Securing Telecommunications Equipment to Living Trees

- The Living Network -

Working Draft 0.2

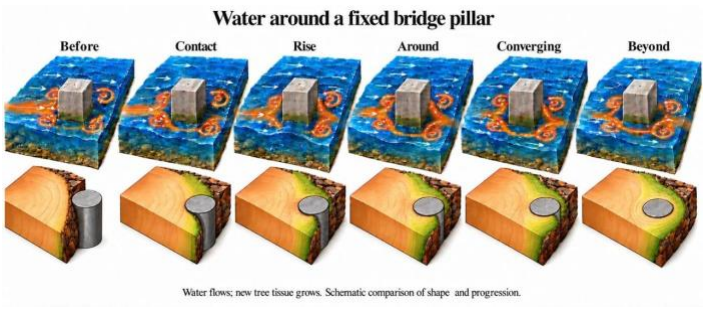


We strive to promote new methods by which we do not fell a tree to erect a tower. Saving the work, the building materials, and their transport gives us a superior result to building towers at lower costs. Below we explain how we do this without injuring or damaging the tree or the ecosystem. We can do this while maintaining structural integrity by exploiting the fact that tree trunks that are adjacent to hard inanimate objects grow , following a geometry called ***engulfment***.

Engulfment - can be described as the process by which a growing tree *progressively grows around an object* that is in contact with it, eventually embedding that object within the trunk. The tree does not consume the object; *the object remains in place while new wood develops around it*. Growth does not simply displace an object outward. As the tree grows, new tissue progressively surrounds the support hardware, until it becomes embedded within (or *engulfed within*) the trunk.

Engulfment

A tree thickens by adding new tissue beneath its bark. In engulfment, this growth meets fixed metal and develops around it. The metal stays in place while new wood surrounds it. The change is too slow to watch directly; time-lapse photography can make it visible. For an intuitive picture, we observe a river flowing around a bridge pillar; the water (in the illustration is highlighted in orange as it) meets the pillar, splits into 2 streams, which rejoin downstream (immediately after the pillar).

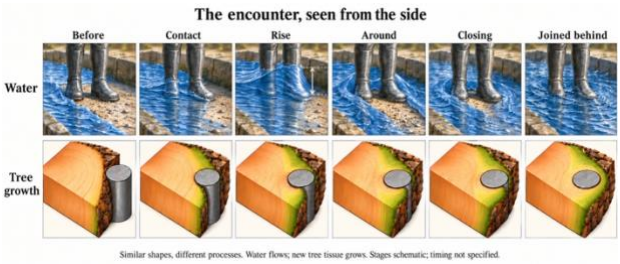


Water flows; new tree tissue grows. Schematic comparison of shape and progression.

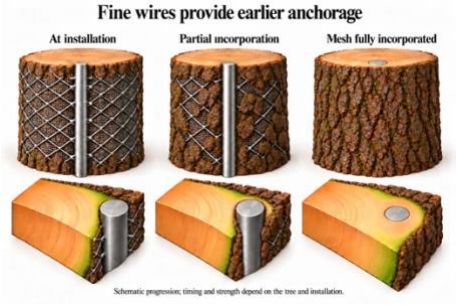
Each stage of water flow is paired with the corresponding stage of new wood growing around the metal. The similarity (between the way the wood grows and the flow of water in the river) is in the shape and *progression around the obstacle*. Water flows in the river; in the tree, new tissue forms…

To be more precise, let's imagine a heavy metal soldier *fixed* to the bottom of an experimental channel. An advancing (mini-) flood meets its (the metal soldier's) legs, rises, splits around them, and rejoins beyond them. This brings us closer to engulfment an advancing front develops around a fixed obstacle.

Geometrically, liquid water *flowing* around a pillar are the same as that of wood, *growing* around a hard inanimate object are the same, except that the interaction with wood and the object occurs over many years, whereas with water it occurs over a fraction of a second.



Compared to us, wood is immobile, hard, and unyielding. That's why we use it and the way it grows to firmly grasp the chassis to which we attach telecommunications equipment according to this method. To hasten the wood's hold on our apparatus, we attach thin wires to the thicker metal pieces and weld them together, so that it is all one connected object.



Below, we zoom in on the mesh and point out to the reader that between the wires of the mesh are wires of a finer mesh (which are completely engulfed first).

The finer mesh has two functions: 1. To be engulfed quickly because it is thinner, while staying connected to the thicker wires of the mesh, thereby holding everything in place (earlier than would have been the case in its absence).



2. By virtue of its geometry (as well as its chemical and atomic structure) the fine mesh provides shielding from magnetic radiation (what is called in physics a 'Faraday cage').