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TREE PRESS

Tree Research and Education Endowment Fund Newsletter | Vol. 1, No. 7 – September 2018

Crowning Achievements

Research Results on Establishment of Bare Root Transplants

Bare root transplanting of large landscape trees is increasing with the availability of air excavation tools to dig the trees. This method offers the ability to retain the majority of the structural root system at transplanting, which theoretically should allow the tree to establish more quickly. Dr. Gary Watson and Angela Hewitt of The Morton Arboretum set out to test this concept in the study, "Establishment and stability of large trees transplanted bare root."

Watson and Hewitt found that large bare root transplanted trees can indeed establish more rapidly – typically in about two growing seasons – than those using the traditional standard soil ball method. Interestingly, this does not appear to be dependent on tree size.

Read detailed findings on this project and discover additional TREE Fund studies related to planting and establishment on the Research Archive page of the TREE Fund website.

To receive a print version of the TREE Press contact Karen Lindell at klindell@treefund.org.

"Nature welcomes inquiry. Nature does not hide its work. Just seek, and you will find."

- Alex L. Shigo

In This Issue

Leading Thoughts

By J. Eric Smith, TREE Fund President and CEO

As the leaves begin to color and drop here in Northern Illinois over the next few weeks, we will be rolling out our individual year-end fundraising appeal, as hard as it is to believe that the end of the fiscal year is already drawing near. We're on track for another great year in 2018, but the unrestricted operating funds earned via the year-end appeal are crucial to our ongoing success, so my thanks to all in advance for considering us in your charitable plans in the weeks ahead.

The "charitable" component of that sentiment is more important than usual this year, as many of you are no doubt evaluating how changes in the Federal tax code could impact the deductibility of your gifts to TREE Fund and other nonprofits. While TREE Fund is not in the business of providing financial advice, we do know that many of you may find it financially beneficial this year to use the increased standard deduction in lieu of itemizing your deductions (including charitable giving), which will reduce the strictly financial tax return benefit you receive from each dollar of your charitable giving in 2018.

I respectfully hope, though, that you do not change your giving plans for that reason, since the charitable good you do for TREE Fund is actually independent of any *quid pro quo* tax benefit you receive as a result of your philanthropy. Charity is, by its very definition, the voluntary giving of help, typically in the form of money, to those in need – and TREE Fund does indeed need your continued support if we are to build on and expand our research and education programs going forward, especially as Federal funding for urban forestry may decline in parallel with lower revenues from Federal taxes.

TREE Fund is a charity, at bottom line, worthy of support for the good work we do, and for the benefits that our research and education results deliver to communities around the world. It is only through your charitable support that we are fully able to be a force for good in the world, funding vital, beneficial work that few others do. I've spent most of my career in the nonprofit sector, and I know that when push comes to shove, that sense of doing something righteous, and making a difference through your gifts, is the truly fundamental motivator for donors, one that resonates deeply in ways that simple monetary benefit from tax deductibility cannot.

Here's hoping you share that sentiment with me, and that we can continue to count on you to do good for a good cause this year when you receive a letter from me asking for your support in the weeks ahead. You may or may not receive a meaningful tax benefit from giving to us this year, but the moral and ethical benefit of sharing your resources openly and without restriction on behalf of TREE Fund or other charities you respect is profound and lasting. At the end of the day, it's simply a good thing to do – and I remain personally committed to ensuring that we leverage your support widely, and serve as responsible stewards for funds entrusted to our care.

Landscape Below Ground Conference IV

The Morton Arboretum, Lisle, IL

October 15 - 17, 2018

This conference features top scientists and practitioners from around the world (including many TREE Fund researchers) providing an unparalleled opportunity to learn about the latest research and best management practices for establishing and maintaining trees' roots in challenging urban situations. Learn more and register before October 8 at The Morton Arboretum's website.

Lead Donors

We are grateful to the following people and organizations who contributed $2,500+ to TREE Fund in August 2018. See the full list of 2018 Lead Donors who make our work possible on the donor page of our website. Thank you!

- ISA Texas
- Mowbray's Tree Service
- Pacific Northwest ISA
- Penn-Del Chapter of ISA
- Ward D. Peterson
- J. Eric Smith and Marcia Brom Smith

Last Chance to Support the 2018 Tour des Trees

If you've been meaning to give but just haven't gotten around to it, now's the time to take action! Tour fundraising ends **October 1, 2018**, on the Tour des Trees page of the TREE Fund website. 100% of your gift supports tree research and education.
Thank you!

Grant Applications Closing Soon

Applications for the Duling and Kimmel Grants close **October 1**. Get details and application instructions on the TREE Fund website.

Asplundh Golf Outing Kicks Off Trees & Utilities Conference in Omaha

by Kristin Wild, Corporate Communications, Asplundh Tree Experts, LLC

Winning foursome (L to R): Eric Albert, Dominion Energy; Andrew Dodson, Independence Power & Light; Chairman of the Board and CEO Scott Asplundh; and Mark Styslinger, Altec Industries.

After a successful event last year in Kansas City, MO, Asplundh brought its 24th Annual Golf Outing to Benefit TREE Fund to Omaha, NE for the Trees & Utilities Conference once again. It was a great start to this joint collaboration of the Utility Arborist Association and the Arbor Day Foundation. Mother Nature also supported the event with sunshine and reasonable temperatures during the afternoon of August 27 when more than 50 golfers teed off for TREE Fund at Shoreline Golf Course in Carter Lake, IA.

All the golfers were treated to complimentary beverages on the course and a festive awards reception afterwards, courtesy of Altec Industries. In addition to Altec and the many golfers from utilities, suppliers and other vegetation management contractors, Asplundh was thrilled with the excellent support received from the 17 hole sponsors displayed on the poster below. Although the final tally of proceeds is pending, Asplundh expects to be able to direct a significant portion of the total donation toward the Utility Arborist Research Fund.

Many thanks to the golfers and event sponsors for putting the FUN in this fundraiser, which supports the research and education that advances utility arboriculture.

Volunteer Spotlight: Randy Miller & Geoff Kempter

Miller

Kempter

Please help us celebrate **Randy Miller** of CN Utility Consulting, Inc. and **Geoff Kempter** of Asplundh Tree Experts, LLC in this month's Volunteer Spotlight. Together they have just published the long-awaited book *Utility Arboriculture*, ISA's Utility Specialist Certification Study Guide. Congratulations!

Randy is a former Chairman of the TREE Fund Board of Trustees, veteran Tour rider, and current chair of the Liaison Committee that leads and develops TREE Fund champions in allied organizations. Geoff is a former TREE Fund Trustee, one of the founders of the Tour des Trees event, and a long-time TREE Fund advocate. Thank you both for your continued support of TREE Fund.

The Word on Webinars

Missed our last TREE Fund webinar on arboricultural biomechanics with Dr. Brian Kane of the University of Massachusetts, Amherst? It's now available for viewing via the webinar page of our website.

While you're there, be sure to pre-register for *Emerald Ash Borer: Strategies for Conserving Ash in the Urban Forest*, featuring Dr. Dan Herms of The Davey Tree Expert Company. Please note the date change on this webinar; it will take place on **November 28** at noon Mountain time. We apologize for any inconvenience and hope you will be able to join us.

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TREE Fund is a 501(c)3 nonprofit whose mission is to support scientific discovery and dissemination of new knowledge in the fields of arboriculture and urban forestry.

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RESEARCH REPORT

Tree Research and Education Endowment Fund Vol. 1, No. 2 – September 2018

Is that tie-in point safe to use?

by Brian Kane, PhD

Tree climbing is an inherently dangerous task. Working at height is dangerous by itself; but add the use of sharp cutting tools and rigged pieces of wood to the job, and it's not surprising that our industry has a comparatively high incident rate. To increase safety while climbing, climbers must choose a tie-in-point (TIP) that can bear the loads applied as the climber ascends and then works in the tree. Failure of the TIP isn't an everyday occurrence, but it has happened, even during an ascent. To reduce the likelihood of failure of the TIP, climbers attempt to assess its load-bearing capacity by visual inspection and performing a "bounce test," but very little research has explored the likelihood of TIP failure.

In 2017, at the ITCC in Washington, DC, I measured forces at the TIP during the "Ascent" event – this is the event that replaced the secured footlock. From the measurements, I wanted to learn how large were the forces at the TIP, what was their frequency of application, and whether they differed among different ascent techniques that competitors used. Most competitors used two foot ascenders, but some footlocked and others used a single foot ascender.

To measure forces, the team running the Ascent event installed a load cell between the anchor point on the tree and the rigging hub that climbers attached their lines to. The load cell (Figure 1), made by Straightpoint LLC, measures the force 100 times each second, so it's possible to obtain a detailed record of the forces throughout each competitor's ascent—this is called a force time history. Figure 2 shows the force time history for a ten second segment of one competitor's footlock—it might remind you of an EKG. The time history shows a series of peak forces as the climber extended their body upwards after locking the rope with their feet. The peak forces occur at regular time intervals, which describes the frequency of peak forces, that is, how many peak forces occur in a specified time interval. Using two foot ascenders applied about the same force as footlocking, but at twice the frequency—twice as many peaks in the same time interval.

Figure 1 *shows the Straightpoint LLC load cell used to measure forces during the Ascent event at the 2017 ITCC in Washington, DC.*

To assess the likelihood of failure of a TIP during an ascent, we need to know both the amount of the peak force, and how frequently it's applied. The reason for this is because as its loaded by the ascending climber, the TIP bounces up and down. The interaction of the repeated application of peak loads with the natural tendency of the TIP to respond by bouncing may cause the effect of the force to be multiplied. This means that even if the peaks are well below the load-bearing capacity of the TIP, the bouncing action can increase the likelihood of failure.

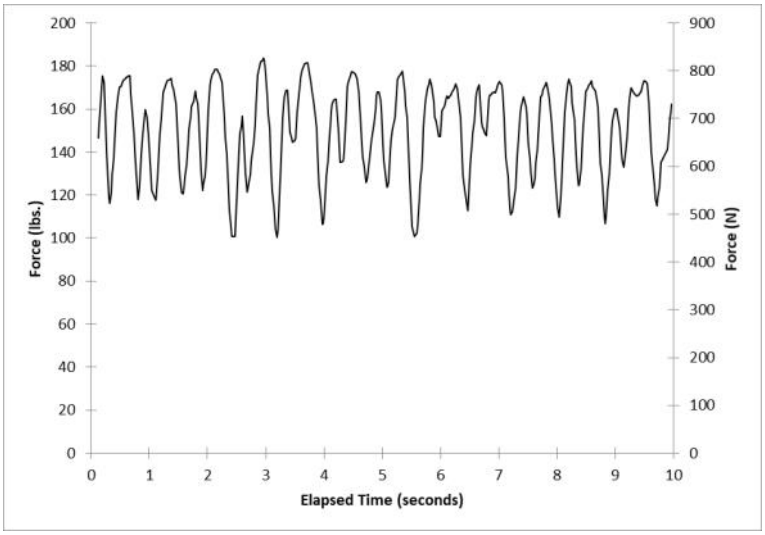

Figure 2 *The black line shows changes in the load on an anchor point during ten seconds of an ascent.*

In general, peak forces were about 1.3 – 1.4 times body weight, and, depending on how long the ascent lasted, there could be 20 – 50 peak loads in total. This type of loading on the TIP is very different from slowly applying a force with a winch to a branch to measure attachment strength of branches, indicating that future experiments should consider applying forces to the TIP that would mimic the forces applied during an ascent.

Is that tie-in point safe to use? *(continued from front)*

This work wouldn't have been possible without a John Z. Duling grant from TREE Fund, which paid for the Straightpoint, LLC load cell. One of the limitations of the data collected at the ITCC is that the TIP was atypically large (which was a necessary safety precaution when more than 60 competitors would be ascending during the event). To address this limitation, and using the same Straightpoint LLC load cell, I am currently measuring forces during ascents on TIPs of typical size. And I plan to repeat those measurements when the trees are leafless to see how much of an effect the leaves have on damping the bounce motion of the TIP. With funds from the Duling grant, I also purchased two Straightpoint LLC "Impact Blocks"—arborist rigging blocks with built-in load cells—to measure forces in rigging systems, which I have been doing this summer. I think these projects, and others I've worked on that TREE Fund has previously supported, will help arborists work more safely, and I'm grateful for TREE Fund's support.

You can find more details about measuring forces during the 2017 ITCC in the following publications:

Kane, B. 2018. Loading experienced by a tie-in point during ascents. Urban Forestry & Urban Greening 34:78-84.
Kane, B. 2018. Understanding the likelihood of failure of an anchor point during an ascent: Part II. Arborist News 27(2):56-57.
Kane, B. 2018. Understanding the likelihood of failure of an anchor point during an ascent: Part I. Arborist News 27(1):58-60.

Dr. Brian Kane is the Massachusetts Arborists Association Professor of Commercial Arboriculture at the University of Massachusetts - Amherst. He has published over 50 scholarly papers, most of them have considered topics in arboricultural biomechanics and tree worker safety. He previously served on the ISA's Board of Directors and currently chairs the Nominating and Elections Committee. Before joining academia, he worked as a production arborist and he maintains his ISA Certified Arborist credential. He has competed in several regional tree climbing championships, placing 4th in New England in 2006.

Behind the Research: Meet Dr. Brian Kane

It's the first day of school at the University of Massachusetts, Amherst, and Dr. Brian Kane is back from sabbatical. Amid the flurry of campus activity, Dr. Kane takes a break to talk about his background and work with me. Dr. Kane, the Massachusetts Arborists Association Professor of Commercial Arboriculture at UMass Amherst, is a leading figure in arboricultural biomechanics and tree worker safety, focusing his research on tree failure and gear failure. With his unassuming, casual manner, it's surprising to know that he is one of very few people who study this complex area of the physics underlying tree failure and arboricultural practices like pruning, cabling, rigging and climbing.

Brian grew up outside of New York City and remembers his early interest in trees was piqued by his dad's Audubon Tree Guide book. He ran a landscaping business as a kid and loved climbing for a local municipal tree crew, but it took a degree in Political Science and an unsatisfactory desk job before he realized that the one constant throughout his life was that he liked trees. So he enrolled at UMass Amherst for a masters in Arboriculture and later a PhD, and he hasn't looked back since.

At the start of his academic career, Brian was interested in the strength loss formulas that predicted the likelihood of tree failure based on how much decay existed in the trunk and branches. The formulas were theoretically sound, but had not been tested for reliability in real life scenarios. What he discovered was that the formulas did not take enough variables into account for such a complex assessment. His work played a role in the development of ISA's tree risk assessment qualification (TRAQ), which has helped to make the risk assessment process more objective.

Brian's current work is focused on arborist safe work practices where there is a deficit of research. Specifically he's exploring the forces that occur (1) when a climber ascends into a tree and (2) in different parts of a rigging system. Because there are so many variables that affect the likelihood of tree failure and many different climbing and rigging techniques and tools, it's virtually impossible to come up with a formula for the safest way to climb or rig every tree. Dr. Kane sees his work as laying the groundwork for safety improvements by helping us understand the physics underlying rigging and climbing. This knowledge allows us to identify the key points or variables for improved safety or reducing the likelihood of failure.

As you might imagine, conducting arboricultural biomechanics research involves everything from people climbing trees to crunching physics and math equations. Dr. Kane emphasizes that his work is a collaborative effort, and he is grateful for all the help from his students, alumni, colleagues in the university's Engineering school, etc. And he's also happy to use himself as a test subject – just another reason to continue climbing trees after all these years.