**Analysis of free cable vibration with material damping for an applied cable-stayed bridge**

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**Abstract.** Recently, monitoring cable tension is an important problem in assessing the condition of cable-stayed structures. Many factors that affect cable tension such as ﬂexural rigidity, sag, lay angle, and complicated boundary conditions were studied. However, the influence of damping has been rarely considered. In this paper, the mathematical model of the damped vibration of the cable has been studied to find the effect of material damping on tension. The experimental results from vibration data of cables in the cable-stay bridge are used to verify the relationship between frequency, damping, and tension. The purpose of this study is to use vibration techniques to increase accuracy in tension determination and condition assessment of cables.

**Keywords:** Damping properties, Cable tension, Natural frequency, Cable-stayed bridge, Cable vibration.