Why trees fall and what we can do

HEAVY rain can cause urban trees to fall due to a confluence of factors, two of which are soil saturation and root instability. When the soil becomes waterlogged, it loses its structural integrity and ability to anchor tree roots. This can result in trees being uprooted easily during storms.

Wind load on wet trees is another critical factor. Wet foliage increases the overall weight of the tree and the wind load it experiences during heavy rain. Tree canopies can store 2%-40% of the rainfall, which roughly translates to an additional weight of 40kg-1,300kg for every 10mm of rain, depending on the tree type and size. This combination of added weight and strong winds can cause trees to topple.

Arborists employ various methods to assess the risk of tree failure. One common approach is Visual Tree Assessment (VTA), in which arborists conduct a thorough visual inspection to look for signs of decay, disease, cracks and root problems. This widely used method relies heavily on arborists' expertise and experience.

Tree Risk Assessment Qualification (TRAQ), developed by the International Society of Arboriculture (ISA), is a systematic process for identifying, analysing and quantifying the likelihood and consequences of tree failure.

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Additionally, sounding or tapping a tree with a mallet can help identify internal cavities using the sound produced.

Advanced diagnostic tools such as resistography and tomography provide more detailed insights.

A resistograph drills a small needle into the tree to measure resistance, helping identify areas of decay or weakness.

Tomography, using sonic or electrical impedance techniques, creates cross-sectional images of a tree's interior, revealing hidden decay or structural issues.

However, despite these methods, several challenges and disadvantages remain. Subjectivity and variability in expertise can lead to inconsistent evaluations, particularly in visual assessment. Internal defects that are not externally visible can be missed, even with advanced tools.

Tools such as resistography and tomography are expensive and require specialised training, making them less accessible.

Each tree's unique characteristics, including species, age and growth conditions, add to its complexity. Furthermore, tree risk is dynamic and can change rapidly owing to environmental conditions or disease progression, necessitating regular monitoring, which can be resource-intensive.

A comprehensive approach is required to reduce the risks associated with urban trees. This involves regular monitoring and maintenance practices such as pruning dead or weakened branches, ensuring proper watering, and addressing soil compaction to promote tree health and stability.

Investing in the training of arborists and equipping them with advanced diagnostic tools can significantly enhance the accuracy and consistency of risk assessment.

As climate change intensifies the frequency and severity of heavy rainfall and extreme weather events, effective tree risk management is becoming increasingly pressing.

Urban planning and development practices must evolve to reduce the impact of waterlogging on tree stability, provide adequate space for tree roots to grow, and select tree species that are more resilient to anticipated environmental stress.

Engaging the community through awareness programmes can educate the public about tree health and signs of potential tree failure, empowering them to contribute to the early detection and prevention of tree-related hazards.

By understanding the underlying causes of tree falls and employing robust assessment methods, associated risks can be effectively mitigated.

A combination of regular monitoring, community involvement, and strategic investments in technology and training will ensure that urban trees continue to provide numerous benefits, while minimising potential hazards.

As cities adapt to the challenges posed by climate change, effective urban tree management is crucial in creating resilient and sustainable urban environments.

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