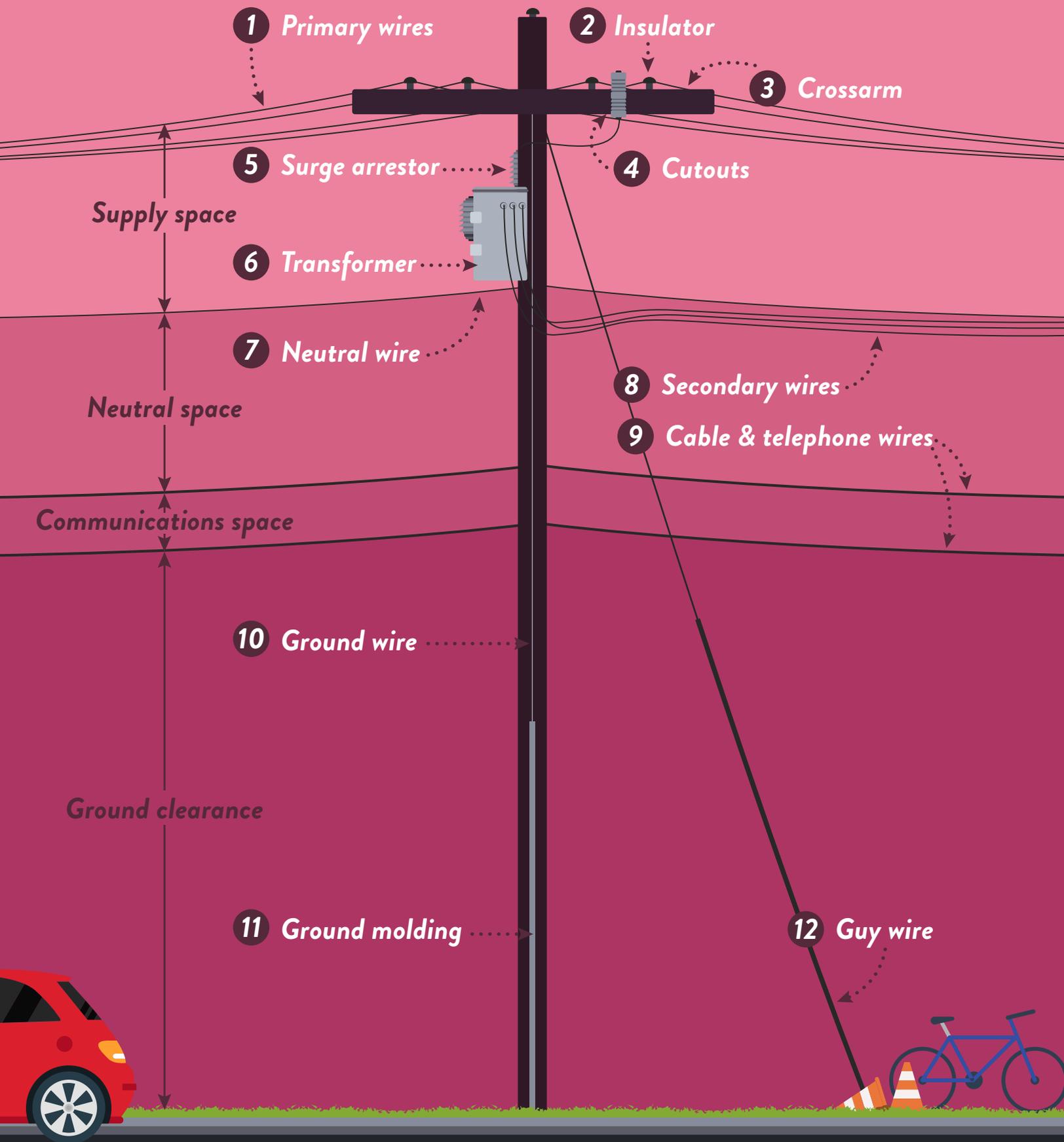


POWER DISTRIBUTION 101:

KNOW YOUR UTILITY POLES



01 WHAT IS A UTILITY POLE?

Utility poles form the backbone of electrical infrastructure in the U.S. These mid-19th century inventions originally carried telegraph lines but were later adapted to support overhead power distribution lines as an overwhelming demand for electricity swept through the nation.

Most utility poles operate as **joint poles**. While individual poles are owned by a single entity, sets of poles are commonly shared by **multiple entities**, including electric utilities, telecommunications and broadband providers, and local municipalities. Joint poles support services like **electric power, cable TV, and telephone** and may also feature devices such as streetlights, traffic signals, fire and police call boxes, and antennas.

03 PARTS OF A UTILITY POLE



Primary wires

Primary power lines are located at the top of the pole. They carry the majority of power and **deliver high-voltage electricity** from a nearby substation to the transformer, which then lowers the voltage for everyday use by customers.



Insulator

Insulators, which are typically made from glass, porcelain, or rubber, **safely support and connect the suspended wires** to the pole. They **prevent the flow of electricity** between wires and through the pole into the ground.



Crossarm

Crossarms are **long horizontal members** that hold up and support the electrical wires.



Cutouts

Cutouts are **fused switches** that are directly attached to the primary wires. If there is an electrical overload or short circuit on the main distribution line, these devices **isolate the problem area** instead of shutting down the entire system.



Surge arrester

Lightning, or surge arrestors, **protect electrical equipment from dangerous electric surges** (e.g., lightning strikes). These devices **directly discharge high-voltage currents into the ground** without disrupting the regular flow of electricity.

02 HOW DO UTILITY POLES WORK?

As power and communications companies compete to deploy services, utility pole space is becoming increasingly valuable. Poles are divided into four zones:

+ **Supply space:** The topmost area of a pole, the supply space houses electrical supply services including high voltage wires and safety and distribution equipment.

+ **Neutral space:** This unused area separates electrical and communications services. It also acts as a safety zone for linemen and communications workers.

+ **Communications space:** The lowest on the pole, this space contains facilities like telephone, cable, broadband, and traffic signal control wiring.

+ **Ground clearance:** Utility poles have minimum ground clearance limits that vary based on electrical voltage and location.



Transformer

The transformer is the barrel-shaped device located near the top of the pole. It **converts high-voltage electricity** from the primary wires into **usable, lower voltage electricity** that is carried by the secondary wires and delivered to customers.



Neutral wire

Located beneath the transformer, the neutral wire serves as a path back to the substation and **balances the electrical load**.



Secondary wires

Secondary wires deliver **low-voltage power** to local homes and businesses.



Cable & telephone wires

These communications lines are the **lowest and thickest** wires on a utility pole.



Ground wire

The ground wire is a thin copper strand that runs the entire length of the pole and into the ground. It provides a **safe and direct path for excess electricity to discharge**, avoiding the risk of electrical shock or fire.



Ground molding

The ground molding is a **protective piece of equipment** that covers the ground wire and attaches it to the pole.



Guy wire

A guy wire is a **tensioned cable** that **secures and stabilizes** the free-standing pole.