

## Resilience Assessment for Power Distribution Systems

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**Abstract :** Power distribution systems are essential and crucial infrastructures for the development and maintenance of a sustainable society. These systems are extremely vulnerable to various types of natural and man-made disasters. The assessment of resilience focuses on preparedness and mitigation actions under pre-disaster conditions. It also concentrates on response and recovery actions under post-disaster situations. The aim of this study is to present a methodology to assess the resilience of electric power distribution poles against wind-related events. The proposed methodology can improve the accuracy and rapidity of the evaluation of the conditions and the assessment of the resilience of poles. The methodology provides a metric for the evaluation of the resilience of poles under pre-disaster and post-disaster conditions. The metric was developed using mathematical expressions for physical forces that involve various variables, such as physical dimensions of the pole, the inclination of the pole, and wind speed. A three-dimensional imaging technology (photogrammetry) was used to determine the inclination of poles. Based on expert opinion, the proposed metric was used to define zones to visualize resilience. Visual representation of resilience is helpful for decision makers to prioritize their resources before and after experiencing a wind-related disaster. Multiple electric poles in the City of Beaumont, TX were used in a case study to evaluate the proposed methodology. &nbsp;

**Keywords :** photogrammetry, power distribution systems, resilience metric, system resilience, wind-related disasters

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