



## FURNITURE ENGINEERING AND NATURAL FIBER COMPOSITES

### A McIntire - Stennis Supported Project

Screws are commonly used in furniture engineering to provide additional stiffness to each object and secure them in place. Screw-driving torque performance is an important mechanical property of wood-based materials, but it can cause wrist injuries to workers. Too much torque on turning screws can fracture the formed screw threads and might cause screw seating and stripping problems. This will reduce the overall screw holding capacity in the material. It can also cause health problems due to the long-time use of hand-held power tools in furniture manufacturing assembly operation.

This project's objective aims to study the effects of the magnitude of vertical driving forces applied on screws in wood-based composite materials, screw penetration depth, and screwdriver air pressure on seating and stripping torques. The results of the project can help furniture manufacturers design their products with confidence, meet quality assurance testing requirements, reduce customer quality issue complaints, and eliminate potential user injuries caused by failed connections in furniture construction.



#### COLLABORATION

This project includes collaborators from Kastamonu University, Zhejiang Agriculture and Forestry University, and Karadeniz Technical University.

#### IMPACTS



Helps furniture manufacturers set the right screw driving torques into products securely and safely.



Contributes to the elimination of wrist injury complaints due to the reduction in the amount of force needed to safely screw.



Improves the quality of furniture manufacturer products by lowering potential issues and complaints.

#### 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.

