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Effects of Temperature Variation on Cable Forces of an Extradosed Bridge

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In order to comprehensively realize and then filter out the temperature effect for further proposing a feasible structural health monitoring methodology mainly based on the variation of cable force, the long-term monitoring of cable frequencies and temperatures of Ai-Lan Bridge, an extradosed bridge located in central Taiwan, is conducted in this study. With the data collected on this bridge for more than one year, the variations of cable frequencies and temperatures at different structural components are examined to extract consistent tendencies. The results clearly indicate that temperature is the major environmental factor to cause the variation of cable force. A simplified model proposed in this study also demonstrates its effectiveness in correlating the variation of cable force with an effective temperature variation simultaneously considering the temperature effects from the pylon, girder, and cable.

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Ключевые слова:

Содержание

Abstract

Introduction

Ai-lan Bridge and its monitoring system

Observed tendencies for cable frequencies and temperatures different locations

Correlation analysis between cable frequency and structures temperature

Conclusions