



## Leaning Trees – What’s up with that?

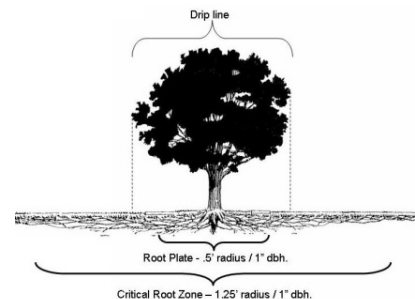
Some people believe leaning trees have great aesthetic appeal or that Mother Nature seldom grows a straight tree. Unfortunately, neither Mother Nature nor the character of a tree can reduce the very real risks associated with leaning. It’s not that trees that lean are inherently bad; it’s just that gravity creates problems. It’s a weighty subject to be sure, as a 70 foot tall oak can easily weigh three to four tons, with that weight distributed between its crown and trunk. Over time, trunks can become hollow or cracked and branches can be unbalanced, improperly pruned, or damaged by storms, thereby increasing the risk level. So how do you know what's risky and what's not? And what amount of risk is too high?

### Where to start

Tree roots, in addition to serving as the transport system for water and nutrients, support the physical weight of the tree and keep it attached to the ground during strong winds and storms. Root systems have different parts that serve two different support functions. The root plate supports the vertical weight of the tree and the transport/absorbing roots help keep the tree "wind firm." It is important to remember that most of a tree’s root system goes no deeper than 16 inches into clay soils, and a leaning tree may have a very different root system that a non-leaning tree, depending on the cause of the lean. A tree that leans because it has grown towards the sun often has a curving trunk. The trunk curves because of the tree's ability to adapt over time to the changing availability of sunlight. Its root system will grow to accommodate the “off center” weight distribution, up to a point. Leaning trees that don’t have that “sweep,” and have straight trunks generally have a history of structural damage to the root system or storm damage that has caused the root system to slip, break, sink or simply fail to support the tree in some fashion. If the trunk appears to enter the ground **without** a mound of soil on the side away from the lean, then the root system has sunk, either from rot, mechanical fracture, physical cutting of the root plate or soil subsidence.



If the mound **does** exist on the back side of the lean, that's a sign that the root plate is being tipped out of the ground and the roots have failed - either through mechanical wounding or structural failure. As roots break under stress from wind or off center crown weight pushing the trunk away from the soil holding the roots, the up-wind side of the root plate will tip out of the ground.



## What to do



Consult old photos (and take current photos for future assessment) to determine if the trunk lean has changed. Changes in the lean of a tree indicate the failure of the root system, and the need for an immediate assessment by a certified arborist experienced to determine the root system's structural integrity. If it can be confirmed that the lean has not changed and there is no target (something of value that may be damaged if the tree fails), then its possible the tree can remain in the landscape without care. If there is a target, then the risk associated with the tree remaining in the landscape increases appreciably. In situations in which the trunk and root systems are structurally sound, the crown can be pruned to reduce the off- center weight or uneven wind loading of the tree.

Leaning trees should always be a cause of concern in the landscape. Securing a certified arborist to conduct an assessment of your tree can't reduce the risks associated with tree lean, but it can help you understand the amount of risk at hand and identify opportunities to reduce that risk through pruning or removal.

For further information about how to calculate risk thresholds associated with leaning trees see Dr. Kim Coder's (University of Georgia Warnell School of Forestry) publication "Estimating Leaning Tree Failure" at <http://warnell.forestry.uga.edu/service/library/for00-013/for00-013.pdf>

