Producing Lumber using the Edge-Glue & Rip Method

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Agenda

- Background
- EGAR process
- Pilot project
- Preliminary testing
- Summary and Conclusion
Edge, Glue, & Rip (EGAR)

• Concept developed by the USDA Forest Products Laboratory in the 1970’s
• EGAR is a sawing and gluing technique that reduces wood loss during milling
• Permits the use of low quality raw materials to make high-quality value-added products
1. Logs flitch cut
2. Flitch cut lumber seasoned and edged
3. Lumber edge-glued producing 4-foot by 8-foot panels
4. Panels ripped to desired width
Partnered with Golden West Pine Mills (GWPM) located in Ault, Colorado
GWPM was responsible for processing EGAR lumber
CSFS provided technical assistance and conducted preliminary bending tests
Small diameter logs were flitch cut

- Ponderosa pine
- Specified length was 8 feet plus trim
- High percentage were blue-stained
- Cut to a 2-inch nominal thickness
Pilot Project

Flitch cut pattern used
Flitch cut lumber was seasoned and edged

- Edged to random widths that maximized yield
Lumber edge-glued producing 4-foot by 8-foot panels

• Adhesive applied both manually and using mechanical applicator
• Panel glue-lines were cured using an RF Press
• A panel was produced about every 10 to 15 minutes during the pilot run
• Glue application was a challenge and limited the rate of production
• 48 Panels were produced during the pilot run
Pilot Run

Edge-glued panel
Pilot Run

Panels ripped to desired width
In this project, panels were ripped to 8-inch, 10-inch, and 12-inch widths.
Glue-line Testing

- Conducted by adhesive supplier
- Shear tests conducted included dry shear, vacuum pressure, boil, elevated temperature rupture
- Except for the boil test, the glue-line tests met minimum standards
- The supplier concluded that results overall were quite promising, especially since the wood was not freshly prepared (planed) prior to processing
- Subsequent testing revealed that the FR cured glue-lines exceeded requirements
Bending Tests

- Conducted at CSU Civil Engineering Lab
- Tested 8-inch, 10-inch, and 12-inch wide lumber
- EGAR and solid wood lumber evaluated
- Three-point bending tests to failure
- Results for EGAR and solid wood lumber compared
Preliminary Testing

Test Apparatus
Preliminary Testing

Common Failure Modes
Summary and findings

- MOE (modulus of elasticity) and MOR (modulus of rupture) were determined for each member
- Collected data were statistically analyzed
- Based on this analysis there was no significant or practical difference between the EGAR and solid wood lumber mechanical properties
Summary and Conclusion

- The EGAR method developed by the FPL was used to produce high-quality value added product.
- GWPM produced EGAR lumber using an RF press, which increased commercial viability of product manufacture.
- Preliminary testing was promising and further testing will be required for product certification and acceptance.
Questions?

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