

Date: July 9, 2025

To: [REDACTED]

RE: Structural Deck Assessment
[REDACTED], Bourbon, MO 65441

Dear Mr. & Mrs. [REDACTED],

RLM & Associates, LLC conducted a structural evaluation of the wooden deck at the specified property as requested. Visual inspection revealed significant structural deficiencies, including sagging floor joists and cross beams, with most components lacking proper end support (documented in Photos 1-12).

Code Compliance Analysis

The structural analysis evaluated floor joists, cross beams, and columns against 2018 International Residential Building Code requirements. The code mandates that decks withstand combined loads of 10 psf dead load, 40 psf live load, and 20 psf snow loads. Using the governing load combination of $D+0.75(L+S)$, the analysis revealed multiple structural failures:

- Floor joists exceeded bending capacity by 8%
- Cross beams failed multiple criteria:
 - Shear capacity exceeded by 73%
 - Bending capacity exceeded by 529%
 - Live load deflection exceeded by 390%
 - Total deflection exceeded by 416%

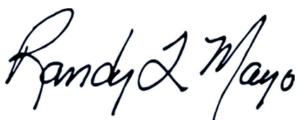
While the 4x4 wooden columns can handle the design loads, the supporting soil is inadequate without proper foundations. Each column would require a 16"x16" concrete footing extending below the frost line (approximately 20-24 inches deep).

Conclusion and Recommendation

The deck's current condition fails to meet 2018 International Residential Building Code safety standards and poses a safety hazard. Complete replacement with a properly engineered and code-compliant deck structure is recommended.

Should you have additional questions, please contact my office.

Sincerely,



Randy L. Mayo, P.E.
President



7/9/25

PHOTOS



Photo 1 – Deck surface sagging



Photo 2 – Recent attempt to repair



Photo 3 – All support structure 2x8 lumber



Photo 4 – Inadequate beam support



Photo 5 – Inadequate beam support



Photo 6 – Missing joist hanger nails



Photo 7 – Support post has settled



Photo 8 – Inadequate beam support

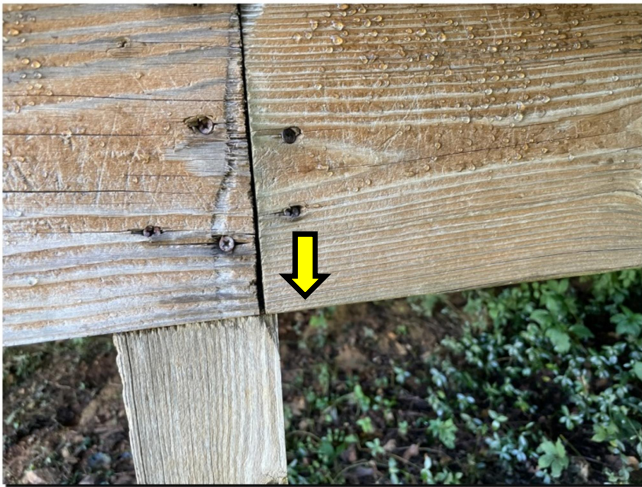


Photo 9 – Inadequate beam support



Photo 10 – Inadequate beam support



Photo 11 – Weak screw connection



Photo 12 – Weak screw connection