bridges and STOL Airstrips). Kathmandu, December 8, 1964. p. 1.

A brief note describing usefulness of suspension bridges and STOL airstrips in facilitating Nepal's transportation system; target of erecting 36 bridge structures and 30 STOL airstrips involving local participation has been mentioned.

USAID/Nepal. Suspension Bridges Project. Suspension Bridge Project; memorandum to John C. Cool from Tim de Jong. Kathmandu, November 27, 1964. Pp. 5.

Memo to Dr. John C. Cool, Chief of the
Community Development Division, USAID/N from Tim
de Jong, Suspension Bridge Project Coordinator on
problems regarding the bridge construction programme.

USAID/Nepal. Suspension Bridges Project. Suspension Bridge
Project E-1: a memorandum to John C. Cool. from Tim de
Jong. Kathmandu, October 20, 1964. Pp. 2.

Memo to Dr. John C. Cool, Chief of the
Community Development Division, USAID/Nepal from
Tim de Jong Suspension Bridge Project Coordinator
indicating solutions for implementation problems
related to the project.

USAID/Nepal. Suspension Bridges Project. Technical Assistance
Project History and Analysis Report (Draft). Kathmandu
March 29, 1965. Pp. 19 + 3.

Draft of historical and analysis report for
Rural Transportation Project No. 367-11-390-011,
covering the period May, 1958 to Feb., 1965, the initiation

and completion date of the project being 1958 and 1968 respectively; contains the background situation of the project, project targets and goal plan objective, project results, resources employed, major factors affecting progress and working balance sheet prior to 1958 status.

<u>- Related Institutions</u>	<u>Telephone</u>
Local Development Department (Planning Section) Hari Har Bhavan, Lalitpur, Nepal	21497 21021
Suspension Bridge Division Roads Department Ministry of Transportation and Communication Babar Mahal, Kathmandu, Nepal	15780
SATA (Swiss Association for Technical Assistance) Ekantkuna, Jawalakhel, Lalitpur, Nepal	21205
United Nations Development Program Lazimpat, Kathmandu, Nepal	11944 14989
United States - Peace Corps Kamalpokhari (Lal Darbar Compound) Kathmandu, Nepal	13875 11692
United States Agency for International Development Kalimati, Kathmandu, Nepal	11144
World Bank RNAC Building Kathmandu, Nepal	14792 14793

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* This list should not be considered as a complete list.
However, this list is expected to be useful for
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-- Others(contacted during this study at the Bridge Sites)

Baglung Bridges

Gauchan, Ojkar Prasad

Baglung Bazar

Baglung

Bhingri Bridge

Gururaj, Subedar Chandya Bahadur

Tallo Bhingri

Bhingri Panchayat

Pyuthan, Nepal

Thapa, Sher Bahadur

Vice-President

Pyuthan District Panchayat

Pyuthan, Nepal.

Jhara Bridge

Acharya, Lok Nath

Pradhan Panch

Siwalaya Panchayat

Parbat, Nepal.

Poudyal, Hari Prasad

Pradhan Panch

Katuwa Panchayat

Parbat, Nepal

Shrestha, Anrit Man

District Panchayat President

Parbat, Nepal

Karabot Bridge

Shrestha, Kaji Narayan

Chisapani Panchayat

Ramochhap, Nepal.

Lekura Cableway

Shrestha, Man Bahadur

Chanuwa Panchayat Dhankuta, Nepal.

Malumola Bridge

Khadka, Man Bir

Pradhan Panch

Paringal Panchayat

Bajhang, Nepal

Regmi, Shiva Bhakta

Pradhan Panch

Paringal Panchayat

Bajhang, Nepal.

Sarfebasar Bridge

Bogati, Lal Singh

Pradhan Panch

Khaparmandu Panchayat

Achham, Nepal.

Khadka, Naun Singh

Pradhan Panch

Baijunath Panchayat

Achham, Nepal

Swar, Nayan Bahadur

Ex-Chairman, Rastriya Panchayat

Bayalpata Panchayat

Achham, Nepal.

Syabrubesi Bridge

Tamang, Chhenam Sonam

Syabrubesi

Rasuwa, Nepal.

Lama, Pengmo

Syabrubesi

Rasuwa, Nepal.

Tamang, Jomling

Syabrubesi

Rasuwa, Nepal

Toxelghat Bridge

Baskota, Bhawa Nath

Ward No. 1. Thakle

Okhaldhunga

Nepal.

Turkesghat Bridge

Karki, Padam Bahadur

Ward No. 2 Phalikot

Deurali Panchayat

Bhojpur, Nepal.

Thapa, Dharma Raj

Deurali Panchayat

Bhojpur, Nepal.

- Steel Fabricators

Agriculture Tools Factory

Pipra, Birgunj, Nepal.

Balaju Yantra Shala Pvt. Ltd.

Balaju Industrial District

Balaju, Kathmandu, Nepal.

Butwal Technical Institute

Butwal, Nepal.

Central Auto Engineering Works

Koteshwar, Kathmandu, Nepal

Hetauda Engineering Works

Hetauda Industrial District

Hetauda, Nepal.

Nepa Engineering Works

Nepalganj Industrial Estate

Nepalganj, Nepal.

Nocoenco Industry Pvt., Ltd.

Patan Industrial Estate

Lalitpur, Nepal.

Nepal Engineering Works

Patan Industrial Estate

Lalitpur, Nepal.

Nepal Tara Industries Pvt. Ltd.

Pokhara Industrial District

Pokhara, Nepal.

Structo-Nepal

Patan Industrial Estate

Lalitpur, Nepal.

Teaction Pvt. Ltd.

Balaju Industrial District

Balaju, Kathmandu, Nepal.

Trekking Agencies in Kathmandu.

Telorchang

Annapurna Trekking and Mountaineering Pvt. Ltd. Darbar Marg.	12736
Express Trekking, Naxal.	13017
Gauri Shankar Trekking Service Pvt. Ltd. Jamal, Kathmandu.	11211
Great Himalayan Adventure Pvt. Ltd. Kanti Path.	14424
Himalayan Rover Treks, Naxal.	12691
Himalayan Sangrila Treks, Ram Shah Path.	
Himalayan Trekking Pvt. Ltd. Ram Shah Path.	11808
International Trekking Pvt. Ltd., Bansbari	11786
Kanchenjunga Trekking Pvt. Ltd. Ram Shah Path.	13805
Manaslu Trekking Pvt. Ltd., Darbar Marg.	12959
Mountain Travels, Maharajgunj	12808
Natraj Trekking Agency	12040,
Nepal Trekking Pvt. Ltd., Thamel.	13004
Nepal Treks & Natural History Expeditions Ganga Path.	14446
Sherpa Cooperative Trekking, Ram Shah Path.	12654
Sherpa Society, Ram Shah Path.	12412
Sherpa Trekking Service, Kopundol.	13176
Trans Himalayan Trekking Pvt. Ltd. Darbar Marg.	13854

ABBREVIATIONS USED

App.	Appendix
CEDA	Centre for Economic Development and Administration
Col.	Colored
ed.	edition, edited by
fig.	figure
HMG/N	His Majesty's Government of Nepal
IBRD	International Bank for Reconstruction and Development
IDRC	International Development Research Center
illus.	illustrations
n.d.	no date
p.	page
PCV	Peace Corps Volunteer
Pp.	pages
SATA	Swiss Association for Technical Assistance
UNDP	United Nations Development Program
USAID	United States Agency for International Development
USIS	United States Information Service
v.p.	various pages
v. vol. vols.	volume (s)