結構參數對中長跨度斜張橋抗風行為之影響

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摘要

斜張橋是一種由纜索、主梁及橋塔組合而成的高度靜不定結構，具有跨越能力大、結構形式簡單美觀的優點。然而大跨徑斜張橋易受到風荷載影響，因此考慮結構參數的變化對斜張橋抗風行為之影響，有其研究價值。本文先以靜荷重及剛性支承連續梁結構模式進行斜張橋之初形分析，接著再進行擬靜風荷重加載，透過改變斜張橋各部構件之材料性質與幾何參數，探討其在風荷重作用下的力學行為變化。研究結果顯示，當改變纜索的彈性模數時，對主梁內力有顯著的影響，而改變主梁彈性模數與主塔慣性矩時，則對主梁位移產生明顯的變化。

關鍵字: 斜張橋、靜風加載模式、結構參數

Effect of Variation of Structural Parameter of Cable-stayed Bridges under the Model of Statical Wind Loads

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ABSTRACT

A cable stayed bridge is a high-order statically indeterminate structure made of cables, girders and towers, with merits of low stiffness, long span capability, and aesthetic appearance. However long span cable stayed bridges are prone to be affected by wind loads, it is therefore worthwhile to study the effects on wind-resistance behaviors of cable stayed bridges through considering variations of structural parameters. The study first carries out Initial Shape Analysis of the cable stayed bridge by way of a structure model of static loads and stiff support continuous girders; it then carries out simulated Statical Wind Load. The study researches variations of mechanical behaviors under actions of wind-loads by way of altering material properties and geometric parameters of different parts of the cable stayed bridge. Results of the study show that significant effects are seen on the internal force of girders when the elastic moduli of the cables are altered, and that significant deviations in girder displacements are seen when the elastic moduli of girders and the moment of inertial of towers are altered.

Keywords: Cable-stayed Bridge, the Model of Statical Wind Loads, Structural Parameter