

Vehicle Impacts on Utility Poles



Background, Objectives, and New Learnings

According to a Federal Highway Administration study, roadway departures accounted for 57,475 highway deaths between 2016 and 2018¹. Utility poles were the most harmful event in 2,562 of these fatalities. Motor vehicle impacts are also a leading cause of distribution pole damage. Some state transportation departments have requirements regarding the types of poles allowed near roadways; for example, concrete poles are prohibited along some roadways due to a higher likelihood of fatality. While anecdotal information exists showing how different pole types respond to an automobile impact, there is no publicly available research containing data showing how much force is generated during an automobile collision and the level of damage as a function of pole material type.

Utilities are seeking information regarding the performance of poles during an automobile collision. Utilities have also expressed interest in means of protecting motorists and poles during these collisions. Protective options could include barriers, breakaway poles, or energy absorbing materials.

The objective of this project is to conduct research to better understand how different pole materials respond during a motor vehicle impact, potentially reducing the risk of fatality during a collision. The research could also help utilities better understand the likelihood of pole failure during an auto collision and the subsequent repairs needed.

Project Highlights:

- Collect test data to better understand which pole materials result in lower forces for the pole and motorists during impact.
- Identify options to better protect the pole and motorist during collisions.
- Facilitate information sharing among the collaborative to determine best practices when siting poles along the roadway, and how to best respond to pole collisions.

Research questions to be addressed include:

- How do different pole materials respond to impact?
- For wood poles, how does treatment effect performance?
- How does pole class change performance?
- What are the best options to protect poles and how can these be applied (barriers for example)?

Benefits

Motor vehicle collisions impact both the public and utilities. Collisions lead to outages, downed conductors, serious injuries, and fatalities. The primary objective of this project is to equip utilities with information and options to reduce damage caused by pole collisions, potentially improving quality of service to customers by improving reliability and reducing motorist injury.

The information generated by this project may also help utilities better understand the risks associated with using different pole materials and identify options to mitigate those risks, particularly as utilities may be selecting pole materials that improve system reliability and resilience. This research can help utilities understand the tradeoffs that may exist between improving structure performance and public safety.

Project Approach and Summary

This research plans to generate pole collision information in a laboratory environment.

¹ "Utility Pole Crashes", Federal Highway Administration, United States Department of Transportation.

The project consists of the following tasks:

- Collect pole collision data by simulating vehicle strikes on various pole types. The research includes subjecting multiple poles to a repeatable collision to measure the resultant impact force. The pole types of interest include:
 - Wood poles, treated with CCA (thought to make the pole harder) and another treatment, such as pentachlorophenol or DCOI
 - Concrete poles
 - Fiberglass-reinforced polymer poles (composite)
 - Ductile iron poles
 - Steel poles
- Conduct literature reviews and document options available to mitigate pole strikes and reduce collision forces.
- Test mitigation options in collision scenarios.
- Facilitate utility information exchanges so utilities can learn best practices based on peer experience as well as research results.

Deliverables

- A utility information exchange regarding pole collision practices, test results, and mitigation technologies to reduce impacts.
- A report sharing results from pole collision and mitigation testing.

The non-proprietary results of this work will be incorporated into EPRI's Distribution Systems R&D program and made available to the public for purchase or otherwise.

Price of Project

The cost to participate in this project is \$45K.

The project qualifies for Self-Directed Funding (SDF) or Tailored Collaboration (TC) funds. Funding can be split across two years.

Project Status and Schedule

This project will start with a minimum of four (4) participants. Twelve (12) participants are required to accomplish the full scope. After the project begins, a utility information exchange will commence to begin exchanging practices and to identify impact force-reduction options. The laboratory testing will take place within one year of full project funding. Periodic updates will take place as test results are collected and task-force input is required.

Who Should Join

Utilities that maintain infrastructure near roadways would benefit from this project.

Contact Information

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