In the Path of a Storm: Tree Damage Prevention

Liz Gilland, SC Forestry Commission Urban Forestry Program Coordinator and ISA Certified Arborist
lizgilland@forestry.state.sc.us

Historic, specimen and even yard trees are valuable, especially when landscapes are designed around them. While these trees provide economic and ecological value to our landscapes, they can also become major financial and social losses during storms.

Most storm events bring wind and precipitation; factors that affect how trees stand up and fall down. Trees are biologically engineered to adjust to wind. Under normal weather conditions, trees sway in the wind and that movement causes the trunk wood to strengthen over time. During the life of a tree, it develops a trait known as "*wind firmness*". Most *open-grown* trees develop good wind firmness in all directions over the years. Trees grown in confined areas may not be as wind firm and storm resilient.

There are several types of storm damage that occurs to trees: blow-over, stem or branch failure, crown twist, and root failure. Each type is the result of a complex and interactive mix of past maintenance practices, tree structure and climate.

Blow-over The tree is physically pushed over by strong persistent winds. Past tree abuse, poor maintenance, pest problems (like fusiform cankers on pine or root rot in hardwoods) predispose the tree to storm damage by weakening the wood architecture.

Stem and/or Branch Failure Trees with old and no longer visible injury sites, large trees with multiple trunks or branches that are poorly-attached or have narrow branch angles are structurally weaker than normal solid wood. These damaged or defective areas can quickly fail under a strong persistent wind and/or saturated soil.

Crown Twist Trees are never perfectly symmetrical in every direction. Many trees, through past abuse or poor maintenance have lopsided crowns. The more wind on one side of the crown than on another produces a twist on major branches and the main stem. During a storm, the twisting effect can magnify weaknesses around old injuries and the stem will split or the branches collapse.

Root Failure Both small and large roots help to hold a tree in place and anchor it in the soil. As the tree grows and the top becomes larger, greater stress is put on the roots to hold the tree in place. Past tree abuse, construction damage, soil compaction, limited growing space, and/or root rot predispose the tree to storm damage by weakening the root architecture. These damaged or defective roots can fail or cause trees to lean under a strong persistent wind and/or saturated soil.

Preventing Storm Damage

There is no way, except for complete enclosure, to protect trees from all storm damage. Trees are not adapted to worst-case scenario storms, only to our average wind climate. Listed are several things to minimize the main types of storm damage (for more information on how to best care and maintain your tree, reference the SC Forestry Commission's *SC Urban Tree Care Book* at http://www.state.sc.us/forest/refcare.htm).

- Let trees adjust to the wind environment. Tight staking and guying at the time of planting is, in most cases, not necessary and is generally left in place too long and can girdle a tree trunk.

- Practice proper pruning techniques by cutting dead, diseased and weakly attached branches before they become larger than two inches in diameter. Proper pruning minimizes a number of structural problems that lead to tree damage.

- Eliminate co-dominant branches. Prune forked branches and branches that arise opposite each other on the stem, ideally while the tree is young. Most tree species should be upright with one main stem. Prune away branches that compete in height with the main stem. Eliminate branches with tight or narrow branch crotches. In trees with opposite branching patterns, such as maple, proper branch training is essential for a long-lived, storm resistant tree. Pruning cuts should be made on the outside of the branch bark ridge and branch collar. See Figure 1. or reference the SC Forestry Commission's *SC Urban Tree Care Book* at http://www.state.sc.us/forest/refcare.htm.

- Keep trees as healthy as possible with timely and adequate watering and mulching. Healthy trees adjust more quickly to changes in the environment, are more wind firm, and react more effectively to damage.

- Do not over-fertilize the tree with nitrogen or over-water the soil. This can increase the crown surface area and/or decrease the rooting area. This type of biological change makes the tree more susceptible to storm damage.

- Eliminate lopsided crowns. Prune branches to produce a reasonably symmetrical crown. If more than 70 percent of the crown is on one side of a mature tree, consider tree removal and replacement. For a listing of tree service companies with a Certified Arborist on staff visit http://www.state.sc.us/forest/treeservice.pdf or the International Society of Arboriculture website at www.isa-arbor.com.

While we can't prevent storms, we can make a small investment of our time in proper selection, installation and maintenance of our trees to help them weather future storms.

(Author's note: Portions of this article were referenced from *Storm Damaged Trees: Prevention & Treatments* by Dr. Kim D. Coder, Professor of Silvics/Ecology at The University of Georgia Warnell School of Forest Resources - March 1995)

Table 1. Lists trees that are most and least wind resistant of tree species growing in the Florida Panhandle as determined by frequency of failure in Hurricanes Erin and Opal and other rankings from Hurricanes Camille and Andrew (University of FL – IFAS Extension http://edis.ifas.ufl.edu/BODY_FR010) and other southern state sources.

Most Wind-Resistant
Dogwood
Live oak
Sabal palm
Red oaks
White oaks
Winged elm
Sweetgum
Southern magnolia

Less Wind-resistant
Chinese elm
Laurel and Water oak
Pecan
Red and Silver Maple
Slash / Loblolly / Longleaf pines

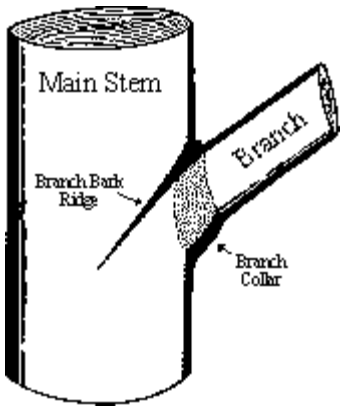

Figure 1. Branch collar where stem and branch join.

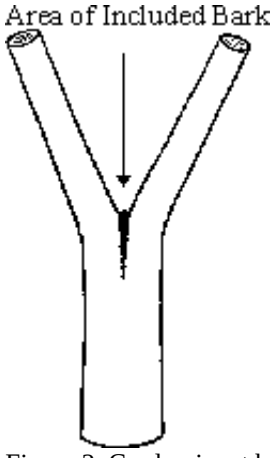

Figure 2. Co-dominant branches or forks are bad for tree support. Splitting can easily occur due to a weak crotch area that can contain included bark (bark that has been grown around).