

An Investigation into the Static Mechanical Behaviors of Special-shaped Arch Bridge

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Abstract

Considering Taiwan's mountainous terrain and winding roads, the special-shaped arch bridge may exhibit superior adaptability; therefore, it has a wide range of applications in the domestic construction of bridges. This paper describes the basic theory and analytical process of the special-shaped arch bridge, using case studies to illustrate the static response of the bridge under uniform dead load. Furthermore, this paper discusses the effects of the changes of the bridge's geometric shape from the static load response. The results show that because the arrangement of the special-shaped arch bridge is distinct from that of the traditional arch bridge, the distributions of the initial and completion cable forces are complex such that obtaining regular stress responses is difficult regardless of whether the bridge is in-plane or out-of-plane. Hence, the arrangement of cable forces should be specifically considered when building an analytic model of a special-shaped arch bridge.

Keyword : Special-shaped arch bridge, cable force, static load.