

# **Species, Grading, and Mechanical Properties of Locally Sourced Timber<sup>1</sup> in the Joyabaj Region of Guatemala**

## **Summary Paper**

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### **1 TARGET AUDIENCE**

Individuals and organisations that design wood structures who are interested in evaluating locally sourced timber provided by sawmills that do not identify timber by species or grade.

### **2 BACKGROUND**

The Milwaukee School of Engineering (MSOE) chapter of Engineers without Borders USA (EWB-USA) has been collaborating with the local government of Joyabaj, Guatemala for over a decade on the design and implementation of several vehicular and pedestrian bridges. The construction of these bridges requires a significant amount of locally sourced timber from a small community sawmill for formwork. The timber from this sawmill is not separated or identified by species or grade. It was known that the timber was comprised of three species of pine, but the distribution of grades and mechanical properties were unknown.

### **3 PURPOSE**

The objectives of this study were to investigate the species, evaluate the quality by assessing the distribution of timber grades, and determine the mechanical properties of timber purchased from an informal sawmill in the Joyabaj region of Guatemala for use on EWB projects.

### **4 METHOD**

This research project included three components: species investigation, timber grade distribution assessment, and mechanical properties determination. The species investigation included interviews, material testing, and comparison to literature. The distribution of timber grades was assessed by grading 509 pieces of timber according to a visual grading guide

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<sup>1</sup> The word ‘timber’ refers to wood that is processed into beams and planks, otherwise known as ‘lumber’ to North American audiences.

created by the authors from standard grading rules used in industry. Clear wood testing was performed on 64 samples in MSOE's structural laboratory to determine modulus of rupture, compression parallel to grain, modulus of elasticity, and specific gravity.

## **5 RESULTS**

The timber provided by the local sawmill in Joyabaj, Guatemala was not identified by species, but was determined to be a mixture of three species of pine grown in the region. The timber quality was additionally not identified by grade but was determined that approximately 90% was No. 3 or better and approximately 50% to 80% was No. 2 or better depending on the size of timber. Design properties of Eastern White Pine were adopted as conservative values for timber sourced from this sawmill.

## **6 IMPLICATIONS FOR TARGET AUDIENCES**

This paper outlines a strategy for other individuals or organisations to evaluate the species, distribution of grades, and mechanical properties of timber from local sawmills where this specific information is unavailable.