

Public Abstract

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Graduation Term: Winter

Graduation Year: 2006

Title: Analysis of Radio Communication Towers Subjected to Wind, Ice and Seismic Loadings

The MoDOT communication tower network was built in the 1950s and 1960s. Today the network is used by state emergency crews and law enforcement agencies on a daily basis in addition to as a communication system in times of natural disasters. Since the towers are aging and the design codes have changed over the years, there is a need to assess the condition of the towers in the network and also to determine if they are up to date with current code. Therefore, the objective of this research is to develop a systematic evaluation and assessment method that could provide the necessary information for the repair and maintenance of the tower network.

Two towers were selected for this project: one tower is guyed, the Taum Sauk tower, and the other is freestanding, Kansas City tower. In this project, the towers were analyzed under wind, ice, and seismic loading and the results indicate that some components of the towers are critical and could control the failure. A parametric study of the towers under various deteriorations to the towers components was conducted to assess their significance to the failure behavior of the towers. It is recommended that detailed inspection of the towers' critical components be performed, in order to perform a detailed risk assessment.