Working Safely Around Power Lines for Roadside Managers

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Electrical Grid Structure

- **GENERATION**
- **TRANSMISSION**
- **DISTRIBUTION**
How to Identify Different Voltages

• Higher voltages are located higher on the pole
  – Transmission on top
  – Primary distribution next
  – Secondary under primary
  – Neutral next
  – Any communication lines are on the bottom

• The more insulators on a structure, the higher the voltage
Main Overhead Distribution Equipment

- Poles
- Guy Wires
- Primary Wires
- Secondary Wires
- Streetlight Wires
- Streetlights
- Service Wires
- Neutral Wires
- Transformers
ANSI Z133 – Electrical Hazards

• Minimum Approach Distance (MAD)
  – Distance that an arborist can be from anything that can conduct electricity
    • Power lines, guy wires, transformers, communication lines, etc
  – Qualified Vs. Non-Qualified Arborist
    • Qualified – Employed by a utility, municipality or their contractor and receives annual EHAP training
    • Non-Qualified – Everyone else
    • EHAP – Electrical Hazards Awareness Program
  – The vegetation, you and your tools cannot break MAD
  – These distances are based on wind, load sag, sea level, and other factors that affect the line’s position in relation to the work
  – When in doubt of the voltage, call the power company
  – If the vegetation you are clearing causes you to break MAD, call the utility
  – I encourage you to get a copy of the ANSI Z133 to keep on hand
## Minimum Approach Distance

Table 1. Minimum approach distances to energized conductors for arborists not qualified by training and experience to work within 10 feet (3.05 m) of electrical conductors.

<table>
<thead>
<tr>
<th>Nominal Voltage (Phase-to-Phase)*</th>
<th>Minimum Approach Distance (MAD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>kV</td>
<td>ft-in</td>
</tr>
<tr>
<td>50.0 and less</td>
<td>10-00</td>
</tr>
<tr>
<td>50.1 to 72.5</td>
<td>11-00</td>
</tr>
<tr>
<td>72.6 to 121.0</td>
<td>12-08</td>
</tr>
<tr>
<td>138.0 to 145.0</td>
<td>13-04</td>
</tr>
<tr>
<td>161.0 to 169.0</td>
<td>14-00</td>
</tr>
<tr>
<td>230.0 to 242.0</td>
<td>16-08</td>
</tr>
<tr>
<td>345.0 to 362.0</td>
<td>20-08</td>
</tr>
<tr>
<td>500.0 to 550.0</td>
<td>26-08</td>
</tr>
<tr>
<td>785.0 to 800.0</td>
<td>35-00</td>
</tr>
</tbody>
</table>

OSHA

• If you must work within MAD of the power lines, the utility must make the job site electrically safe
  – Deenergize or ground the line
  – Remove the electrical hazard
    • Drop a service line
    • Drop a streetlight wire
  – Make the tree safe to work in
  – Any vehicle or mechanical equipment capable of having parts elevated near the lines shall maintain a 10 ft clearance at 50 kV or lower and increase by 4 inches for each 10 kV above 50 kV.
Make Safes

• A make safe is a style of trimming that makes a tree safe for a non-qualified tree trimmer to work around
• OSHA requires us to perform them
• MidAmerican Energy’s Make Safe Policy
  – Remove every part of the tree or brush that is within 10 ft of an energized conductor
  – Remove everything that overhangs the energized conductor
  – We don’t go past 10 ft
  – At 10 ft, any qualified tree contractor should be able to remove the tree safely
  – Leave all brush and debris for you to clean up
Make Safes Continued

• How to get a make safe
  – Call customer service
  – Let the representative know that you need a tree made safe
  – A ticket will be generated and sent to the forestry department
  – You will be contacted within 2 business days by a member of the forestry department
  – We will work with you to perform the job in a timely manner
Best Management Practices

- Walk the area that you plan to mow first
- Flag all the obstructions, especially the guy wires
- Hand cut a 10 ft perimeter around poles and guy wires
- Don’t leave debris in the utility ROW
- Don’t fell trees that could contact a high voltage transmission line
- Don’t burn debris in the ROW
  - Smoke can be conductive
Vegetation Management in and Along Transmission ROWs

- 5-year cycle on our 345kV transmission lines
  - These lines run through private, state, and county properties
  - Remove any incompatible species within the designated easement and trim to easement width (typical easement width is 100-150ft)
  - With landowner permission we will use herbicide after mechanical mowing

- Hotspot maintenance on all other transmission lines in the fall, winter and spring
MEC Contact Information

• Website
  – https://www.midamericanenergy.com/home

• Important Phone Numbers
  – Customer Service: 888-427-5632
  – Report an Emergency
    • Electrical: 1-800-799-4443
    • Gas Leak: 1-800-595-5325

• Email:
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