

Eco Week Prishtina - Treehouse

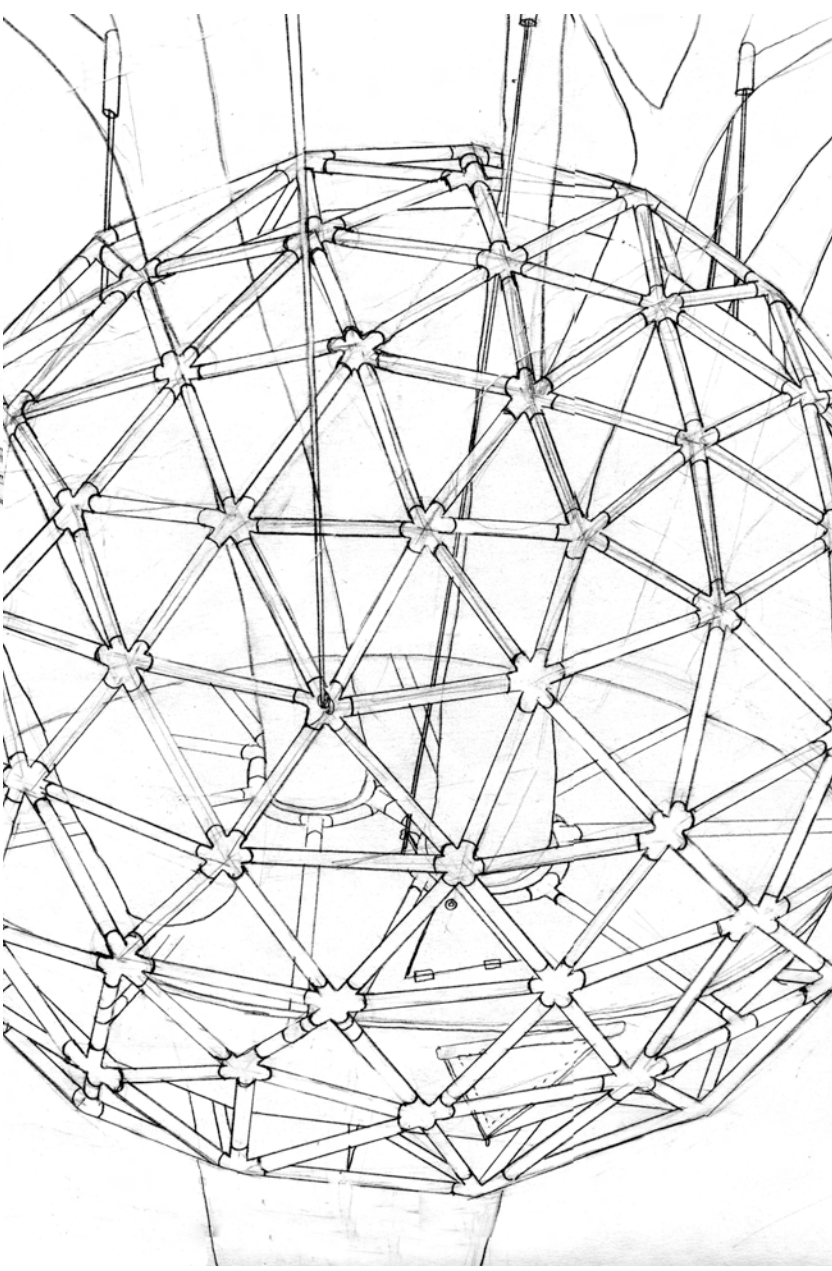
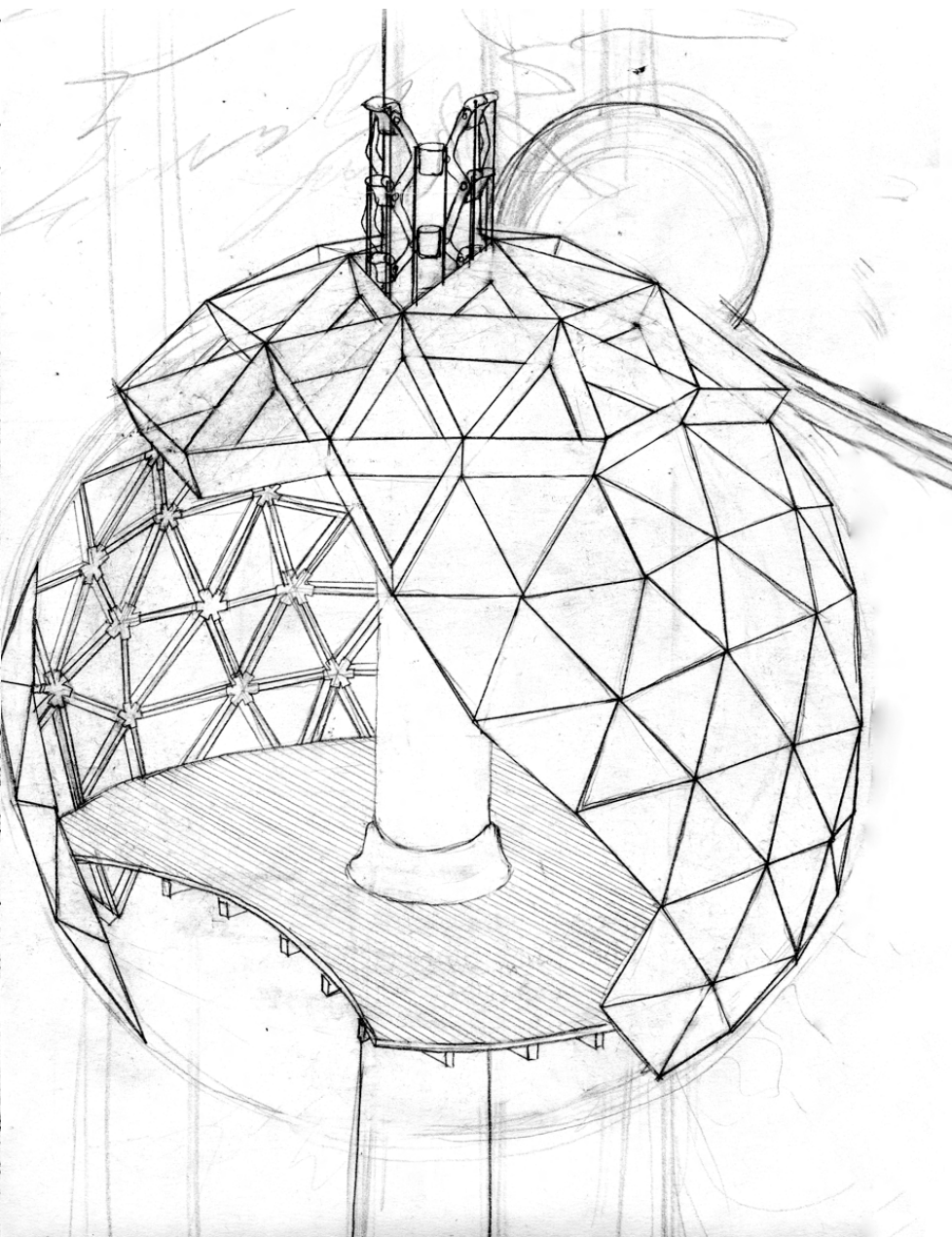
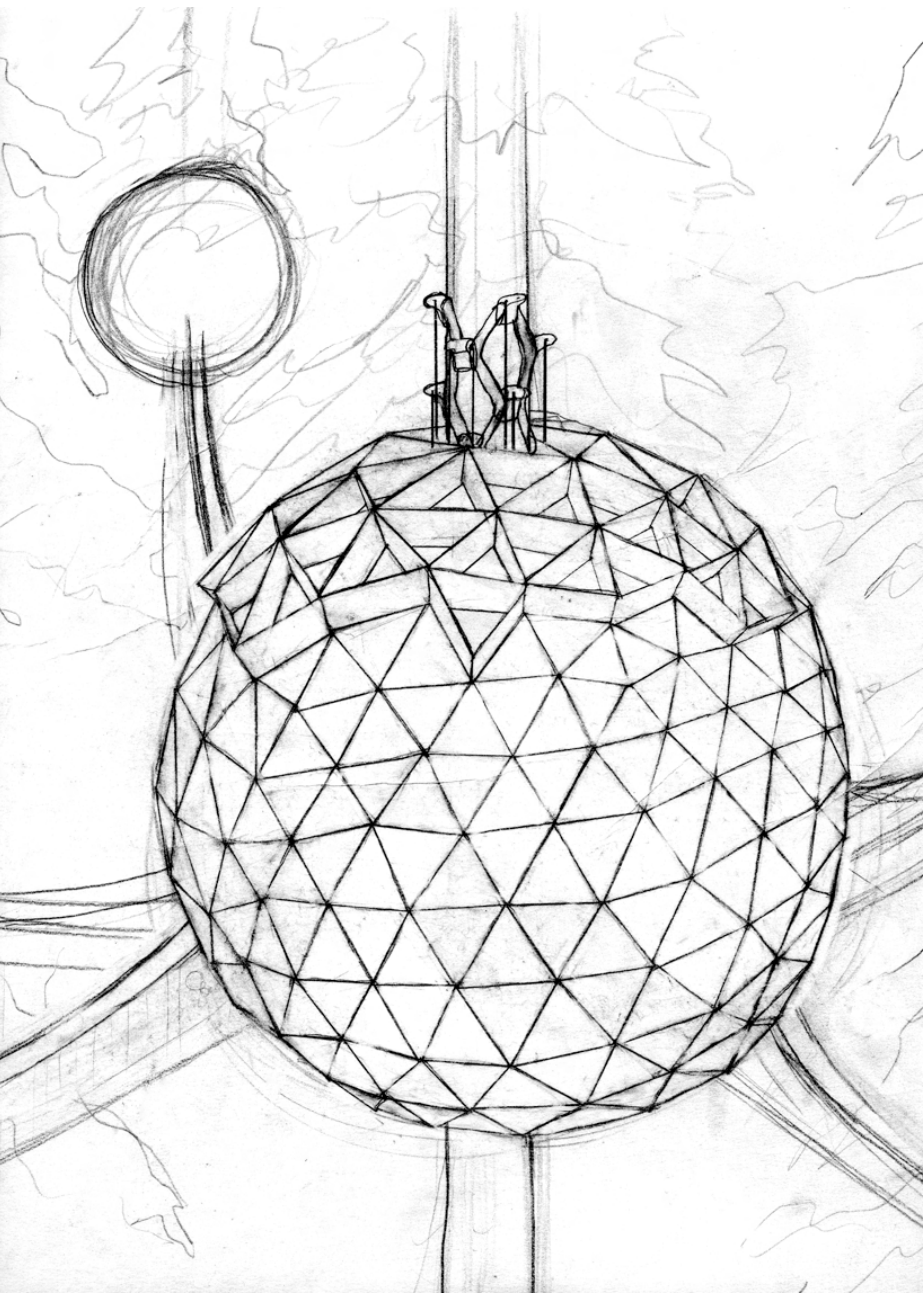




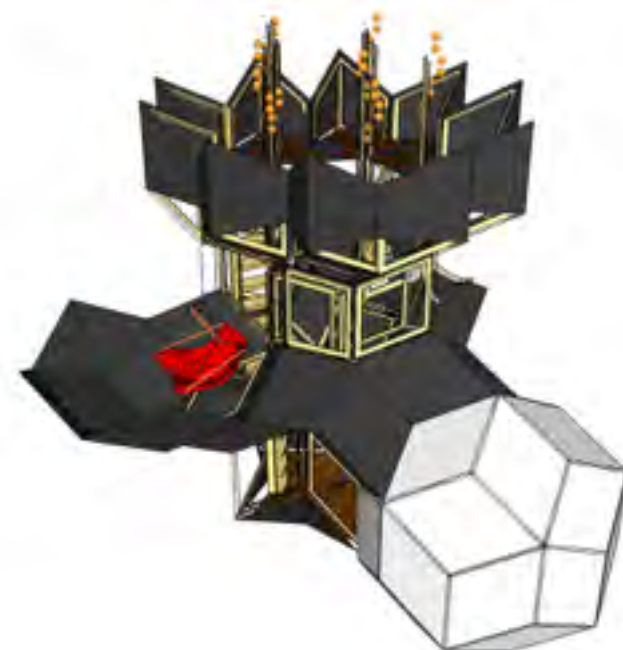


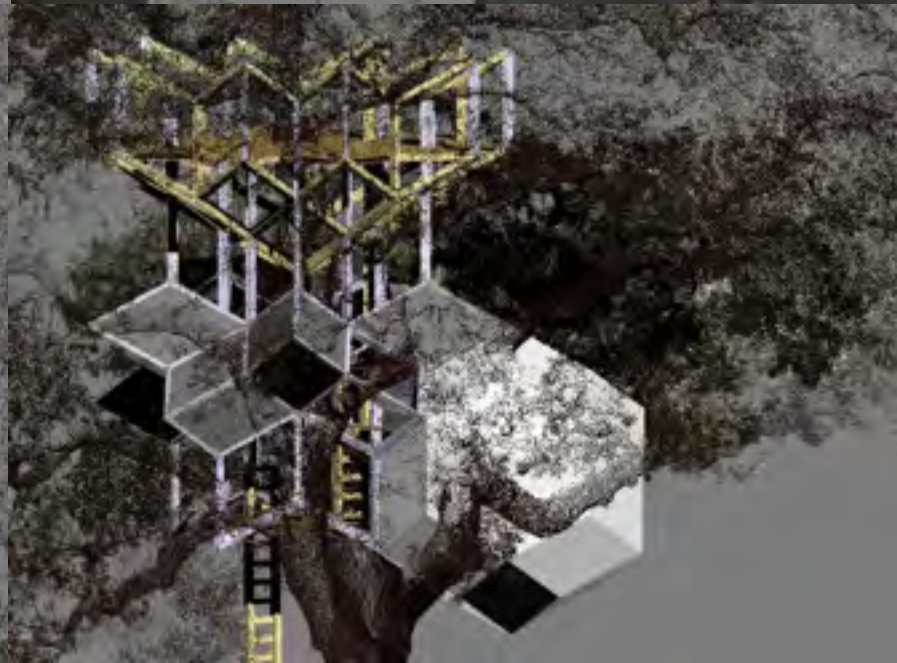




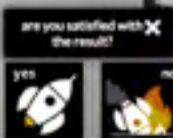
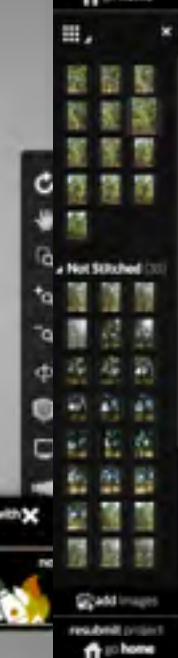
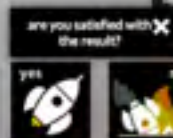
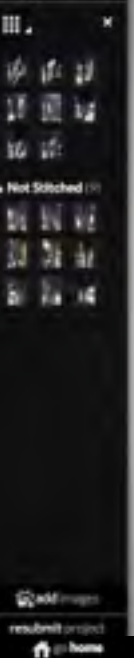
photo: Jeff Clark



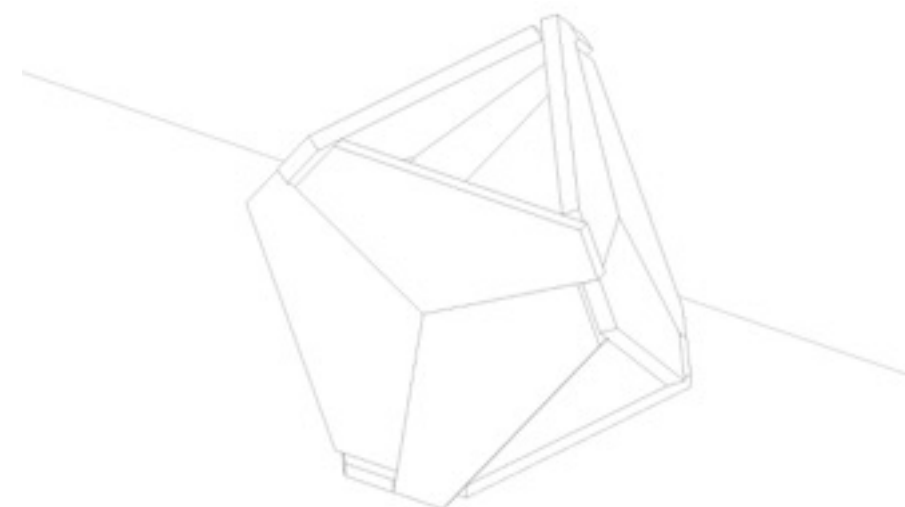
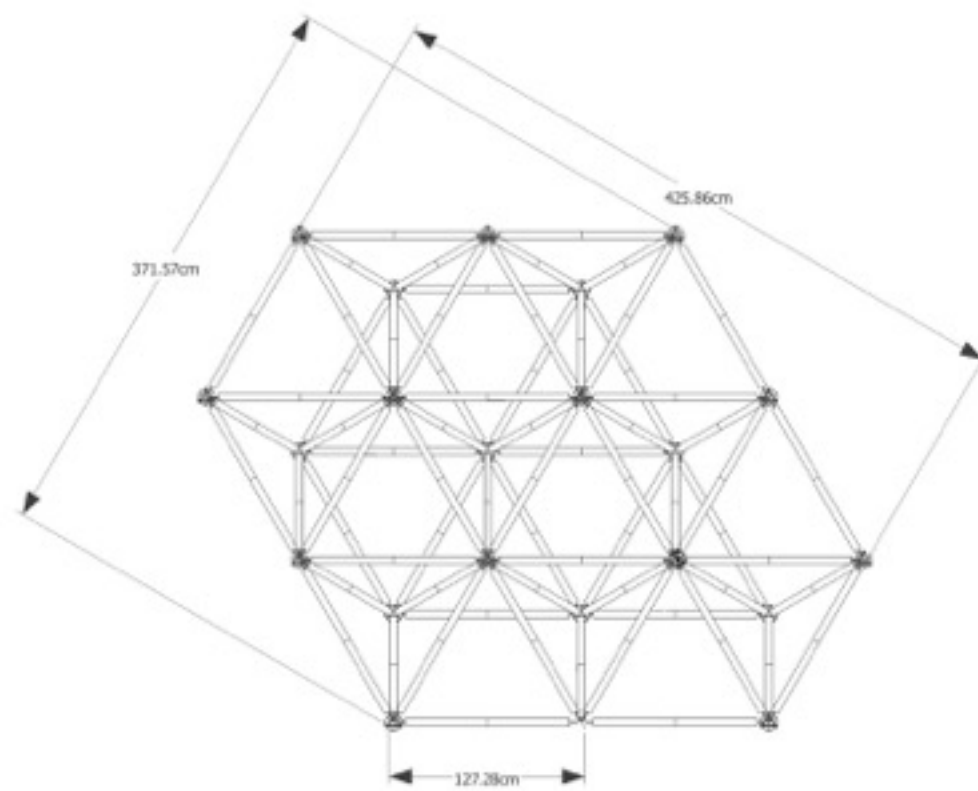
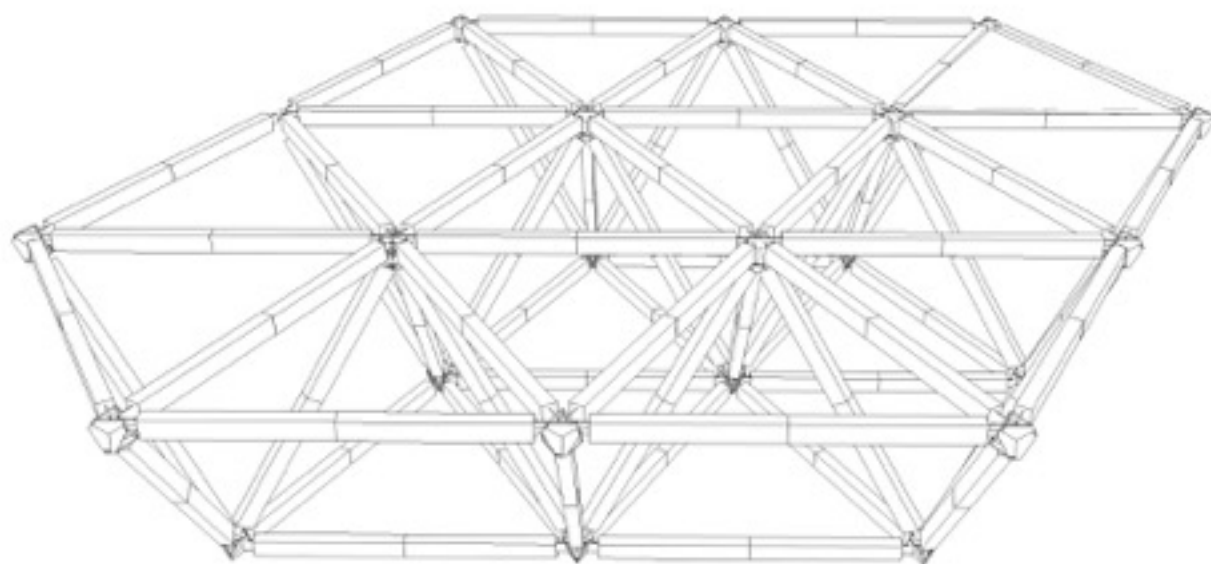




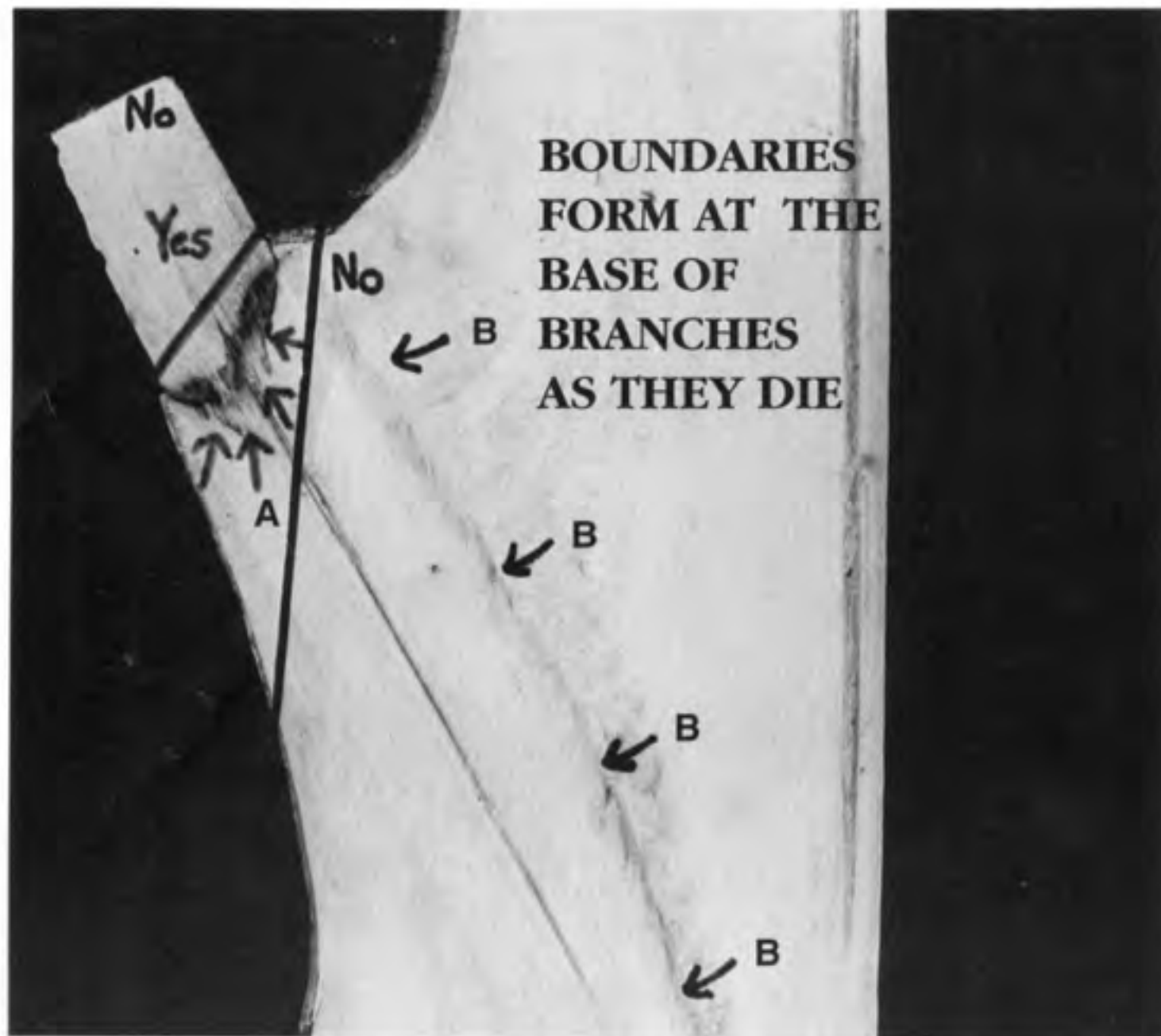
Recap 360



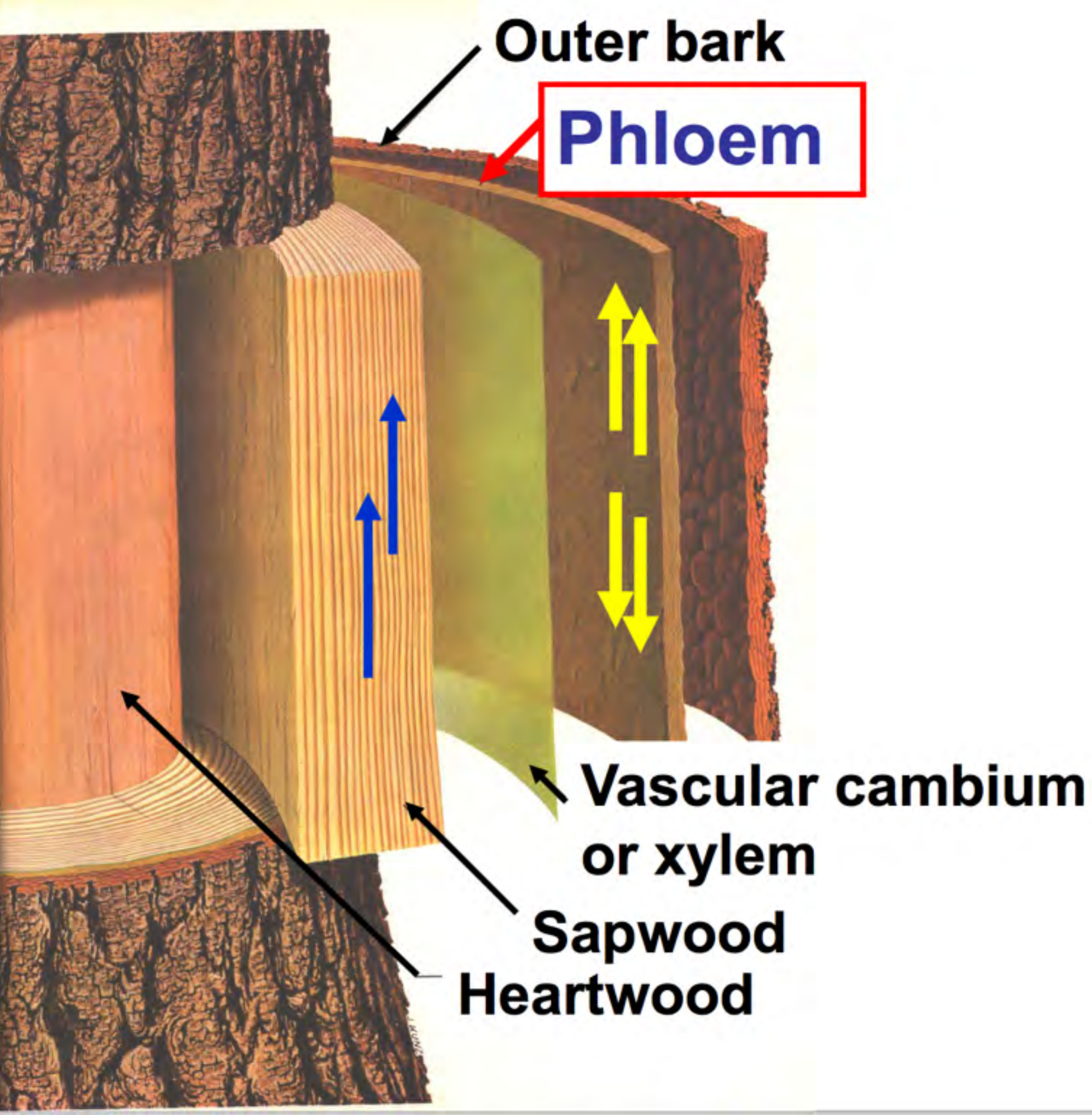




Tree Health



Boundaries also form at the base of branches as they die. The boundaries resist the spread of infections into the tree from organisms in the dead branch. Because the dead branch is mostly cellulose, which is made up of glucose — sugar — fungi can use the dead branch as a source of food while they “press” against the boundary within the branch base. Arrows A show the boundary. When pruning, do not leave stubs as food for fungi, and do not cut branches flush with the stem — flush cuts — thus removing the tissues that form the boundary. Do cut as close as possible to the swollen base or collar of the branch, but do not injure or remove the swollen base or collar. Arrows B show where the trunk tissues grew around the branch tissues.



Connections



Engineering

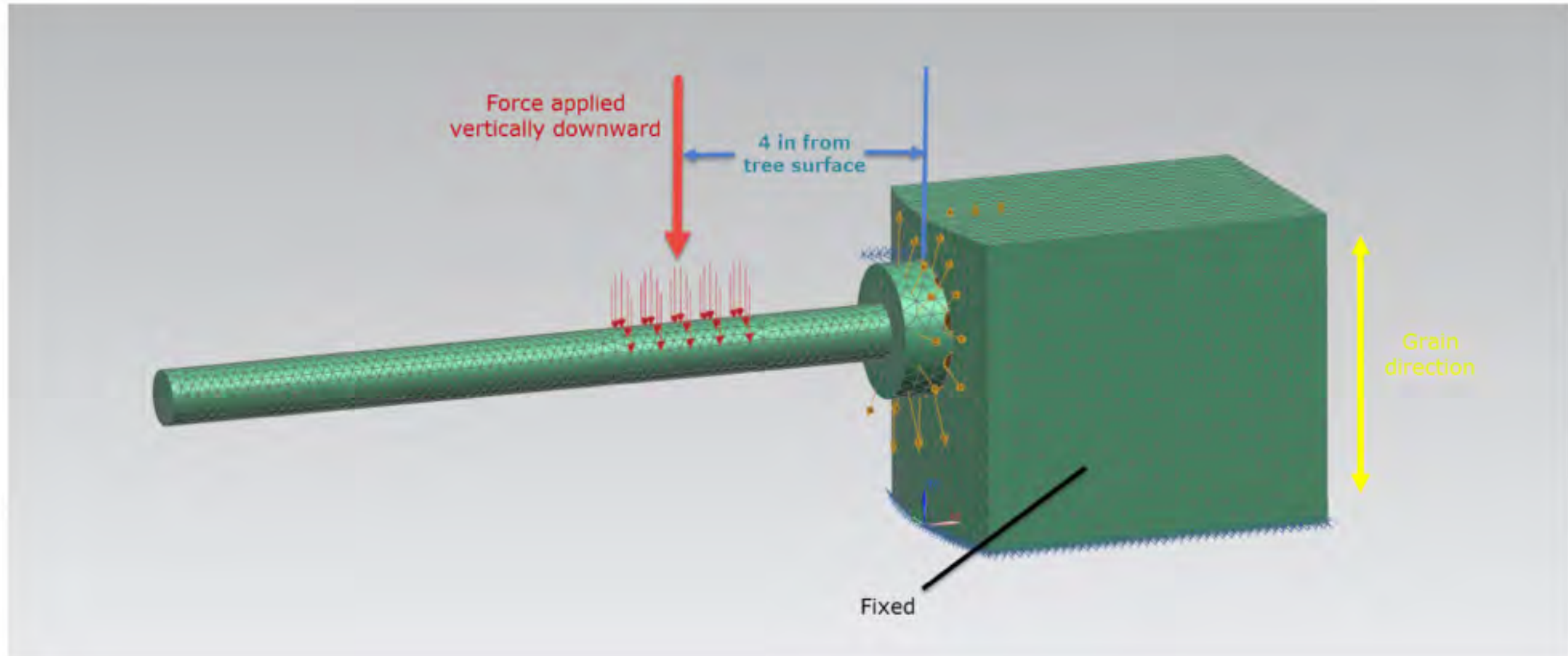
ANALYSIS SETUP – MATERIAL PROPERTIES & INPUT FORCES

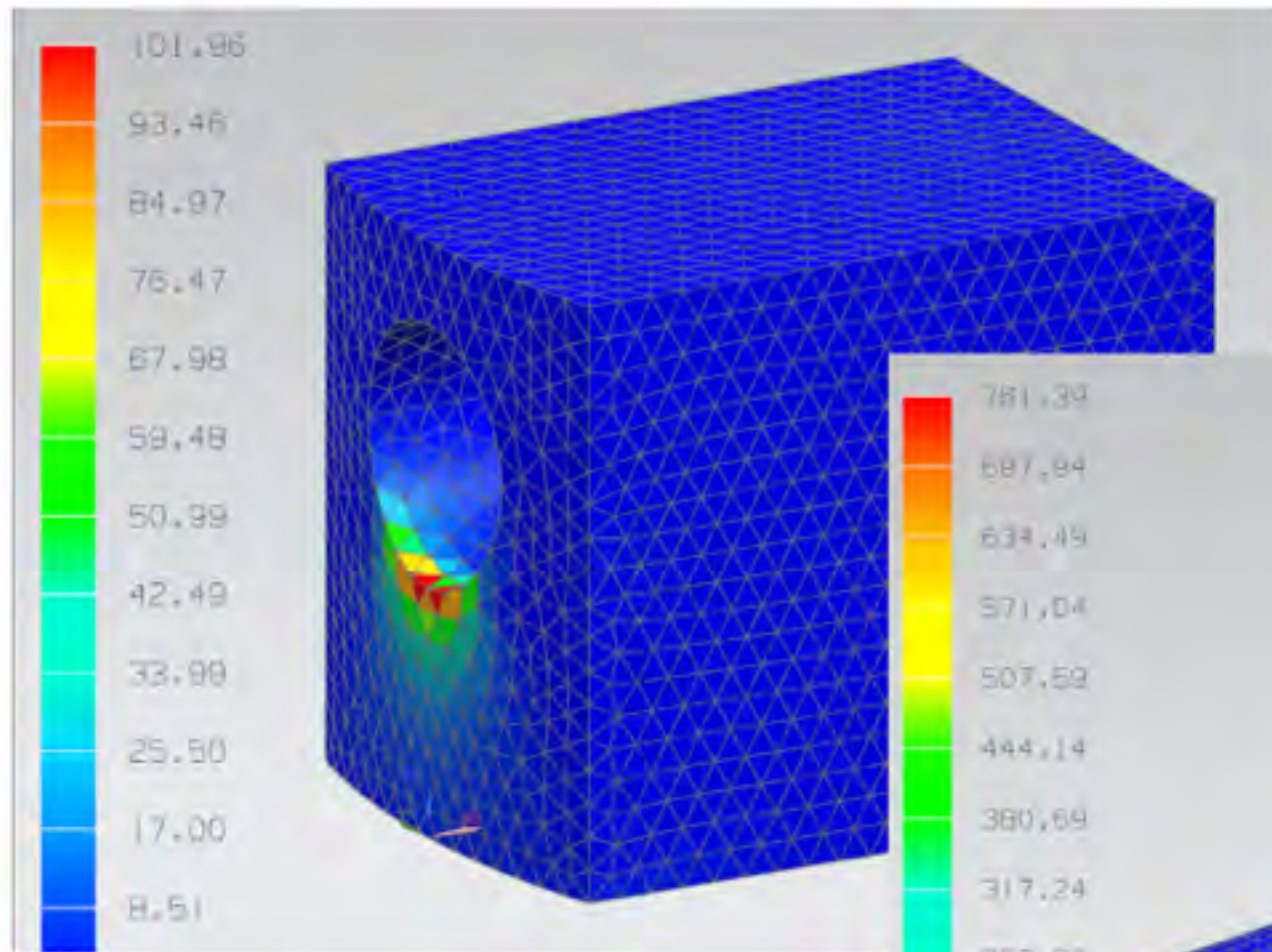
material properties (red oak – green):

density = 0.56 g/cm^3
modulus of elasticity = 8.0 GPa
poisson's ratio = 0.35
Yield strength = $20\text{-}25 \text{ MPa}$

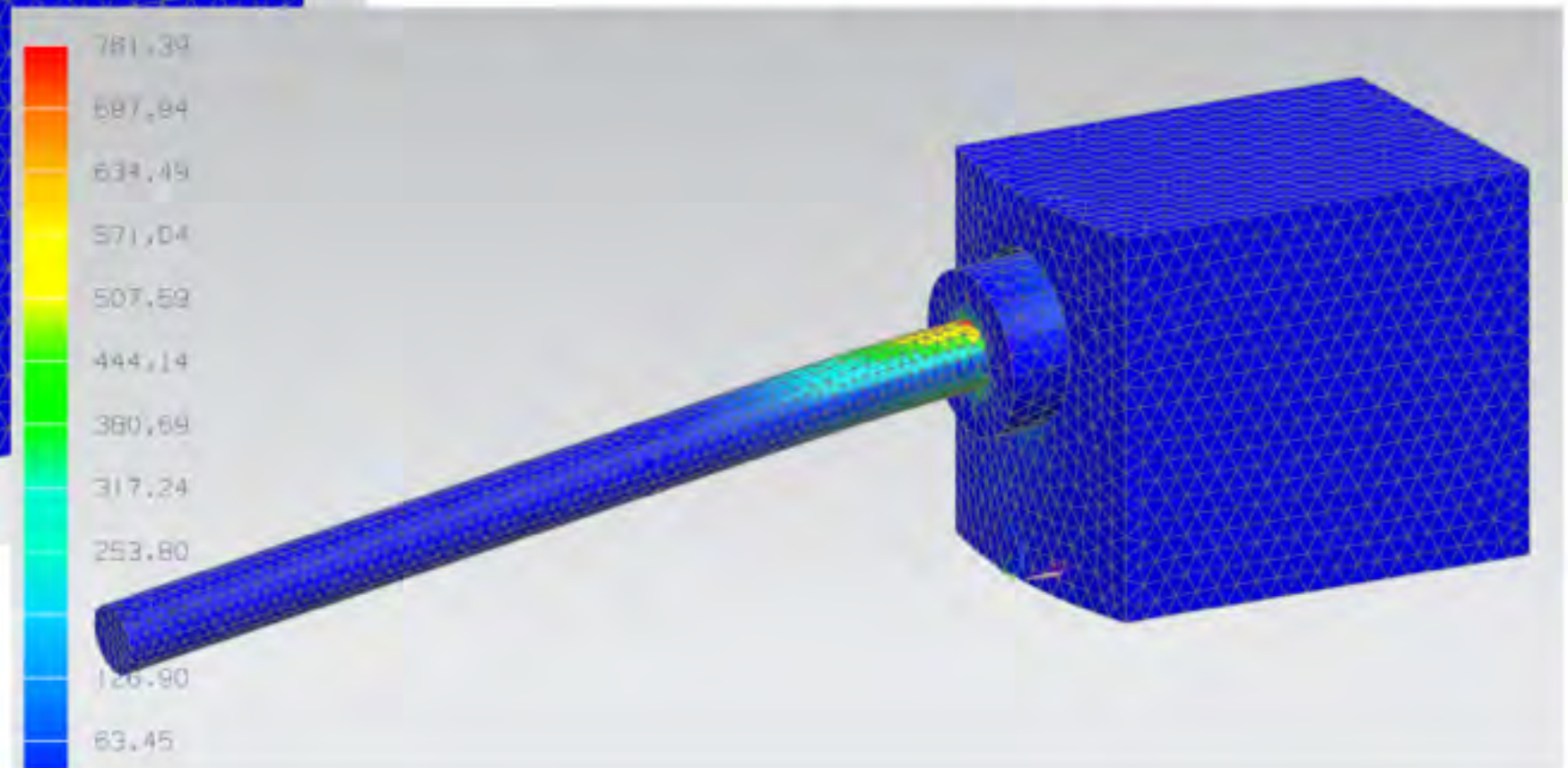
force used for calculations:

9000 lbs total load, spread on 4 TAB's
2x safety factor
→ 4500 lbs (20 kN) per TAB





(left) Max stress in wood = 102 MPa



(below) Max stress in bolt = 761 MPa

conclusions:

- without cantilever support, peak stress is up to 5x higher than desired, in worst case (102MPa vs 20MPa)
- this is using conservative side of material property/etc ranges, as well as 2x safety factor