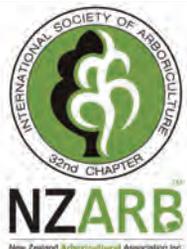


TreeMatters

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New Zealand **Arboricultural** Association Inc.

New Zealand Arboricultural Association Inc.,
PO Box 1193, Nelson, 7040, New Zealand nzarb.org.nz

Mission statement: *To encourage, foster, improve and educate members and others in all aspects of arboriculture throughout New Zealand.*

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TreeMatters

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Auckland Regional Tree Climbing Results



Thoughts from Edmonton



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President's branch

The Path Ahead



By Will Melville
President NZ Arb

correspondence to:
president@nzarb.org.nz

Arborists and trees have featured in the News a lot over the last few months, from the storm in Auckland to detection of Myrtle Rust in the South Island. Trees are facing an ever-challenging time in our urban environment with misinformation and risk often being used as reasons to remove trees.

Working for a local authority, I regularly hear from people who have their story about a tree, but most of these tales are not inspiring in the least. When a resident calls complaining that their lemonwood is dangerous because it is "too big" I have to remind myself that their perception of the risk is often driven by negative press and a social contagion that is unfortunately too often perpetuated. I have seen trees easily become an emotive issue that will unnecessarily divide friends, neighbours and communities.

Every time we receive comments and complaints about trees that are unfounded or illogical we have an opportunity to dispute the poor perception with some great facts about the benefits that trees offer or discuss the actual risk. The benefit of good information can contribute towards New Zealand's green and livable cities, whereas poor advice can lead to our profession being undervalued and discounted. Individually and as an industry we should be advocating for the truth and leading by example. Continual professional development is an essential component to assist us in doing so.

NZ Arb provides opportunities for this at our annual conference, NZ Arb Husqvarna Tree Climbing Competitions and ISA Tree Risk Assessment Qualification courses. The ISA also has an abundance of resources available for free or you could take advantage of the great benefits of membership.

Winter provides a good opportunity to think about professional development for the coming year which could include studying for the ISA Certified Tree Worker or Certified Arborist exam, and if you already are certified take some time to complete a few Continuing Education Units (CEUs) to stay up to date with current international research and best practice. We are always interested in hearing about courses that members would like to see the association run in the future.

Also, there are some excellent articles in this edition of Tree Matters that will contribute towards your arboricultural knowledge or perhaps excite your interest in new topics.



Editor's Leaf

Planting, Growing, Changing



**By Erika Commers
Editor**

correspondence to:
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As you receive this issue, New Zealand is in the throes of tree planting season. How many trees have you put in the ground so far this year? You may have heard it said, “the best time to plant a tree is 20 years ago, the second best time is...” Planting a tree can be one of the most fulfilling long-term activities for so little time required and just a bit of skill. If you need a simple and very useful tree-planting refresher don't forget to check out the excellent resources offered by ISA on TreesAreGood.org.

Our government has pledged to plant a billion trees. What exactly does or doesn't this mean for our urban treed environment? We have asked the question, and in this issue you will find an article that *Tree Matters* has commissioned to seek answers and further understanding of the government's policy, straight from the horse's mouth. Our journalist's enquiry provides some good insight from government officials and will hopefully inspire action from the likes of you, the arborists in our community.

Keeping up-to-date with new developments and information is vital to professionalism in our frequently changing world. Tree assessment can be simple, complex and

everything in between, so stay abreast of the latest views with more thoughts and ideas from Mark Roberts, David Evans and Frank Rinn. Also find out how one of our own arborists has invented an innovative technology in response to an industry need for better recording of lift weights on crane and helicopter jobs – cool stuff.

Recently we received a thoughtful letter from a Canadian municipal forester who has reached out to share his New Zealand experience with us. You are sure to enjoy this account of our trees. Two further articles also tie together the importance of our urban trees and how we may need to modify our behaviour to become more professional stewards of our industry, our trees and our environment.

I am also pleased to introduce a few new additions to the magazine, which are intended to be recurring series: on tree species profiles, on tree problem diagnosis and on plant identification.

Trees decline for a multitude of reasons and ascertaining this can be a challenge as well as a great opportunity to learn. Check out the article “Corticular Photosynthesis- Plane for all to See” which details the complexities of

deconstructing the decline of London plane trees.

And because learning new things never loses its appeal, we hope to see you at the great New Zealand arboriculture get-together; this year, the annual NZ Arb conference will be held in Dunedin at the stunning Town Hall on the 8-10th of November. The keynote speakers have now been selected and our programme is looking fantastic. For those that are ISA Certified Arborists, the conference can award up to 20 continuing education units (CEUs), which is more than half of those required for re-certification. Early bird registration closes on September 30th 2018 so don't delay if you plan to attend.

Of course there is a lot more to discover in our winter issue, and certainly something of interest for every tree person. But lastly, I certainly recommend that you don't miss the opportunity to test your plant ID for the chance to win a copy of the legendary James Urban publication *Up By Roots*.

We're always looking forward to receiving any feedback you may have so enjoy reading between these pages and don't be shy.



Meet Your Representative



Five minutes with... Mark Roberts

Director / Consultant at Roberts Consulting
NZ Arb Executive Committee Secretary

What inspired you to pursue a career in arboriculture?

I finished Massey University smack-dead in the middle of my class, and it was pretty obvious that New Zealand didn't need yet-another very average landscape designer. In Hamilton something called arboriculture was being offered as a course for the second time – I knew that there were only a handful of arborists in the country, so I thought to myself, "even if I become a very average arborist, I'll still be one of the top few arborists in the country." So, I did the course, became a very average arborist and then left the country shortly after that. I'm not 100 percent sure it actually made sense at the time but as illogical as that seems, it was the logic that started my career

What is the best part of your current job?

I'm still trying to come to terms with the fact the people pay me to talk about trees – I love it, I love everything about it. But at the end of the day, it is all about people – I

like working with good people and for good people and currently I'm surrounded by good people.

What is the best job you have had in arboriculture?

I can't answer that – I often find myself feeling pretty lucky (if I wasn't so anti self-harm I'd be constantly pinching myself). Last year I was a guest of the Korean Government, they put me in a five-star hotel and fed me until I hurt. In a couple of weeks, I am being flown to the UK – how good is that? I think arboriculture is the best job. I've tried to leave it a few times, but I couldn't and now I can't imagine doing anything else.

What motivated you to volunteer for NZ Arb?

Fun, I actually enjoy it. At one stage it was all about giving back and some sense of greater good or making a difference, which it still kind of is but in reality, I get to hang out with a bunch of passionate, intelligent

people and that energises me.

What do you think is one of the biggest challenges facing arboriculture in New Zealand?

Ignorance – people don't know what they don't know, and that includes arborists as well as tree owners and the public. If tree owners and the public had a better understanding of the worth of trees they would invest more in them (and they would know good tree work from bad). As for us, (the NZ arborist community) we are fantastic at climbing but pretty average at caring for trees. We need to start to manage trees more than treating each tree as a one-off pruning event and we need to expand our options – the more you know the more options you have.

If you were a tree what tree would you be and why?

A twisted and broken one, I suspect – but one with good vitality; there is plenty of living yet to be had.

Five minutes with... Chris Walsh

Managing Director, Treotech Specialist Treecare Ltd and currently on the Board of Directors and Treasurer of the International Society of Arboriculture (ISA)



You've been involved in arboriculture for 25 years, on the ISA Board of Directors for two years and ISA Treasurer for one year. What inspired you to pursue a career in arboriculture way back at the start of it all?

I have always had a passion for the outdoors and plants, which led me to completing an apprenticeship in Horticulture and Turf Management in Invercargill. While there I worked with a talented arborist called Derek Winwood, being his groundsman.

He became a very good friend of mine and encouraged me into this adrenalin-filled career which consisted of using different skillsets every day, being able to work outside, climbing trees, using chainsaws, machinery and being able to educate people about trees which I thought was the best job ever. I even got paid doing it! So I moved to the UK and studied arboriculture. When I came back to NZ I started my own business and haven't looked back.

What motivated you to volunteer for the ISA?

I have volunteered with NZ Arb for a number of years and it was very motivational being able to contribute as part of a team improving arboriculture in NZ.

Once my term finished as the President of NZ Arb I was approached by the then Executive Director of the ISA to see if I would stand for the ISA Board in a general election.

I enjoy continuing to make a difference

in arboriculture and this now means I can be on a global team that helps support chapters throughout the world to promote the benefits of trees and people working with them.

Tell us about your role with the ISA and what it involves?

As a board member for a three-year term, I am one of 15 people who govern and navigate the ISA throughout the world.

We have approximately six teleconferences and three face-to-face meetings a year in which we strategically plan future initiatives for the ISA and our members such as member linkage, workforce development, credentialing programmes, chapter relations and many more.

We oversee the Executive Director and measure the performance of the initiatives the board has put in place previously to ensure the ISA is on the right track each quarter.

As the Treasurer of the ISA board I chair the Finance Committee and help oversee the budgets for the ISA and the board to ensure we are fiscally compliant and to ensure our fiduciary obligations.

What is the best part of your involvement with the ISA?

Involvement with the ISA has always been great even when I wasn't on the ISA Board. Participating and being at chapter events, conferences, tree climbing competitions and workshops has given me increased knowledge and upskilled me. The ISA is

about trees and people so you can't find a better place to reach out and ask questions on any of these subjects. Everyone comes from different walks of life but are all like-minded and have passion for the industry. Meeting people and knowledge transfer would be the best part.

What do you think is one of the biggest common challenges facing arboriculture here in New Zealand and internationally?

Workforce careers and retention are probably the biggest issues both internationally and here in New Zealand at this time.

Getting workers and especially qualified workers is always going to be an issue when our tree assets appear undervalued by a large proportion of people throughout the world. This will get better but only after increased education about the value of trees and when the care of trees is promoted as a profession and career.

If you were a tree what tree would you be and why?

Acacia baileyana purpurea

This is a fast-growing evergreen tree with striking new purple foliage which makes an impact on the landscape very quickly. The downside? It declines as quickly as it grows, has structural failures and the foliage turns grey as it gets older, so I think this tree is aligned to me

In The Urban Forest

Trees in Cities: bring it on

By Gordon Campbell
Freelance journalist

Correspondence to:
editor@nzarb.org.nz

- **New Zealand has signed up to an international action plan for urban forestry.**
- **The government has no clear details of this policy yet.**
- **Ministers are welcoming submissions on how the policy can be achieved.**
- **A preliminary \$180 million for forestry has no specific allocation for urban planting.**

While the Labour-New Zealand First-Greens coalition government aims to plant a billion trees over the next 10 years, it has yet to focus on the contribution that urban forestry could make to achieving this goal.

As Forestry Minister Shane Jones explained in an exclusive interview with *Tree Matters*, he's been more engaged thus far with commercial forestry, and is looking to share the running on urban forestry with colleagues, and with local government. The Energy Minister Megan Woods, Jones indicated, plans on a substantial replanting of trees in and around Christchurch. "So I'm going to be guided by her."

In Auckland, Jones continues, a key part of the ports extension will involve planting a corridor of trees to enable the birds nesting on Hauraki Gulf islands to travel through the city. That's one element in an urban forestry framework that exists now only in outline, but Jones is wide open to being lobbied: "So if non-governmental organisations (NGOs), if councils anywhere in Aotearoa come up with programmes as a part of our civic engagement strategy for trees, they will feel the love."

Reportedly, only \$180 million has been allocated to forestry as a whole, out of the \$3 billion Regional Development Fund. That \$180 million figure, Jones replied, was only preliminary.

Yet within his overall forestry budget,

does central government have a plan (or a funding ratio) in mind for urban forestry?

"Certainly not for urban," Jones replied. "It's not that we're not interested in it. We just don't have any proposals."

Seoul Action Plan

That situation is set to change, albeit slowly. Last September in South Korea, New Zealand was represented among 17 Asia-Pacific countries that formulated the Seoul Action Plan (SAP) aimed at promoting the protection, appreciation and expansion of trees across the region's towns and cities. The SAP now forms part of the United Nations Sustainable Development Goals that New Zealand formally signed up to in 2015.

Among its goals, the SAP commits member nations to increase the canopy cover of their cities by at least 10 per cent by 2027, and to ensure that at least 80 percent of urban dwellers have access to urban forest and green spaces, for purposes of human health and well-being.

As part of the SAP commitment, extensive tree designation and inventory reports will be required of New Zealand, come 2020.

While Jones has not yet devised a budget or policy framework for urban forestry, he convenes a "reference group" of Ministers who, Jones explains, will eventually be making the funding calls in this area. That group, which is already taking advice from officials, consists of Jones as chair, Environment Minister David Parker, Climate Change Minister James Shaw, Conservation Minister Eugenie Sage and Minister of Agriculture, Damien O'Connor.

"There is a significant amount of grant funding purely for the planting of trees, preferably natives, wherever civic groups, wherever councils want them, subject to one caveat: right tree, right place, right time."

This group, Jones continued, is "shielding" the government's forestry policy "so that it's not just about exotic trees. It is chaired by me and is there to ensure the forest policy I'm driving does not compromise environment, primary produce or conservation values."

The details, however, seem entirely up for grabs at this point. The ratio of funding allocated to urban forestry within the Billion Trees programme, the preferred balance between natives and exotics and the ideal carbon price that Jones regards as optimal for any widespread transition from farming for

dairy to farming for forestry...all of these, Jones indicated, are works in progress at this point. The necessary research into urban forestry is likely to be carried out by the newly re-established Forestry Service in Rotorua.

Of late, Jones has also been working on a revamp of the two Ministry for Primary Industries (MPI) grant schemes currently aimed at improving water catchment management and preventing erosion. Some urban forestry proposals, he indicated, could fall within this ambit, but the revamp has yet to take final form, much less be presented to Cabinet.

Could he envisage urban forestry eventually enjoying say, a third or half of his discretionary funding for forestry? Again, nothing so specific.

"Of the billion trees, obviously the first port of call I've been working with has been the [commercial] industry. The second port of call has been landowners -- not exclusively farmers, some Maori land owners where they want to effect a change...[I'm saying] bring through your proposals for urban, peri-urban and provincial city towns and we'll embrace them."

Urban forest policy

Urban forestry is the term for managing trees and their eco-systems in cities and towns, for personal, community and environmental benefits, rather than for commercial gain. By some distance, Auckland is ahead of the rest of the country in developing an urban forestry policy backed with the necessary research. In February, a draft action plan on urban forestry was forwarded to the Auckland City Council.

Action is needed not only to plant more trees, but to protect the existing urban forest and eco-systems from the looming pressures of population, housing intensification and climate change.

By 2048, Auckland's population is set to increase by 729,000 people and inevitably, this will place pressure on the existing forested areas. Climate change will enhance the social and community value that trees deliver in providing shade, enabling birdsong, sequestering carbon, reducing air pollution, insulating against urban noise and providing relief from urban heat, even as the rising temperatures will import more pests likely to put trees at risk.

As temperatures and rainfall levels increase, trees will continue to play a crucial role in reducing and slowing the

run-off into the stormwater systems and watercourses that are already under pressure in Auckland. For city dwellers, the value of urban forests cannot be measured solely, or directly, in dollar terms. As research in 2017 by Geoffrey Donovan for the US Forest Service has shown, trees in our cities deliver extensive public health benefits, improve the quality of urban life, and enhance the sense of community well-being.

Tree cover

In 2013, LIDAR [aerial imaging] surveys revealed that Auckland's urban area has 18 percent canopy cover, spread unevenly between its leafier northern and western suburbs, and falling to only 7-8 percent coverage in some south Auckland suburbs. Tall, mature trees are not the norm: almost 60 percent of Auckland's urban forest is less than ten metres tall.

Problematically, 60 percent of Auckland's urban trees are situated on private land. As such, the bulk of the city's forest has been left vulnerable by the previous government's reforms of the Resource Management Act (RMA), which -- from 2015 -- have removed blanket protection on existing trees in urban areas, and left councils with only non-regulatory tools to protect trees on private land from destruction by owners and developers.

For this article, Greens co-leader James Shaw confirmed that his party will be pressing to re-instate those protections. "We disagreed with virtually all the reforms of the RMA that the last government put through, and fought against them. Many of the things we said would happen, did happen. Like the sound of chainsaws on a Saturday in Auckland was immediate, right? So it is kind of ironic now that [Auckland mayor] Phil Goff is trying to plant a million trees in Auckland to put them back, after everyone cut them down."

RMA reform

RMA reform, however, is the preserve of Environment Minister David Parker. For this article, Parker was asked whether he intended to scrap those RMA amendments -- namely, sections 76 (4A, B, C and D) -- and if not, how was the government planning to enable councils to counter the impact of the RMA changes?

In a written reply, Parker indicated that this change would be addressed, but only in the context of next year's wider RMA reforms. "Consistent with Labour Party policy I will, when the RMA comes under review, consider whether it currently provides significant urban trees with adequate protection."

Parker's reply pointed to the climate change benefits of the government's Billion Trees target, thereby (arguably) reflecting a rather narrow perception of the value of urban forestry. Parker also cited his May 3 press release on RMA reform in which, among other things, he promised to restore the appeal rights of applicants and objectors on residential activities and sub-division of land.

As mentioned, Auckland's canopy cover is distributed -- unequally -- along socio-economic lines, with Titirangi, Mission Bay, and Mt Eden having markedly higher levels of forestation than the barren reaches of south Auckland. The government agency Housing New Zealand is currently involved in intensification work in Tamaki, Waterview, and parts of south Auckland.

Arguably, Housing and Urban Development Minister Phil Twyford should be ensuring that urban tree planting is part of that activity. In fact, shouldn't urban forestry be regarded as an essential social amenity by the Urban Development Authority super-agency that Twyford is reportedly setting up? The agency is meant to work with

local councils and speed up intensive development projects not only in Auckland, but throughout the country.

Theoretically, Shaw agreed, a case could be made for urban forestry along those lines. "Between Twyford and [associate Transport Minister] Julie-Anne Genter, they are thinking a lot more about urban form and design than we've thought about in this country before. While they might not necessarily want to take ownership for an urban forestry programme, I think they are thinking quite carefully about urban form. So that would not be a hard argument to make."

In practice though, Shaw explained, other priorities are likely to crowd urban forestry out of the picture. "Twyford's agency, I suspect, won't be interested,



Photo Credit - David James

because they're trying to build houses, and to get transport and hard infrastructure in place. The idea of adding to that work programme would be just too hard for them."

Christchurch

As in Auckland, Christchurch's canopy cover (only 11.6 percent in 2015, when plantation forests are excluded) is unevenly distributed, with high coverage in the affluent Coastal Ward, Cashmere and Fendalton parts of the city, and comparatively low figures in Hornby, Linwood and Heathcote.

Among the prime ingredients of the city's urban forestry effort is a 2.75 hectare forest under way on the lower grounds of Linwood College. The native plants and tree plantings envisaged will work in combination with other measures to reduce the flooding to which the area is prone. The project will also create a publicly accessible bird habitat likely to foster native bird movements to and from Riccarton Bush, the Travis Wetland and Styx River Reserve network and the Port Hills reserves. Similarly, an extensive tree-planting programme -- with potential stormwater control benefits and a forested bird sanctuary -- are features of the Draft Regeneration plan for the Cranford Basin area, north of the city centre.

To date, said Christchurch City Council landscape architect Antony Shadbolt, forestry projects around the city have largely happened "opportunistically" as options arose and were seized on by enthusiastic community groups. James Shaw echoed that

Resource Management Act 1991

Section 76 of the Resource Management Act relates to the power of a territorial authority to include rules in a district plan. As part of the previous government's revisions to the Act, it appears to enable easier felling of trees.

Section 76...

(4A) A rule may prohibit or restrict the felling, trimming, damaging, or removal of a tree or trees on a single urban environment allotment only if, in a schedule to the plan,—

- (a) the tree or trees are described; and
- (b) the allotment is specifically identified by street address or legal description of the land, or both.

(4B) A rule may prohibit or restrict the felling, trimming, damaging, or removal of trees on 2 or more urban environment allotments only if—

- (a) the allotments are adjacent to each other; and
- (b) the trees on the allotments together form a group of trees; and
- (c) in a schedule to the plan,—
 - (i) the group of trees is described; and
 - (ii) the allotments are specifically identified by street address or legal description of the land, or both.

(4C) In subsections (4A) and (4B),— **group of trees means a cluster, grove, or line of trees.** urban environment allotment or **allotment** means an allotment within the meaning of section 218

- (a) that is no greater than 4 000 m²; and
 - (b) that is connected to a reticulated water supply system and a reticulated sewerage system; and
 - (c) on which there is a building used for industrial or commercial purposes or as a dwellinghouse; and
 - (d) that is not reserve (within the meaning of section 2(1) of the Reserves Act 1977) or subject to a conservation management plan or conservation management strategy prepared in accordance with the Conservation Act 1987 or the Reserves Act 1977.
- (4D) To avoid doubt, subsections (4A) and (4B) apply—

- (a) regardless of whether the tree, trees, or group of trees is, or the allotment or allotments are, also identified on a map in the plan; and
- (b) regardless of whether the allotment or allotments are also clad with bush or other vegetation.

sentiment for this article, praising community groups like Trees That Count in Auckland and Trees for Canterbury.

"You can be a diner and fork over some money for the programme," Shaw said, "or be one of the volunteer groups that get involved in this. I think it is driving quite a lot of voluntary activity all over the country in urban sanctuary and conservation areas. Or in the Red Zone in Christchurch, which is about to become heavily re-forested."

Point being, Shaw added, such efforts create native forest and bird sanctuaries that people can get to without needing to travel far outside the city.

"And that connection will start to build up peoples' sense of enjoyment [of forest values] even closer to home than the Karori bird sanctuary [in suburban Wellington]."

Hopefully, this won't be the only driving force. Ideally, the imperatives of the Seoul Action Plan and the Billion Trees target -- in a climate where Shane Jones has professed his readiness to use the funds at his disposal in tandem with local councils -- will create a virtuous circle. In future, maybe the public's enjoyment of urban forests and the eco-systems on which they depend, will no longer need to rely quite so heavily upon the volunteer ethos.

Gordon Campbell is a former senior journalist with the New Zealand Listener. He runs the long-form journalism website www.werewolf.co.nz.





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Plant Health Care

Case Study - Corticular Photosynthesis Plane for all to see

By Godfrey Fitzpatrick
Consultant Arborist

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Plane for all to see?

The (Crime) Scene NZ's "bother dog" was engaged by Auckland Council to establish the cause of decline associated with a number of planted and transplanted *Platanus* spp. growing in traffic islands, in South Auckland.

Visual symptoms evident included crown retrenchment, epicormic release, foliar bunching and powdery mildew; a now-altogether too familiar feature of a number of Auckland's deciduous northern hemisphere tree stock.

Some specimens were, however, a little more intriguing; a number had been without leaves for such a length of time that residents spoken to believed the trees had been the subject of another recognised sideline of the urban environmentalist's diary – surreptitious poisoning.

Investigation Ensues

From the initial site visit, it was evident that the trees had been in a state of chronic decline for some period, reducing the likelihood of herbicide injury being the culprit. Growth was retarded and larger trees retained lichen; again evidence of their condition being the result of chronic decline.

Excavation of transplanted specimens identified that the trees had been planted in heavy clay soil and subjected to a 300 mm grade change. Further root loss had occurred within the structural root zone during the formation of the carriageway and traffic islands.

The carriageway accounted for > 80% of the technical permeable root zone. Orthotropic root growth and soil penetration resistance > 300psi was consistent with compaction and reduced oxygen levels during periods of inundation. Such conditions are conducive for hypoxia, limiting the efficiency of respiration.

Rooting volumes for the transplants within the islands were estimated to be 4.8m³; significantly less than the 63m³ which a tree with a crown radius of 7m is estimated to require in an unrestricted rooting environment.

However, volume and compaction alone failed to explain the decline of adjacent planted specimens exhibiting similar symptoms.

Stem, soil and root samples failed to identify any known pathogens. Soils were found to be acidic (pH 4.7) and low in organic matter and potentially available nitrogen. Foliar analysis of control trees in unmodified soils indicated that foliar



Figure 1
Foliar clustering and retrenchment; typical symptoms of *Platanus* spp. decline, South Auckland.

nitrogen was reduced, suggesting potential limitations to availability and assimilation.

The Unanswered Question

Samples collected from the few remaining leaves of the London planes in decline had elevated foliar nitrogen levels (3.3%), with leaves that were generally larger and darker than the control trees' leaves

In a study into the effects of pruning, Hipps et al. (2014) found that similar morphological changes occur as crown reduction approaches $\geq 1/3$ rd. In addition to leaf size and nitrogen concentration, less reactive forms of δ^{13} Carbon and δ^{18} Oxygen were noted, correlating with boundary layer conductance and stomatal closure. Typically, heavier isotopes are considered a function of height and age of mature trees (Steppe, 2011).

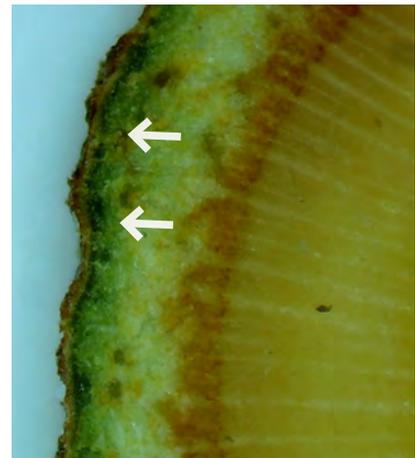


Figure 3
Micrograph : Cortical chlorenchymal tissue, indicated.



Figure 2.
P. x acerifolia control (left). Enlarged leaf of a tree in decline (right).

So...Why Won't You Die?

With so few leaves and repeated foliar pathogens, it was unclear how the trees had managed to "survive" for so long.

An interesting feature of the subject trees was the maintenance and conductance of twigs and branches long after visible axillary buds had been exhausted and carbohydrate reserves diminished, suggesting a role for corticular or "bark" photosynthesis.

The efficiency of corticular photosynthesis associated with aspen twigs has been found to be ~75% that of leaves and, importantly, may function when conditions constrain foliar photosynthesis, until a functioning crown is re-established (Kharouk, 1995).

In the absence of a functioning crown and the exhaustion of axillary and epicormic buds, "corticular" photosynthesis may sustain "life" until such point as carbohydrate reserves are depleted and point of starvation reached (which starch staining revealed).

Discussion

It was concluded that the chronic decline of the subject trees was the result of site and soil conditions along with horticultural

practices that have affected the efficiency of physiological processes (respiration) which predisposed the trees toward secondary parasitism and, ultimately, starvation.

It is hypothesised that articulation of the decline complex, including "leafless" periods, is extended by species-specific "corticular" potential and the intermittent release of epicormic growth during periods of clemency supporting "up-regulated" leaves.

Treatment and Response

Recommendations were made for the removal of the subject trees and construction of properly formed tree pits with sufficient soil volume to support the projected crown radius of replacement specimens. Recommendations were also made in respect of soil amelioration measures and management practices to correct the pH through the application of fertiliser and mulch to improve the availability and assimilation of nitrogen for trees exhibiting early characteristics of decline.

Postscript: In death there is life

During the course of investigating the decline of the assessed trees, several beneficial parasitoids of scale and fungal saprophytes were observed, including nymphs of the fungus-eating ladybug, *Illeis galbula*, considered a saprophyte of powdery mildew.

References

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Figure 5

Micrograph : Transverse section, IKI staining of epicormic growth in decline (note the presence of starch within dilated ray extensions and banding near vascular cambium). *P. x orientalis* (May 2018).

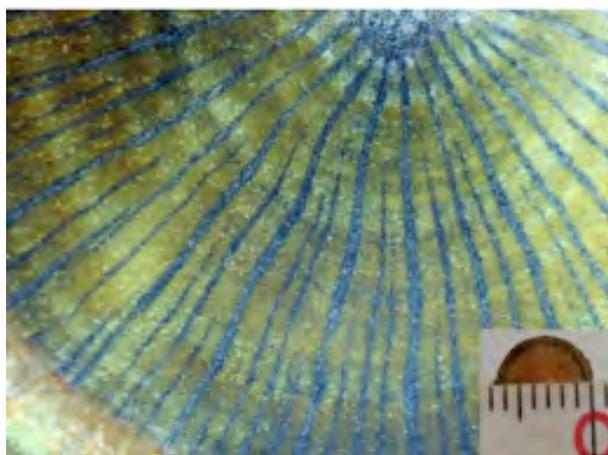


Figure 4

Micrograph: Transverse section, IKI staining of 10yr growth, control, *P. x acerifolia* (May 2018).



Figure 6-7

Micrograph : *Illeis galbula*, nymph, considered a saprophyte of *Erysiphe platani*.

In the Urban Forest

Trees in the Townscape



By Terry Snow
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“Trees make places work, look and feel better. As well as playing a role in climate-proofing our neighbourhoods and supporting human health and environmental well-being, trees can also help to create conditions for economic success.”

So begins the comprehensive document “Trees in the Townscape, A Guide for Decision Makers” put out by the British Trees & Design Action Group (TDAG).

The value of trees which their opening statement emphasises is well-known to NZ Arb members and is a message which NZ Arb firmly wants to spread throughout New Zealand.

As the President said in his message in the previous issues of *Tree Matters*: “Public awareness about the benefit and value of trees is a message that the association and its members need to push. This is an issue close to my heart and something that we are all responsible for promoting. Public comments in the media show that most people do not value trees and instead they focus on the ‘risks’ they pose. Changing this mind-set will take a generation and the Executive want to start that process now.” The guide to 21st Century Urban Trees put out by TDAG moves the feel-good aspiration of NZ Arb to a level of practical advice for all parts of the community, engaging everyone from house owners, property developers and volunteers through to business and resident associations and the highest level of local councils.

There is plenty of detail in this report to

The advice to those who make decisions about urban trees is to adopt 12 principles:

1. Know your tree resource;
2. Have a comprehensive tree strategy;
3. Embed trees into policy and other plans;
4. Make tree-friendly places;
5. Pick the right trees;
6. Seek multiple benefits;
7. Procure a healthy tree;
8. Provide soil, air and water;
9. Create stakeholders;
10. Take an asset management approach;
11. Be risk-aware (rather than risk-averse);
12. Adjust management to needs.

show how the principles can be actively applied. The case studies show that this positive and active tree policy management works. For instance, in the simple first step of knowing what you have, so that you can take action, the Greater Manchester tree mapping project is a perfect example. In 2006, the City of Manchester commissioned Red Rose Forest, a local community forest organisation, to undertake the city’s first full tree audit. At the time, the City only kept records on public street trees and knew very little about the overall size of Manchester’s urban forest.

Red Rose Forest worked with a local consultancy using aerial photography to map the tree canopy across the city. The audit results were analysed to identify areas affected by both low canopy cover and high levels of deprivation.

This allowed Manchester to target public tree planting efforts in disadvantaged communities that had very few trees. The audit results also provided the basis for setting a canopy cover increase target in the city’s strategy to manage climate change, Manchester: A Certain Future.

The Manchester tree audit proved so cost effective and successful that neighbouring Salford City Council, which held no information on its local tree population, commissioned similar work.

This in turn prompted all 10 Greater Manchester local authorities to join forces to do the same.

The Manchester Tree Audit phase 1 and phase 2 reports can be found at <http://www.redroseforest.co.uk/downloads2.htm>

Once commitment to a tree policy and strategy is in place, it helps put trees on equal footing with other types of infrastructure when it comes to making decisions, by ensuring that evidence of need can be supported with figures.

In the construction of the Trinity shopping centre in Leeds, developer Land Securities had to remove three trees and accidentally damaged another. As a result, it made a donation to “The Gift That Grows,” a tree

sponsorship scheme managed by the local community forest, the South Yorkshire Forest Partnership, enabling the charity to plant 400 new trees in Cantley Park in neighbouring Doncaster.

This initiative was the result of Land Securities’ decision in 2010 to introduce a new corporate social responsibility target. It pledged that for each tree the company cut down or damaged in the process of making way for a new development, it would plant at least 100 new trees at a nearby site.

The Leader of the City of York, Councillor James Alexander says “The Trees in the Townscape 12 Principles is a great idea. It offers practical guidance and best-practice examples to increase the number of trees in cities; bringing health and other environmental benefits for us and future generations of residents. The ‘York Economic Vision: New City Beautiful’ noted the relatively small number of trees in our city and we have since progressed our commitment to planting thousands more trees in York through our Tremendous York Campaign.”

Tom Foulkes, Chairman of the Victoria Business Improvement District in London said, “The multiple benefits trees bring to a business district make perfect economic sense. Often they are undervalued, but we are working to put this firmly back on the business agenda – and the 12 principles of Trees in the Townscape provide a clear roadmap to get there.”

A crucial element in having a comprehensive tree strategy, says TDAG, is that it not only provides the most effective mechanism to achieve a good general tree coverage, but helps to ensure that evidence-based and consensus-driven decisions are made, thereby limiting the scope for ad-hoc resource allocation which might favour the most vocal and articulate.

Directing resources based on actual needs, rather than historical precedent, is likely to yield both better results and, in the long run, save money.

Tor Homes is part of the South Devon and Cornwall Housing Group. As a social



landlord, Tor Homes manages over 9,000 affordable homes across south Devon and also takes on the development of new affordable properties for rent or shared ownership.

In 2006 the Tor Homes board adopted a tree management policy, which established a presumption in favour of keeping trees unless there were demonstrable risks of harm. To ensure this was enforceable, the policy also defined how risks would be assessed and how a comprehensive audit of Tor Homes's tree stock would be conducted. The policy also defined clear responsibilities for tree care between the local authority, Tor Homes and its tenants, depending on where the tree was located and who planted it.

According to Rob Scholefield, the landscape manager for Tor Homes, "this tree policy has been worth its weight in gold." Rob has found that securing board level support for the policy has unlocked access to increased resources to manage trees and enabled him to focus spending where it is most needed. Having the policy in place, combined with the fact it was clearly being publicised and implemented, resulted in a dramatic decrease in the ad hoc calls and complaints that Tor Homes had previously received about trees from its residents.

All this in the context, says TDAG, that trees matter for 21st-century neighbourhoods, towns and cities. More than 80 percent of the UK's population live in urban settings – the figure for New Zealand is 86 percent – and trees in and around built-up areas, which many call the "urban forest," have become a key component of the infrastructure that makes places work, look and feel better.

In the government-sponsored report *Trees in Towns II*, four questions were defined as the pillars of "good practice" for producing a tree strategy.

1. What do we have?
2. What do we want?
3. What do we do?
4. Are we getting what we want?

It is important, according to the *Trees in the Townscape* formulation, to embrace the whole of the urban forest. It is critical that local authority tree strategies include highway trees, trees in public open spaces on housing land and private trees.

The extensive survey for the *Trees in Towns II* report found that 70 percent of urban trees in England fall within private property. Although mechanisms to influence private trees differ from those available for trees on publicly owned land, they are equally important to consider.

Locally, a 2013 survey by Auckland Council's Research and Evaluation Unit, RIMU found that around a quarter (23 percent) of Auckland's urban forest canopy is on Auckland Council parkland, nine per cent on road corridors and eight percent on other public land (e.g. schools). The remaining 60 percent of the urban forest canopy is on privately owned land.

The *Trees and Design Action Group* recommends that the starting point for success is understanding where you are and where you want to go. The 12 principles outlined are designed to aid working together with others including councillors, planners and key officers giving the lead on sustainable housing, highways, green space and trees, together with community volunteers, businesses and residents to establish solid foundations for a tree strategy.

As Dr Mark Johnston noted in the *Arboricultural Journal*, "The aim of urban forestry is to improve the welfare of urban residents; the planting and care of trees is a means to that end, not an end in itself."

Terry Snow is a journalist and former editor of the *New Zealand Listener* and *The Shed* magazines.

Industry News

NZ Arb Husqvarna Auckland Regional Tree Climbing Competition

By David Stejskal
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The Auckland Region Tree Climbing competition, sponsored by Husqvarna, was held in the lovely Auckland Monte Cecilia reserve at the beginning of April. Everyone involved deserves a huge applause for making it such a great event. Thanks to all of the volunteers, sponsors and competitors, you make the incredible happen.

Six competitors will have the opportunity to represent the Auckland region at the National Climbing Competition in Dunedin this November. Abby Wilkinson will represent the women, and Scott Forrest, Zane Wedding, Sam Smith, Sam Turner and Scott Geddes all qualify in the mens. Good luck to you all!

This year's competition built on a successful model from the last two years. The competition setup and series of amazing workshops prepared by Freddie Hjelm from Living Tree Company was held on Saturday followed by the climbing competition on Sunday.

The setup went smoothly with workshops starting after the lunch. This was made easier with NZARB providing food for the volunteers. Workshops focused on current affairs, including topics on the Kauri rescue program, myrtle rust, climate change effects, Auckland's urban forest strategy, working around kauri trees, ascent event and body positioning.

The competition day followed the traditional layout of the five competition events; the Kid's Climb and the New Arborist of the Year were set in some stunning trees.

The Work Climb event, sponsored by Kask, was set in a holm oak. The climb was fairly quick but technical. A large amount of epicormics made it challenging and tested each climber's ability to find a way around without breaking any branches. Abby Wilkinson and Scott Forrest took the lead for their categories.

Aerial Rescue, sponsored by Silky, was set in a big tulip tree. The scenario was to rescue a climber with a cut to the arm who was secured to a branch 10 metres above the ground. All contestants showed some interesting ideas and as always the event reinforced the importance of this particular skill. Abby Wilkinson won the females; Jeremy Millar (Waikato) won the males.

Throwline, sponsored by MetroGreen, was set in a twisted and tall pohutukawa. Contestants scored the highest targets despite a large number of tight branch unions and a fairly high number of small twigs in the way. Abby Wilkinson won the females; Scott Forrest won the males.

Speedclimb, sponsored by AB Equipment, was set in a relatively small yet challenging totara. The climb was spiced up by the addition of one extra bell on a lateral limb above the ground. Abby Wilkinson won the females; Scott Forrest won the males.

The Ascent Event, sponsored by Donaghys, was set in a large elm. This was first time we ran this event in the Auckland Regionals. Andy Neverman made sure we were all up to date with the rules and the event ran well. Abby Wilkinson won the females; Noel Galloway (Waikato) won the males.

The New Arborist of the Year event, sponsored by Hansa Chippers and Tree Hub had an awesome turnout with six participants this year. It was taken by a competitive Ngatihau Kaihau (1st) and Kayne Prior (2nd). Both Kayne and Ngatihau showed impressive skills and will represent the Auckland Region in Dunedin this year. Kayne and Ngatihau have their travels and accommodation at the Nationals covered as part of their prize. Well done to you both!

Big thanks to all the sponsors and also to our local tree gear supplier Treetools, who kindly provided additional prizes and also sponsored coffee for everyone on Sunday. Special thanks go to Zane Wedding and his Manukau Institute of Technology students for their support and willingness to help.

Thank you all again and hope to see you in Auckland soon!

Photo Credit - Richard Tregoweth - Treetools



Photo Credit - Richard Tregoweth - Treetools

Silky Saws Aerial Rescue

Category	Name	Chapter	Score
Females	Wilkinson Abby	Auckland	6.00
Males	Millar Jeremy	Waikato	45.00
Males	Galloway Noel	Waikato	42.67
Males	Smith Sam	Auckland	42.00

AB Equipment Speed Climb

Category	Name	Chapter	Score
Females	Wilkinson Abby	Auckland	-
Males	Forrest Scott	Auckland	20.09
Males	Galloway Noel	Waikato	22.33
Males	Smith Sam	Auckland	24.89

Donaghys Ascent

Category	Name	Chapter	Score
Females	Wilkinson Abby	Auckland	64.02
Males	Galloway Noel	Waikato	11.60
Males	Millar Jeremy	Waikato	13.43
Males	Turner Sam	Auckland	13.95

Metrogreen Throwline

Category	Name	Chapter	Score
Females	Wilkinson Abby	Auckland	0.00
Males	Forrest Scott	Auckland	21.00
Males	Lin Wah Ling	Auckland	21.00
Males	Nitz Anthony	Auckland	20.00

KASK Work Climb

Category	Name	Chapter	Score
Females	Wilkinson Abby	Auckland	10.00
Males	Forrest Scott	Auckland	66.33
Males	Geddes Scott	Auckland	62.65
Males	Smith Sam	Auckland	62.12

Results

Male Competitors	Chapter	Overall Prelim Ranking	Preliminary Total (200 Max)
Forrest Scott	Auckland	1	157.50
Millar Jeremy	Waikato	2	151.00
Galloway Noel	Waikato	3	150.14
Wedding Zane	Auckland	4	145.17
Smith Sam	Auckland	5	142.21
Turner Sam	Auckland	6	136.73
Geddes Scott	Auckland	7	136.31
Bennett Tony	Auckland	8	127.36
Bainbridge Seb	Waikato	9	126.77
Sircombe Troy	Waikato	10	107.56

Female Competitors	Chapter	Overall Prelim Ranking	Preliminary Total (200 Max)
Wilkinson Abby	Auckland	1	64.02



Photo Credit - Richard Tregoweth - Treetools



Photo Credit - Richard Tregoweth - Treetools



Photo Credit - Richard Tregoweth - Treetools

Auckland Regional TCC Judges & Technicians

On behalf of Husqvarna, NZARB and all our sponsors, I would like to thank the excellent team of judges and technicians that helped at Monte Cecilia on 7 and 8 April 2018.

Regional Coordinator	David Stejskal
Head Judge	Craig Webb
Head Technician	Andy Neverman
Workshops	Fredrik Hjelm
Scorer	Erika Commers
BBQ	Howell Davies

KASK Workclimb

Event Head Judge	Shaun Hardman
Judges	Chelsea Robertson, Steve Krebs
Technicians	Hiro Ikeno, James Fulford, Mathew White (in tree Tech)

Silky Saws Aerial Rescue

Event Head Judge	Rhys Fransen
Judges	Elena Lauterbach, Guy Clark
Technicians	Liam Cudahy (in tree), Mark Jakobs

Donaghys Ascent

Event Head Judge	Andy Neverman
Technicians (in tree)	Dale Thomas
Timing Team	the MIT crew - Jerome Neu, Santos Tuma, Antonius Ensink, Kawhia Chambers, Tim Gallant, George Burgess



Photo Credit - Richard Tregoweth - Treetools

AB Equipment Speed Climb

Event Head Judge	Rick Jobbitt
Technicians	Tahae Turei-Wall, Andrew Benson

Metrogreen Throwline

Event Head Judge	Jawand Ngau-Chun
Technicians	Robert de Longe

There were others that contributed to the set-up, the workshops, the 'ask an arborist' stall, the scoring, the catering and the other general running around that made the day a wonderful success. Thank you all.

Craig Webb, Consultant Arborist



Photo Credit - Richard Tregoweth - Treetools



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- Horizontal outreach from 7.0m - 10.3m depending on model.



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Industry News

Technological change and safety re-defining arboriculture

By Michaela Terry
Wintec

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- **Increased recognition of the health and safety risks of tree work is one of the major drivers of change in the industry**
- **Changes in the industry have led to improvements in the way arborists are trained**
- **“It seems to me that Kiwis are using more and larger equipment. A qualification is very important for the safety of the trees, ourselves and others.”**

New technology and a growing focus on safety are leading to more demand for arborists who are qualified in using the latest techniques and machinery.

No longer are people tending trees with an old Willans harness and a Sach Dolmer chainsaw. They now need to understand the newest equipment, the most recent tree science, and the latest software for tree diagnosis and GPS mapping.

Wintec Arboriculture Programme Coordinator Rob Graham says new equipment and climbing techniques have made the industry more accessible and easier on the body, but they also leave more room for error as people use machinery and equipment they are unfamiliar with.

The shifting landscape

Increased recognition of the health and safety risks of tree work is one of the major drivers of change in the industry, Mr Graham says. This, combined with a need

to ensure those caring for trees are suitably skilled, has led to growing demand for arborists to hold relevant qualifications. “We have always been safety conscious but we didn’t know what safety meant,” he says. “Back when I started we were climbing trees with a chainsaw and a pair of jeans. Helmets weren’t worn and there was no code of practice or legislation guiding us.”

Another major change since he began is the use of arborists to clear trees around powerlines. Up until the early 1990s power companies used linesmen for powerline clearance, but these days it makes up as much as 40 percent of arboriculture work, he says.

A third shift, and perhaps one of the most significant, is technological change and advances in tree climbing technique. A lot of the equipment being used for arboriculture work requires specific skills and techniques to be used effectively. Rather than using it themselves, many New



Photo Credit - Michaela Terry



Photo Credit - Michaela Terry

Zealanders are calling on arborists with relevant training to do the work for them, Mr Graham says.

“There’s a lot more science, safety and technological information. Some things that were once considered revolutionary are now accepted practice.”

The impact on training

Wintec Arboriculture Tutor Andrew Harrison says the changes in the industry have led to improvements in the way arborists are trained. The veteran arborist and former New Zealand Tree Climbing Champion has been involved in the industry since the 1990s and has noticed a shift in the way arborists are taught and the skills required to succeed as a modern arboriculture professional.

“The fundamentals are still taught but training has become more focused on the machinery we use and the equipment we use for climbing. We are also more science-based in terms of how we diagnose and deal with tree issues.”

Growing awareness of the health and safety risks involved in working with trees has also influenced arboriculture training and is now a significant component of all arboriculture courses. Health and safety awareness also affects the way the training itself is done and tutors take great care to ensure students have mastered the relevant skills before letting them use machinery and harnesses, Mr Harrison says.

Other areas influencing training include changes in technology – students are now trained in GPS surveying of trees and using the latest tools for diagnosing tree defects – and there is greater demand for training that can be done extramurally or on block courses while people continue to work in the industry.

Arborist and Wintec tutor Elliot Fitzjohn agrees that on-the-job training has become more common. He has worked in the industry for 18 years and currently assists Wintec as a part-time tutor, alongside his job managing arboriculture business Honest Tree Work. He says he has noticed a trend towards people who are in the industry gaining qualifications for career progression and to ensure they are operating machinery safely.

“It seems to me that Kiwis are using more and larger equipment.

A qualification is very important for the safety of the trees, ourselves and others.”

What’s more, New Zealand councils and other employers now require arborists they contract to hold recognised industry qualifications so that their expertise is certified.

The future

Mr Graham says he is confident the arboriculture industry will continue growing and will play an increasingly important role in people’s lives, particularly in our cities.

“Our future is going to be dictated by climate change and how we react to it. We are seeing more storms and droughts and as a result the public think trees are bad because they fall on houses and cars. But really trees are the things that will save us.”

In Australia the City of Melbourne is investing \$300 million in planting an urban forest that will act as the city’s green lungs, helping to reduce pollution, reduce carbon emissions and ensure a more temperate climate, Mr Graham says if New Zealand cities follow suit, they will require a large number of skilled arborists to provide advice and care for the urban forest.

“Even in Hamilton, where we have 24 percent tree cover, more trees are needed. The United Nations recommends 32 percent tree cover for a city with a temperate climate.”

Dealing with this change requires education and leadership, both from council managers and people working in arboriculture, Mr Graham says.

“We need dramatic action now. Arborists and city managers need to stop thinking about individual trees and think about the whole urban forest. Training and education play a vital role in making this happen.”

Industry News

Arbor Day Events Round-Up

As part II of an Arbor Day project with Whitney Street School (Blenheim) David James Tree Service returned to donate a 'Day of Service'. David James said that it is 'a chance for us to give back to the community that entrusts us with their trees'.



Photo Credit - Catherine Kirby



The annual Arbor Day planting at Waiwhakareke has become a key date for the ecological restoration project. This year the Arbor Day planting attracted an awesome 1,506 registered planters (updated since video):

- Students, teachers and caregivers = 1332
- Individual volunteers = 19
- Groups from Businesses = 155
- all planting a massive 18,221 native plants planted in the 'wetland area' (13925 trees).



Whitney School Planting Arbor Day 2018

Arbor Day at Waiwhakareke has proven particularly popular with school groups and some corporates: for teachers it's a chance to get children out of the classroom and into the natural environment for a different kind of learning, while for corporates there's an opportunity to contribute to the community and develop bonds within teams of staff.



David James - Arbor Day at Whitney Street School



Delta Tree Services Dunedin, undertook tree maintenance works on the Olveston Oak for Arbor Day 2018. The works involve replacing the old cable brace and carrying out some end-weight reduction pruning. Those that work in the Delta tree team and first and foremost arborists; a lot of the pruning work that is done is dictated by tree regulations and utility safety zones, so it is nice to be able to do some work that is more in keeping with traditional arboriculture.

Dunedin's tree population includes many historic and beautiful trees, and we can thank the effort and forethought of the Dunedin Amenities Society for much of this. The Olveston Oak is a beautiful and iconic tree and the maintenance work should keep it that way for many years to come. The works were done free of charge by Delta tree services with cable bracing supplied by the Dunedin City Council – there were no budgeted maintenance works scheduled for this tree so the work is simply to celebrate Arbor Day and to try to retain some of Dunedin's tree heritage for future generations

Industry News

Log A - A data collection tool for arborists

By Sam Evan Turner
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The recording of lift weights when removing trees via crane or helicopter is considered best practice in arboriculture [Bridge et al 2015]. While this is widely accepted in the industry, the reality is that this is something that often gets forgotten or completed in a lacklustre fashion. We should do better as an industry, but there are also good reasons behind this. Paper doesn't do well on a worksite and at thousands of dollars per hour for a helicopter; it's all hands on deck when they arrive.

Evidently, there is potential for a better system that streamlines the whole process. By taking a pragmatic look at the problem, the following issues were identified:

- Paper is time-consuming for logging results and gets easily lost and damaged.
- Once logged, any data analysis must be done mentally by the reader -- no calculating or graphing is done for you.
- Eventually the paper forms are likely to be entered into a computer anyway -- particularly for long-term storage.

So it became clear that the process should be digitised into an effective and mobile-friendly package. A spreadsheet immediately lends itself to the task, and with some of the modern additions to the more traditional software suites, data entry and presentation have become easier than ever -- even for a keen amateur coder.

MASS UNITS	TARGET ERROR [+/- %]	AVERAGE ERROR [+/- %]	AVERAGE LIFT WEIGHT [kg]	AVERAGE TIME PER LIFT [minutes]	ESTIMATE TENDENCY
kg	10%	-6%	790	4	30% OF LIFTS OVERESTIMATED 40% OF LIFTS UNDERESTIMATED
CHOPPER SWL	TARGET SAFETY FACTOR	AVERAGE SAFETY FACTOR	AVERAGE kg PER MINUTE	NO OF LIFTS + TARGET SAFETY FACTOR	RECOMMENDATIONS
1200	2.0	1.6 (0.5 SD)	240	16/39%	TRY INCREASING YOUR ESTIMATES BY 5%

LIFT ID	TIME	ESTIMATE [kg]	ACTUAL [kg]	ERROR [% of ACTUAL]	TIME PER LIFT [minutes]	kg/ MINUTE	SAFETY FACTOR	COMMENTS
1	08:46	700	690	+ 1%	3	230	1.7	
2	08:49	750	850	- 12%	3	263	1.4	
3	08:52	800	830	- 4%	4	208	1.4	
4	08:54	880	840	+ 5%	3	287	1.4	
5	08:59	800	730	+ 10%	3	243	1.6	
6	09:02	800	800	+ 0%	3	267	1.5	
7	09:05	700	770	- 9%	3	237	1.6	
8	09:08	600	590	+ 2%	2	295	2.0	
9	09:10	800	840	- 5%	3	260	1.4	
10	09:13	800	780	+ 3%	4	195	1.5	
11	09:17	900	900	+ 0%	4	225	1.3	
12	09:21	700	670	+ 4%	3	233	1.8	
13	09:24	750	780	- 4%	14	56	1.5	
14	09:28	750	710	+ 6%	4	176	1.7	Rebuilding chopper
15	09:42	900	940	- 4%	3	313	1.3	
16	09:45	950	910	+ 4%	3	303	1.3	
17	09:48	1,000	1,100	- 9%	8	126	1.1	
18	09:56	500	550	- 9%			2.2	

What Does It Do?

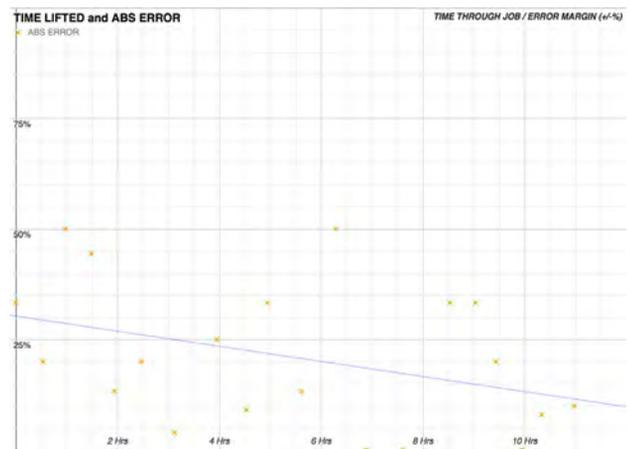
Basically it's primarily a spreadsheet that has some fancy functions and conditional formatting which mean that the information becomes colour-coded and immediately calculated into useful feedback. At the moment, the package is very much "in Beta" [not finished] but hopefully by releasing it to a wider audience and gathering user feedback, it can be fine tuned into a finished product.

The dogman recording lift weights fills out the sheet as the climber completes their cuts. Blue text indicates an input [information needing to be inserted by the user]. Pink text indicates an output [insight gained from the inputted data]. An error margin is calculated, based on how close to the estimate the actual weight of each lift was. These can be either positive or negative [over or under estimates]. The user also sets a target error margin that they do not want to fall outside of. If the climber makes an estimate that falls outside of this target then a red exclamation mark is produced next to this data log. A target safety factor is also inputted at the beginning of the job; the sheet calculates this for each lift as you go through the job.

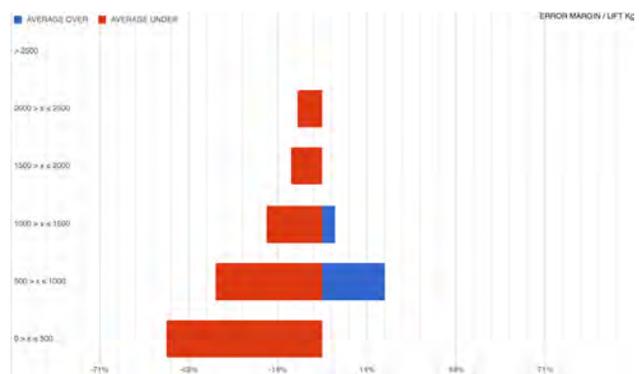
Once the job has been completed, the climber's performance can be assessed via text-based feedback [pink text at the bottom of the sheet]. Alternatively a series of graphs can be used to assess the climber's performance visually.

Visual Feedback

The first graph produced plots the time through the job [x-axis] against error margin for each lift [y-axis]. This is arguably the most important representation of performance because it shows whether the climber became more or less accurate with their estimates as the job got completed. Put simply, if the blue line goes downwards, you became more accurate as the job progressed [less error]; if it goes upwards then you became less accurate.

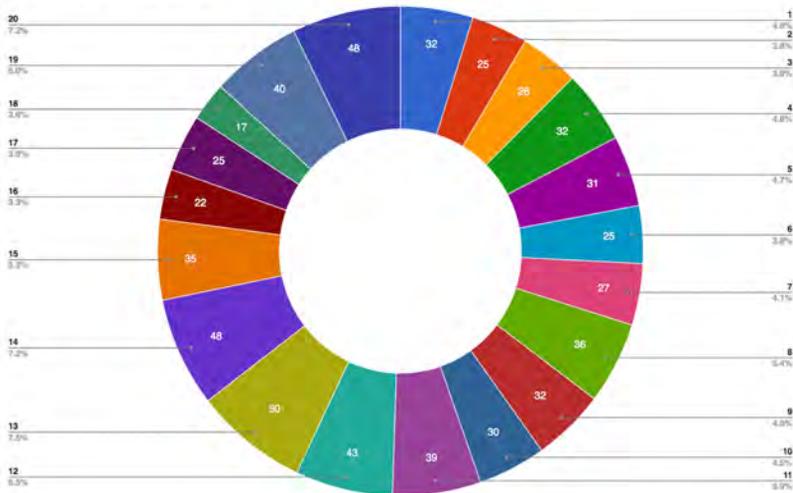


The second graph breaks down the lifts into size categories. This means that the climber can see what their estimate tendencies were relative to the sizes of piece being lifted. It is likely that the larger, round sections of timber at the end of the job are easier to estimate accurately. This would be shown by a small bar at the top of the graph. Red bars show what the average underestimate was for that size category, blue bars indicate what the average overestimate was for that size category.



The final chart is arguably the simplest. It shows the time taken for each lift. Managers or estimators will likely be interested in this graph because they can easily see how long each lift takes to complete. Minutes taken for the lift are written in the centre of each section, the lift ID and percentage of the total time are indicated at the sides of the graph. A series of roughly equal-sized sections indicates a smooth and effective job.

TIME TAKEN (minutes) PER LIFT



Who Should Use LogA?

This package appeals to three main tiers within the industry, these being:

CLIMBERS - [Looking to improve]

COMPANY OWNERS/MANAGERS - [Looking for hard evidence of their commitment to safety/productivity]

TRAINERS/POLICYMAKERS - [Looking for insight into how best practice should be developed]

WHAT COMES NEXT?

We need user data! If you're interested in using the sheet then please get in touch via the following email:

sam@ropeworkeducationdesign.com

The program is freely available and at the moment it runs via Google sheets on desktop, tablet or mobile -- all data is stored online and backed up to the cloud. All you need is a Google account and mobile signal. Eventually a "Big Data" style cloud processing element will be incorporated. This will collect information from across all users -- hopefully resulting in useful feedback for contractors, manufacturers, policy-makers and most importantly climbers.

Sam works as a climber in West Auckland and operates a technical consultancy company trading as RED - Ropework Education Design Ltd. With strong links to manufacturers and a thorough understanding of arboriculture and its related disciplines, RED offers high-end technical solutions to complicated problems. Watch out for training courses, online content and technical reports on future developments in the industry.

Reference | M. Bridge [2015] | "Documentation, Documentation, Documentation" | Treemagineers Blog | 17-06-15
 URL | <http://www.treemagineers.com/blog/documentation-documentation-documentation/>

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Industry News

Standards Series 2: What You Said- Survey Results

By Howell Davies & Erika Commers

Correspondence to:
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In November last year, the NZ Arb 2017 Membership Survey was carried out as a means to understand our members and to shape our strategy objectives. One of the core themes identified from this was the need for greater industry professionalism. Industry Standards are the foundation for industry professionalism.

In the Autumn 2018 issue of *Tree Matters* an introductory article about Industry Standards was provided to readers. An NZ Arb online survey followed during the month of April to collect thoughts and knowledge from our community on the topic.

A majority of arborists want New Zealand to work collaboratively with agencies offering international standards of best arboriculture practice, rather than going it alone to form a set of New Zealand standards. That's one of the important conclusions from NZ Arb members and others who answered the NZ Arb survey questions.

Thank you to those who completed the survey. The executive appreciates your time and input on this. Breakdown of the survey showed that we had 190 people respond and of those who looked at the survey 99 completed it, and 91 started or looked at it, but dropped out. If you were one of those we would appreciate some understanding as to why.

The survey had a 52.83% completion rate, which is a very positive effort.

Viewed	592
Started	191
Completed	99
Completion Rate	51.83%
Drop Outs	92
Time To Complete	6 minutes



Figure 1
Exhibits the responses by location. It is nice to see we are reaching our colleagues overseas.

Survey responding may seem a hassle, however, just as trees take time to grow and mature, feedback assists to cultivate our industry in a deliberate way so that we can reach maturity as a successful organisation and profession.

Surveys help us to gain an understanding of a subject and whether there is a need to work harder to up skill and inform the NZ Arb membership.

Figure 2 shows a percentage breakdown of the answers to the questions sought. Feedback received was largely positive. It's good to have this level of engagement and overall quality of the feedback.

Now that we have a reasonable understanding of the New Zealand arboriculture industry's Standards awareness, from here it can be discussed how our community can benefit from and improve on these results.

The general feedback has been that we as an organisation need to adopt some form of standard that the association will support and endorse.

Our survey numbers show that the British Standard looks to have the most backing with 42% of respondents most familiar with it. And why is this? Is this a result of our British heritage? Or may it also be that this standard is commonly used in our educational programmes?.

Who pays?

There were a number of comments in the survey that relate to how and who should pay. However, actual costs are unknown. Central government, the NZ Arb Association and industry partners have all been suggested for funding the development of NZ standards. Other feedback provided has indicated that the creation of a single official Standard can easily cost six figures. It is unclear at present what opportunities there are for us to develop our own Standards, or to fund this work. Further exploration may be needed. Please let us know if you have more information to add to this.

In reviewing existing published Standards, for example BS 8545:2014 "Trees: from nursery to independence in the landscape – Recommendations", a robust bibliography appended contains 22 references and 84 further reading recommendations. This list includes people such as Kim Coder, David Nowak, Cecil Konijnendijk, and Philip van Wassaner; all are considered to be leading industry experts. This example should demonstrate how existing Standards already contain appropriate context and detail required for our industry to work to.

We know that industry standards are essential to the professionalism of an industry and that adherence to consistent specifications will benefit us all. However, extensive time and significant funding are required to develop arboricultural standards specific for New Zealand.

What about climate?

Others suggested the need for developing Standards specific to New Zealand conditions versus adopting an overseas approach. It is acknowledged that trees do grow differently in various regions of a country. However, this does not necessitate developing a Standard with a level of detail that is specific to every climate in a country. Looking at the existing Standards we have reviewed, an industry has only one set of Standards across an entire country. The American, British, and Australian Standards are all applicable to their entire political, cultural, and geographic region, although

the climates are highly varied, ranging from coastal to inland and north to south.

We all know that tree protection policies with local authorities are variable across New Zealand, which does lead to a number of problems and outcomes. It would be ideal to have one set of standards adhered to nationwide with finer detail in localised regions or area-specific standard operating procedures and guidance documents.

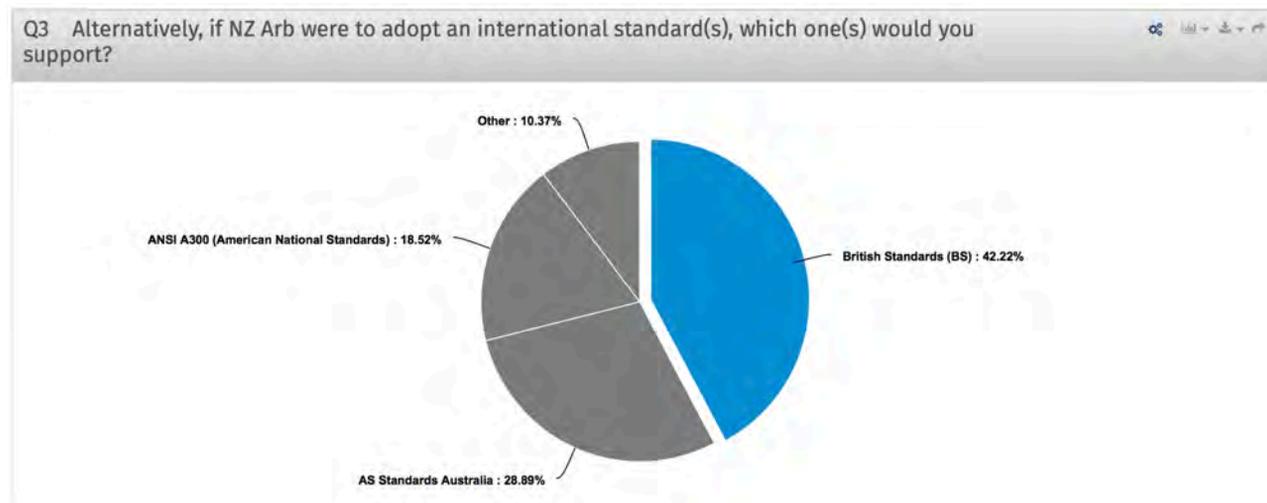
Why just one?

Simple, professionalism. It is our hope that we can successfully come together as an industry to agree upon a common standard or approach. This will provide a basis for determining consistent and acceptable minimum levels of quality, performance, safety and reliability.

There was a lot of feedback to questions 3 & 4 that reiterated and supported the need to unify our approach; this further reinforces what the NZ Arb Committee determined when we embarked on this journey.

In time, as we develop our industry there are going to be increasing opportunities, and in the future we may have sufficient critical mass to develop our own standards. Until then let's work collaboratively to agree on the use of existing standards with modifications only if need be. It may be discovered that a suitable answer exists. If not, it looks like we have a lot more work to do on our own case studies.

Figure 2



Q1 We would like to know how much knowledge you have of international standards on tree work, tree care, tree protection, and nursery practice. Please rate your familiarity with each of the following standards:

British Standards (BS)		
Very Familiar	20	16.95%
Familiar	41	34.75%
Slightly Familiar	49	41.53%
Not Heard of it	8	6.78%
Total	118	

Australia Standards (AS)		
Very Familiar	12	10.43%
Familiar	38	33.04%
Slightly Familiar	54	46.96%
Not Heard of it	11	9.57%

American National Standards (ANSI A300)		
Very Familiar	9	7.69%
Familiar	26	22.22%
Slightly Familiar	63	53.85%
Not Heard of it	19	16.24%

Q2 What is your opinion? Do you believe NZ Arb should work with industry to develop our own NZ standard(s) for tree work, tree protection, and nursery production, planting?

Yes, NZ Arb should work with industry to develop our own NZ Standards (or SOP or industry best practice guide)	34	31.78%
No, NZ Arb should work collaboratively with bodies offering existing international standards (or SOP or industry best practice guide)	52	48.60%
No opinion	8	7.48%
Other	13	12.15%

Q3 Alternatively, if NZ Arb were to adopt an international standard(s), which one(s) would you support?

British Standards (BS)	57	42.22%
AS Standards Australia	39	28.89%
ANSI A300 (American National Standards)	25	18.52%
Other	14	10.37%

Tree of Knowledge

The One Third Rule



By Frank Rinn, Physicist and court-registered tree expert
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Shortly after the first presentations, the so-called “one-third-rule” (see for example: Mattheck et al. 1993) became a popular criterion for evaluating the breaking safety of urban trees around the world: as soon as the thickness of the outer intact shell-wall (t) of a hollow or decayed tree stem is less than $1/3$ of the local radius (R), this stem section was supposed to be significantly more likely to break under wind loads. Many arborists, and probably even more judicial and insurance experts around the world, interpreted the corresponding graph (Fig. 1) as defining a clear line between “safe” and “unsafe”. As a central part of the so-called VTA concept (“Visual Tree Assessment”: Mattheck & Breloer 1994), the $t/R > 1/3$ -rule is still the most commonly applied tree-breakage safety threshold around the world.

However, since its introduction, the $1/3$ rule has been widely criticized especially from experts preferring the SIA concept for evaluating tree-safety (“Static Integrated Assessment”: Wessolly & Erb 1998). Gruber (2007, 2008), for example, criticised the VTA- $1/3$ -rule as a “scientifically unproven”, “mono-causal” and “untenable failure criteria” for trees. On the website www.dasgruen.de, several publications and statements from various authors can be downloaded in support of Gruber’s criticism against the use of the $1/3$ rule and other VTA thresholds, such as the H/D (height/diameter) ratio. In addition, many arborists have observed real trees breaking with small or no defects (Fig. 2), and mature trees standing on thin shell walls for decades (Fig. 3). These observations tend to confirm Gruber’s criticism that the $1/3$ -rule is not correct.

Several other professors from public universities support Gruber’s position and promote SIA, while criticising the $1/3$ -rule in VTA. In consequence, the criticism of the “mono-causal” VTA criteria developed into a mono-culture of SIA advocates dominating nearly all tree-care conferences and educational institutions in tree safety issues. This trend is seen not only in Germany, where the debate started and was successfully exported, but even internationally: at an international tree-biomechanics conference in USA, for example, nine out of ten presentations criticised VTA and promoted SIA and the related diagnostic products of one company.

Mattheck and Bethge responded clearly to the criticism of Gruber and others (2007, 2008) and claimed: VTA and the $1/3$ -rule are valid results of reliable scientific studies

and SIA is based only on assertions. In 2009, Fink (a widely respected forest pathologist) confirmed Mattheck’s statements and clearly contradicted Gruber’s positions as well.

This debate left many arborists and experts around the world in confusion: the by far the most frequently asked question I am getting at workshops around the world is: “Who is right: VTA or SIA?” in conjunction with “Can we still use the $1/3$ -rule for safety evaluations although most well-known experts now prefer and promote SIA?” Thus, there seems to be a need for a clarification of this aspect.

Basics

According to Gere & Timoshenko (1997), the relative load carrying capacity (rLCC) of a circular cross-section of a homogeneous material (with outer diameter D), covering a centrally located void (of diameter d) is proportional mainly to these two geometric properties. Consequently, it can be written as a function of radius (R) and shell wall thickness (t) as well:

$$rLCC \sim (D^4 - d^4) / D = 8(R^4 - (R - t)^4) / R$$

This calculation determines the so-called “section modulus”. Using this formula, it can be shown how the normalised bending load-carrying capacity of a cross-section depends on the ratio of t/R (Fig. 4). But,

this concept only recognises longitudinal tension and compression stresses and assumes a homogeneous material. Because wood is not homogeneous and not isotropic, the section modulus cannot describe the behavior of cross-sections having large defects: a deeper analysis of these aspects by Ledermann (2003) shows that even when loaded under bending, tangential tension stresses occur in the cross-section (Fig. 5). And these stresses are significantly stronger when t/R decreases as compared to tension and compression stresses (covered by the section modulus as described above). This is important for wood because it is non-homogeneous and non-isotropic (Blass & Schmidt 1998): material strength properties vary significantly depending on loading direction relative to the fibres, and torsional strength is by far the weakest, making wood significantly more susceptible to shear and tangential tension stresses. Consequently, the real load-carrying capacity of hollow wooden cross-sections is significantly smaller compared to homogeneous materials (as shown in Fig. 4. and represented by the section modulus) as soon as the ratio of shell wall to radius drops down below approximately $1/4$ or $1/5$ (Fig. 6) – depending on the longitudinal size of the defect and depending on various wood

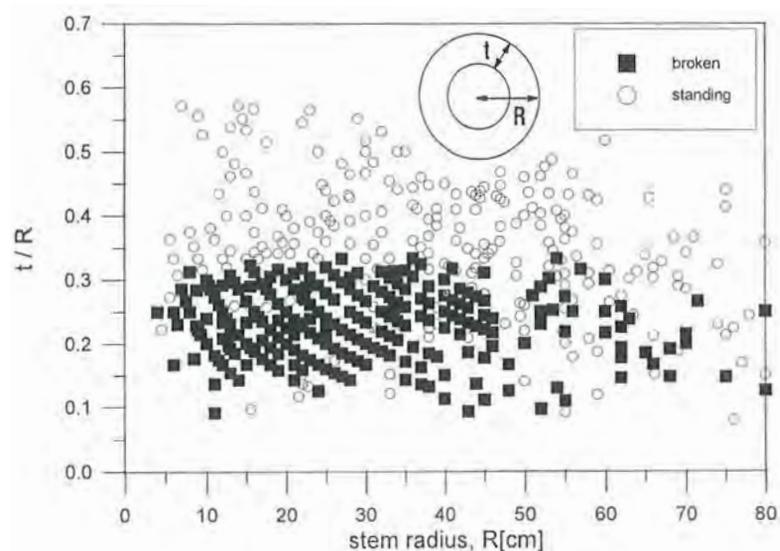


Figure 1

This is one of the graphs that were used to prove the $1/3$ -rule (Mattheck et al. 1993): broken stems with centrally rotten zones are represented by black squares and hollow circles show standing trees with corresponding central defects. The position of the symbols is defined by the outer radius of the stem (R) on the abscissa (X) and the ratio of t/R on the ordinate (Y) axis. The fact that no black squares are shown above $t/R = 1/3$ led to the first interpretation of this graph by many (if not most) arborists: as long as $t/R > 1/3$, the tree is safe and will not break.



Figure 2

Two of many examples of broken conifer trees (*Picea abies*) not represented in Fig. 1. The tree on the left had a small defect in the center of the stem base with $t/R \approx 1/2$ but broke on a height where $t/R = 4/5$. The tree on the right was fully intact ($t/R = 1$) and broke in a combination of torsional and dynamic loading in a wind gust of a thunderstorm (while the author was standing beside the tree inspecting the stem). Such failures should be represented by at least a few black squares above the 1/3-line in Fig. 1, but, such values are missing.

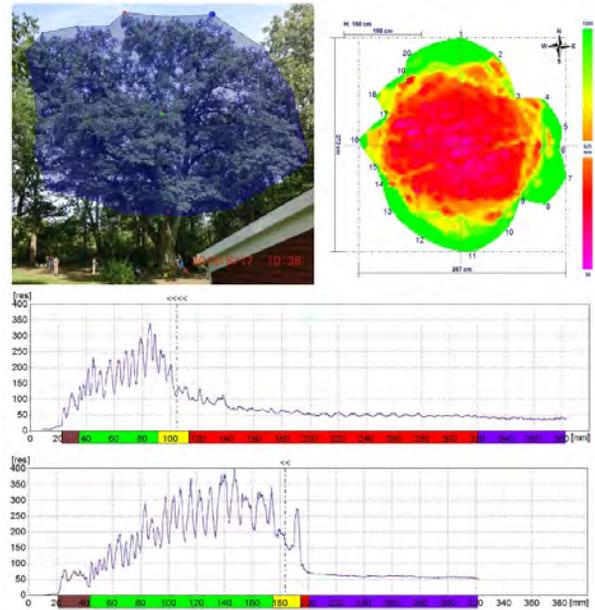


Figure 3

This mature oak tree (*Quercus*) has a diameter at breast height of more than 2.5m (>100"). As can be seen by the sonic tomograph (Rinn 1999, 2014b) and the resistance drilling profiles (Rinn 1988, 1990, 2016), the intact outer shell wall ranges from a few centimetres to approximately 30cm (12"). The average shell wall thickness is less than 25cm (~10"), which means $t/R < 1/5$. This tree is standing although being heavily defective and hollow for decades and providing a significant total height of more than 25m. Arborists, strictly applying the 1/3-rule as commonly understood, usually condemn such trees as being unsafe or tend to recommend strong pruning and even cabling, although often there is no need for that and although strong reductions significantly contribute to an accelerated spread of internal fungal defects (Rayner & Boddy 1983). Applying the tree-safety concept presented here, leads to different conclusions and mostly results in nothing to be done or pruning the crown symmetrically in order to prevent wind-induced torsional loads.

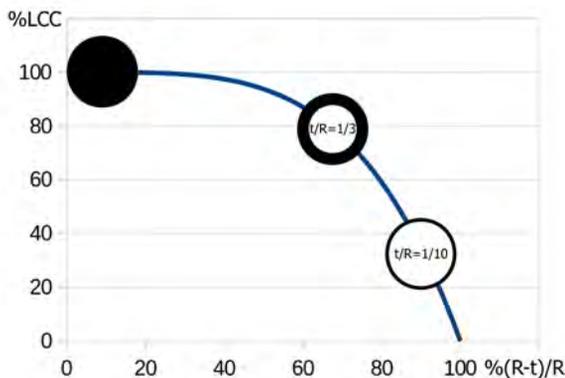


Figure 4

This graph visualises how the relative load-carrying capacity (%LCC) of a cross-section depends on the shell wall thickness and corresponding „hollowness”, according to Gere and Timoshenko (1997) for homogeneous materials. The curve starts at left with t/R at 100%, representing the fully wooded and intact cross-section. With decreasing shell wall (t), the size of the centrally located void increases and leads to a correspondingly bigger loss in load-carrying capacity. Surprisingly not only to many arborists, with $t/R = 1/3$, the central void covers approximately 45% of the cross-sectional area but leads to a loss in load-carrying capacity of only about ~20%. From this point on, however, with further decreasing shell wall and increasing void size, the loss in load-carrying capacity increases more significantly than before. Because of that, $t/R = 1/3$ is seen by many as a “turning-point” from where to start worrying about stability. But, it is important to understand that this is valid only for trees still growing in height with centrally rotten circular stem cross-sections. For other trees, another concept has to be applied.

material properties (Spatz & Niklas 2013). That means, according to Fig. 6, as soon as t/R drops below approximately 1/3 or 1/4, the load-carrying capacity of the corresponding cross-section decreases significantly as compared to the simplifying section modulus concept (used by SIA, for example, as can be seen in Fig. 12). The findings of Scatter and Kucera (2000) confirm that torsional loading is a frequent cause of failure for trees (Fig 7).

Obviously, nature knows about these aspects of stability in such kinds

of structures: radial density profiles of coconut palms, for example, typically show significantly higher density on about 1/3 of the outer part of the radius (Fig 8). Thus, there must be a reason for this kind of internal mechanical design, otherwise, the evolutionary process would not have selected this concept. Interestingly, the ratio of total tree height (H) over diameter at breast height (D) and several other allometric properties of coconut palms are similar to those of slender conifer forest trees (Fig. 9) from

which the data for the 1/3-rule graph (Fig. 1) was derived.

This means, $t/R \sim 1/3$ seems to have a meaning in terms of the load-carrying capacity of hollow or rotten stems of a specific kind of tree (centrally rotten circular stem), but the question is how to apply this knowledge practically to the typical mature urban tree to be inspected in terms of safety?

At the real urban tree

Arborists trying to practically apply the 1/3-rule quickly realise that mature urban trees are much more difficult when compared to the common young slender forest tree with a centrally rotten zone (Fig. 10). The typical urban road-side or park tree to be inspected in terms of safety is different in many ways:

- the cross-section of the trunk at the stem base – root transition is not circular
- the defects are mostly not located in the center of the cross-section.

As a result, the 1/3-rule simply cannot be applied because there are hundreds of different t/R values in the same cross-section.

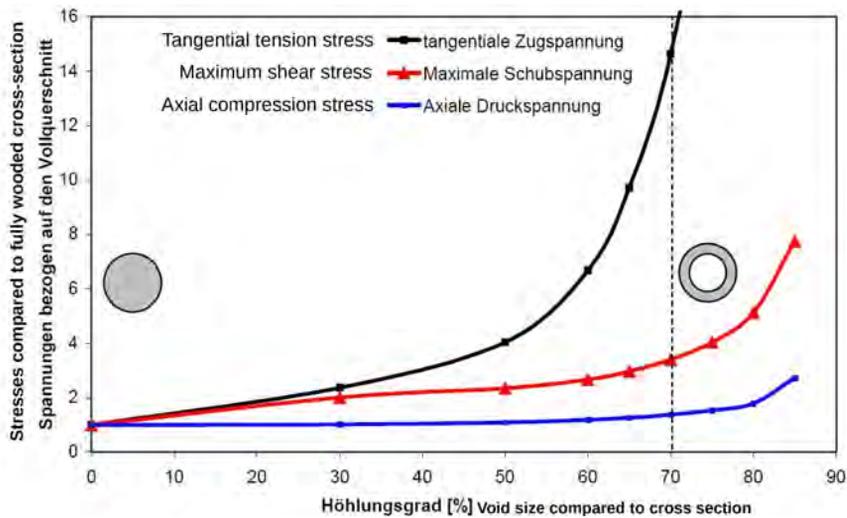


Figure 5

Ledermann (2003) showed that shear (red) and tangential tension (black) stresses increase significantly more strongly compared to longitudinal compression stresses (blue) when hollow cross-sections are loaded under bending – depending on the shell wall thickness. This is important for wood because torsional strength is by far the weakest material property (Blass & Schmidt 1998).



Figure 7

Torsional failure of hollowed trunks like that shown here (Picture by Duncan Slater) are mostly observed at trees with $t/R < 1/4$ (and thus below $1/3$ as well).

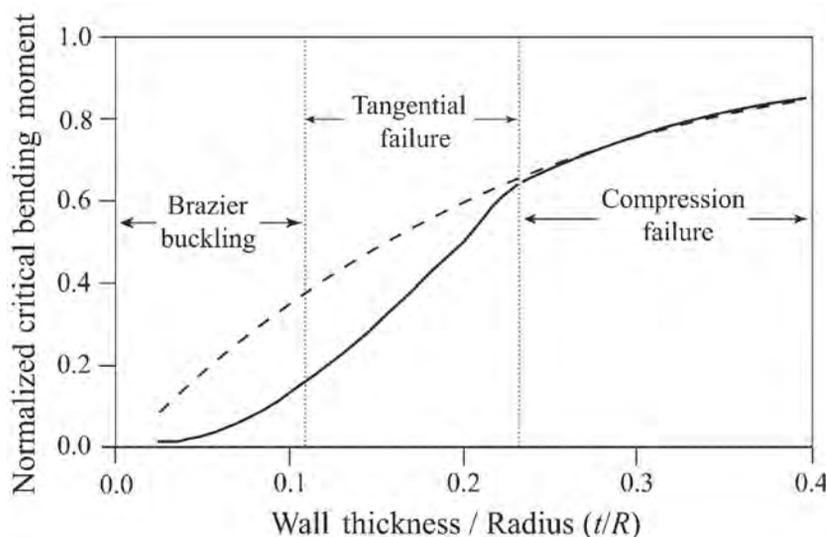


Figure 6

Mainly in consequence of the relatively low torsional strength of wood (Blass & Schmidt 1998) and because bending loads lead to shear and tangential stresses (Ledermann 2003), the real load-carrying capacity (as represented by the critical bending moment and shown here with a solid line) is significantly smaller than the simplifying section modulus concept (dotted line) as soon as $t/R < 1/4$ (Spatz & Niklas 2013). This explains why evaluation methods (like SIA) based only on the section modulus and ignoring shear and torsional stresses overestimate the load-carrying capacity of thin-walled hollow cross-sections (Fig. 12).

Which one is the correct for evaluating safety? None, when taking into account the findings described in the previous section. Does that mean, the 1/3-rule is worthless? Fortunately not!

As shown above, a circular stem with a central void gets significantly more susceptible to breakage as soon as the shell wall drops below $t/R = 1/3$, that is, as soon as the loss in load-carrying capacity due to the defect is higher than 20%. Then, why should natural evolution not provide the same threshold when cross-sections are not circular and defects are not concentric? Thus, it seems very logical that tree stems as natural, mechanically loaded structures in general tolerate up to approximately 20% loss in load-carrying capacity due to defects without getting significantly more susceptible to breakage -- for all kinds of

cross-sectional shapes and locations of defects. This threshold we can apply to any kind of cross-sectional shape with any kind and location of defect(s): we just have to determine the loss in load-carrying capacity depending on the size and shape of the cross-section and depending on the location and size of the defect(s).

To do this, we need a tomographic representation of the cross-section. That can be done either by applying sonic tomography (Rinn 1999; 2014b) or by simply drawing the cross-section by hand on a smartphone/tablet application (Fig. 11), based on visual estimation or some resistance drillings (Rinn 1990, 2012, 2016). Although such tomographic approaches may look simple, using such kinds of applications and calculations requires a basic understanding of the topic. And it has to be done carefully.

The smartphone application shown here calculates only geometrical properties of the section modulus and delivers relative results: the relative loss in load-carrying capacity of a defective cross-section in comparison to the fully intact situation. For two reasons, this relative approach does not take into account the potentially differing material properties within the cross-section: on the one hand, it is practically impossible to measure the material properties of a cross-section precisely enough without destroying it (Niklas & Spatz 2012). On the other hand and much more importantly, the geometrical size properties of the load-carrying parts of a cross-section are much more important than the material properties (Rinn 2013): the load-carrying capacity of a cross-section is proportional to the material strength multiplied by the diameter to the power of three (Gere & Timoshenko 1997). And this shows that, in this context, size matters much more than material quality. This is the reason why it is more important to determine the size (diameters and shape) of a cross-section and the location of defects than the material properties. Consequently, locally measured values of strength or elasticity are of relatively small importance in terms of the breakage safety issues discussed here.

An alternative approach could theoretically be to take material property values from reference tables as done by the SIA concept. However, how it becomes clear how dangerous it is to assume material properties taken from reference tables for a certain wood species, when applying the freely available SIA online tool, providing basic calculations used in the SIA concept and for SIA-pulltest calculations:

<http://sia.simgruppe.de/sia.php>

This online calculation basically determines the load-carrying capacity by calculating the section modulus as described above, multiplied by material property values taken from reference tables (Wessolly & Erb 1998). Applying this concept

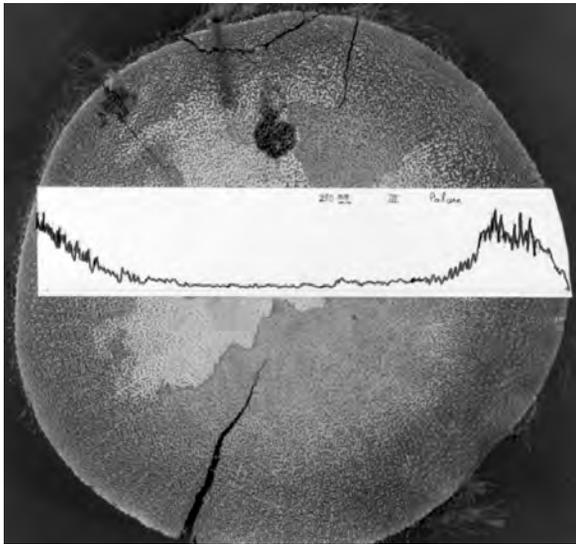


Figure 8

In stems of coconut palms, the radial density profile often shows high values on the outer 1/3 of the radius. Such density profiles can be measured by resistance drilling - but only when the drill provides a profile with a high resolution and high correlation to wood density ($r^2 > 0.8$; Rinn 2016), because only then the profiles correctly reveal wood density along the needle's path of penetration. The profile shown here was obtained by using a 'real' RESISTOGRAPH®. This special kind of electronic recording resistance drilling device was developed after two of the method's inventors (KAMM&VOSS) realised that mechanical and spring-driven recording of penetration resistance systematically delivers erroneous profiles leading to wrong evaluations of the wood condition. Knowing this, it would have been irresponsible to sell such kinds of resistance drilling devices and in consequence, KAMM&VOSS developed a system with electric recording and applied for a patent (Kamm & Voss 1985). This was then further developed to electronic recording and the machines were later branded with "RESISTOGRAPH®", a trademark since registered in 39 countries.

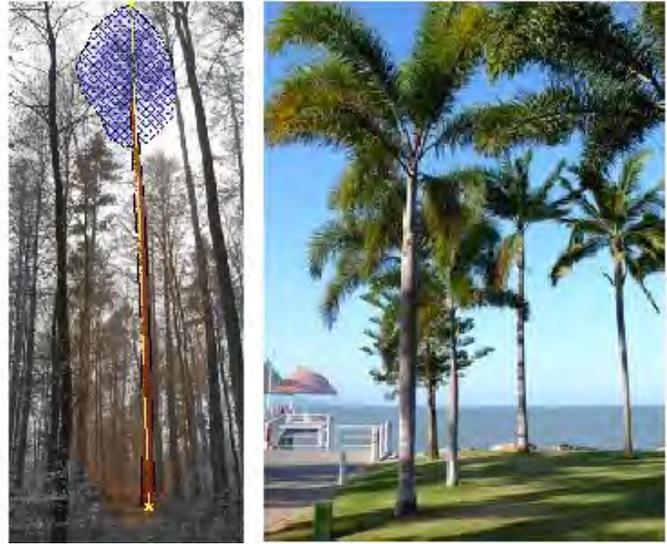


Figure 9

When comparing typical coconut palms and slender conifer forest trees, allometric properties such as tree-height to stem diameter at breast height as well as crown size, the relationships seem to be quite similar. Consequently, the fact that coconut stems provide high density wood on the outer 1/3 of the radius (and can be very soft in the center) is seen as a confirmation that such kinds of mechanically wind-loaded structures need the outer 1/3 of the radius to be intact and strong in order to be sufficiently safe against wind bending.

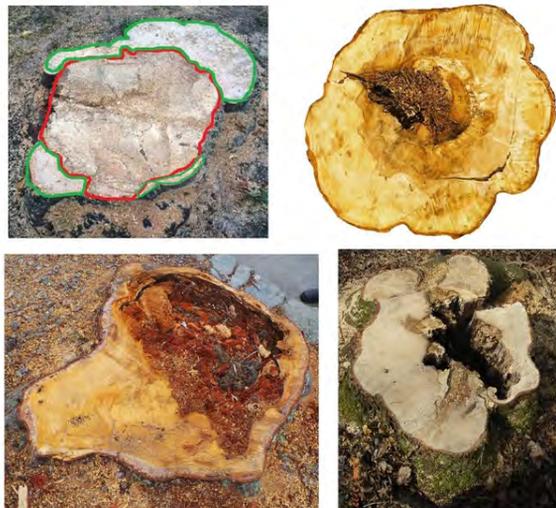


Figure 10

Stem cross-sections typical for mature urban trees to be inspected in terms of safety: the cross-sections are commonly not circular and the defects mostly located off-centre. Such cross-sections provide many different radius values and many different shell wall thicknesses (t), often ranging from zero ($t=0$) to fully wooded ($t=Radius$). Consequently, there is no typical or average t/R that could be quickly determined at the tree. Minimum, maximum, or average t/R values do not represent the load-carrying capacity of such cross-sections and thus, the 1/3-rule does not apply to this kind of tree.

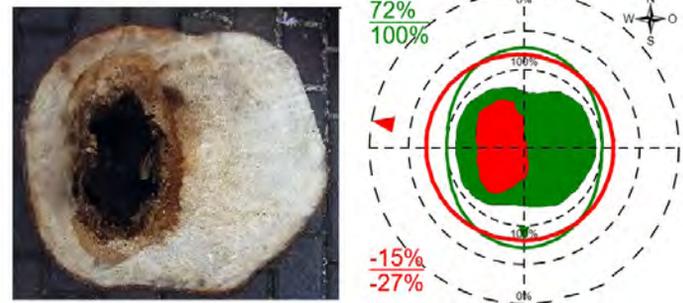


Figure 11

For evaluating the loss of load-carrying capacity of such a relatively simple non-circular cross-section with an off-centre defect, a local measurement of shell-wall thickness is not sufficient and the 1/3 rule cannot be applied in any reasonable way. When no sonic tomography is available or too expensive, a few resistance drillings can help with the drawing of a sketch of the cross-section by hand on a smartphone app (right). This allows us to determine the loss in load-carrying capacity for a better evaluation of tree safety. In this case, the defect leads to a loss in load-carrying capacity of approximately 26% for winds from the East and ~15% for winds from North and South. This aspect shows how difficult or even impossible it is to determine the breaking safety of such a cross-section with any kind of method by measuring only at one point (resistance drilling, pull-testing, increment core cracking). Without knowing the internal situation and the loading direction with the biggest losses in load-carrying capacity, it is impossible to determine the safety of such a tree. The tree would have to be pulled into several directions (preferably using four strain sensors at different heights) in order to determine the most dangerous loading direction. This is commonly far too expensive and thus impractical. In addition, for evaluating the meaning of strain-measurements, reference values are required that might not be applicable to the specific tree for evaluation (Fig. 12). Thus, pulling-tests are not a solution for such kinds of breaking safety evaluations.

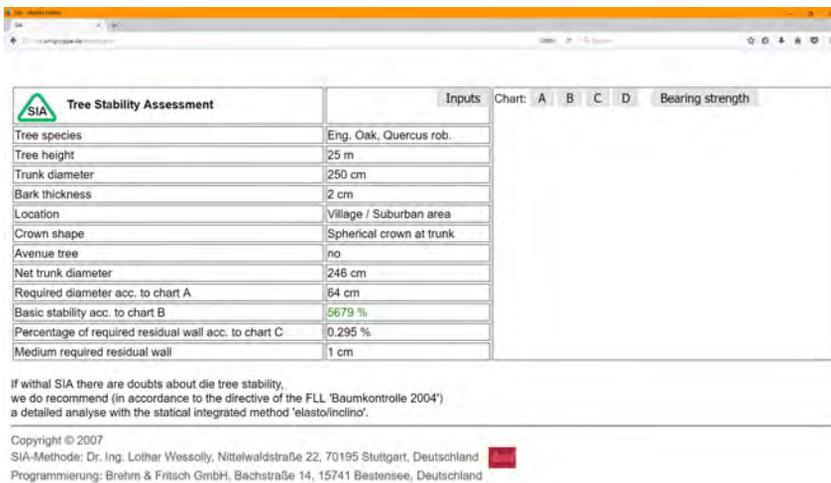


Figure 12

This SIA-Online Form can be used for free and allows us to determine the so-called “Basic stability” (=breakage safety factor of the tree with an intact stem) as well as the “Medium required residual wall” for sufficient safety. For the oak tree shown in Fig. 3 with a total height of more than 25m and a stem diameter of 2.5m (~100”), this minimum wall-thickness has to be 1cm (0.4”) according to SIA for sufficient safety. This obviously incorrect result is a consequence of inappropriate reference values and the fact that the section modulus does not correctly reflect the load-carrying capacity of thin-walled wooden tubes as can be seen in Fig. 6.

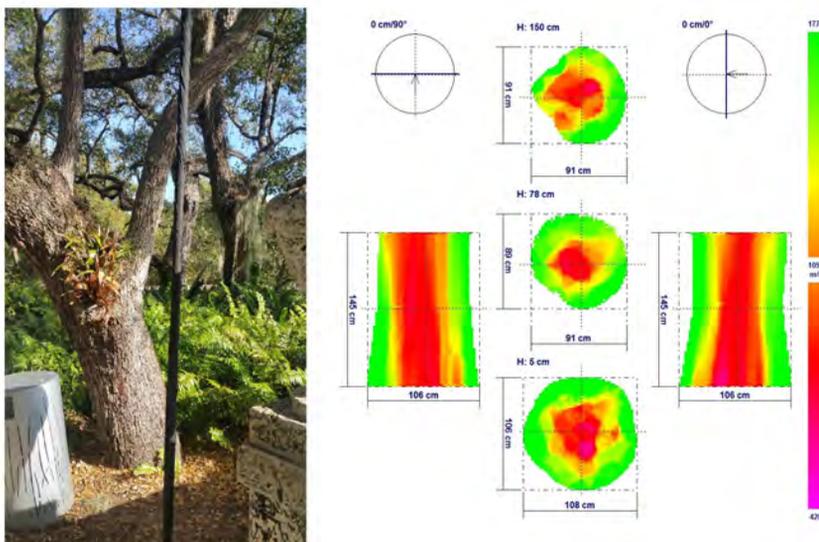


Figure 13

This tree has been standing close to a subtropical coastal shore line for more than 120 years. As shown by the sonic tomogram, the stem is severely damaged and and has been hollow for decades. But, the tree survived dozens of hurricanes while young intact trees in the same area broke. This confirms that the older trees are, the higher their basic safety and the more decay they can tolerate without being significantly more susceptible to breakage.

to the oak tree shown above (Fig. 3) leads to an interesting result (Fig. 12) for sufficient breaking safety: “Medium required residual wall = 1cm”. This obviously incorrect result is a consequence of mainly two reasons:

- material property reference values (stiffness, critical strain, and drag coefficient) do not need to be correct for the specific tree (Spatz & Pfisterer 2013);
- the real load-carrying capacity of hollow wooden cross-sections is significantly smaller when calculated by the section modulus (Fig. 4) soon as $t/R < 1/3$ (Fig. 6).

In consequence, the SIA concept overestimates the real load-carrying capacity by at least a factor of 10 and should thus not be applied for safety-related evaluations of such kinds of trees. However, there are some aspects to be recognised and acknowledged within the

SIA concept (Wessolly 2005):

- Breakage safety is not only determined by the relative loss in load-carrying capacity of a cross-section but is always a result of comparing load-carrying capacity with the real load the tree is facing (However, doing this in absolute numbers does commonly not work as shown in Fig. 12).
- Mature trees can provide a much higher basic safety compared to younger trees (due to their age).

The load on a common urban tree mainly comes from wind and is proportional to height (H) of the tree to the power of three (Rinn 2014a). Interestingly, the load-carrying capacity of the stem cross-sections depend on the diameter (D), similar to the way wind-load depends on total tree height (H). In consequence, D^3/H^3 can be used as a measure for tree

safety, not in absolute numbers (as shown above), but by observing relative changes of this ratio over time (Rinn 2015). The fact that trees try to keep H/D constant for decades after the juvenile growth phase (Kahle et al. 2008) can thus be interpreted as their desire to keep a constant safety factor ($\sim D^3/H^3$) for this period of the tree’s life-time. But, as soon as tree height is not increasing any more (typically 60 to 80 years of age for common urban broad-leaved trees), trees still annually put on a new growth layer and thus continue growing in girth. Consequently, the older that mature urban trees are, the higher their basic safety factor and the more defects they can tolerate (Fig. 13) because of the continuously increasing basic safety ($\sim D^3/H^3$). Taking into account this aging effect allows us to determine the gain in safety for any kind of mature tree (Fig. 14) and thus allows us to find out the extent of defects that can be tolerated without having an increased probability of failure. In consequence, in many if not most of the mature trees we inspected in the last years, there was no need for pruning (for wind-load reduction) or need to recommend any other kind of mitigation measures, leading to many positive effects:

- less money needed for pruning and cabling;
- less damage to vitality and to the tree’s power of resistance against fungal decay;
- longer and cheaper conservation of mature and ancient trees as important natural habitats, not only in urban areas.

Summary and conclusions

The 1/3-rule correctly reflects the fact that the load-carrying capacity of circular cross-sections with centrally located voids drops down more strongly as soon as the ratio of shell-wall-thickness (t) over radius (R) goes below 1/3. This “turning point” in the curve of the section modulus (Fig. 4) equals a loss in load-carrying capacity of approximately 20%. But, from this point on, the section modulus calculation gets increasingly incorrect when determining the relative loss in the load-carrying capacity of a cross section due to internal defects (Fig. 6), because wood is a non-isotropic material, specially weak for shear and torsional stresses. That means, the 1/3-rule is a valid and important aspect for understanding the general properties of a certain kind of loaded, defective stem cross-section.

But, for safety assessments of the typical mature urban trees, the 1/3 rule usually cannot be applied because the cross-sections to be evaluated are commonly not circular and the defects are usually not located in the centre. Such cross-sections can be evaluated only when applying tomographic approaches, revealing a relative loss in load-carrying capacity as compared to the fully intact cross-section. But, this is only one input parameter when evaluating safety, because the load has to be taken into account as well and thus, the height and the approximate age of the tree have to be determined. Doing this in absolute numbers (like SIA) can

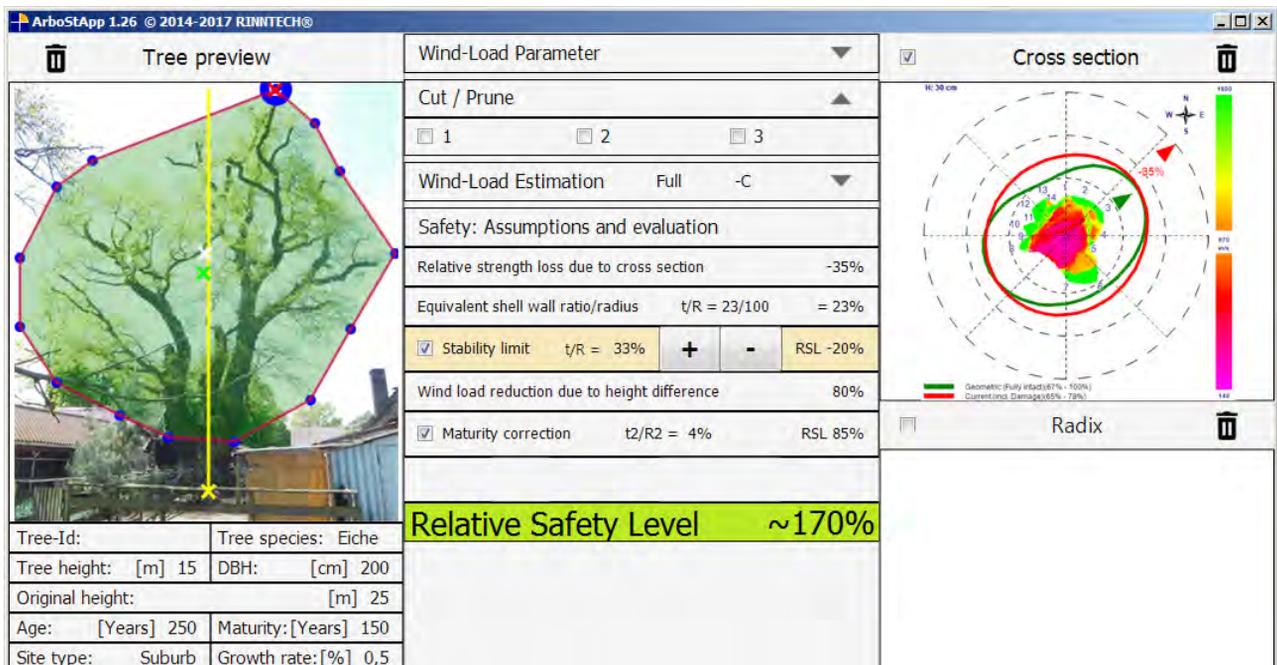


Figure 14

Example of a smartphone application estimating the relative breakage safety level of the stem of a mature oak (*Quercus robur*). The key factors are original/maximum and current tree height (Rinn 2013, 2014a), tree age, and years of maturity (after having reached maximum tree height). Although this stem cross-section lost about 35% of load-carrying capacity due to the obvious defects (equalling approx. $t/R \sim 23\%$), the remaining safety level is still significantly higher than a young intact tree (100%). Due to the reduced height (originally $\sim 25\text{m}$, now $\sim 15\text{m}$) and the age-effect (increasing girth since height growth stopped, thus for about ~ 150 years), the tree gained approximately 165% additional basic safety. Subtracting 35% due to the defect, still leaves approx. 170% and shows that there is no need for further crown reduction – although more than 60% of the cross-sectional area is hollow or decayed. However, when the load-carrying parts of such stem cross-sections get segmented, symmetric pruning and static crown cabling may be required in order to prohibit branch failures from torsional stresses.

deliver worthless or even dangerous results, as shown in Fig. 12.

Thus, relative approaches, looking for changes in the major factors over time (tree height and breast height diameter) are more appropriate as shown above: as soon as trees no longer grow in height, their basic breaking safety increases annually because the load-carrying capacity of the trunk depends on stem diameter taken to the power of three. Even tiny radial growth rates thus lead to a significant increase of the load-carrying capacity. Consequently, depending mainly on age, the changes in diameter and crown height over time lead to the fact that mature trees can tolerate significantly more and bigger defects without being more likely to break as compared to young (and even intact) trees. An uncountable number of mature trees, hollowed out over decades but surviving strong winds prove this as a fact. Fortunately, the increase of the basic breaking safety (as a function of age and growth rate) as well as the loss in load-carrying capacity can

be estimated using smartphone applications (Fig. 14) at the tree without need of external reference data (as used by SIA). Applying this safety evaluation concept to mature trees in the last years, has mostly led to no, or significantly less, pruning required because of breakage safety concerns, which is positive in many ways: it saves money and does not further reduce the tree's capabilities to defend against fungal decay (Boddy & Rayner 1983).

The director of the urban tree department of a German town recently wrote shortly before retiring: "After having applied this 'new' (RINN-) concept of tree-safety evaluation for several years, we can state that we kept many trees much longer than we would have done before, we spent much less money for tree care (pruning and cabling) while preserving a more natural urban environment and habitat - without having more failures. That means, more benefits for less money."

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Tree of Knowledge

Tree Risk Assessment The Good, the Bad and the Ugly

By David Evans
ARBEVENTS

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Following the Likelihood of Failure article in the Autumn 2018 issue of Tree Matters, it's been suggested that what you'd really like to see is an analysis of the strengths and weaknesses in current tree risk assessment systems to help you make up your own mind. Then have a look at how we might do things better.

In order of popularity, the two main players are;

- TRAQ, which is a qualitative approach that measures risk using words.
- QTRA, which is quantitative approach that measures risk using numbers.

This short review looks at some key technical points in how these systems measure risk. It's not about the people who put them together, the trainers, or those of you who use them. Though about the big two, the same points apply to any tree risk assessment system.

On the right TRAQ?

One of the attractions of measuring risk with words is that we're all familiar and comfortable with language. Words, like 'high', 'moderate', and 'low' are easy on the eye, and ear. Everyone thinks they know what they mean. The appeal of risk matrices is their 'friendly bingo card' layout and bottom left to top right risk gradient. They're uncomplicated, straightforward to understand, and are widely used. With only four categories at each stage, TRAQ increases the chances that different assessors will get the same risk simply by limiting their choices.

So what's the problem when measuring risk with words and matrices? It turns out, there's quite a few - too many to cover in such a short piece - but in a nutshell, their strengths are also their weaknesses. Before going there though, let's start with an obvious question to ask about any tree risk assessment system. Does it produce reasonable and believable outcomes? Is it credible?

A game of Russian roulette

If you're unfortunate enough to be playing a game of Russian roulette, with 'The Deer Hunter' rules, you might be surprised and relieved to find that the first round is only a Moderate risk according to TRAQ. If you're still alive by round 5 you'd be astonished to find that the risk is still Moderate. It's only if you make it to round 6, when you're going to shoot yourself in the head that the risk increases to become both High AND Extreme at the same time. Why is such an obviously extreme risk being rated as Moderate by TRAQ?

Entering the Matrix

Despite their popularity, risk matrices are "often worse than useless" (Tony Cox, 'What's Wrong with Risk Matrices', Risk Analysis, 2008) because they frequently fail to rank risks sensibly. There's a wealth of research that repeatedly demonstrates this. One of the more obvious issues is that unless they're clearly defined, words like 'high', 'moderate', and 'low' often mean very different things to different people. Whereas, some of the technical reasons, like 'betweenness', can be complicated to understand. Other ingrained problems are easier to grasp. We'll have a look at two of them - 'range compression' and 'poor resolution'.

Not too wide, not too narrow

Range compression is where a category is too narrow and too



What's the risk?

Likelihood of Failure	Likelihood of Impacting the Target			
	Very Low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Likelihood of Failure & Impact	Consequences			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Likelihood and Risk Matrices –Russian Roulette

Likelihood of Failure	Likelihood of Impacting the Target			
	Very Low 1	Low 2	Medium 3	High 4
Imminent 4	Unlikely 4 + 1 = 5	Somewhat likely 4 + 2 = 6	Likely 4 + 3 = 7	Very likely 4 + 4 = 8
Probable 3	Unlikely 3 + 1 = 4	Unlikely 2 + 3 = 5	Somewhat likely 3 + 3 = 6	Likely 3 + 4 = 7
Possible 2	Unlikely 2 + 1 = 3	Unlikely 2 + 2 = 4	Unlikely 2 + 3 = 5	Somewhat likely 2 + 4 = 6
Improbable 1	Unlikely 1 + 1 = 2	Unlikely 1 + 2 = 3	Unlikely 1 + 3 = 4	Unlikely 1 + 4 = 5

Behind the curtains of the Likelihood Matrix

accurate to be plausible. One example of range compression in TRAQ is the likelihood of failure category 'Probable'. Probable is described as 'may be expected'. In other words, more likely than not. In numbers, that's at least more than 50% of the time. Or where there's a greater than a one in two chance of it happening. This is a terrifically narrow range and requires an unrealistic level of accuracy with no room for uncertainty. Particularly, when the likelihood of failure category above it is Imminent; which is 'most

likely...in the near future' in words, a 100% in numbers, or 1/1 as a probability fraction. In Russian roulette, the likelihood goes from Possible to Probable AND Imminent at the same time in round 6.

On the other hand, 'Possible' suffers from the opposite of range compression, and that's poor resolution. At the top end, Possible must be at least as high as 50%, or 1/2 because it's the next category below Probable, even though Possible is described as 'unlikely'. And at the bottom end it needs to have stretched a remarkable distance to stand shoulder to shoulder with the lowest likelihood of failure category, 'Improbable'. Possible is far too wide and vague to be useful.

Adding apples and oranges

An ordinal number is a ranking classification. It's like giving 1st place to your favourite meal, you've come 2nd in a three-legged race, and 3rd in maths test. You can't add ordinal numbers as you would with cardinal numbers, like $1 + 2 + 3 = 6$ to come up with a final figure that means anything sensible. It's mathematically wrong. It'd be like suffering five screenings of 'Sex in the City 2' and adding them up to score it the same as one viewing of 'Citizen Kane'.

Similarly, you can't add ordinal numbers in risk assessments. It's a problem with what's known as 'Matheny & Clark', where ordinal number categories are added to give 'hazard rating' scores from 3 low to 12 high. For example, a high rating like 9 could be an extremely low risk because it's a big tree that's just about to fall, but it's in the middle of nowhere. On the other hand, a 100mm cracked branch over a park bench would only have a rating of 6 even though it's a much higher risk than the 9.

2+2 = 5

This is why the International Society of Arboriculture's 'Best Management Practices, Tree Risk Assessment' says, "Risk professionals caution that addition or multiplication of ordinal numbers is mathematically incorrect." What's odd about this sound advice from risk professionals is that it's ignored. When you draw back the curtains on the Likelihood Matrix, you can clearly see that it's built by adding ordinal ranking numbers. As is most of the Risk Matrix.

Making sense of adding ordinal numbers converted into words to measure risk can be a bit of headache. Are cardinal numbers the answer?

The numbers game

Measuring risk with numbers makes a lot of sense because it solves many of the problems of measuring risk with words. Numbers are not ambiguous or open to interpretation. They can be compared to tolerable or acceptable levels of risk that we know could be reasonably imposed because of the benefits that trees provide. We can also work out the likelihood of occupation and damage to property by using measurable values rather than words, and letting you try to work out what those words mean.

That's Numberwang!

So what are some of the problems when we measure with numbers, like QTRA does? Numbers can all too easily baffle and many of us are not very comfortable with maths. Let's explore an example of how numbers look like they can help us, but then cause problems. TRAQ describes a 'minor consequence' in words as 'moderate monetary damage to a vehicle'. This use of words to



Many of us can struggle with maths and numbers

measure consequences is not very helpful. Not least because minor damage to a new car could cost a lot more than moderate damage to a second-hand car, or writing off a very old car.

Say we clear up the ambiguity of words and use numbers to agree the average value of a vehicle. You've now got to perform some mental gymnastics to work out how long a parking bay might be occupied for. That means accounting for the hours, days, nights, weekends, holidays, numbers of cars parked, and then coming up with an average occupancy. Not only are you likely to be doing this calculation with incomplete knowledge, but it's a tax on your thinking time, and it's very easy for you to get the maths wrong.

1 Day ÷ 24 ÷ 60 ÷ 60 × y = ?

Similarly, with the number of vehicles per day. Even if you can get your hands on the traffic data, a useful figure to start with can easily become punctured by uncertainty when it's converted into what you might actually see during an assessment. It's complicated to divide day rates into manageable numbers, then make some kind of unknown adjustment because far more vehicles are likely to be there at 5pm than 5am, and on Monday to Friday than the weekend. Each step in your calculation is an opportunity for you to mess it up.

1 in what?

Numbers can not only be tricky when assessing risk, but also challenging for the tree owner or manager. They often struggle to make sense of risk outputs as probability fractions, such as 1/3 000, 1/40 000, or 1/500 000. More importantly, there's too much uncertainty in tree risk assessment to claim a level of accuracy to one significant figure, like 1/20 000. Or to be able to tell the difference between a 1/20 000 risk and a 1/50 000 risk with enough certainty to justify the difference between them.



Occupancy greater than 'constant' in words, or '1/1' as numbers is common

Not dead by 8.6

We've already talked about range compression and poor resolution. QTRA used to suffer from it with its Targets before the release of v5. However, range compression and poor resolution is still very evident in the Size Ranges. The boundaries from the top are 1/1 – 1/2 – 1/8.6. Where 1/1 is a death and 1/2 is half a death.

Similar to TRAQ's Probable, a range of 1/1 – 1/2 at a factor of ×2 is too narrow and accurate for a consequence that has such a high level of uncertainty. The next range is also very slender at just over ×4 from 1/2 to 1/8.6, and then we encounter another credibility issue. Can you really assess the extent of an injury to someone from being hit by a tree part to one decimal place? Especially when a 600mm diameter is the 1/1 value, and there's little basis or evidence to mark this diameter as equalling a death. It's simply chosen as 1/1 because it's the largest diameter in the allometric data set used. To compound the problem, 600mm is the weakest part of the data, yet it's the most important measurement because all the Size Ranges are worked from it.

At the other end, we have poor resolution, with 1/82 – 1/2500 being a factor of ×30. And another issue with accuracy. An injury to a person that's 2500 times less painful than death is a questionable level of accuracy to confidently claim or measure. After all, the medical profession doesn't try to measure an injury 1000 times less than a fatality with its Abbreviated Injury Scale, so how can we?



Switch from 24hr to stopwatch for user-friendly per vehicle likelihood of occupation

Exposing yourself in public

Something that's great about measuring risk with numbers is its transparency. But that can also be a point of some anxiety because if you get the maths wrong it's there for everyone to see, leaving you naked and your reputation exposed. It's noteworthy that the highest profile cases involving QTRA are when there's been a mistake measuring the risk with numbers.

Do we really need another one?

The answer is yes, if it sorts out those problems we've looked at in this article, and more that there wasn't the space to cover. Whether you're assessing or managing tree risk, here's how VALID gives you a helping hand. Take a 'best of both worlds' approach that works on the strengths and ditches the weaknesses when measuring risk with words and numbers. That means collaborating with an independent maths professor who's an expert in measuring risk to model what you're trying to measure, so that it's credible and realistic. Define categories that are just right and neither too wide, nor too narrow. Where necessary, embrace imprecision. Describe the likelihood of occupancy and consequence categories so that you don't need maths, and they can easily be understood and recognised when you're out in the field. Have risk outputs that are believable, that are not too vague or misleadingly accurate. Then test the model for uncertainty and user error to check its resilience.

Where it matters most

One of the more eye-opening revelations when putting VALID together was that the likelihood of occupation on the busiest roads and in city centres is often greater than constant when measured in words. Or 1/1 when measured in numbers. In other words - and numbers - if a tree

part falls it's likely more than one person or vehicle will be hit. What that means is the most important assessments, where the 'targets' have the highest value, are being systematically undervalued by every tree risk assessment system out there.

The VALID answer

How VALID deals with occupancy when it's higher than constant in words, or 1/1 in numbers is a window onto how we can make things better. The complex stuff is dealt with in the engine room of the App, and a combination of words and numbers help you easily recognise it when you see it. It goes like this. You're assessing a tree next to a main road in a city with a 50kph speed limit. There's five likelihood of occupation categories available, and from this description alone it won't be three of them. It'll be 1 Very High, or 2 High. Switch the App from '24hr' to 'stopwatch'; which is calibrated to show figures for 7am - 7pm, Monday - Friday. If you're typically seeing a vehicle pass every 2-3 seconds or more, then the occupancy is 1 Very High. If it's less than that, then the occupancy is 2 High.

Loitering without intent

Working out the likelihood of occupation where people loiter or mill around is especially difficult to measure. So let's describe some of them to make it easy for you. A signalised pedestrian crossing in a city centre will most likely be a 1 Very High occupancy. Similarly, a market, an entrance to a mainline train station, or an event like a Royal A&P Show are all 1 Very High. The entrance to a school or college is 2 High. A car park is 3 Moderate. And so on.

Anyone can do (most) of it

Much hard work has gone into VALID's design to make the likelihood of occupation and consequence decisions straightforward for you when you're on site. That way you don't have to interrogate your client at length, use a thesaurus, or take out your calculator. It's done through a combination of easy-to-understand descriptive words supported by simple numbers, as we saw earlier with the 50kph road.

The Full Monty

With previous tree risk assessment systems, what's often been overlooked is the tree owner or manager. They're the ones that hold the liability and are paying for the risk assessment and any tree works. We should be looking to help them out as best we can. That's why VALID provides the complete package of tree risk-benefit policy, plan, and assessment.

Back to the likelihood of failure future

By taking care of the occupancy and consequences part of the risk-benefit assessment. Then making them user-friendly so that you can confidently identify them with a bit of training. VALID frees arborists up to focus your efforts on what you know best. The tree. And what's the likelihood of failure? (Autumn 2018 issue *Tree Matters*).



Tree of Knowledge

Species Profile: Liriodendron - Tulip Tree

By Craig Webb
Consultant Arborist

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Nomenclature:

Liriodendron tulipifera L. (Magnoliaceae)
Common names include: tulip tree, yellow poplar, tulip-poplar and yellow wood

Distribution and habitat:

Naturally occurs across Eastern USA, from the Great Lakes to the Gulf of Mexico. Yellow poplar has a broad geographic distribution and therefore grows in a variety of climatic conditions. The average rainfall varies from 760-2030 mm, and the number of frost-free days varies from 150 to 310 days. Yellow-poplar grows near sea level in Florida to 4,500 feet (1,364 m) in the Appalachian Mountains. [USDA]

Associated species:

Forest canopy associates include baldcypress (*Taxodium distichum*), tupelo (*Nyssa spp.*), loblolly pine (*Pinus taeda*), shortleaf pine (*P. echinata*), eastern white pine (*P. strobus*), oaks (*Quercus spp.*), white ash (*Fraxinus americana*), American beech (*Fagus grandifolia*), black walnut (*Juglans nigra*), and hickory (*Carya spp.*) [USDA]

Description:

Large deciduous tree with a long, straight limb-free bole, though often multi-stemmed and low branching in open-grown situations. Often reaching over 30m tall and known to reach 60m.

Characteristics:

The leaves have a very distinctive shape, having four lobes and an apex that is flat or cut across at a shallow angle, making the upper part of the leaf look square.

The flowers are cup-shaped, erect and conspicuous, borne on twig terminals. They are pale green or yellow, with an orange band on the tepals. Flowers yield large quantities of nectar.

Flowers are followed by cone-like fruits formed by many winded seeds that disperse to leave a central axis and cup-like outer ring.

Pests and problems:

Few pests or diseases are associated with tulip trees. The large size that tulip trees attain make it unsuited for many sites.

Uses:

Tulip poplar makes a desirable street, shade, or ornamental tree. Its good points for aesthetic use are: rapid growth, pyramidal form, resistance to insect and disease damage, unusual leaves and attractive flowers and yellow autumn colour.

Wood properties:

The wood of tulip trees is light, fine-grained, moderately strong, often straight-grained, stable and easily worked. It has relative low density, with high bending, shock resistance, and stiffness values, but is lower in compression and overall hardness. Tulipwood has extraordinary overall strength properties relative to weight. The heartwood is pinkish or yellowish brown, with a marked difference between sapwood and heartwood. It is used for furniture, veneer and pulpwood and is suitable for structural applications.

Cultivation:

Prefers deep, rich, and moist soils, but not tolerant of inundation and clay. Tolerant of a wide climate range. Shade intolerant. Easily grown from seed.

Champion trees:

- The tallest verified height of tulip tree on the New Zealand Notable Tree database records register as 36.4 metres, in Mt Eden, Auckland. Thirty-eight (38) metres is recorded for an unverified tree in Hastings. The largest recorded girth in New Zealand is 9.6m (305mm diam.) for a multi-stemmed tree in Bruntwood, Cambridge.
- The American Forests Champion Tree National Register lists a tulip tree that is known as the largest tree of its species in the US, with a circumference of 339 inches (861mm) and a height of 116 feet (35.36m), in Chesapeake, Virginia. Taller trees are known to exist in forests.
- A massive tulip poplar tree in Fall River, Massachusetts has been named the state's biggest tree for its species. It is 126 feet (38.4m) tall, has a 217-inch (5512mm) circumference, and an average canopy spread of 67 feet (20.4m).
- An old tulip tree that is located in Alley Pond Park, New York City is the being the tallest carefully measured tree in the New York metropolitan area. It might also be the oldest living thing in the New York Metropolitan area. As of 2005, the tree measured 133.8 feet (40.8m) tall and is probably 350-400 (and possibly as much as 450) years old.

Other facts:

- The reference to "poplar" in the common name is a result of the tree's height. The external resemblance of its flowers to tulips gave it the tulip tree name.
- Native Americans made dugout canoes from tulip tree trunks.
- Like other members of the Magnolia family, they have fleshy roots that are easily broken if handled roughly.
- The flowers from a 20-year-old tree produce enough nectar to yield 1.8 kg of honey.
- Yellow-poplar was used medicinally in the late 1800s. A heart stimulant was extracted from the inner bark of the root, and a tonic for treating rheumatism and dyspepsia was extracted from stem bark.
- Yellow-poplar has been rated fair in palatability for livestock.
-



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Climbers' Zone

One-Handed Operation of a Chain Saw: Is It Ever Safe?

By Kevin Myers
CTSP

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TCI Magazine

Arborists agree that in the majority of pruning scenarios, maintaining two hands on a top-handle chainsaw while it is in operation ensures proper control and minimises kickback. But in certain situations, some argue, one-handed operation is acceptable – or even preferred. What's the true answer?

There's a quote from the famous American humorist Sam Levenson that I like to think back on when it comes to safety in our industry. "You must learn from the mistakes of others," the quote goes. "You can't possibly live long enough to make them all yourself."

I, like surely every tree care professional, have made mistakes on the job. And I've been fortunate enough that these mistakes haven't led to serious injury or death. As professionals, it's our responsibility to learn from our mistakes, reflect on what led to them and let those lessons guide our behaviour moving forward.

With all that said, there was an incident described in the January issue of Tree Care Industry magazine that caught my attention and got me thinking about a hot-button issue that I see tree care professionals wrestle with frequently: one-handed chainsaw use. The incident, "Climber killed one-handing chain saw in Great Britain" (page 67), describes the incident as such:

Grigore Bulbuc, 31, from Sydenham, in Kent County, and a tree surgeon for 10 years, was trimming a large sycamore in the backyard of a residence when the incident occurred. He was about 50 feet (15.24m) up when he apparently made a cut very close to his body and with only one hand on the chainsaw when the saw kicked back, severing his jugular vein and carotid artery. ...

"I could see Greg holding a branch in his right hand and cutting the branch with a chain saw in his other hand," the victim's boss told an inquest. "As I looked up, I saw the chainsaw kick back and go into his shoulder and neck. It went into his neck on his left side. It was quite deep, and I realised immediately he had injured himself badly," the boss reported.

The incident report further describes that the victim was an experienced and skilled arborist. But a mistake was made, and one-handing the saw led directly to the incident. One-handed operation of a chainsaw, in general, leaves the arborist vulnerable and unable to defend him or herself against a kickback event. Two hands

on the saw enables the arborist to lock the left arm so as not to form a pivot point at the elbow.

Some arborists argue that one-handing the chainsaw is acceptable in certain situations. Those situations usually describe the arborist in a climbing or cutting position where one-handing the chain saw is safer. I'm not naive enough to believe that I've been put into every possible situation as an arborist, so perhaps these situations exist and I've simply never found myself in one.

I'm guilty of one-handing a chainsaw. I did it when I was a younger, more inexperienced arborist. And it wasn't an easy habit to break; I struggled with it for months. But with a desire to improve, paired with positive encouragement from my foreman, I was able to change the habit. And as I've gathered more experience and become more involved with safety instruction and training, it's my belief that there is always a better way than to perform one-handed chainsaw cuts.

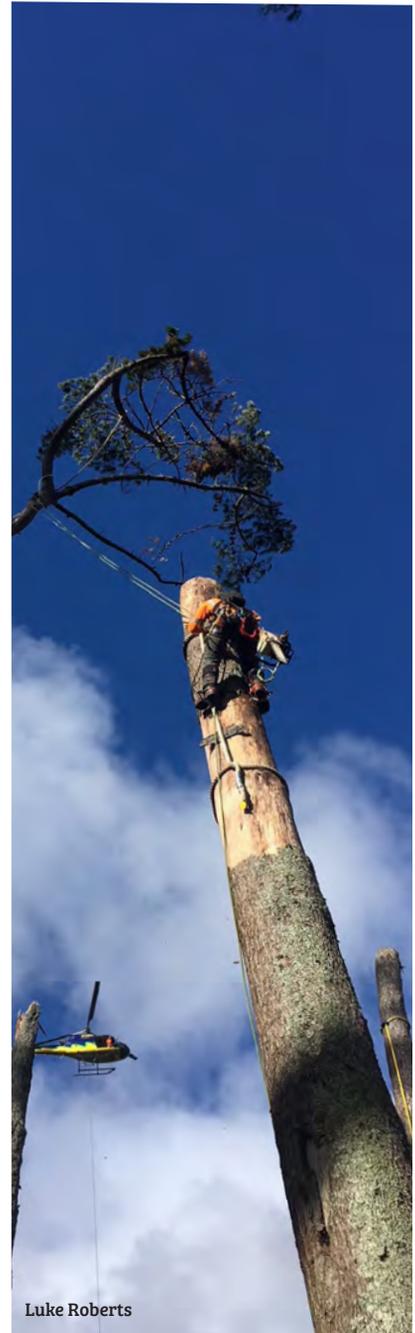
By the book

First, let's refer to what the rules have to say. The ANSI Z133 Safety Standard states clearly under section 6.3.5 the following:

"A chainsaw shall be operated with two hands at all times, one hand on each handle with thumbs wrapped around the handles.

"The operator shall operate the chainsaw with the left hand and thumb gripped firmly around the forward handle and the right hand and thumb gripped firmly around the rear handle, unless it is not practicable, and the employer demonstrates that a greater hazard is posed by operating the chainsaw that way in that particular situation."

This is taken from the most recent revision to the standard, revised in 2017, which contained a small but important revision to the chainsaw language: "A chainsaw shall be operated with two hands at all times." Previously, the language was not as direct and allowed more freedom to the reader, based on his/her interpretation. The addition of that text clarifies the intent:



Chain saws are to be operated with two hands. Period.

Note also the language around hand positioning. In general, chainsaws aren't designed for ambidexterity. However, the rule allows for a chainsaw to be operated differently from the way instructed, i.e., with the left hand on the throttle and the right hand on the forward handle, if, in a given situation, it's demonstrably safer to do so. But that isn't for the operator to decide. It's for the employer to decide and demonstrate.

Most of the arguments I've heard for the acceptability of one-handed chainsaw use hinge on part of this rule stating "a greater hazard" is posed if attempting to use the saw two-handed. This language is not intended to be an alternative to:

- Increase productivity;
- Good work positioning;
- Using a tag line to pull the top over;
- Using rigging lines to control limbs.

Using a handsaw to make the one-handed cut

Relatively frequently, utility arborists find themselves in a position where limbs are hanging over power lines, where the target branch would fall onto the power line below unless the arborist holds it with a free hand. Many of these cuts can be made with a handsaw, and those limbs that are too large to be made with a handsaw can be controlled by using rigging lines, or making bypass cuts.

Another scenario involves a climber who is "throwing the top" out of a tree. The climber in this scenario might push the piece over with his left hand while making a one-handed back cut with the chainsaw. My question here: If the piece requires directional control, in addition to the notch, why not use a tag line? If using a tag line is not practical, try making most of the cut with the chainsaw, and then finish with the handsaw. An added benefit to finishing the cut with a handsaw is, if the spar has unexpected movement after the piece comes off, there isn't a chainsaw running at full throttle by our ropes and face.

Every combination of tree and scenario is different, and as stated above, maybe there are situations where one-handing the chainsaw could be safer. However, I don't know of a situation where this is true, and, if those situations exist, they aren't common enough that we should see one-handed chainsaw use on a regular basis. What I do know is that every situation where I have one-handed the chain saw, and every situation where I have observed others one-handing the chainsaw, could have been avoided.

But to reiterate, if the situation does exist, it's not for the arborist to decide in that moment. It's up to his or her boss. Most organisations will have their own policy in place requiring two-handed chainsaw use at all times, which, effectively, supersedes the "loophole" written into the Z133. In fact, many large utility contractors these days have put a stop to the use of top-handled chainsaws altogether for safety purposes, restricting the arborist to the use of handsaws or larger chainsaws. To be sure, not all organisations will have a policy like this, but most do. For those that don't have these policies, another revision to the Z133, which states that handsaws shall be taken by the bucket operator and climber (5.2.13 and 8.1.5), will hopefully lead to arborists choosing to use the handsaw over the chainsaw more often.

Why are those policies so common? Because the Occupational Safety and Health Administration (OSHA) requires employers to ensure their working environment is "free from recognisable hazards that are causing or likely to cause death or serious harm to employees," per the General Duty Clause. The General Duty Clause legally obligates employers to provide a workplace free of those conditions and activities that are recognised as hazardous or with the potential to cause "serious harm." All of which is to say: If you're an organisation that's transparently allowing workers to one-hand their chainsaws, you're opening the door to some serious legal trouble.

Finally, there is the matter of chainsaw manufacturers' instructions. There isn't a single chainsaw manufacturer I'm aware of that does not clearly specify two-handed use at all times. I've referenced several chainsaw manuals in writing this piece. Take this quote from page 24 of the manual for the Husqvarna P435 top-handle chain saw: "Never use the chainsaw one-handed!" Exclamation point included.



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In practice

Keep in mind also, the employer isn't always watching over the arborist's shoulder to ensure he or she is following the rules.

Typically, when someone one-hands the chainsaw, it's not because they've accidentally found themselves in the position where it's necessary. It's bad work positioning, the convenience of the chainsaw over other available tools (such as the handsaw, as mentioned earlier) or wanting to get through the work at a faster rate. And even if you've found yourself in a position where one-handing the saw is safer or even just more convenient, it doesn't mean you ought to make a habit of it. Some arborists may use the argument that "one-handing the chainsaw could be safer" to justify doing it all the time.

It's also simply a matter of ongoing training and education. As I mentioned earlier, I'm guilty of operating a chainsaw one-handed. But that was before I was more thoroughly studied on the safety standards and best practices that our industry depends on. It was before I had received training alternatives. And, to reflect on the quote at the beginning, it was before I was aware of how serious the consequences could be.

So, what are the alternatives? Using a handsaw in many of these situations can be the ideal alternative, given that a handsaw is perfectly safe to use with one hand. An important part of this strategy, though, is always having your handsaw available, so you're able to use it when the situation calls for it. Elsewhere, you can always look to achieve a better working position that doesn't make a one-handed chainsaw cut the safer-seeming alternative. Your true safe alternative in that situation is to reposition.

Will these alternatives cause the work you're performing to be done a bit slower than if you'd simply one-handed your chainsaw? You might think so, but consider that using the handsaw saves the time you'd need to crank and fire up the chainsaw. Repositioning might make the rest of the work more efficient. In any case, it's certainly worth saving yourself a trip to the hospital.

Building safe behaviours

Changing long-standing behaviour in any worker is going to be a challenge. It takes overcoming habit with sound reasoning, positive

encouragement and a sharp focus on the true benefit of doing things the right way – going home safe and healthy at the end of each workday.

Whether it's correct chainsaw operation or another arborist function, it's important we always remember that arborists are continuously working in high-risk environments. That can be an easy thing to forget sometimes. Being an arborist is, of course, a job. And jobs can become routine and monotonous after we've done them so many times.

Unsafe behaviour can weave its way into those routines, and safety can take a backseat to getting certain tasks accomplished by the end of our shifts. One-handed chainsaw use can become a part of a routine. It's faster to get the job done that way; you've done it so many times, and it's never been a problem in the past. It only takes one time that you misjudge the location of the tip of the bar, leading to a kickback event. Maybe the chain saw misses any critical part of your body, maybe it doesn't.

When thinking about chain saw use, or any safety best practice as an arborist, I always recommend thinking about "why?" Why do I come to work each day? Generally, I come to work to take home a paycheck. But there's more to it than that when you dig a little deeper. Why do I need a paycheck? It's because I have a family to support, and they depend on me coming home.

When trying to break a bad habit, I believe it's important to continually think back about that "why?" Keeping that in mind while performing our work will make us think twice before we attempt a one-handed chainsaw cut.

Changing behaviours isn't easy. Neither is changing minds. But it's not impossible, and it is important.

Kevin Myers is an ISA Certified Arborist and Certified Utility Specialist, TCIA Certified Treecare Safety Professional (CTSP), an arborist training instructor with ACRT and recipient of the 2016 UAA Silver Shield Award.

This article first appeared in the March 2018 issue of Tree Care Industry Magazine.

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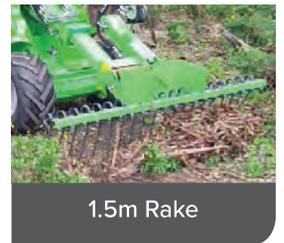
Transport Trailer



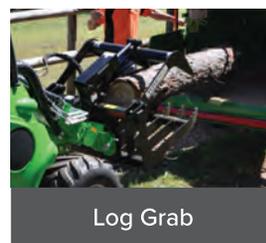
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Peter Andersen,
Andersen Tree Services

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Plant ID Challenge



WHAT AM I?

by Matthew Priestley

Test your troubleshooting and identification skills by submitting your answer to editor@nzarb.co.nz

Accurate answers go in the draw to win a copy of James Urban's *Up By Roots*, courtesy of Treescape. The correct answer and book winner will be published in the next issue of *Tree Matters*.

- I occur commonly throughout New Zealand.
- I am considered to be indigenous.
- I produce dark brown spores.
- I occur on a wide range of native and exotic hardwood trees.
- I cause heart wood decay.
- I am considered to be weakly parasitic.
- I can often be seen growing up to three metres high on a tree trunk.
- I am often identified by my dark-coloured skirt.
- I belong to the Strophariaceae family.
- I can grow large fruiting bodies, up to 300 mm wide.
- I have been described as edible by some sources.

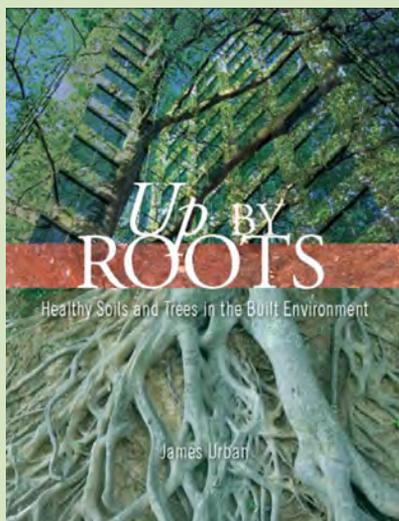


Photo Credit - Matthew Priestley



Photo Credit - Matthew Priestley



Photo Credit - Matthew Priestley

Obituary

In Memoriam, Jolyon Manning

By Frank Buddingh

Correspondence to:
frank@buddinghtree.com

It is sad to announce that Jolyon Manning passed away on 9 April 2018, in his 85th year. He was the sixth recipient of the New Zealand Arboricultural Association (NZAA) Ronald Flook Award. Jolyon had a vivacious approach to life and expressed a deep interest in a vast range of social and environmental issues which often made for long and deep conversations whenever I had the pleasure of being in his company. If anyone in this country stood many times on the barricades to defend our environment and trees, it was Jolyon.

His passion for trees can be experienced at Jolendale Park where he and his wife created a tree oasis in the desert. As the citation for the Ronald Flook Award said:

“...Jolendale is the culmination of plant wisdom, faithful and detailed weather recordings over many years and the interpretation of this knowledge in the establishment of the park. Jolyon and his wife Dr Enny Manning have also ensured that this effort will not be lost in the future by preparing a covenant over the park with the QE II Trust as a conservation landmark.”

JOLYON CHRISTOPHER MANNING was born in Gore, Southland and educated at Waihopai School, Maori Hill School, Otago Boys' and Southland Boys' High Schools and at the University of Otago. He was a Registered Chartered Accountant, an Associate Fellow of the NZ Institute of Management, an Accredited Member of the NZ Public Relations Institute and a Member of the NZ Institute of Forestry Inc. He also had a New Zealand Diploma in Sports & Recreation and was a Justice of the Peace.

His professional career as an accountant saw him in posts as diverse as Secretary/Manager for the Otago Chamber of Commerce, Secretary for the Otago Regional Development Council and Chief Executive for 20 years of the Otago Council.

In his Who's Who entry, as a public relations consultant he was credited with being involved in the evolution of government-sponsored regional development strategies, especially in forestry and tourism strategies.

His many contributions to local organisations in a governance role covered parks, Otago museum, the local polytechnic, Dunedin stadium and forestry. He was on the NZ Forestry Council for nine years, the Otago National Parks and Reserves Board for nine years and the Dunedin Metropolitan Planning Authority's scenic reserves and amenities survey committee for approximately ten years.

Jolyon played a significant role in advocacy for large-scale commercial plantation forestry for the Dunedin City Council and the NZ Forest Service Coastal Otago Districts. While on the NZ Forestry Council he was a strong advocate for more positive promotion of the forestry sector for both indigenous and introduced species and for the national monitoring of the Exotic Commercial Plantation Forest Estate.

As well as setting up an arboretum-type collection of special drought-hardy species at Jolendale, Jolyon and his wife also established a lakeside amenity planting of Turkey oak, Japanese willow and North American Prairie crab apple at Champagne Gully. In the late sixties they also gifted some thousands of dry-land tree saplings from seed from the USA and Australia that was propagated at the NZ Forestry Service Milton Nursery for the Waitaki Lakes Committee plantings (Lakes Benmore and Aviemore). Jolyon was from that time on a staunch advocate for the essential ongoing maintenance of the three million trees planted, the largest public amenity tree planting in NZ.

Jolyon's special interests were in tree planting related to landscape amenity in semi-arid zone research and climatic changes. As Chairman of the Otago and Southland Wilding Tree Management Committee he advocated pre-emptive strategies for the wise management of potentially aggressive species that escape from formal commercial plantations, catchment conservation and informal private plantings.



Photo Credit - Ian Lawson

Clippings

Why get a qualification?



By Mark Roberts

Correspondence to:
mark@robertsconsulting.co.nz

The line between social media and social networking can be a fine one. Once you press enter, and your comments appear in a group chat, the roller-coaster begins and where or when it stops nobody knows. On one occasion, I innocently entered a slow-burning chat that simmered away for nearly two years; just when I thought it was safe it came back, again, and again it returned -- it had become a cyber-cancer.

I foolishly pressed the enter key on a similar post recently — the same people started posting... had the cancer metastasised? I briefly found myself defending qualifications - risk assessment qualifications -- then the roller-coaster turned left and I got out; I turned off the notifications.

In the same way that social media and social networking can be subtly different, so too can being qualified and having a qualification. A qualification is a document that says you can do something; being qualified is being able to do that something. You can have one without the other; many people do. When it comes to risk assessment qualifications, we are really talking about qualifications for using a given methodology. If you become TRAQ or QTRA qualified (possibly VALID too, but I'm not sure), you gain a qualification that says you can use that methodology.

To be able to effectively use those assessment methodologies you must first be able to risk-assess trees, i.e. you must be qualified before you gain the qualification. I know that this sounds a bit backwards, but in reality, you don't need to use a set methodology or hold a qualification to be able to risk-assess trees. Arborists have been risk-assessing trees for longer than there have been qualifications that say that they can. So, what is the point, why get a qualification?

Apart from knowledge, and knowledge is never wasted, I believe that a qualification gives you protection. When it comes to risk-assessing trees, being able to defend and document how your decision was made is really important – especially when the decision is to retain trees. I believe you are being given protection when you are able to stand in front of your client, or the Court, or

a reporter and say: "I came to the decision that I did, through my knowledge and experience and because I used the internationally recognised methodology X, and here is my qualification that says I can use methodology X."

Note the number of "ands" in that statement: my knowledge and experience and because I used the internationally recognised methodology X, and here is my qualification. "Ands" give you protection. The more "ands" you have the stronger your position will be. And if you are an employee it gets even better: "I have knowledgeable and experienced staff and I have put them through training in the internationally recognised methodology X, and they used that methodology and here are their qualifications."

Of course, you could always just use methodology X — after all the ISA sell the TRAQ manual and you can download the forms for free. QTRA expires — why not do it once and never renew?

Because not being certified as having a qualification but using it, weakens your position; not only is it hard to defend but it is an invitation to be attacked. "I used methodology X, but I'm not qualified to use it."

If you don't hold the qualification don't use it, simple as that — use your knowledge and experience. "Ands" give you protection — "buts" weaken your position.

All of that said, and to repeat what I have said many times — a qualification [in this instance, a methodology qualification] is just a tool, and like all tools, they are only as good as the person that uses them. If you don't know how to assess trees in the first place, it is unlikely that methodology X (whichever one that may be), will make your assessments better. You don't need to use a methodology or hold a qualification to be able to risk-assess trees, but having one will strengthen your position.

So, why get a qualification? Because they give you protection and right now, we and our trees need all the protection that we can get.

EFUF Young Urban Forester Award



Photograph from the recent European Forum on Urban Forestry (EFUF) in Helsinki. Winner of the best research work, Matej Rupčić, proudly sporting the NZ Arb t-shirt that Howell Davies contributed to the winner's prize package!

Good to see a great young urban forest scientist being recognised for his research work and great to see NZ Arb represented at such an important international forum.

For more information about the Forum go to www.efuf2018.com



Thoughts from Edmonton

By Crispin Wood
Manager of Urban Forestry for the City of Edmonton, Canada

Correspondence to:
crispin.wood@edmonton.ca

Greetings from Edmonton Alberta Canada, one of the top ten coldest major urban centres in the world and proudly branded as Canada's Winter City. With eight months of the year recording below-freezing temperatures this title is well earned.

Edmonton is the largest major centre in North America north of the 50th parallel. With a regional population of around 1.2 million it's a surprising metropolitan city given its proximity to just about nowhere. As Canada's 5th largest city, it is home to the second largest population of indigenous peoples in Canada which is part of our unique and culturally rich character. We are the end of the road as far as major centres go, and the last outpost for an urban forester such as myself.

Given how few growing months we have and how cold our climate can be, Edmonton has a surprisingly impressive urban forest. Edmonton's street tree inventory is quickly growing past 350,000 trees and the city boasts the longest continuous greenspace of any

municipality on the continent. Situated right at the edge of the great Northern Boreal Forest, we are limited in what we can grow. Regardless, we still claim to have the largest population of Dutch Elm Disease-free American Elms in the world, a privilege ironically bestowed upon us by our isolation and frigid winters.

Edmonton, however, is the only part of this story, as by now you are probably wondering what is this Canadian on about. Back in December, I had the opportunity to visit relatives in New Zealand and tour across the North Island of your beautiful country. Prior to leaving on vacation, I thought about reaching out to a few Kiwi Municipal Forestry Managers for some networking and knowledge transfer. I finally made the decision to leave work at home; however, as you can never truly take the arborist out of the man, my camera is now full of pictures with me standing in front of this tree or that. Let's face it, I'm a tree nerd, and New Zealand has some magnificent trees. I fully regret passing up on the opportunity to reach out and make some connections across the Pacific.

Photo of Edmonton by Crispin Wood



Upon visiting a number of the major centres on the North Island, I couldn't help but notice some surprising similarities between the urban forests of New Zealand and Edmonton. In some ways our two countries are worlds apart; being that they are halfway across the globe from each other. New Zealand is warm, mountainous, and covered in ferns while Edmonton is cold, flat and covered in grass. Edmonton has bears, cougars, wolves and moose while New Zealand has birds, birds and more birds. But here the differences seem to end, and some surprising similarities arise.

While walking around Wellington, Hamilton and Auckland, I noticed that many of the challenges faced by urban trees are exactly the same as they are in Edmonton. It almost felt like home. I saw conflicts between trees and infrastructure, issues with protection and conservation, and then I learned of the arborist shortage and thought, they have that problem too? I took some solace in the notion that I wasn't the only Urban Forestry Manager faced with these problems; balancing politics, budgets, science, economy, geography, expectations and legacy all in an effort to make the world a better place, one tree at a time.

On the flip side, it's not hard to recognise when something stands out. What I also saw in New Zealand were the innovations for

dealing with some of the challenges, from movable tree planters in Auckland for the greening of otherwise sterile public spaces, to various permeable media solutions in and around tree plantings in downtown Wellington. I saw innovative solutions to achieve adequate growing conditions for mature trees and a surprising array of open-pit planting designs with stormwater management components. I saw a greater species diversity in new plantings, an increase in the use of native species and an overall trend of improved pruning practices across the urban forest. And this is what I saw just walking around passively, I'm sure there is much more I could have learned had I reached out to speak with someone. What I learned from my trip to New Zealand, however, isn't that we have our similarities and differences, it's that there is more we can do to learn from one another. We are all facing the same challenges, at the same time, and all innovating and succeeding in our own ways. As we are all very busy managing our little piece of the globe it can be challenging to find the time to reach out and make connections, especially connections on the other side of the planet. As New Zealand and Edmonton share the geographical distinction of being at the end of the world, at least as far as the urban forest is concerned, there are no doubt some innovations that have come as a result of this isolation that we could share with one another.

I speak here of the application of experience and research in the form of innovative designs or best management practices; this could easily extend to a sharing of work planning practices, policy development, investment strategies, partnerships, technology transfer, recruitment techniques, asset management and indigenous inclusion. The list is endless. From the perspective of a municipal administrator, however, I am most interested in how these innovations and ideas came to fruition, and how success was achieved, despite the challenges.

When I see an innovative solution, I often question: why were the change managers successful, what led them to their success and what did they learn along the way? It's great to have an new idea or concept, but a great idea without a road map can easily end up as a document gathering dust on a shelf. When I see a new technology, a new design in practice or hear of a new policy for tree protection, I am interested in knowing how it happened and what was learned so that I might emulate its implementation in my jurisdiction. It is this knowledge that is can best be transferred through networking. This isn't to say that these connections don't happen, and that innovation and improvements in policy, design and the application of best management practices don't cross borders. I mean, we all

now know that trees need adequate soil volume to grow and thrive, right? What I have recognised, however, is that we can't expect this to just happen; networks and relationships need to be fostered. It can be all too easy to rely on books and the internet for our information; yet sometimes the best way to learn is through good old-fashioned human contact.

I hope that I may see some of you at the International Urban Forestry Congress this September in Vancouver. What I will say is this: let's stay in touch New Zealand, I would love to hear of your successes and how you achieved them. Feel free to reach out, and you are welcome to visit Edmonton any time you please. Just be sure to dress warmly.

There is one more thing similar between Edmonton and New Zealand; Kiwis and Canadians are both a friendly lot.



Photo Credit - Luke Roberts





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Ted Green MBE

Founder member and President of the Ancient Tree Forum and Honorary Vice President of the International Tree Foundation. He was awarded an MBE in recognition of his work in conservation, especially with trees and fungi. He was awarded an honorary lectureship by Imperial College, University of London for his outstanding contribution as a technician to science and education. He was given the Arboricultural Association Annual Award for his services to arboriculture. Recently was awarded the prestigious Gold Medal by the Royal Forestry Society. Ted was named in a poll of the UK Environment Agency in 2006 as one of their "Top 100 eco-heroes as voted by their peers." Ted has worked for Natural England as Conservation Liaison Officer to the Crown Estates at Windsor and later became and remains their Conservation Consultant. Ted is a regular writer, broadcaster and speaks regularly at international conferences on ancient trees, Pollards, wood pasture and parkland and fungi.



Dr. Edward F. Gilman

*Professor, Environmental Horticulture Department
University of Florida*

The 2018 Conference Keynote Speaker is Dr Edward Gilman, Professor, Urban Trees & Landscape Plants in the Environmental Horticulture Dept of the University of Florida. In 1999, Dr. Gilman received the prestigious R W Harris Author's Citation Award from the International Society of Arboriculture for his books and web sites on trees and landscape plants. He has also received the ISA educator and research awards. Dr. Gilman serves the landscape industry and allied professions with his teaching and research efforts worldwide. He lives in Jacksonville, Florida with his wife of 35 years and they have two daughters. Away from the world of plants, Professor Gilman enjoys the craft of woodworking.

www.nzarbconference.co.nz

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Clippings

Reporting Unsafe Practice

A reminder to all that, if you spot unsafe practice or an unsafe work situation, you are able to contact WorkSafe (24 hours) on 0800 030 040.

When reporting you will need to provide sufficient information to enable WorkSafe to act if they deem it appropriate, including

- Details of the unsafe practice or work situation.
- Details of the business or undertaking, the work, and/or precise enough information to locate the work site.
- WorkSafe also prefers you to provide your contact details so they can contact you if they need more information. Your contact details will be kept confidential if you request it. If you'd prefer to raise your concern anonymously, you must tell WorkSafe this when you contact them either by phone or the online form.

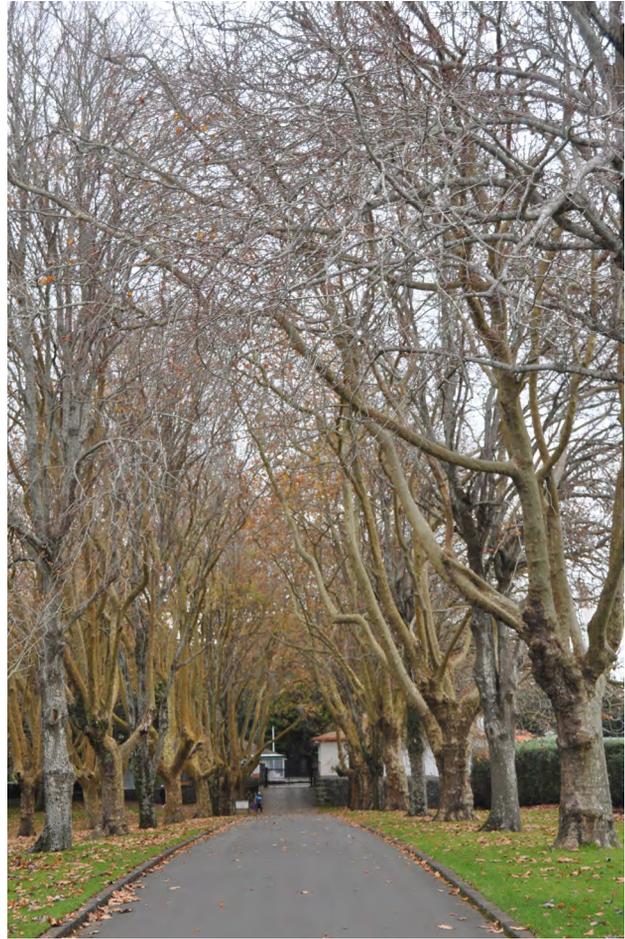
You can also report concern about an unsafe practice or work situation on the WorkSafe website (www.worksafe.govt.nz), via the 'Raise a Concern form'.

WorkSafe will assess the situation from the information you provide and will send an inspector to the site if they believe the situation could lead to a person's death or cause a very serious injury or illness.

More details on reporting unsafe practice or work situations is available on the WorkSafe website.

www.worksafe.govt.nz

WorkSafe
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NOTIFICATIONS OF INTENT APPROVED CONTRACTOR PROGRAMME

NZ Arb have received applications of intent from several members recently, who have commenced the process to become Approved Contractors.

Visit the NZ Arb website for details

www.nzarb.org.nz/News/Notifications



Luke Roberts

Stumpmaster Appeal Update

By Fran Tyler
Freelance Journalist

Correspondence to:
editor@nzarb.org.nz

A case involving a palm tree whose branches struck a woman while it was being chopped down, injuring her and costing an Auckland arborist \$108,500, is likely to set a precedent in how the new Health and Safety at Work Act is applied.

In the High Court at Wellington on May 18, Justices Geoffrey Venning and Simon France heard appeals from Stumpmaster and two other companies against District Court fines. The fines were up to nine times higher than those which would have been imposed under the old legislation. WorkSafe and the three companies agreed to combine the appeals so that the court could decide on these and provide guidance for future ones.

Stumpmaster's owner James Isaacs had pleaded guilty, on January 18, to a charge under the new Act that the company had failed to ensure, so far as was reasonably practicable, that the health and safety of other persons was not put at risk from their work and that failure exposed other persons to a risk of death or serious injury.

An investigation by WorkSafe found that while the company had used three road cones to cordon off the tree, it did not place them the required two tree lengths away, nor did workers use barriers to restrict access or warn the public.

Stumpmaster was fined \$90,000 and ordered to pay \$18,500 to the injured woman, who spent six days in hospital after

suffering fractures and a laceration in the May 2016 accident. The charge carries a maximum penalty of \$1.5 million.

In the appeal heard in the High Court, counsel for Stumpmaster Tim MacKenzie said the courts needed to place more importance on the financial status and size of the companies involved and asked the justices to consider the intent of lawmakers when they developed the legislation.

"What did Parliament intend in providing a \$1.5m penalty? Did it intend it to be equal? The District Court shouldn't be approaching this with a one-size-fits-all approach. For one company, what may be a blip on the accounting sheet may spell the end for another."

He argued that lower or more realistic starting points for fines should be considered,

"and then approach the ability to pay and then increase accordingly."

For a company such as Stumpmaster, which he described as a "one-man band with very little money," a starting point of \$500,000 was too high.

"Did anyone actually stop and think about the little guys in that case?"

Mr MacKenzie said he believed a starting point of \$100,000 was more appropriate. While it was important that victims received adequate reparation for their injuries, Mr MacKenzie said huge

fines could jeopardise that.

"I'm not trying to scaremonger here ... [But] If companies are fined to such a level that they may go into liquidation there may be no money to pay reparation."

WorkSafe's counsel Dale La Hood said it was the case that reparation must be considered first. If there was no ability to pay a fine, reparation must still be considered and in most cases insurance pays the reparation anyway, he said.

WorkSafe's other lawyer Sue Pretrivic told the court that the organisation did not believe any of the fines were manifestly excessive. In the case of Stumpmaster the fine had been imposed with an arrangement for it to be paid once another debt had been paid off.

The judges reserved their decision.

Outside the court, Mr Isaacs, who had flown from Auckland to attend the hearing, said he hoped the court would revoke the \$90,000 fine and impose one that was "more realistic" for a company of his size.

Mr Isaacs said he was winding up the business and planned to return to university.

The other two companies were Tasman Tanning Company, which was fined \$380,000 after a worker was overcome by hydrogen sulphide gas, and Niagara Sawmilling, which was fined almost \$325,000 over hand injuries sustained by a worker.

Fran Tyler is an experienced newspaper journalist who teaches at the School of Communication, Journalism and Marketing at Massey University, Wellington.

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Treescape Ltd	Kumeu	northern@treescape.co.nz	(09) 412 5017
Treesafe Arboriculture contractors	Auckland	nick@treesafe.co.nz	0800 873 3769
Waikato / Bay of Plenty			
Treescape Ltd	Hamilton	waikato@treescape.co.nz	(07) 857 0280
Arbor Care Tree Services	Tauranga	arborcare@clear.net.nz	(07) 543 1776
Central / Wellington			
Bark Ltd	Wellington	enquiries@bark.co.nz	0800 227 558
Treetech Ltd	Wellington	office@treetech.co.nz	0800 873 378
Treescape Ltd	Wellington	central@treescape.co.nz	(04) 569 5813
Arb Innovations	Wellington	enquiries@arbinnovations.co.nz	(04) 2126 366
Wellington City Council Parks & Gardens	Wellington	william.melville@wcc.govt.nz	(04) 499-4444
Canterbury			
Treetech Ltd	Christchurch	office@treetech.co.nz	0800 873 378
Treescape Ltd	Christchurch	canterbury@treescape.co.nz	(03) 544 0588
Nelson/Tasman			
Treescape Ltd	Nelson	south@treescape.co.nz	(03) 544 0588

For more information on ACS, or to check latest 'Notification of Intent' companies, visit the NZ Arb website www.nzarb.org.nz

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5 - 8 AUG / COLUMBUS, OHIO

**NZ ARB HUSQVARNA SOUTH ISLAND
TREE CLIMBING COMP**
29 - 30 SEPT / CHRISTCHURCH
BOTANIC GARDENS

**ISA ANNUAL INTERNATIONAL
CONFERENCE & TRADE SHOW**
5 - 8 AUG / COLUMBUS, OHIO

ISA TRAQ RECERTIFICATION COURSE
8 OCT / WELLINGTON

**ISA CERTIFIED TREE WORKER AND
CERTIFIED ARBORIST EXAM**
9 NOV / DUNEDIN TOWN HALL

**NZ ARB ANNUAL CONFERENCE
+ NZ ARB AGM**
8 - 9 NOV / DUNEDIN TOWN HALL

**NZ ARB HUSQVARNA NATIONAL TREE
CLIMBING CHAMPIONSHIP**
9 - 10 NOV / MUSEUM RESERVE
DUNEDIN

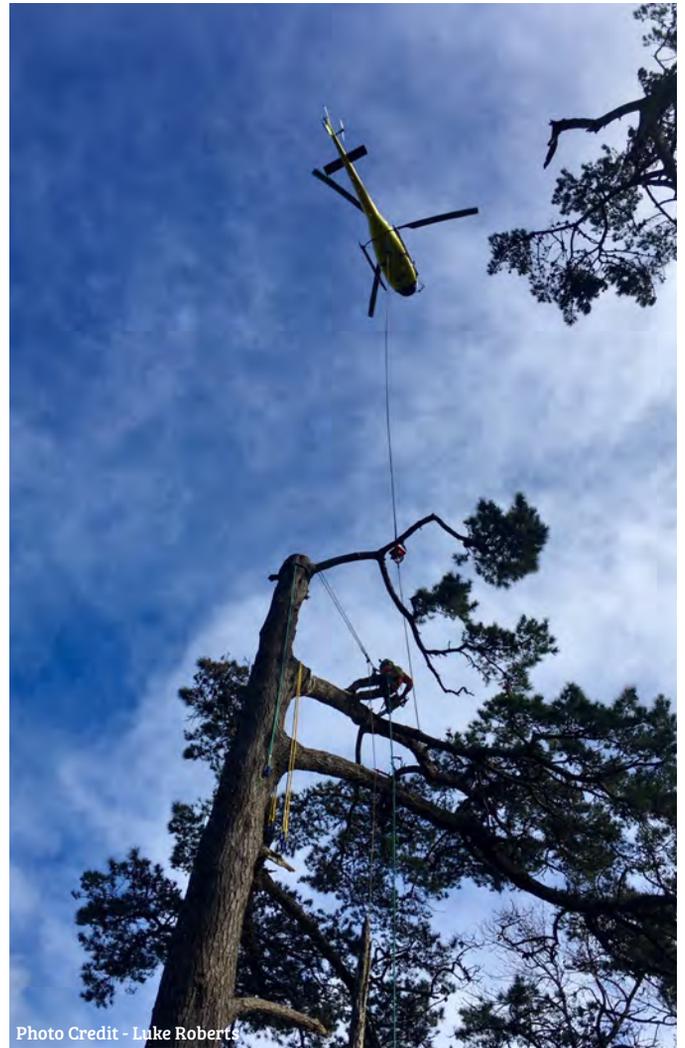


Photo Credit - Luke Roberts

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