



Working Safely Around Power Lines for Roadside Managers

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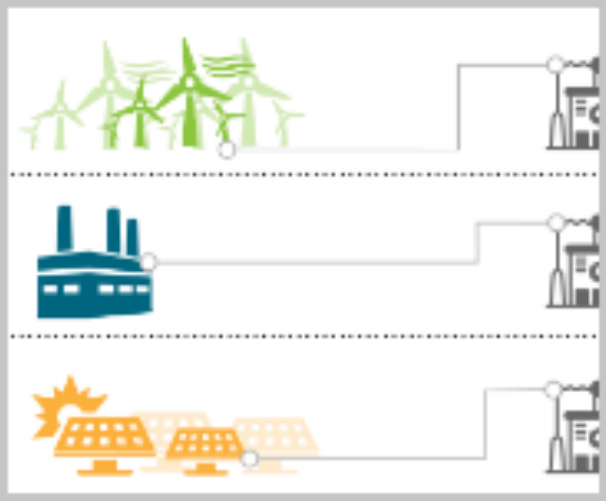
Distribution District Forester and Transmission District Forester



Electrical Grid Structure



GENERATION



TRANSMISSION



DISTRIBUTION



How to Identify Different Voltages

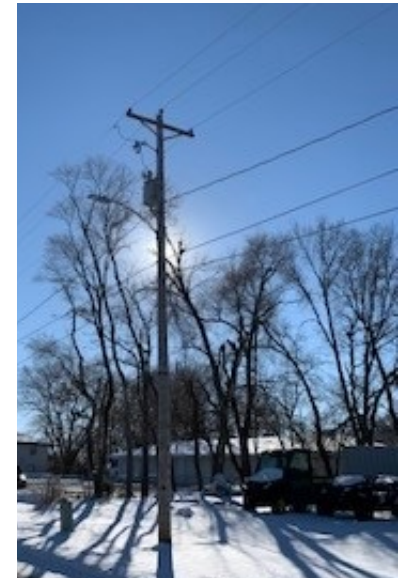
- Higher voltages are located higher on the pole
 - Transmission on top
 - Primary distribution next
 - Secondary under primary
 - Neutral next
 - Any communication lines are on the bottom
- The more insulators on a structure, the higher the voltage



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.

Nominal Voltage (Phase-to-Phase)*	Minimum Approach Distance (MAD)	
	kV	ft-in
50.0 and less	10-00	3.048
50.1 to 72.5	11-00	3.353
72.6 to 121.0	12-08	3.861
138.0 to 145.0	13-04	4.064
161.0 to 169.0	14-00	4.267
230.0 to 242.0	16-08	5.080
345.0 to 362.0	20-08	6.299
500.0 to 550.0	26-08	8.128
785.0 to 800.0	35-00	10.668

*Exceeds phase-to-ground per 29 CFR 1910.333.

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:
 - Des Moines Distribution District Forester Matt Bootier
 - matthew.bootier@midamerican.com
 - Transmission Forester T Dunsmoor
 - tonya.dunsmoor@midamerican.com



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