

CHALLENGES TO THE CONSULTANTS AND CONTRACTORS IN BRIDGING NEPAL RIVERS

ABSTRACT

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INTRODUCTION

Development in Nepal is currently occurring at a very rapid rate, and for it, the design and construction of major infrastructures like roads and bridges are unavoidable. At present, road transportation is the main mode of transportation in Nepal far exceeding the volume of other available transport modes. In an average, about ninety two percent of all the goods and passengers are being transported by road. Due to this reason, Nepal has expanded its road network from 376 km in 1951 to about 18000 km at the end of 2008. In the mean time some 1300 bridges have been built in the total road network of the country which still is not sufficient and at the same time, some 1-2 numbers of bridges are being collapsed and others are severely damaged annually, which is a major concern to the user-communities as well as to the concerned Government agencies.

This paper describes the concepts behind the design, construction and maintenance of the bridges in the hazardous environment under Himalayan condition. The main aim of this paper is to focus the attention on planning, investigation and special requirement of design and construction of bridges in hills and mountains of Nepal.

Approximately eighty percent of the total territory of the country is occupied by hills and mountains. There are more than 6,000 rivers and rivulets. Rapid development in infrastructure, the construction of roads and bridges are very challenging.

The design, construction and maintenance of roads and bridges under Himalayan condition are less explored. And accordingly, the bridges in these areas have always challenged Nepalese Engineers and Contractors not only on account of varied problems met with geology, topography and other environmental condition but also to blend the bridge structure aesthetically with the surroundings.

The bridge design, construction and maintenance in Nepal needs a different approach to that conventionally adopted in other flat or rolling topography, however, engineering principals remain the same. Not only each country is unique but each bridge design and construction should also be unique to fit-in with the individual problems posed within each country.

Whatever codes or construction practices adopted, it should be able to address the predominant mode of failures that occurred in different catastrophic situation in that country for example: floods, earthquake etc.

Scour is one of the major causes of bridge failure. Flood and foundation movements were responsible for almost ninety percent of the 38 cases of bridge failure that was documented by the author in his study. Riverbed scours at bridges has gained increased attention in recent years in Nepal. At worst these have resulted in complete or partial collapses of bridges, and in several cases the loss of lives.

During the presentation, the paper will discuss the followings:

- Brief Introduction to Topic
- Historical Developments of the Road Development in Nepal
- Existing Engineering Problems/Environmental Condition
- Discussion on the Behavior of Nepalese Rivers, and
- Conclusion

CONCLUSION

Deep gorges in the upper mountainous reaches, boulder beds with deep waters in the sub-mountainous reaches, wide flood zones in vast alluvial plains, difficult founding condition, deep bed scours, channel instability, structural durability, need of navigation, environmental quality and host of other engineering and social demands are the problems needing a satisfactory solution for the country/s bridging need.

An optimal solution under the above parameters will call forth the best of the bridge technology both in simplicity in design and economy of construction, durability, ease of maintenance, sympathetic design to suit the site condition and reasonable time-frame of construction.

There has until recently, been little awareness among the bridge engineers on the danger of the scour. Compared to the effort concentrated on structural assessment, examinations on scour have been very limited. In the research fields also, scour has received relatively little attention until recently. Many of the “recommended” design formula are based on physical model tests carried out decades ago, and are of questionable relevance to typical bridges.

Bridge Engineers, responsible for design and construction, must take the risk seriously. The engineer who overlooks the water running under the bridge may well find the bridge under water.