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Best Practices in Landscape Lighting: Tree Light Mounting and Wiring



The CAST Lighting Tree Light (CCTL1C) – properly mounted.

in height only takes place in the crown of the tree, where buds emerge and lengthen to add to the length of the trunk and branches. Regions of trunk and branches that are already established do not increase in length or height, instead they only increase in diameter.



Tree damage due to improperly mounted tree light.



Mounting multiple ballasts or transformers to trees is not only unsightly, it compromises the health of the tree.

INTRODUCTION

Moonlighting is the technique of illumination that uses lighting fixtures mounted in trees. The light from these fixtures is projected downward through branches and leaves to simulate moonlight. It is one of the most effective lighting techniques and presents one of the most challenging installation scenarios.

The challenge addressed in this document is how to secure the lighting fixture and its wire to the surface of the tree without damaging the tree and without compromising the integrity of the electrical system. Understanding how trees grow and how they may be damaged will guide us towards the best installation practices.

HOW TREES GROW

As trees progress through various stages of growth (from sapling to maturity) the method of growth remains constant. Trees grow in height and width. The growth

In other words, a light attached to a trunk 35 feet from the ground will remain at that height regardless of how tall the tree grows. In the same way, a light attached to a branch 6 feet from the trunk will remain at that location regardless of tree growth. The only change that occurs is the outward movement and accumulation of bark resulting from expansion of the underlying cambrian growth layer.

Tree roots also grow both in thickness and length. Most active tree roots are in the top 3 feet of soil, with the majority living within the top 12 inches. Length, width, and density of tree roots vary with species. The preservation of a healthy root structure is critical to the health of the tree.

TREE DAMAGE

The attachment of any foreign object to a tree has the potential of damaging the tree. The most common types of damage include strangulation (when a wire or cord encircles the tree) and insect and fungus invasion (when bark is removed or damaged).

The technique of securing lights with elastic cords or wire can be very harmful to a tree - preventing it from normal growth and restricting the supply of nutrients. This technique should never be used.

The preferred technique is the use of a mounting canopy or bracket secured with stainless steel screws or bolts. The insertion of these screws or bolts into the tree does cause damage, but the tree is able to repair itself. It does this by compartmentalizing a region around the wound, sealing it with a woody structure. As long as the wounded compartments cover less than 25% of the tree circumference, then the tree survives.

Another type of damage can be caused by brackets or canopies if they are attached with their surfaces flush against the trunk. In this case, the region between the bracket or canopy can become a fertile place for insects and fungus. Both

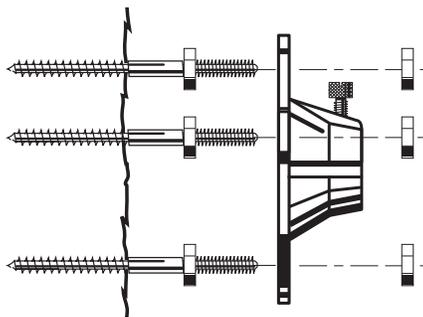


Figure 1. CAST Tree Canopy Mount with hardware (CTREEH1) for offsetting canopy from tree.

intruders, when allowed to thrive can penetrate the trunk and infect the underlying cambial layer; from there, the infection can spread to the rest of the tree.

To prevent this type of damage, the canopy or bracket should be installed with hardware that creates at least an inch of space between the device and the bark. As the tree grows, the hardware will require periodic backing-off to maintain the offset distance. (See Figure 1.)

The same approach should be taken for hardware that attaches fixture wire to the tree. This can be accomplished with wood screw eyebolts or screws that extend at least an inch from the tree. Wires are then affixed to the hardware using plastic cable ties. The plastic ties can be of two types: with mounting head (screw hole) or without mounting head. Various color cable ties are available to match bark color.



Figure 2. Cable ties with and without mounting head.

Wood Screw Eyebolt Method



Step 1. Pre-drill hole then secure stainless steel screw eyebolt. Leave about 1" thread exposed.



Step 2. Thread cable tie through eyebolt and around wire(s).



Step 3. Close cable tie loosely to allow for movement of cable through tie. Trim excess cable tie.

Methods to Secure Wire

In both of these methods, screws are inserted into the tree along the wire route. A minimum of screws should be used - inserted in places that keep the wire run near the tree surface, ideally along a path not visible to occupants and visitors.

Wood Screw Eyebolt Method

Step 1. Select an appropriately sized stainless steel wood screw eyebolt. Thin-barked trees need shorter screws than do thick-barked trees. Screw should extend at least one-inch into the tree beneath bark level.

Pre-drill hole taking care not to drill too deeply into tree. Insert eyebolt and turn until about one inch of thread extends from tree.

Step 2. Insert cable tie into eyebolt and wrap it around wire(s).

Set 3. Close and secure cable so wires are secured but not firmly bound to the eyebolt. Cable tie should be loose enough to allow free movement of wires in an up and down direction. Trim excess cable tie.

Wood Screw Method

This method follows the same steps as with the above method, except that a stainless steel flat-head screw is used instead of the eyebolt. This method requires cable ties with mounting heads.

Maintenance

Canopy mounting and both wiring methods require servicing at least once every 18 months, or more often with fast growing trees. Screws should be periodically backed off to maintain distance from the bark.

Wood Screw Method



This method has the advantage of allowing the installer to back off the screw as the bark expands. The eyebolt method requires cutting and changing the cable tie as the tree grows.

Protecting Root Structures

Running wires through root structures to gain access to the tree can be a challenge. Roots can be easily damaged and compromise the health of the tree. Great care should be taken in digging at the base of a tree. Whenever possible, roots should not be cut; instead, the installer should dig around and under existing roots to find a path for the wire. If such a path cannot be made (without damaging roots) then flexible or bent conduit can be laid over the roots to reach the tree trunk.

At the point where the wire exits the ground, the wire should be inserted into a PVC conduit and extended several feet up the side of the tree. NEC code requires wiring (emerging from a grade) to be enclosed in conduit for a distance of at least 8 ft. (Article 300.1(D)(1)). In practice, however, circuits under 30 volts are seldom held to this standard. Check with your local electrical inspector for guidance.

For More Information

Go to www.cast-lighting.com/learning/articles for more information on this topic.

Or, call CAST Lighting at 973.423.2303.