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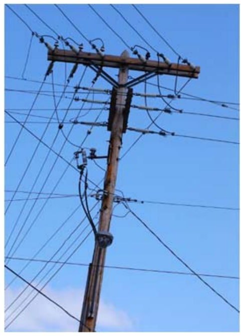
Improved Wood Utility Poles

Facts About Wood Utility Poles



- Wood utility poles provide an excellent support for overhead transmission, distribution, and communications lines[1], are reasonably priced, non-conductive, and easy to install.
- There are approximately 135 million wood utility poles installed in the United States, and are replaced at a rate of 1.5 million per year[2]. The average life span for a conventional wood utility pole is 30-40 years.
- The most recognized standards for buying and designing wood poles is the ANSI O5.1. Most wood poles are 45ft. in length and a butt-end diameter of 12 in.[3].
- Common species for wood poles are Southern Yellow Pine, Douglas fir, Jack Pine, Lodge pole Pine, Pacific Silver Fir, Red Pine, and Western Red Cedar[4]
- The most common chemical treatments for wood utility poles are pentachlorophenol in heavy oil, chromated copper arsenate, and creosote[2].

Some disadvantages of conventional wood poles are:

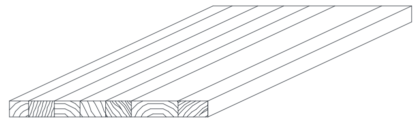
- Prone to decay, especially at or near ground line.
- They are heavy. A typical 45ft Class 4 Red Pine pole weighs approximately 1,100 pounds.
- Prime trees are required for conventional wood poles.
- Inadequate preservative treatment. Shrinkage during in line service will expose untreated wood that is subject to decay.
- Due to the natural variability in the physical properties of trees, a high safety factor is required in conventional wood poles.

Value Proposition

"An engineered hollow wood pole, that meets specifications, conserves wood, has a longer service life and a cost of manufacture that is equal to or less than that for its conventional counterpart"

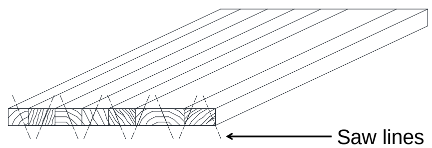
Technical Characteristics of Invention

Creation of the Parent Flitch



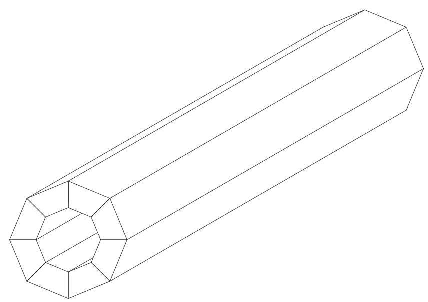
Boards of random-width and length are edge-glued to form a parent flitch of the thickness and area required to produce the octagon-shaped pole or portions thereof.

Stave Retrieval



Staves are sawn as shown, with near zero waste of wood.

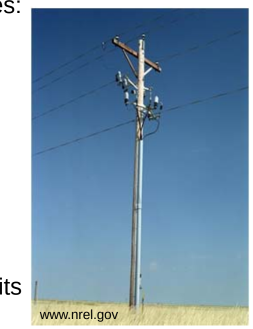
Assembly of the Staves into the Octagon-Shaped Entity



The staves, with adhesive applied, are nested into the octagon shape. Modest pressure is applied to the nested staves via a few strapping devices. An air-tight cap is applied to each end of the hollow pole, one of which contains an air-line fitting through which a vacuum pump evacuates the hollow core. The resulting difference in air pressure applies uniform pressure to the glue-lines. For example, at a 10 psi. differential, each square inch of the external surface area receives 10 lbs. of force.

Benefits

This engineered wood pole will have the following benefits compared to conventional wood poles:



- A hollow pole uses approximately 60% of the material required for conventional wood poles.
- It is easier and more effectively treated against biological attack.
- Wood of low moisture content contributes to higher dimensional stability and much lower weight.
- It's weight is about half of that for its conventional wood counterpart. This facilitates ease of manufacture, transportation, and installation.
- Allows for more efficient utilization of our renewable forest resource.
- An engineering approach creates greater flexibility in designing for different shapes, sizes and strength requirements. It also provides an opportunity for marrying a performance enhancing material, such as fiberglass, to the structural wood components.

Remaining Work

The following activities need to be carried out before commercial-scale production of the octagon-shaped pole:

- Prototype construction.
- Testing according to ANSI standards.
- Further development of manufacturing process .
- Feasibility analysis of commercial-scale production.

References

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