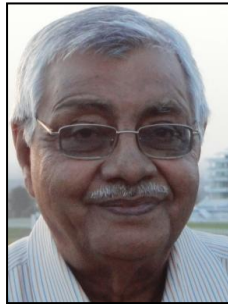


Challenges in Bridge Construction over a canal of crocodiles at an extremely remote location thirty years ago

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Summary

Many bridge structures are built all over the world with numerous challenges. The construction of a cable suspended bridge in the mid seventies at a extremely remote village of Andaman & Nicobar Island was a real challenge since there was hardly any proper equipment available, as well as a lack of skilled man power. These challenges may be dealt with proactive initiatives and executable planning by experienced professionals. Matters could become beyond control if further challenges from wild animals are encountered. This paper is the challenges faced during the construction of a bridge built more than thirty years ago in the extremely remote village of Andaman and Nicobar Islands over a canal of crocodiles.

Keywords: Suspension Bridge, CPWD, APWD

1. Introduction

Suspension Bridges are popular all over the world. They are appropriate for very long span bridges or moderately longer span footbridges, which are also built as suspended structures. Introduction of Verantius' 'theoretical' design in the 1600's (figure 1) suggests that people started thinking about the use of suspended structures as a further development of folding bridges over moats (to enter into castles) to be a permanent solution in order to cross wider obstacles.

According to various resources, Adam's Bridge is considered the oldest form of structure used by human to cross over a large obstacle called "Gulf of Mannar". The Hindu mythological book "The Ramayana" suggests it was built at least 5000 years ago. However, all these demonstrate and reconfirm the very old phrase "necessity is the mother of invention". If there is a need human beings could come up with a solution to cross a 30 kilometre wide obstacle in those days too.

Further development of idea from Verantius' 'theoretical' design was not restricted to the UK & Europe only. People from the subcontinent also showed their skill in constructing suspension bridges. Between 1784 & 1794, Thomas and William Danielle met the Maharaja of Garhwal by using a rope suspended bridge (Figure 3) to cross the Alaknanda River at Srinagar in the Garhwal district of Uttarakhand.

James Finlay may be considered as the father of the modern day suspension bridge (Sayanga, 2008) but it is evident rope

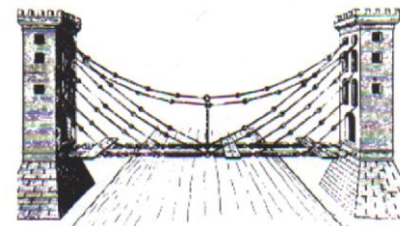


Fig. 1 Verantius' 'theoretical' design in the 1600's



Fig. 2 Rama's bridge across the Gulf of Mannar



Fig. 3 Rope bridge - Srinagar, Garhwal

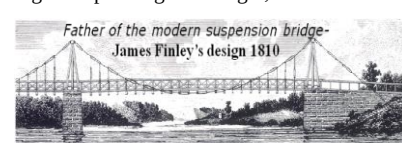


Fig. 4 James Finlay's design of the first modern suspension bridge in 1810



bridge structure construction with similar concepts already existed in the Indian sub continent 25 years prior to his design of modern suspension bridge.

This particular briefing article is about the construction challenges faced by the author while constructing a relatively small suspension bridge over a water course in one of the remotest part of India Andaman and Nicobar Islands in the mid seventies. The remoteness of the bridge site wasn't the main challenge; rather the presence of highly ferocious crocodiles nearby was the main risk.

2. Brief description of the site

Andaman and Nicobar Islands are a group of islands stretched over the southern part of the Bay of Bengal parallel to Thailand as shown in figure 5. The project site was located over the main water course of the north island, connected to the sea, running between two North Andaman villages called Ramkrishnagram and Dosh-Bandhugram.

Crocodiles were visible every now and then in a tributary downstream of this water course. The presence of crocodile gave rise the name Magar Nala. Further detail of this water course is shown in figure 5 above. The earliest arrival of newspapers to readers is two to three weeks, which illustrates the remoteness of the island site.



Figure 5 Satellite image showing the stretch of – Andaman & Nicobar Islands – Diglipur the actual bridge site & Magar Nala in close up

3. Requirement of this Bridge



Fig. 6 Remains of the Hanging Bridge built with great difficulty along with the new Bailey bridge

Remoteness, crocodile attack on human and the 6-9 month rainy climate was the main reason to the construction of this bridge as a part of improvements of the local infrastructure carried out by CPWD. The main author of this article Mr. Ashit Kundu was the engineer in-charge of APWD.

4. Construction Challenges

Absence of proper design drawings, necessary construction equipment and skilled labour were obvious challenges encountered. Over and above the main challenges was the presence of wild crocodile nearby. This particular type of bridge structure was chosen

to have a single span over a water course which was more than 100m wide in places.

5. Conclusion

From this briefing article it is evident that even complicated structures can be constructed with a minimal amount of equipment and unskilled manpower resources despite the challenges imposed by wild animals. Wherever it is on earth as long as there is planning of the available resources and their limitations are clear, engineers can achieve their target. It reiterates where there is a will there is a way, no matter which age of human civilisation engineers of India have accepted the challenges to come up with a solution irrespective of the available technology and resources. Though it was not robust enough; like many other structure to withstand 9.1 Richter scale Tsunami in 2004, it provided nearly 30 years of service to the users where in most cases the design life of foot bridges is 50 years. It may be a rope suspension bridge built more than 300 years ago or a cable suspension bridge over a main watercourse at the remotest part of India, engineers have delivered to users.

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