



# INVESTIGATING MECHANICAL LUMBER PROPERTIES AND PROPERTY RELATIONSHIPS TO GRAVITY AND LARGE SCALE BENDING

## A McIntire - Stennis Supported Project

In 2013, the Southern Pine Inspection Bureau reduced the design values of southern pine lumber by 25%. Southern pine lumber was effectively repositioned in the marketplace to one of the weakest lumber products, resulting in substitute products replacing the yellow pine in many applications. As design values were reevaluated, researchers questioned the specific gravity of plantation grown timber as well as the impact the reduction of the gravity might have on resultant mechanical properties.

Over 2,000 Southern pine lumber samples of various sizes were collected from Texas to North Carolina. The samples will examine non-destructive estimation techniques with proof loaded static bending and ultimate bending strength. Sample remnants will examine small clear specimen properties of tension, bending, compression parallel and perpendicular, hardness, and specific gravity.

The project examines the relationship between specific gravity using a moisture meter and Metriguard E-computer. Specific gravity measurements are also obtained by the cutting of small lumber blocks to measure its dimensions and initial, dry, and bone-dry weights to see how the emerging specific gravity relationships can explain changes in properties and the resource.



### COLLABORATION

The USDA Forest Products Laboratory collaborated on this project.

## IMPACTS



In conjunction with a graduate student, an economic location model has been developed to compare competitive positions of individual state and county locations across the southern pine growing region for new forest products processing facilities.



A number of publications have been written in refereed journals that describe the relationships among specific gravity and other growth characteristics with modulus of rupture, modulus of elasticity and the small properties of wood specimens.

### ABOUT MCINTIRE-STENNIS

The McIntire-Stennis program, a unique federal-state partnership, cultivates and delivers forestry and natural resource innovations for a better future. By advancing research and education that increases the understanding of emerging challenges and fosters the development of relevant solutions, the McIntire-Stennis program has ensured healthy resilient forests and communities and an exceptional natural resources workforce since 1962.

