

Advancement in Bridge Infrastructure

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Abstract: Bridge construction is one of the cores of traffic infrastructure construction. To better develop relevant bridge science, this paper introduces the main research progress in China and abroad in 2020 from 16 aspects. The content consists of four major categories in 16 aspects. The first part is about the bridge structure, including concrete bridge and high-performance materials, steel bridges, composite girders. The second part is about the bridge disaster prevention and mitigation, including bridge seismic resistance, wind resistance of bridge, train-bridge coupling vibration research, bridge hydrodynamics, the durability of the concrete bridges, fatigue of steel bridge, temperature field and temperature effect of bridge; The third part is about the bridge analyses, including numerical simulation of bridge structure, box girder and cable-stayed bridge analysis theories. The last part is concerning the bridge emerging technologies, including bridge informatization and intelligent bridge, the technology in bridge structure test, bridge assessment and reinforcement, prefabricated concrete bridge structure.

Keywords: Bridge construction.

I. INTRODUCTION

Bridge construction is closely related to the development of human civilization and is also an important part of human civilization. It is the unremitting pursuit and dream of human beings to build bridges and overcome obstacles, making a deep chasm turned into a thoroughfare. The construction scale and the technical level of China's bridge engineering have already reached the world's advanced level in recent decades. With the rapid development of China's economy, the society has increasingly higher construction needs for infrastructure and transportation systems, and there are continuous construction and completion of ultra-long sea-crossing bridges, high-speed railway bridges, and super-span bridges. At the same time, with the expansion and deepening of scientific research and technical application in the field of bridge engineering, new technologies, new materials, new structures, new technical theories, etc. have emerged one after another, and the level of technical application and theory of bridge construction has reached an unprecedented height. With the progress of the construction progress, the span demand of the bridge is increasing; the functional requirements are getting higher and higher, such as all-weather opening to traffic, road-rail dual-use, high-speed railway; the construction conditions and operating environment are becoming more and more severe, such as typhoon, fracture zone, Plateau, strong earthquake, tsunami, etc. All these provide a wealth of research topics and design challenges for bridge design and scientific research personnel.

II. LITERATURE REVIEW

The following chapter shall introduce the reader to past, present, and future in bridge engineering. The history of engineering is as old as mankind itself, and it is without doubt that technical progress and the rise of human society are deeply interwoven. Bridges have often played an essential role in technical advancement within Civil Engineering. The development of important types of bridges and the changing use of materials and techniques of construction throughout history will be dealt with in the first part of this chapter. Notably, manifold legends and anecdotes are connected with the bridges of former eras. Studying the history of a bridge from its construction throughout its life will always also reveal a fascinating picture of the particular historical and cultural background. The second part of this chapter introduces the main challenges that the current generation of bridge engineers and following generations will face. Three important areas of interest are identified. These are improvements in design, construction, maintenance, and rehabilitation of a bridge, application of high-performance materials, and creative structural concepts. As technology advances, many new ways of innovation thus open for the bridge engineer.

III. HISTORY OF BRIDGE CONSTRUCTION:

The bridges described in the following sections are examples of their kind. A vast amount of literally thousands of bridges built requires choosing a few exemplary ones to show the main developments in bridge construction throughout the centuries. Any book examining bridges in a historical context will make its own choice, and studying these works can be of great value for understanding of the legacy of bridge engineering. The subdivision into certain periods in time shall provide a framework for the reader's orientation in the continuous process of history as it unfolds.

IV. FUTURE CHALLENGES IN BRIDGE ENGINEERING:

Having given an overview of more than two millennia in bridge building with some discussion of the impact of developments on later bridge engineering, the following paragraphs shall look ahead. The second half of this chapter will give an overview of the wide spectrum of future challenges. As opposed to the history of bridges, for which an abundance of literature can be found in any library, books or articles on the future of bridge construction are more rare. How can predictions be made at all? The basic approach is to identify current problem areas and trends in research interests. With some imagination, it is then possible to derive ideas of where bridge engineering may be heading. These predictions will certainly not be exact, but they give an impression of future challenges. New concepts are emerging, yet there is still very little experience with the practical application of these. It will take creativity and sometimes also courage to face them.

Future Scope of the Project:

India's 1st Vertical lift Railway

Sea.Bridge #NewPambanBridge

- 84% work completed & track laying work is in progress
- Fabrication of Vertical Lift Span girder is nearing completion.
- Assembling platform for vertical lift span on Rameswaram end of the bridge is getting ready.

