



EVOLUTION OF BRIDGE TECHNOLOGY

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SUMMARY

The evolution of bridge technology can be divided into two major eras: The Arch Era, from 2000 BC to the end of 18th century, was dominated by the Roman structures. They were practically all stone arches. The Contemporary Era that followed and continues today, flourished after steel was commercially available as a construction material in the mid 19th century. All modern bridge types including girder bridges, cable-stayed bridges, suspension bridges and arch bridges, especially those with larger spans, have been possible only because of the high strength of steel, both in compression and in tension.

Keywords: bridges, bridge evolution, stone bridges, steel bridges, concrete bridges, bridge technology

1. INTRODUCTION

If we observe the anatomy of all structures in the world, we find that there are basically only three types of structural elements: those that transfer the forces that act upon it by **axial force**, by **bending** or by **curvature**. A member in a truss is an axial force element. A beam is a bending element. And, arch ribs and suspension cables are curvature elements. These can be defined as the “ABC of structures”, Fig. 1.

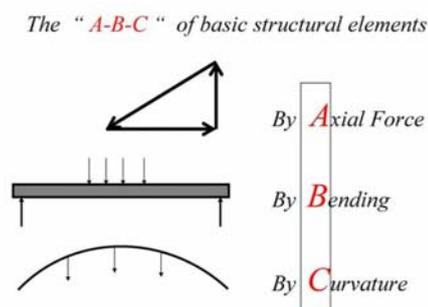


Fig.1 Basic Elements in Structures

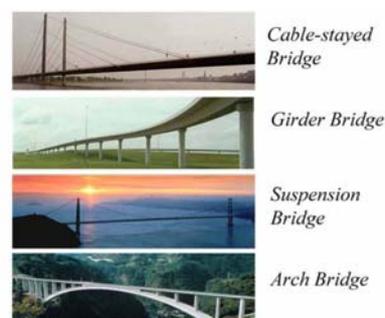


Fig.2 Four Types of Bridges

Every structure is a combination of these three types of elements. Some elements may have one type as its primary function and the other as secondary, such as the girder of a cable-stayed bridge. It is primarily an axial force element, but due to strain compatibility, it also must carry loads by bending.