

## TREE PRUNING, LOPPING AND TOPPING FREQUENTLY ASKED QUESTIONS

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### ***Q. Is Tree Pruning The Same As Tree Lopping And Tree Topping?***

A. The short answer is 'No' but this needs some explanation because of the widespread belief that they are the same.

Lopping and topping are historical and now unacceptable tree management practices. They officially ceased to be acceptable as a result of the 1996 publication of the first national Australian tree pruning standard AS4373-1996. The Standard was superseded in 2007 by AS 4373-2007 Pruning of amenity trees.

The Standard defines lopping and topping as:

- lopping is 'the practice of cutting branches or stems between branch unions or internodes'
- topping is 'reducing the height of a tree through the practice of lopping'

The Standard says lopping and topping are unacceptable because:

- They increase the rate of shoot production and elongation.
- The resulting regrowth is weakly attached and becomes prone to failure or collapse.
- The stubs may decay.
- The natural habit of the tree destroyed.
- They may reduce the lifespan of the tree.
- They predispose trees to fungal infections and insect attack.

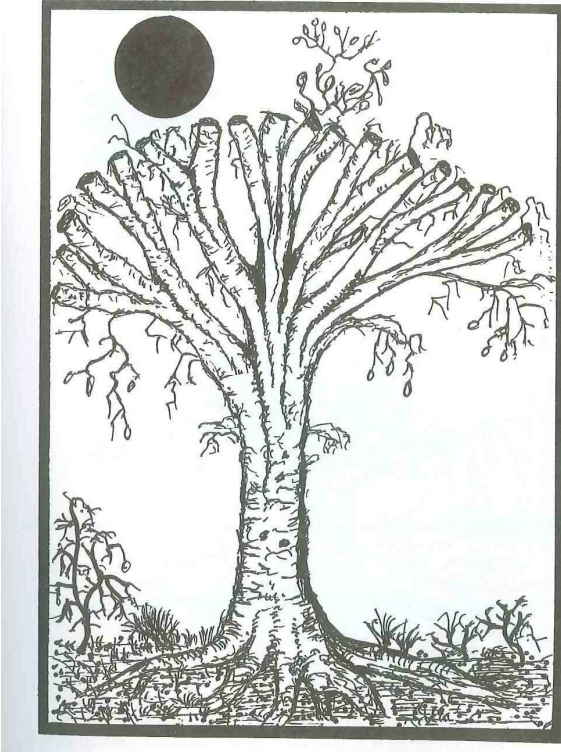
### ***Q. What Does The Research And Literature Have To Say About Topping And Lopping?***

A. USDA forest pathologist and research scientist Alex Shigo published extensively on tree pruning practices. His research influenced the development of pruning standards world-wide. Shigo described topping as '*a crime against nature and an assault on tree physiology*'

Referring to tree topping as a way to reduce tree size Shigo said '*You cannot make a big tree a small healthy tree no matter what you do*'

Dr Greg Moore, arborist and past principle of the Burnley College at the University of Melbourne has published extensively on tree management and tree pruning. Dr Moore collaborated with engineer Dr Ken James to publish research on pruning and the dynamics of wind loading in trees. Dr Moore makes this observation on the principles of modern pruning:

*The basic principles of modern pruning practice are founded on the understanding of tree structure and physiology, a non-interventionist approach to manipulation and an improved knowledge of the mechanics and physics of tree structure. In considering the carbon balance, water balance, dynamic mass and the mass damping properties of tree canopies it is difficult to justify either crown thinning or weight reduction under most circumstances.*



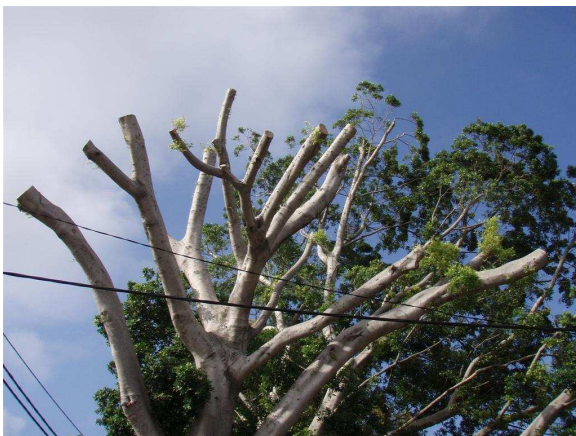
With the obvious exception of tree removal, lopping is arguably the most drastic intervention possible on the live tree, and so there will be consequences not only for those who approve tree lopping, but also for the lopped tree's health and future stability.

When lopping cuts are made in order to reduce the height of a tree, the overall process is referred to as tree topping.

***Image 1: Topping is a world wide tree mutilation practice that must stop! Topping not only destroys a tree's dignity, but it weakens the tree and makes it a high hazard risk. If a tree must be topped it is time for a new tree. (Shigo)***

### **Q. What Happens To A Tree After It Has Been Lopped?**

A. Lopping and topping inevitably removes the leaves. Without leaves the tree cannot capture sunlight and manufacture sugars for transport to the roots. Without leaves, the cooling effect of water transpiration ceases and the tree can no longer move water and nutrients upwards from the soil. In essence the entire physiology of the tree is disrupted. Some tree species respond to topping and lopping by growing 'emergency' shoots (epicormic shoots) whilst others including many Eucalyptus species are killed outright.



***Image 2: Sprouting follows lopping – as the sprouts extend they will start to peel off and fall. To prevent this, the tree owner will need to prune the sprouts back to a new stub every year. This conflicts with the trees recovery because the sprouts job is to return energy.***

A short time after the lopping, new shoots will emerge from below the lopping cuts. Known as epicormic shoots, they arise from suppressed buds retained just under the bark cambium. Removing the uppermost branches stops the downward flow of bud suppressing chemicals. With no suppression from above, the dormant buds burst through the bark skin to act as emergency light receptors as the tree attempts to establish a new canopy using energy stored in its woody parts and especially in its roots.



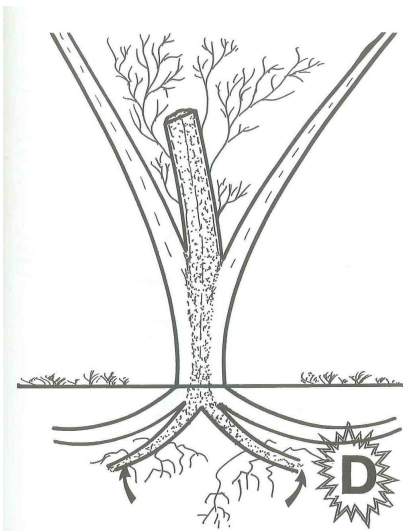
Lopping cuts create wounds in the trunk and the branches. The cuts expose the inner wood to airborne spore pathogens that rapidly inoculate the exposed sugar rich surfaces. Now the tree uses energy reserves to respond to the pathogen invasion and the process of wood decay begins.

**Image 3: Lopped branches on a Hills Fig have started to sprout new shoots. Good for the tree but problem for the tree owner! The wounded stub is an entry point for pathogens.**

The lopping also causes a sudden change in the distribution of load stresses to which the tree had previously adapted. Because the tree is a self-optimising structure it will respond to the new internal and surface stresses by laying down new tissue. This sudden additional energy demand depletes the trees energy reserves and so the adaptation response may slowed or could even cease. As a consequence, internal fractures and cracking are then increasingly likely and these defects increase the potential for structural failure.

Unlike the strong attachment of original branches, the new 'emergency' shoots that develop after lopping will be attached only in the outer layer of bark and they will tend to peel off the tree with potentially serious consequences for property or persons beneath the tree.

**Q. Does Cutting The Top Off The Tree Affect The Roots?**



A. Yes. Lopping will kill some of the roots. The tree is an integrated system and injury to one part of the system eg branches, will result in injury to other parts of the system eg roots.

Cut the branches, and the roots will be injured. Injured roots are susceptible to soil born pathogens eg root rots such as *Armillaria*, *Phytophthora* and *Ganoderma*. Tree roots not only store energy reserves, they also provide mechanical support for the tree. When pathogens invade, the mechanical function of the injured roots is diminished and tree stability is likely to be compromised. This may have very serious consequences in the case of large trees.

**Image 4: When tops are removed the roots that normally get their food from the tops begin to starve (Shigo)**

***Q. If topping is not a suitable way to reduce tree height, can reduction pruning be used instead?***

A. No. The Australian Standard makes it very clear that reduction pruning is not lopping or topping. So, if the pruning that is proposed can only be carried out by '*cutting branches or stems between branch unions or internodes*' then it cannot be described as pruning.

***Q. Are all trees suited to reduction pruning?***

A. No. The Australian Standard says reduction pruning is to be restricted to trees with suitable secondary branches. To be a suitable candidate for reduction pruning the secondary branch must not be less than one third the diameter of the branch or trunk where the cut is to be made. For example, if the branch to be pruned is 300mm diameter then the secondary branch must be more than 100mm diameter.

A species that is not generally suited to reduction pruning is the Hills Fig which produces few secondary branches except in the outer extremity of the crown. This is especially so if the tree was lopped as a young tree and then allowed to develop the typically clean vertical branch habit seen in mature trees. This growth habit means that Hills Fig is rarely suited to reduction pruning.

***Q. If a tree does not have the required secondary branches to allow for reduction pruning, and is at risk of whole or partial failure, how can the risk be managed?***

A. The first option is to consider if it is possible and practical to isolate the affected area from access to people and traffic.

If, after isolating people and traffic there are other valuable fixed structures and assets at risk, then the isolation strategy will not be suitable, and tree removal has to be considered.

***Q. If topping and lopping are such inappropriate practices why are some arborists and tree businesses offering lopping and topping services?***

A. Reputable and ethical arborists and tree service companies do not offer lopping or topping services.

## **References**

Australian Standard AS4373-2007 Pruning of amenity trees. Standards Australia.

James, K.(2005), Dynamic Wind Loads on Trees. Conference Proceedings, ISAAC Annual Conference

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