Finite Element Modeling of Stockbridge Damper and Vibration Analysis: Equivalent Cable Stiffness

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Abstract : Aeolian vibrations are the major cause for the failure of conductor cables. Using a Stockbridge damper reduces these vibrations and increases the life span of the conductor cable. Designing an efficient Stockbridge damper that suits the conductor cable requires a robust mathematical model with minimum assumptions. However it is not easy to analytically model the complex geometry of the messenger. Therefore an equivalent stiffness must be determined so that it can be used in the analytical model. This paper examines the bending stiffness of the cable and discusses the effect of this stiffness on the natural frequencies. The obtained equivalent stiffness compensates for the assumption of modeling the messenger as a rod. The results from the free vibration analysis of the analytical model with the equivalent stiffness is validated using the full scale finite element model of the Stockbridge damper.

Keywords : equivalent stiffness, finite element model, free vibration response, Stockbridge damper
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