**Question and Answers follow-up from TREE Fund Webinar (3/19/24) with Matt Folley on *Advances in our understanding of the dynamic forces applied to a tree during removal operations: results and techniques to mitigate risk of failure***

**When you were testing the load on the safebloc how did you thread the rope through the device?**

Good question, using all three rings, starting with the one closest to the anchor, and weaving through all three in sequence. In all cases the rope was tensioned to a predetermined amount to remove slack (20kg). In the case of the safebloc, this meant the block was “standing” off the anchor sling in a vertical position.

**Q1 What about or will you do in a "double block scenario" / v rig**

**Q2 Do you plan on trying any of this research with a double block system, and do you have any intuitions on what that might look like?**

I think the math on the double block (assuming close to frictionless sheaves) is pretty intuitive in that there is going to be a reduction in load of about 1/3 applied to the stem (it’s actually a bit less because of the vector resultant angle when the peak force is realized in the stem - before the falling piece is right below the block) – have a go at sketching it out. There is also the benefit that the rope itself sees less loading, but of course there is significantly more set up time. It would be an interesting exercise to look at the effect of using “rings” in this scenario. 😉

**Could you not put two ropes instead of one on the falling piece for more control?**

Two ropes to the same stem anchor point like the double roping system sometimes seen? Yes, for sure this can be used, but it will not change the energy input into the stem itself. Sure the rope may see about half (potentially half, but it would be hard to equalize the loads perfectly in a running scenario, so lets say “around a half”) the load of one rope, but again this would have no effect on the tree supporting the load.

**Was there any consideration/priority given to removing invasive species while conducting these experiments? For example, experimenting on sawtooth oaks instead of native oaks.**

Not invasives, but the rigging projects here in Montreal used ash species (*Fraxinus americana* and *F. pennsylvanica*) which were declining due to Emerald Ash Borer (*Agrilus planipennis*) which is an introduced pest to North America (and in this case the subject trees were most likely to die). In the notch angle project, I was so short on time, and only briefly explained they were dead trees, Western Hemlock (*Tsuga heteropylla*) which is in stand level decline in the lower mainland of British Columbia due to a suite of factors (heat/drought/native insect pest).

**What's your personal opinion, what do you recommend for a better safe rigging system, rings or blocks?**

Horses for courses. When negative rigging (the piece is falling from above the anchor point), and you have the option to let the piece run, and the ground crew/rope handler is skilled in that task, rings reduce the load at the anchor point. However, bear in mind Brian Kane’s article (2019) that demonstrates in a snubbed off scenario there can be a negative effect.

**This height reduction lowering the force on the tree supports our mitigation options to reduce the risk of whole tree failure by reducing height and spread. Is this usable?**

The projects presented did not specifically look at this. There is evidence elsewhere in the literature to support height reduction (or “reduction pruning”) as a method of reducing failure potential. So of my other work speaks to this specifically, but not the projects here.

**Does the weight and force of a piece double each foot it falls?**

We briefly touched on this in slide 44 and 45, it doesn’t “double” with every foot, but if you double the distance it falls, it will double! so from 1 foot to 2 feet… it would double, 2 to 4, etc. The formula is:

U or E (potential energy) = m(mass)x g(gravity constant)x h(height) = E = mgh

So if you double the mass, you would double the energy (with the potential of doubling the force, but this depends on how you manage the force. Force and Energy; these are 2 different -but related - concepts), and if you double the distance it has to fall, the potential energy would again double.

**Thinking about chapter 3, what notch would you recommend to reduce movement in the top?**

From our preliminary results, we see an effect of notch angle, but there in not enough data yet to speak to type of notch. We see there is an increase in forward movement (pull) with a more open notch, more work to do on this.

**A ground-person’s management of the lowering devices and lines has a dramatic effect on loading on anchors and stem/anchor point. Worthy of comment, methinks.**

Yes for sure!, to the point we created the “robot groundie” because even a highly skilled rope runner is going to vary the loading between runs. Oh, if I had the time, all the experiments we could run…

**Question about the hinge thickness left in topping vs keeping cutting?**

That is a great question! We don’t know! That is part of phase II of our project. Of course there is some conjecture, and we all have personal experience, and most would say removing the hinge may reduce the pull; but there are definite implications in some instances of cutting through your hinge (particularly in forested areas or other close crown proximity)