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Questionable Research in a White Paper Comparing Wood, Composite Utility Poles

A paper published in the *Canadian Journal of Pure and Applied Sciences* contains several questionable and misleading comparisons on the structural performance of fiber-reinforced polymer composite poles vs. pressure-treated wood poles. The paper's conclusions that "composite poles offer a higher level of reliability than wood poles" is not supported by standard engineering practices or comparisons of performance.

The paper ***Structural Reliability of Wood and Composite Poles Subject to Hurricane Winds*** appeared in the October 2023 edition of the journal. Following comments and concerns about the unsupported conclusions made in the originally published paper, the authors revised the paper to include less specific performance claims.

The white paper is published in a journal that uses a "pay to publish" model. The paper acknowledges that financial support for the research was provided by RS Technologies, Inc., a manufacturer of composite utility poles. The paper was not thoroughly vetted by a peer reviewing committee to confirm calculations made in the publication. As a result, calculation errors such as missing NESC strength factors to compute the moment capacity of wood poles were found in the originally published paper.

The paper purports to provide "a nominal comparison of the mathematical reliabilities" of both pole materials. However, the comparisons are biased per the selection of wood and composite poles assessed. Wood poles of lower capacity are compared to composite poles of much higher capacity.

Unequal comparison

The wood poles referenced in the study are Western Red Cedar poles, which have the lowest assigned structural strengths for any species used as wood poles. The cedar poles are then compared to composite poles with much higher strength ratings.

Table 2 in the white paper lists the Factored ANSI Load Rating for Western Red Cedar poles at 15.0 kN. The comparative composite poles listed in Table 3 show load ratings ranging from 26.3 to 33.0 kN, more than double the load rating compared to wood poles.

Flawed premise

The paper's core premise appears to be fundamentally flawed. In the originally published version, the authors neglected to apply NESC strength reduction factor of 0.75 for wood poles for the 250C load case. After the inaccuracy in the engineering calculations was brought to the author's attention, the paper was revised and re-published in May 2025. In the revised version, the strength reduction factor was applied and this reduced the moment capacity to be lower than the applied moment.

Table 6 of the revised white paper shows the moment capacity is lower than the applied moment, indicating a structural inadequacy in the pole class being selected for the study. This suggests that the paper's theoretical framework does not produce a viable application scenario.

Misleading bending strengths

In describing the poles for comparison, the paper notes the fiber bending stress, or Modulus of Elasticity (MOE) for composite poles range from 18.17ksi to 41.87ksi “depending on the module and wall thickness.” Yet there is just a single MOE value for the Western Red Cedar pole, as listed in ANSI standard ***O5.1-2022 Wood Poles, Specifications and Dimensions.***

Offering such a wide range of MOE values for composite poles by changing the thickness and resins could be construed as a misleading comparison concluding such poles are more reliable that wood poles.

Non-specific conclusions

The original white paper included assertions such as: “composite poles can offer more than 20 times the reliability of wood poles for high-wind loading.” It also stated that the calculated “probability of failure” for both materials “means that for every 1,000 poles subjected to 210 kmph (130 mph) wind loads, wood poles would experience nearly 400 failures whereas composite poles would experience no failures at all.”

The authors retracted some initial claims such as “20 times the reliability” and replaced them with a generic and less certain conclusion that composite poles had “significantly higher structural reliability than wood poles.” The certainty of the “mathematical structural reliability” calculations presented in the originally published paper were replaced by cautious and generic phrases in the revised paper, concluding that: “Further studies are needed before the findings here can be generalized in any shape or form.”

General conclusions

The paper published in the *Canadian Journal of Pure and Applied Sciences* presents unreliable and biased comparisons between fiber-reinforced polymer composite poles and pressure-treated wood poles. Overall, the paper does not provide a credible or scientifically rigorous basis for concluding that composite poles offer higher structural reliability than wood poles.