The Industry's Most Definitive Pole Fire Fact Sheet

By John Lauletta, CEO & Founder of Exacter, Inc.

Each year in the United States there are over 3000 incidents of utility poles catching fire and causing damage. We hope this fact sheet provides valuable insights in your pole fire mitigation efforts.

Cost & Collateral Damage

1. The average cost of a pole fire on a distribution line is approximately $25,000.
2. The average cost of a pole fire on a 230kV H-frame transmission tower is $35-$50,000.
3. Brush fires from embers, or the pole fire itself can cost in the millions dollars.
4. Poles or equipment falling on homes or vehicles can cost from $5000-$300,000.
5. Liability lawsuits from injury to people or property can cost in the millions of dollars.

Insight into the Conditions that Lead to Pole Fires

1. Very dry, drought conditions followed by fog, moisture, and drizzle are the most susceptible conditions for pole fire occurance.
2. Wetness, even light rain makes wood structures less resistant to leakage current. Arcing and burning occurs at the points with the highest electric field, and the burning process accelerates when the moisture content of wood was increased.
3. The two most high risk periods for pole fires are (a) During the first ½ hour of a rain event, and (b) During the first hour after a rain event.
4. The end of a dry season is the time poles are most susceptible to fires.
5. Early spring, freeze-to-thaw season is a susceptible period for pole fires.
6. High leakage currents are produced when the relative humidity is greater than 70%.
7. Assets not protected by lightning arresters are vulnerable to lightning-related fires and transformer fires.
8. Fires are more likely to start where there is shorter distance from conductors to the ground, and because the conductor phases are closer together.

The Pole Conditions that Exacerbate the Risk of Fire

1. Wood shrinkage and cracking around bolt holes form a combustive-friendly cavity for leakage current to eventual combustion.
2. The age of wooden poles increases the risk. Poles over 35 years old are at highest risk.
3. Wetness of the wood is also a factor when there is current leakage. Moisture of wood accelerates burning at points of highest electric field.
4. Leakage current arcs at metal-to-wood interfaces are primary location for fires to start.

Utilities Can Detect Early Root Causes to Prevent Pole Fires Before they Occur.

The root cause of most pole fires is the breakdown of insulating properties of overhead equipment and the resultant current leakage. Unfortunately, this current leakage is usually invisible and does not produce a heat signature – making it almost impossible to detect using standard visual and IR inspections.

Detect Leakage Current. Prevent Pole Fires. The good news is that Exacter technology is uniquely able to detect all kinds of invisible partial discharge – including leakage current. By identifying the locations of equipment exhibiting these conditions gives utilities an opportunity to change-out, or wash the affected components. Eliminating leakage current can prevent pole fires.

How Exacter Technology Detects Partial Discharge. Exacter's patented technology is placed in vehicles or aircraft. As lines are travelled, Exacter identifies partial electrical discharge on your overhead system. Points are GPS marked. Lines are assessed 3-4 times to confirm problem. Field teams are sent to locations with ultrasonic detection devices to identify the pole and specific component emitting the partial discharge. All report data is GIS-compatible and includes maps, photographs and video confirmation of the problem.

For more information on Pole Fire Mitigation Strategies, Contact Exacter, Inc.

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The Electrical Process that Causes Most Pole Fires

1. Salt, dirt, dust, fire ash, bird feces and other contaminants from the environment adhere to the surface of components.

2. This begins to breakdown insulation properties (BIL) of the insulator, arrester, cutout, or even transformer causing minor current leakage.

3. Diverged axial currents will cause the growth of a dry layer of these contaminants on the surface, further impeding insulation properties.

4. Most of the applied voltage tracks across the contaminants forming a pathway for leaking and arcing current. Light rain, fog or drizzle, exacerbates the problem.

5. As the leakage current bleeds into the wood and makes its way to ground, it dries the wood.

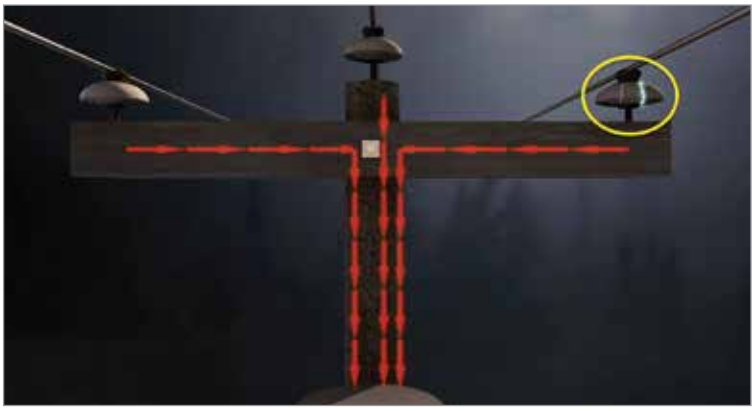
6. The leakage current also heats up the through-hole bolt that holds the crossarm to the pole.

7. As the metal bolt heats up, it accelerates the drying of the wood, eventually combusting and causing the pole fire.

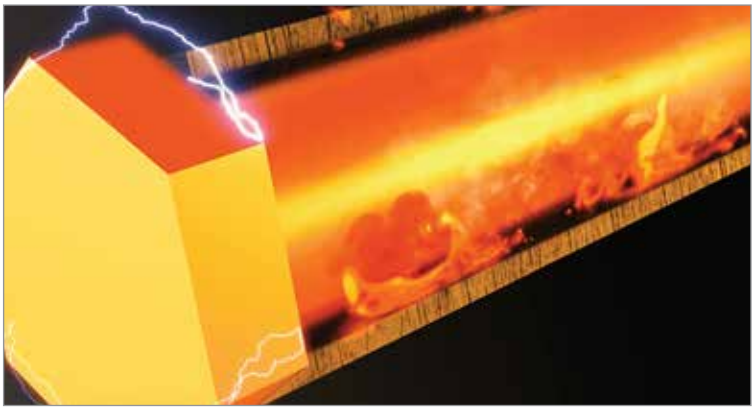
** This process can take a period of months, but power surges can accelerate the process and lead to an immediate ignition.*

Contaminants adhering to surface of components form dry bands which create conductive pathways for leakage current.

Current leakage from contaminated components bleed into the wood.



As current makes its way to ground, it begins to heat up the through-hole bolt.



After through-hole bolt heats up over time, combustion can occur and start the pole fire.

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