Building an Engineered Beam: An Investigation in Design-it-Yourself Beam Performance

Brue, Rylan

Engineered wood beams are advertised to be stronger and more durable than standard sawn lumber beams. However, the commercially available engineered wood beams are much more expensive than standard sawn lumber. This project researches the possibility of designing and building simple homemade engineered beams that are stronger than standard sawn lumber beams without increasing the cost of the beam. Two homemade beams were constructed with an I-beam configuration. The first beam was constructed using an eight foot 2 by 4, and the second with a single eight foot 2 by 6. The beams were cut and grooved to serve as the I-beam flanges and to accommodate a ?” OSB web. These beams were similar in material cost and overall dimensions to the sawn lumber alternatives. To test beam performance, the beams were loaded as cantilevers. High precision dial indicators measured the total deflection to the nearest hundredth of a millimeter at a designated distance from the fixed end. It was hypothesized that the homemade I-beam would be stronger than the equivalent sawn lumber beam, but making it cost-competitive to sawn lumber would be difficult to achieve. The homemade I-beams did reduce deflection in all cases and resulted in a reduction in cost per capacity by 24 percent and 5 percent in the 2 by 4 and 2 by 6 cases respectively. This experiment demonstrates that it is possible to design and build a homemade engineered beam that outperforms a standard sawn lumber beam of equivalent cost.

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