1d – Design proposals

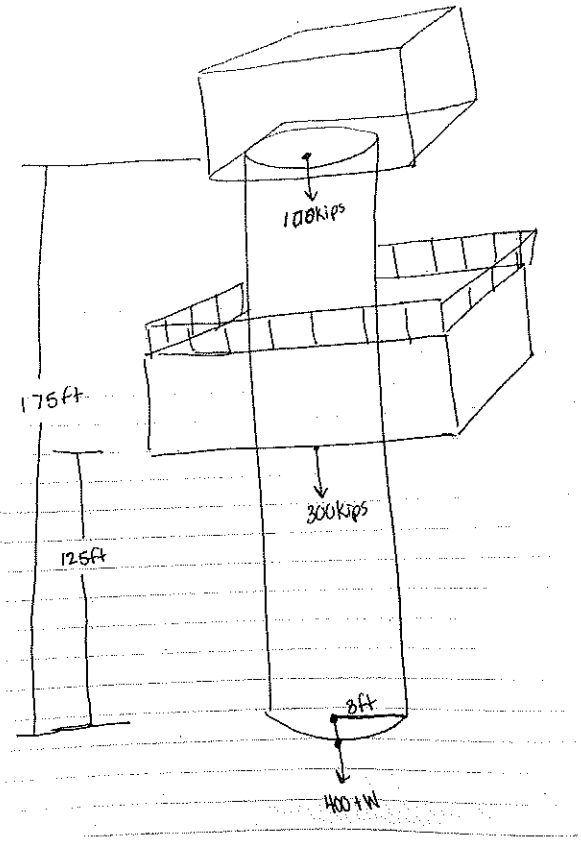
Dear Aunt Ada,

After deliberating over the many potential designs for your treehouse, I have compiled several of the most prominent and feasible designs for your appraisal. The main difference of these designs is found in the base material, and the arrangement of the treehouse structure itself. Each of the designs features a treehouse with a 2000ft^2 interior and stands at 175ft tall. This height was chosen with the intent that you would have the most interesting view of the fireworks; smaller fireworks you will be able to see from above, while larger fireworks you will still be far below, and able to observe just as you always have. Also, since the tallest trees in the Poconos stand at about 150ft, you are high enough to be safely above the tree line. I look forward to hearing which design fits your definition of "epic".

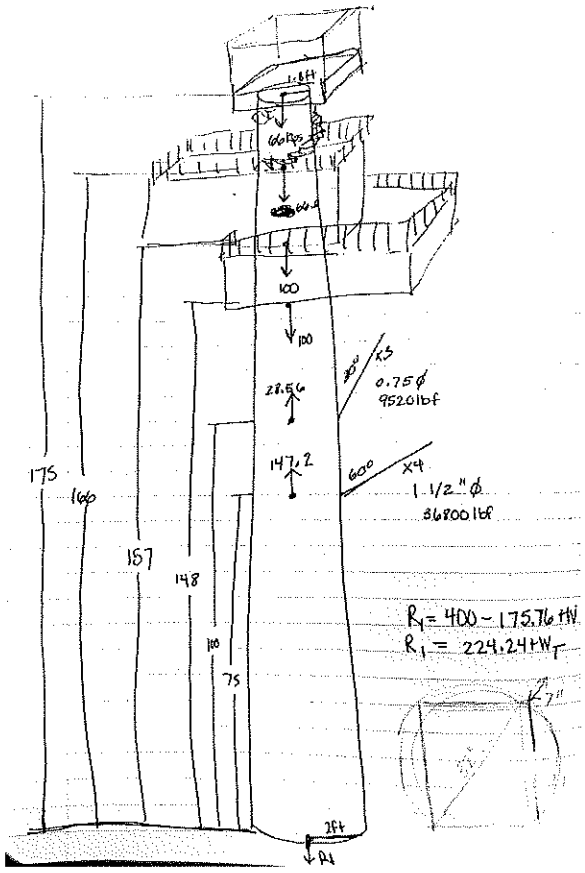
1) Straight and Simple
   This first design is the most basic of all of the following designs, but would also appear to be the most modern. The trunk itself would be a straight cylinder made out of a translucent polycarbonate. The cylinder would have a constant radius of 3ft, which is larger than the other designs, but is complemented by not trying to appear as a normal tree. The treehouse itself will be divided into two floors, and the load will be distributed among those floors. The top floor will be sized in such a way the load at the top of the cylinder will only be 100kips, and the second floor will bear the remaining 300kips. To avoid buckling, the second floor will be located approximately 50ft below the first floor. While this may seem inconvenient, it will allow for balconies and a spiral staircase from one landing to another, and maintain that the load is less than the critical buckling load.

2) Sustainably Saavy
   This design stresses sustainability and cost effectiveness. The trunk will be a tapered cylinder, and the treehouse itself will be divided into three aesthetically offset floors. This will provide for balconies to observe nature's finest vistas. These floors will occur at heights of 148ft, 157ft, and 175ft, and each bear loads dependent on the size of the floors (see diagram). The trunk will be hollowed out in such a way that a small geothermal heat pump (22.4"x22.4"x40.5") can be placed in the base to heat your treehouse in the cold winter months. This will also allow for plumbing to be installed up through the trunk. In the middle of the trunk there will be two tiers of cable fixed to the trunk, and then attached to neighboring trees to reduce loads in the base. These cables will be situated at common branch angles (60 and 30) and then can be disguised as actual branches. The first tier will have four larger, symmetric, cables, and the second will have only three smaller cables. The trunk will be made of Beech, which is locally available and typically has a larger diameter and has a high young's modulus.

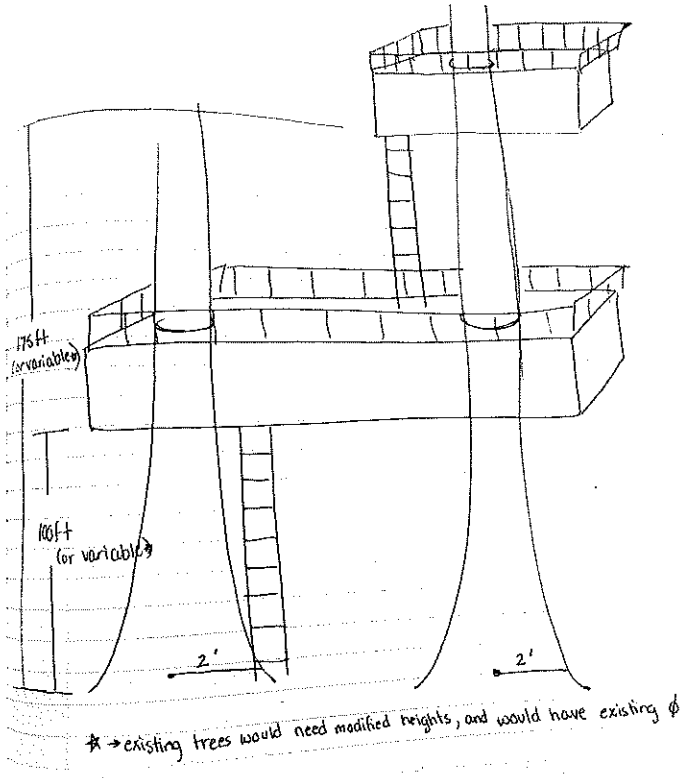
3) Epitome of Epic
   This design will take advantage of the dense Pocono forests and have two trunk supports. The treehouse itself will be multi-tiered, with the bottom floor spanning both of the trunks, and the top floor standing on only one trunk. The trunks will pass through each of the floors completely, offering an integrated and edgy look. Each floor will feature a roof-balcony, with the top balcony being the best location to view fireworks. The bottom floor will be lower down in the treehouse, so its weight is best distributed. Both trunks will be made of eastern pine, and will taper in the same way as a general tree. Because this design features multiple trunks, it would be much more expensive to build on its own; however it may be possible, depending on your chosen location, to modify this design around existing trees. Using existing trees is even more feasible because the bottom floor, since it spans two trunks, will have a different buckling equation than a single load treehouse; this will allow for smaller, more typical diameters. However, the flipside is that using existing trees can harm the growth of the tree, and restricts the convenience of added plumbing.



Straight and Simple



Sustainably Saavy



Epitome of Epic