PONDEROSA PINE GLULAM BRIDGES
IN ARIZONA
INTRODUCTION TO THE PROJECT

• Began in 1998
• Partial funding, Timber Bridge Initiative
• Tonto National Forest
• Replacement of superstructure
• Bray Creek
• Webber Creek II
Arizona
Existing Structures

• Bray Creek Bridge
  – Flat Car
  – Timber plank deck
  – 30’ x 16’ (o-o)

• Webber Creek II
  – Steel girders
  – Nail-laminated deck
  – 18’ x 15’ (o-o)
Bray Creek
Webber Creek II
Design

• Bray Creek
  – Existing substructure
  – Steel girders
  – Transverse glulam panels
  – 10 – 5 1/8” x 37 1/2” x 16’
  – No. 2 Ponderosa Pine
  – Creosote treated
BRAY CREEK

Plan View

Cap beams
Stream Flow
Panel connectors
Glulam panels
Steel girders
Design

- Webber Creek II
  - Existing substructure
  - Longitudinal glulam panels
  - 4 – 10 ¾” x 45” x 18’
  - No. 1 Ponderosa Pine
  - Creosote treated
Webber Creek II

Stream flow

Stiffener beams

Gulam panels

Cap beams

PLAN VIEW
Construction Crew
Bray Creek
Construction Details

- Glulam panel
- Steel beam
- Glulam cap beam
- Backwall
- Existing concrete abutment

Dimensions:
- Cap: 2'
- 4' intervals
Webber Creek II
Construction Details

- Glulam Panel
- Timber Caps
- Filler Board
- Existing Abutments
- Timber Bolt
- Stiffener Beam
- Log Screws
- Steel Angle
Completed
Guardrails, Running Plates
Load Tests

• Performance
• Deflection under static load
• Dump trucks, 3 axle
• $11,900 \text{ lb} + 34,500 \text{ lb} = 46,400 \text{ lb}$
• $10,620 \text{ lb} + 27,260 \text{ lb} = 37,880 \text{ lb}$
• Suspended rules & surveyors level
• Readings in millimeters
Truck Configuration

17,250 LB 17,250 LB
4.4’ 13.3’
11,900 LB
GVW 46,400 LB

6.1’
4.4’ 13.3’ 6.9’
Placement on Bray Creek
Bray Creek
Bray Creek
Bray Creek
Placement on Webber Creek II
Webber Creek II
Webber Creek II
Maximum Deflection

- Bray Creek Bridge
  - End panel
  - Rear axle – 17,200 lb
  - Duals between girders – 8,600 lb
  - Total deflection of 2.5 mm (0.10 in)
  - Deflection between girders of 1 mm
Bray Creek Deflection

![Graph showing deflection against deck width in inches. The graph indicates a downward trend as deck width increases.]
Maximum Deflection

• Webber Creek II
  – Centerline near edge
  – Both rear axles – 34,500 lb
  – Deflection of 9.3 mm (0.36 in)
Webber Creek II Deflection
Bray Creek, 2009
Bray Creek, 2009
Webber Creek II, 2009
Webber Creek II