Steam-Pressed Scrim Lumber (SPSL):
A developing new material for bridges

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History

TimTek Technology Development…….
A Cooperative Effort Between

Timtek

Forest and Wildlife Research Center

Mississippi Agricultural and Forestry Experiment Station

Mississippi State University

Mississippi State University Research Technology Corporation

State of Mississippi

CSIRO

Val Julе

Plantation Forests etc....


BIG-TEX
Trailers

Construction of Research Facility at Mississippi State

MISSISSIPPI STATE UNIVERSITY

Serial #1 Machine Centers

- March 15, 2003 at Shuqualak, MS


First Scrim made
in Mississippi –
March 19, 2003
MISSISSIPPI STATE
UNIVERSITY


August 8, 2003 –
Moving to MSU
CRUSH MILL ROLLER
AND CONVEYOR
MISSISSIPPI STATE
UNIVERSITY


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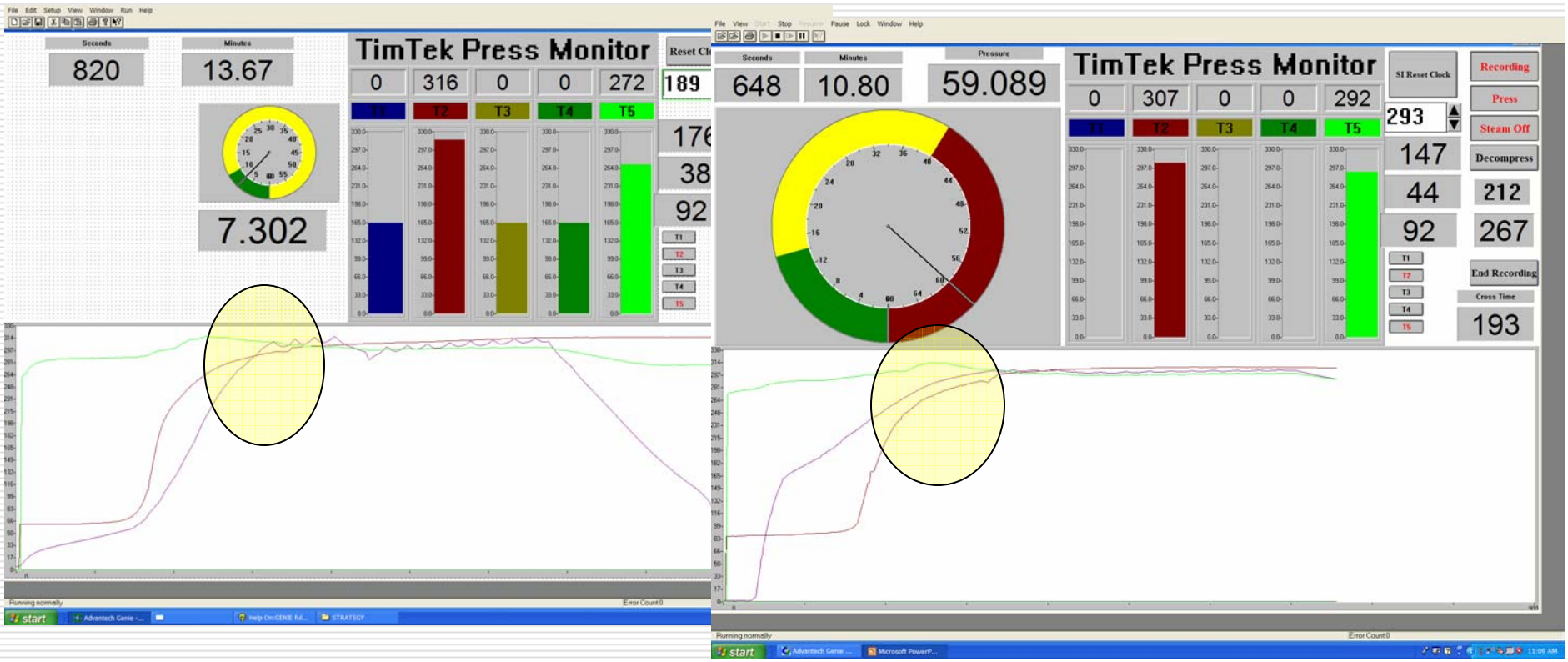
#25
Top
MISSISSIPPI STATE
UNIVERSITY

Development and Mechanical Properties

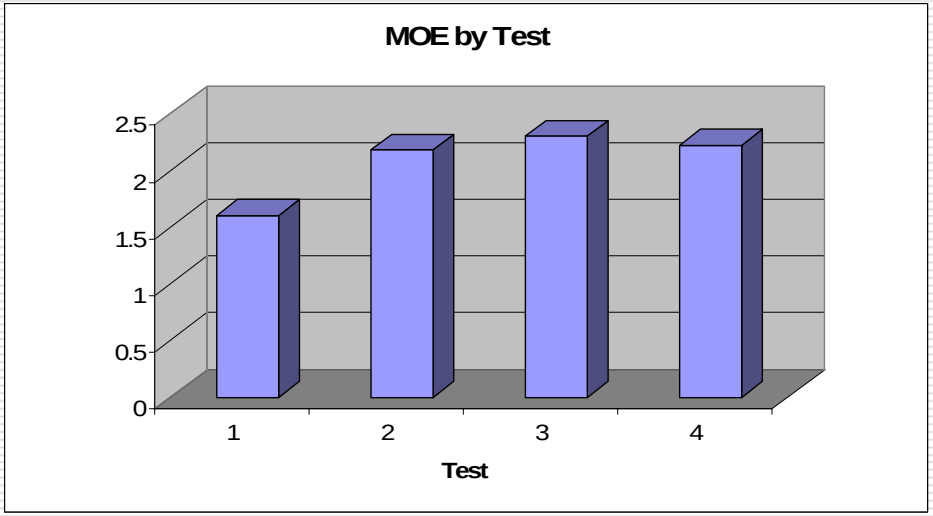
Data Collected on over 200 Test Beams

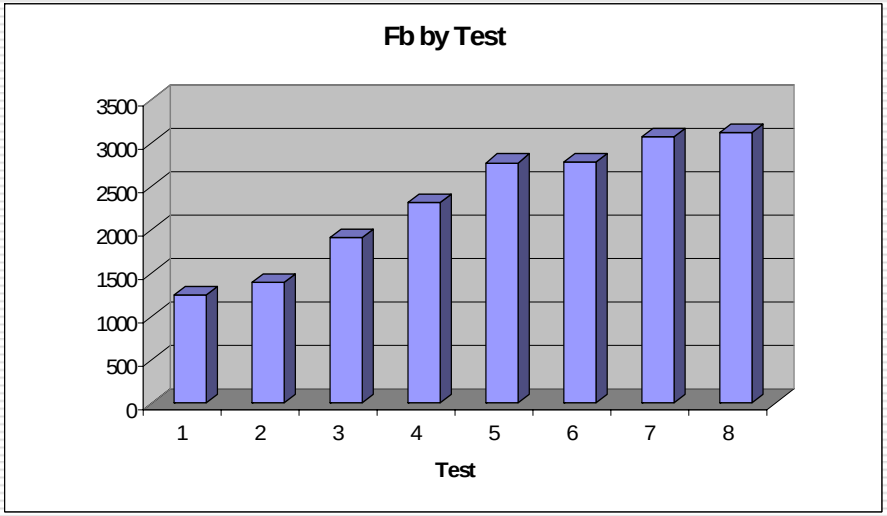


Current monitor and cycle that has brought consistency to the process at MSU

MISSISSIPPI STATE UNIVERSITY

Performance Improvements





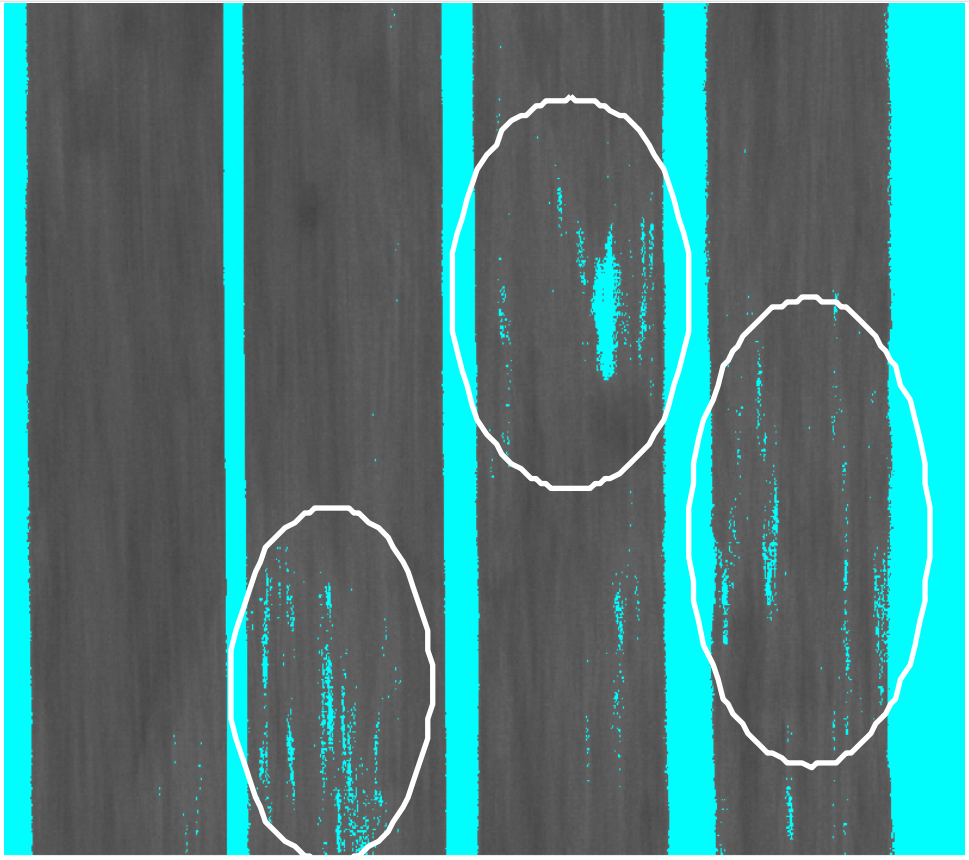
MOE hit targets early!

Fb – has steadily climbed!

Property Testing Results

- Design values for southern pine SPSL
- Basic mechanical properties for SPSL from ponderosa and lodgepole pines

X-ray useful in determining low density areas



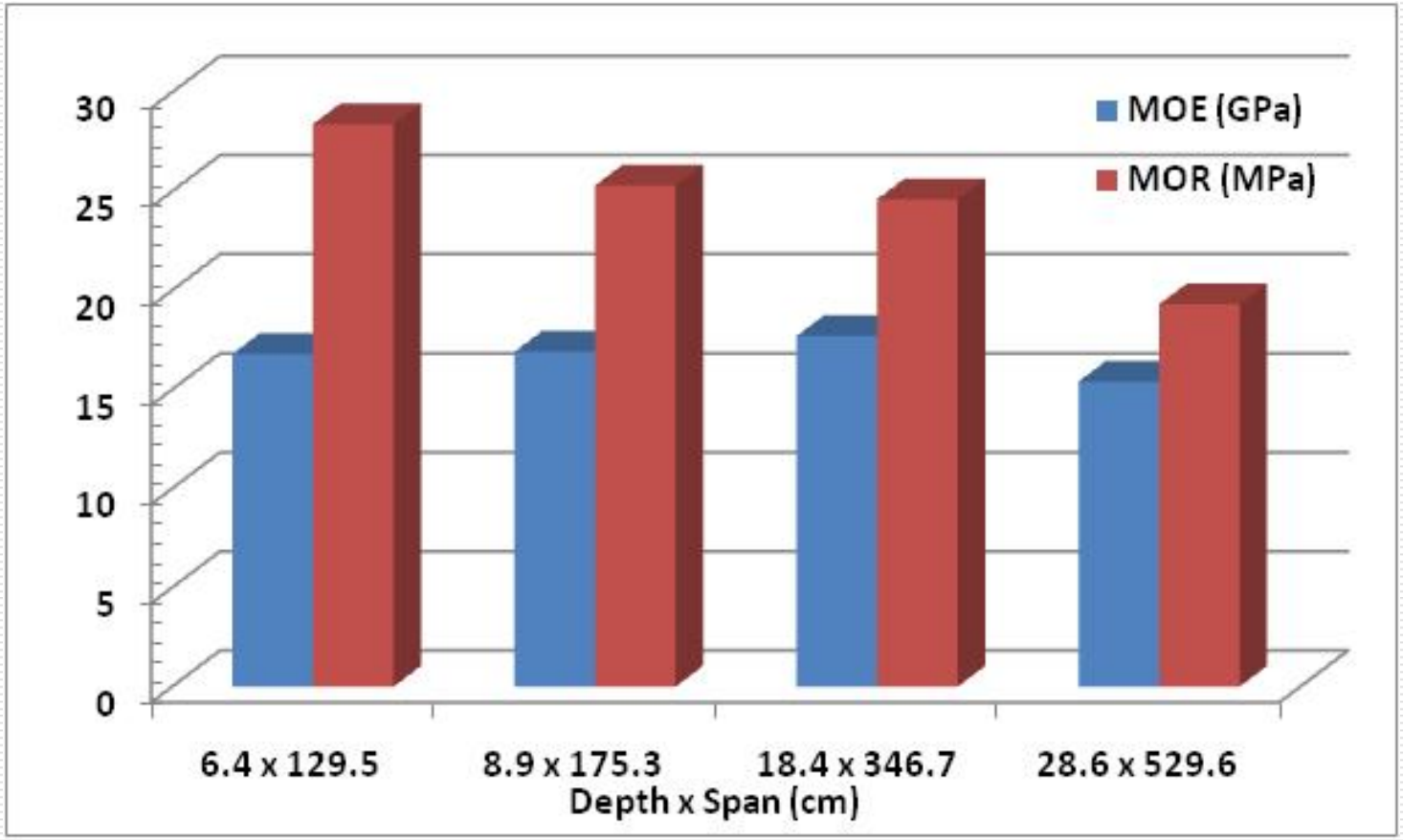
Design values for southern pine SPSL have been established

Depending on depth and span:

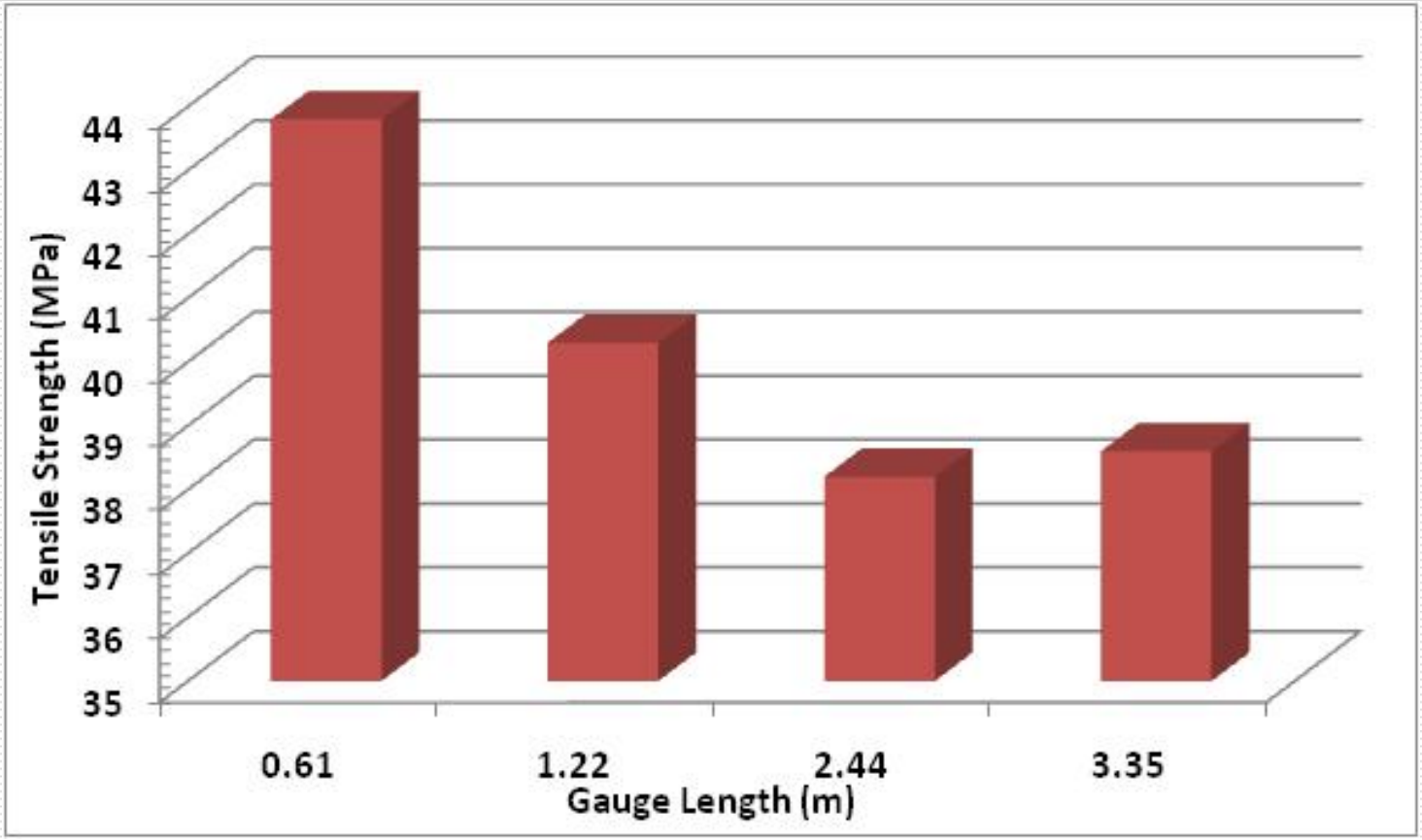
- MOR = 19.3 – 28.4 MPa
- MOE = 15.4 – 17.7 Gpa

for bending stress

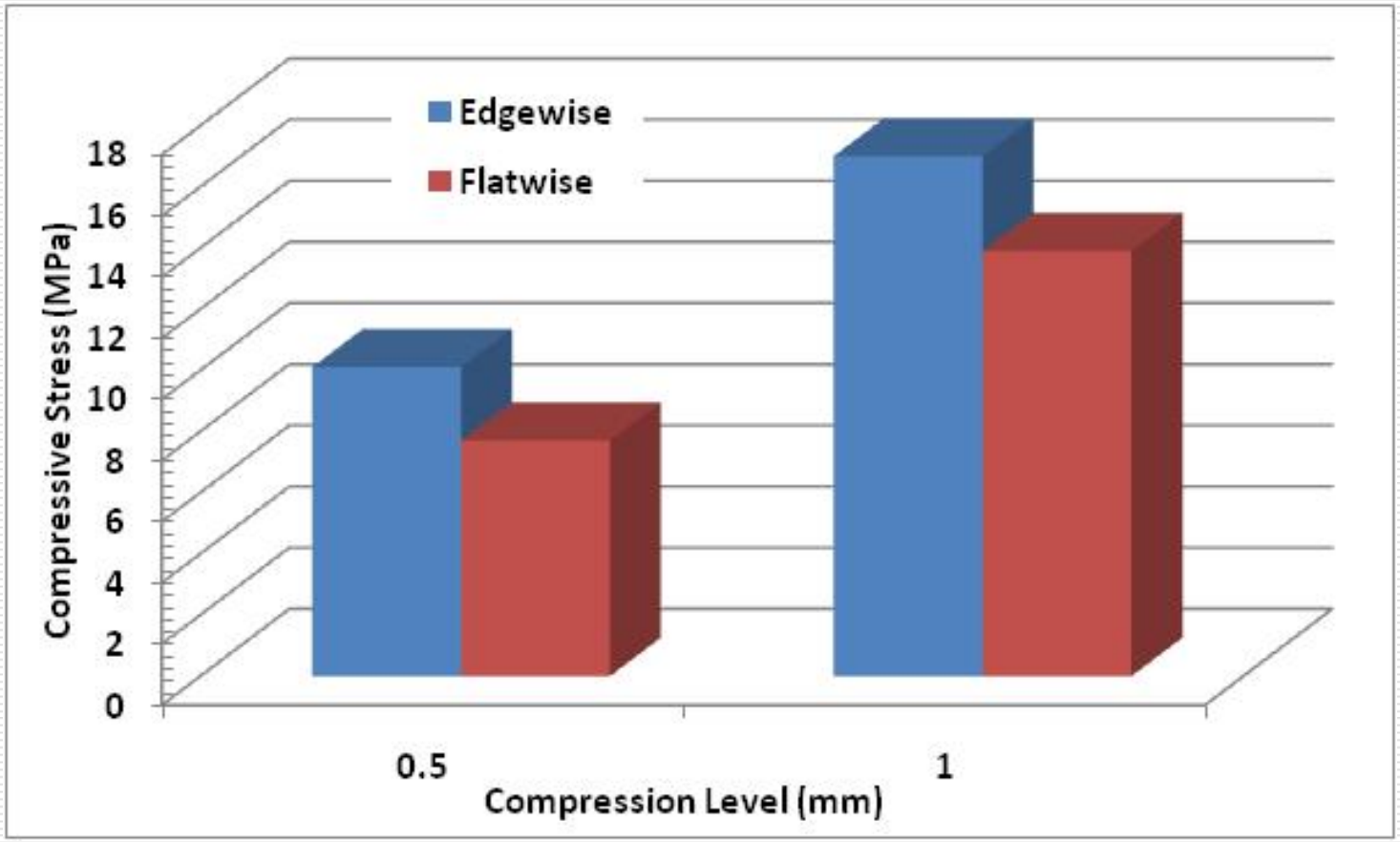
Bending Stress Design Value



Tensile Strength Design Values



Compressive Strength Design Values

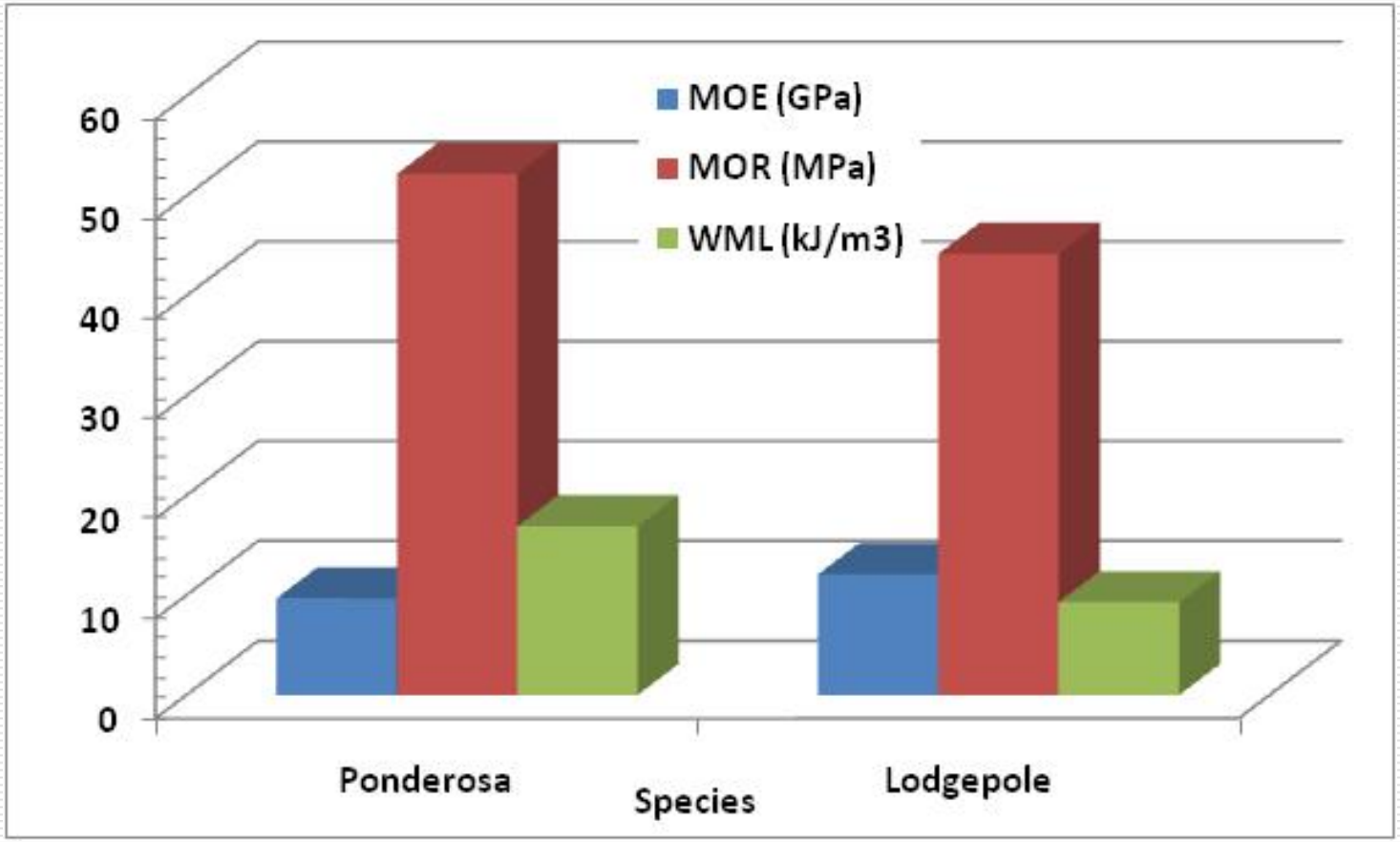


Southern Pine Results

- MOE and MOR design values meet or exceed commercially available products

- Tensile and compressive strength values are comparable to commercial products

Mechanical Properties of SPSL from western species



Results with western pines

- Fire-killed material does not scrim well; low MC is culprit
- NDE testing with a sonic E device may prove useful but reguires more work
- Low MOE values due to blows but other values seem reasonable

Increase durability for various potential uses

Additives to Increase Durability

- Water repellents
- Dimension stabilizers
- Fungicides &/or insecticides
- Fire Retardants
- Corrosion inhibitors

Limitations on Additives

- Negative effect on adhesive
- Decompose at press temperatures
- Corrosive to fasteners
- Hygroscopic
- Pigmented
- Cost

Blended with Adhesive (Resin) Prior to Application to Scrim


Maxwell House
Smoothe
3 CT


1 57.TB


#1
2
3
#5
#4

Added to Wood Furnish (scrim) prior to Drying


KOCH

Added to Wood Furnish (Scrim) after Drying but Prior to Pressing


CT Pretreat 12"

Added to Pressed Material Prior to Cooling


TB+CT-Red

Penetration of Topically – Applied Additives (Spray or Dip) is Facilitated by Air within the EWP cells Contracting as it Cools

Added to Cooled TimTek Products


Gilmour

Summary

- Mechanical properties have been achieved
- When to add Durability –
  - Enhancing Additives to EWP Depends on
    - Their Physical and Chemical Properties
    - Degree of Enhancement Required
- Commercial facility is being constructed in Mississippi

THANKS....