

An Alternative To Tree Staking: The 8-2-1 Method

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Introduction

The UK is facing a tall task to meet its tree-planting targets. The 2020 budget statement set out the government's target of establishing over 30,000 hectares of new woodland by 2025. However, in 2019-20, just 13,460 hectares of new woodland were created, with 80% of new planting taking place in Scotland.

By 2050, the target is to take the UK's woodland cover from 13-17%. These targets go hand-in-hand with our commitment to the Committee on Climate Change's net zero emissions targets. Planting trees will not only improve our environment; it will also safeguard our future. Trees help reduce flooding, improve the air quality, reduce noise pollution and reduce energy costs for surrounding structures.

Current tree-planting figures fall short of expectations, and inconsistent planting methods mean that many of the trees planted today are destined to fail. For any tree planting initiative to find its footing, we need a unified, can't-fail approach. Trees in the ground will only contribute to our carbon emissions targets if they can reach maturity.

The Queen's Platinum Jubilee will be marked with the launch of Queen's Green Canopy, encouraging everyone to "Plant a Tree for the Jubilee". This initiative will surely benefit communities seeking to enrich their surroundings. We know that trees offer health, social, environmental and financial benefits.

Landowners and greenspace management organisations can also benefit from the funding available from the Woodland Trust and Forestry Commission. There's no shortage of incentives for local authorities, landowners and developers to make green spaces a priority in 2021 and beyond.

But getting trees in the ground is only one part of the puzzle. Once planted, young trees need the proper support to develop into strong, independent trees. Unfortunately, some of the most widely accepted tree support methods can have detrimental effects on tree health. Tree planting methods should look for long-term benefits, not short-term wins.

The United Kingdom has a rich history of the planting and transplanting of trees, but methods we consider to be "best-practice" today are responsible for increasing tree failure rates. Instead, we propose a radical new approach to tree supports.

We believe in an approach that encourages the tree to function as it is intended. Trees are designed to sway in the wind, with substantial root systems to keep them upright. Traditional staking methods, guying and anchoring trees encourage insufficient root formation, while inflexible tethers can damage and disease the trunk. To ensure the success of any tree planting initiative, a new method of tree planting is required. Using The 8-2-1 Method, the tree will be fully independent in the landscape in as little as two years and not require further support.





Tree Support Systems and Why They Fail

Tree staking methods, guying and anchoring trees can result in damage and disease of the trunk or young limbs. In addition, tree tethers may lead to future problems with tree failure or breakage because they inhibit the natural swaying motions necessary for root development. Tethers can also damage key parts of the tree, requiring ongoing support and work from the arborists later in life.

As far back as the late 70s, we've known that tree failure rates are high. In a 1986 study of <u>tree survival rates</u>, the Scottish Development Agency revisited trees planted in 1979 to determine success rates. Of the 5671 trees planted on local authority sites in 1979, only 54% survived. The report determined that choice of species, tree placement, exposure to vandalism and soil condition all contributed to this high failure rate. This report does not specify tree planting and support methods used.

More recently, a 2021 review of <u>tree failure rates</u> revealed that wind is predominantly mentioned as the prior cause of tree failure. Windstorms were responsible for 53% of the total damage in forests between 1850-2000. The second most common cause of tree failure is fungi causing decay. The fungus can enter a tree at the site of a wound, such as those caused by restrictive and unmonitored staking methods.



Traditional tree support methods of restrictive staking damages young standards in multiple ways. By restricting the movement of the trunk, the roots are not encouraged to grow. This leaves young trees vulnerable to the wind once the tree outgrows the stake. The tree is effectively encouraged to outgrow its roots by providing unsustainable support.

Restrictive staking methods can also contribute to tree failure rates by causing trauma at critical points in the tree structure. The most common site for this type of trauma is the crotch, where two or more branches meet. In addition, when tree ties are left in place, this can cause wounds that leave the tree exposed to fungi.



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Allowing a young tree to move naturally in its environment also encourages the release of strengthening hormones in the trunk where it is needed most.

This supports the tree throughout its lifetime by determining areas of weakness and giving it freedom to prepare.

Modern tree support methods avoid these problems by using a system that allows young trees to grow in unrestricted space and gradually be contained as they approach maturity.

Common Problems with Single Stake, Double Stake, Angled Stake, Guying and Ground Anchors

The choice of stake placement is not as important as the choice of tie. Ties should be flexible and non-restrictive. The use of inflexible ties increases the risk of failure from poor root formation and damage to the trunk. A wound in a tree's trunk will result in unbalanced growth, loss of strength, and increase the risk of failure in the long term.

Likewise, the use of guy ropes to anchor a larger tree places opposing pressure on the trunk and can increase the risk of failure by restricting movement. Trees are designed to sway in the wind, so removing this environmental factor encourages poor root formation. Trees may lead towards their support, resulting in uneven weight distribution and growth direction.

Each of these methods presents obstacles and limitations for widespread use. Therefore, we are proposing a universal method of tree-staking that will reduce costs and limit the risk of failure.





Introducing The 8-2-1 Method

The 8-2-1 Method uses a length of tree strapping eight times as wide as the two supporting posts, fixed at one single point. These tools are widely available, even for community planting groups.

This method is also effective whether the young standard is placed on flat or sloped ground. The primary consideration for stake placement should be wind direction. For example, when planting alongside a road, the two stakes should be placed across







the strongest wind direction to support the tree.

This method is effective as it holds the tree at one point rather than creating opposing forces with double and non-flexible binding. In addition, the flexible and breathable strapping allows the tree to move with the wind, encouraging the tree to develop strong roots. This method also allows for expansion of the trunk in growth spurts and its reduction in winter.

For a tree to establish strong roots, it needs to develop a downward tap root early in life. The taproot provides stability while the horizontal root grow gives access to nutrients and water. Conversely, a tree with shallow roots is more likely to be uprooted in strong winds.

By using the 8-2-1 method, the tree moves naturally with wind and strong gusts. This example shows a tree staked using the 8-2-1 method. The stake was removed after three years with no damage or disease.

This tree is now completely independent in its environment. More importantly, this tree required no maintenance during these three years. This method offers promise for developers looking to quickly establish trees with minimal intervention and a reduced risk of failure.





Preparations for The 8-2-1 Method

This method is cost-effective and requires very few materials. This makes it suitable for professionals and amateur tree planters alike. It may be used for mass planting or single specimen installation. We recommend the use of augers on digger units for mass planting as this increases speed and accuracy.

Sourcing your trees

The choice of trees can have a significant impact on the success rates. We recommend sourcing trees from a reputable nursery and enquiring about stock availability well in advance of planting season, which runs from September to March.

Native species are preferred as these will have a track record of being grown locally and nationally. This should give some confidence that the tree will adapt to the climate and location. Planting non-native species may be possible but should be treated as a bespoke service.

Location and soil type

Your choice of tree type should take into consideration the location and soil type. Soil tests should be completed before planting to establish the pH value. Follow general planting advice for choosing plants that are likely to be successful in the chosen location.

Wind direction, sunlight, draining and limitations on reaching maturing should also be considered. Check the boundary lines for hazards that might impede root development.

Before planting, review the placement to ensure the tree's position, potential size and placement will be balanced in its surroundings.





How to plant and secure a tree using the 8-2-1 method

With the tree firmly in the ground, it's time to place the support posts and attach them to the trunk using flexible and breathable strapping.

Each post should be equidistant from the trunk towards the edge of the hole. For example, if the tree container is 30cm wide, the hole width would be 60cm wide. Therefore the posts would be placed 20-25cm from the tree, or 50cm apart.

Depending on the circumference of the trunk and size of the canopy, posts from 75mm - 100mm in diameter are substantial enough at the height of 1.8m. For areas of high wind, consider longer and wider posts. Adapt according to the tree size, placement and wind conditions.

Driving the posts with a post-driver must be undertaken with caution for hazards below hole depth. City planting should consider pre-fab planting units*, or test the area before installation.

Continue to backfill soil into and around the roots and the posts, firmly pressing but not compacting the ground.

With the tree upright and posts on either side, it's time to secure the tree using The 8-2-1 Method.

- Unwrap the tree strapping to eight widths of the two posts.
- Fix one end of the strap to one post and wrap the strap across the back of the truck to the other post.
- Continue to wrap back to the first post across the front of the trunk.
- Wrap a third time across the back of the trunk to the second post. You now have a band formed around each post with the tree trunk in the centre.
- From the second post, begin wrapping the strap over and under the outer band. Wind this strap toward the trunk, around the trunk, then onto the first post.
- The remaining strap can be tied or fixed to the first post.
- The 8-2-1 Method is now complete.

Advice for implementing The 8-2-1 Method

The 8-2-1 method is suitable for professionals and hobby gardeners alike. It is a costeffective and low-maintenance method that can increase tree survival rates with very little change to current planting methods and a more natural implementation into a new landscape.





General advice for Tree planting

Standard tools required, (spade, breaker bar, shovel) for larger projects consider Auger mounted mini diggers for efficiency and uniformity. On preparing holes, exercise caution for underground and hidden dangers, cables, water/gas pipes. Always check with service providers and survey area before planning. 2 posts and tree strap per tree, consider tree guards for protection against wildlife and machinery.

Not required if caging is provided which also limits vandalism. On sourcing trees, ensure they're well watered before and after installation.

Ensure hole is deep enough to accommodate roots and wide enough for at least 2 trees. Soil at the base of hole should be dug over, loosened and left to allow for young roots to establish. Wide enough holes allow lateral roots to become strong enough to penetrate denser soil around the planting area during the time of establishment.





Tree maintenance

Our climate should be wet enough to provide water to the tree naturally; however, additional manual watering should be considered immediately after planting and any dry spells that occur during the first spring and summer seasons. Nutrients can be applied to the surface soil only, but the tree will seek water and nutrients naturally.

Wire mesh can be adapted around the posts to safeguard the tree from wildlife and maintenance contractors and equipment used to maintain the surrounding area.

The 8-2-1 Method provides a maintenance-free system of securing a tree. Monthly and seasonal checks to the strapping and tree health are advised.

Tree strapping can be lowered or raised depending on tree growth, with both strapping and posts removed as early as the third spring after planting. There will be no trauma to the tree, and the roots will be well-established.

The flexible and breathable strapping will support the tree and allow the tree to grow without causing wounds or disease to the protective bark.

Conclusion

Trees clean the air, store carbon, stabilise the soil and provide habitat for wildlife. Research has also shown that a few minutes spent around trees lowers blood pressure and stress levels. Something as simple as a view of a tree from a hospital window can accelerate recovery times.

Trees are important for our wellbeing and the environment, and there is clearly a public appetite for green spaces. We can incentivise tree planting through funding, grants and opportunities for green developers, but these incentives need to be matched with planning and initiative.

If we are to meet current tree-planting targets, there needs to be a unified and approach that prioritises tree success rates. Trees in the ground might help the UK hit an arbitrary target, but if a large portion of these trees is destined for failure, this could damage confidence in tree-planting initiatives.

In Thailand and the Philippines, <u>mangrove replanting initiatives</u> were marred by a paltry 20% survival rate. Recommendations in this instance were to shift focus from area or propagule planting targets to survivorship targets.

Through the 8-2-1 method, tree planting initiatives will cost less and have a greater chance of survival. A one-size-fits-all approach will simplify the discourse and make it easier for everyone to get involved with tree planting.

