Pruning and Storm Preparation

Historically, techniques to reduce the risk of storm damage included topping and “lion’s-tailing” (stripping out interior foliage and branches and leaving only “tufts” at the end of large branches)—practices that are harmful to trees and no longer recommended. Instead, the ANSI A300 standard for tree pruning describes seven pruning types and requires arborists to develop objectives before undertaking pruning.

Pruning reduces the risk of storm damage two ways:

1- by reducing drag (wind resistance on the crown)—this is true of all pruning types
2- by lowering the height of the pressure center of the crown—this is only true of reduction pruning.

Pruning can thus reduce “bending moment”, the product of drag and height of the pressure center.

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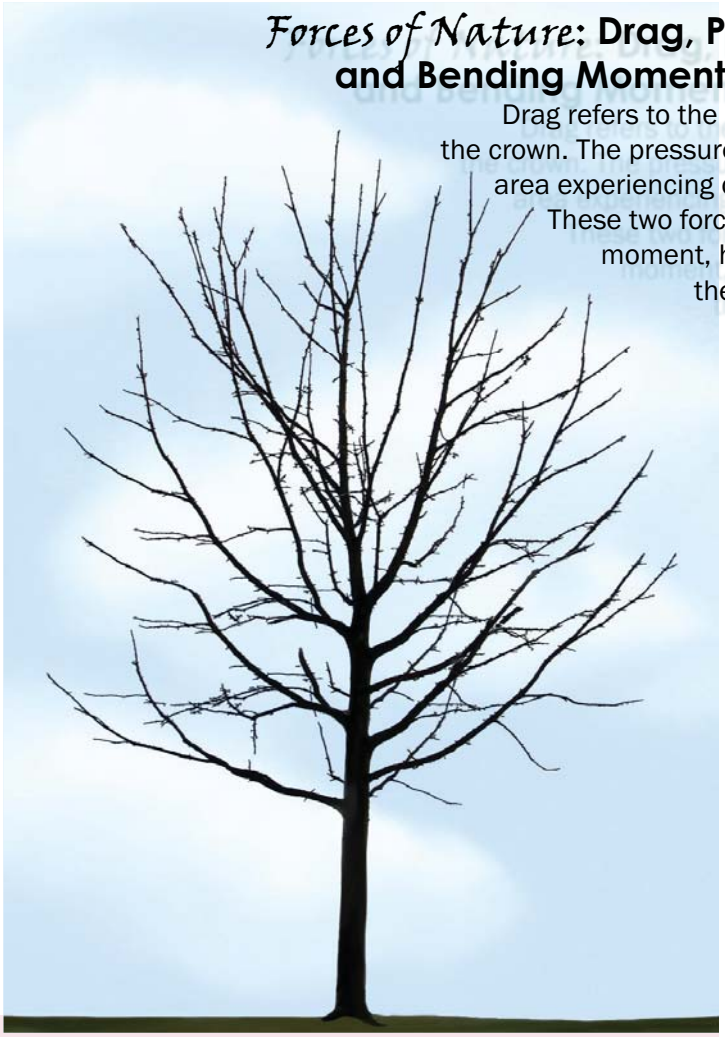
The Mall, Elm Walk in Central Park, New York City
Photo and brochure design by Sarah Dickinson

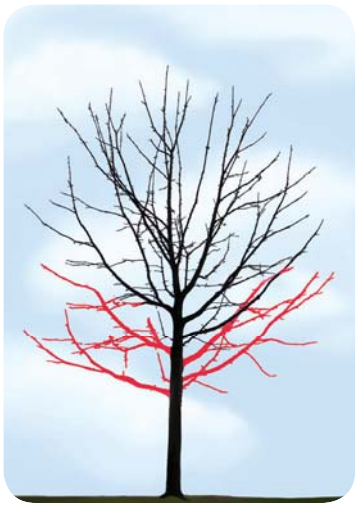
Forces of Nature: Drag, Pressure Center, and Bending Moment

Drag refers to the wind resistance created by the crown. The pressure center is the center of the area experiencing drag, in this case the crown. These two forces determine the bending moment, how the tree experiences the wind and thus how likely tree failure is.



Crown Reduction

Crown Thinning



Crown Raising

The Experiment

We measured the effects of crown reduction, thinning, and raising on Freeman maple (*Acer x freemanii*), swamp white oak (*Quercus bicolor*), and shingle oak (*Quercus imbricaria*), all at 3-3.5 inch caliper. We cut trees just above the root flare and fastened the tree in a steel sled mounted in a pickup truck (see back photo). The truck was driven from 0 to 55 mph before and after pruning treatments. Gauges attached to the tree recorded how different pruning methods reduced drag and bending moment.

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