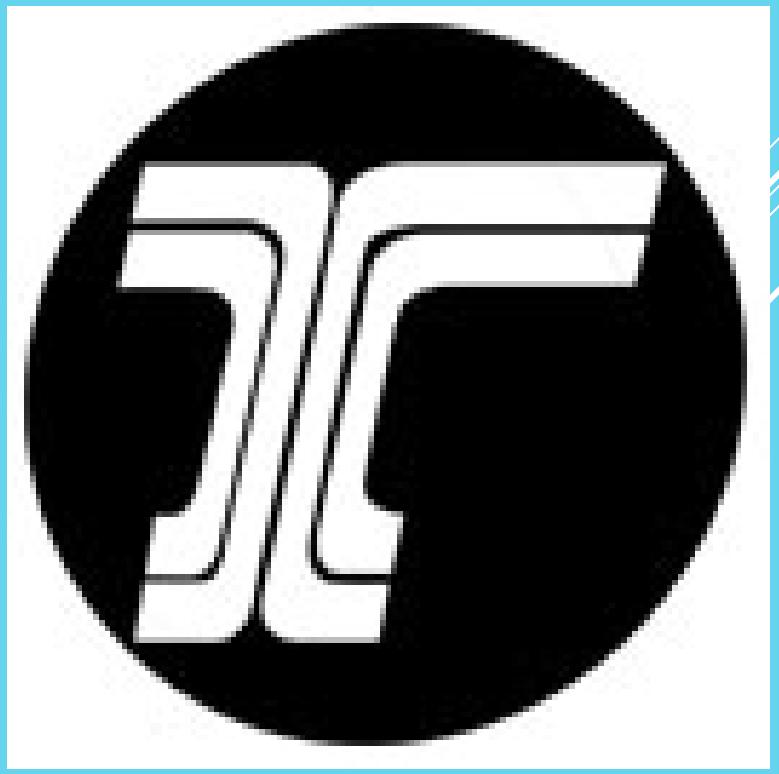
Oregon Highway Bridge Maintenance Workshop





Timber Deck Replacement

Timber can be desirable for use as a bridge decking material because it is:

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- Resistant to deicing agents

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- Resistant to deicing agents
- Easy to fabricate in any weather condition
- Less expensive, faster to construct, and lighter weight than concrete
- An abundant / renewable material source

Disadvantages of Timber Decks?

Disadvantages of Timber Decks?

- No composite action

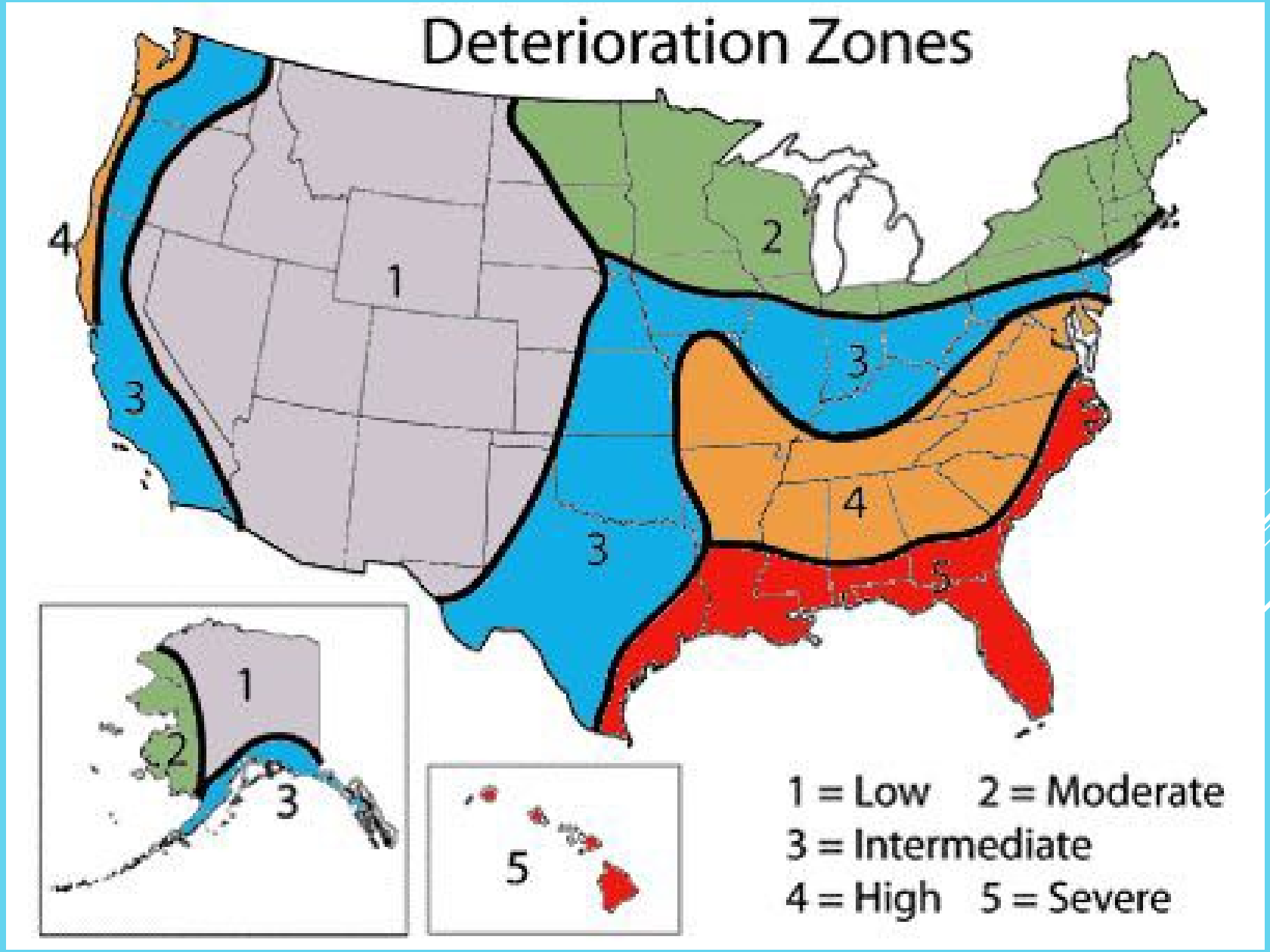
Disadvantages of Timber Decks?

- No composite action
- Beam spacing limitations

Disadvantages of Timber Decks?

- No composite action
- Beam spacing limitations
- Deterioration from Decay / Insects

Decay


Deterioration Zones
1
2
3
4
5
1 = Low
2 = Moderate
3 = Intermediate
4 = High
5 = Severe


6. 13. 2001

Disadvantages of Timber Decks?

- No composite action
- Stringer spacing limitations
- Deterioration from Decay / Insects
- Issue of reflective cracking in asphalt



Reflective cracking in asphalt can be reduced by:

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- The use of heavy timbers with strong anchors

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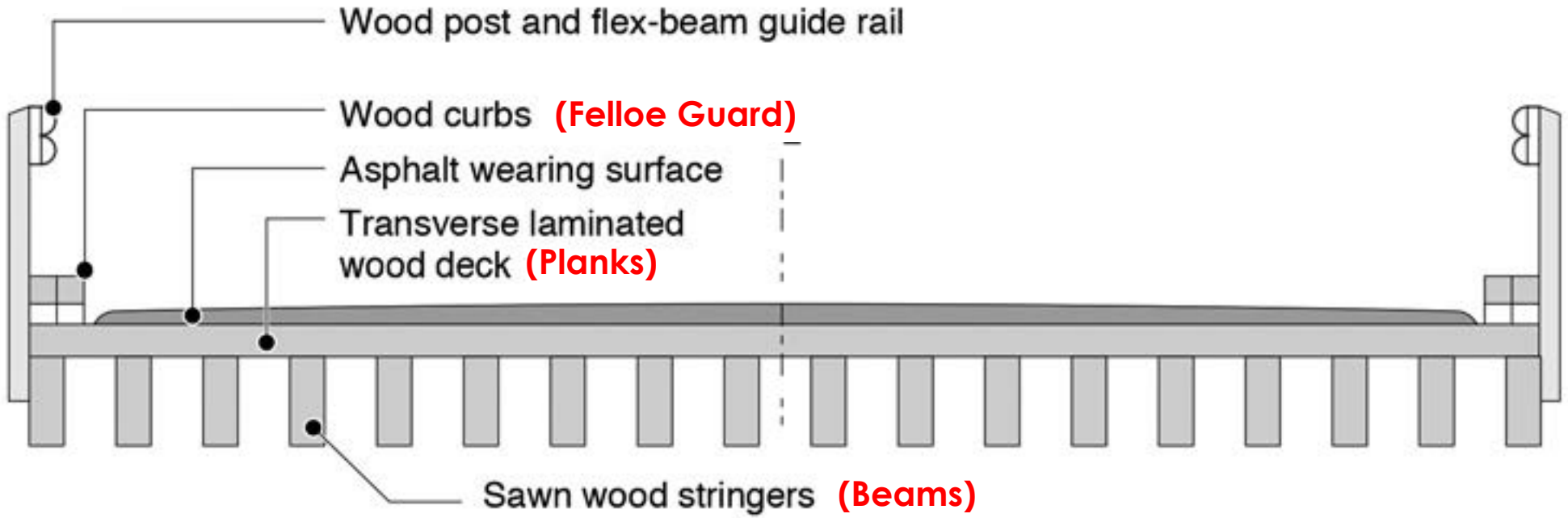
- The use of heavy timbers with strong anchors
- Additional Beams / Stringers

Reflective cracking in asphalt can be reduced by:

- The use of heavy timbers with strong anchors
- Additional Beams / Stringers
- Special asphalt mixes


Transverse
Longitudinal

Cross section of a sawn wood stringer bridge



Transverse flat-laid heavy planks on closely spaced longitudinal beams



Transverse flat-laid heavy planks on closely spaced longitudinal beams

Occasional use of 2nd layer on top

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6. 15. 2001

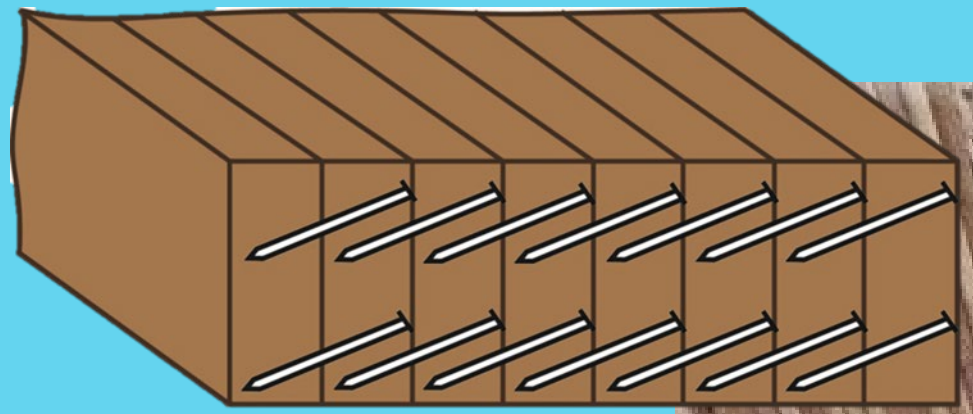
Transverse flat-laid heavy planks on closely spaced longitudinal beams

Occasional use of 2nd layer on top

- Provides wear protection of primary transverse decking
- Longitudinal very common – wear protection only
- Diagonally for wear protection and some additional strength


STOP

Transverse Nail-lam Vertical Planks on-edge placement (Individual)





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- 2-inch nominal thickness boards – 4, 6, or 8-inch wide

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- Can be used with or without overlay

Transverse Glulam or Nail-Lam Panels on Longitudinal Beams



Transverse Nail-Lam or Glu-Lam Panels

Transverse Glulam or Nail-Lam Panels on Longitudinal Beams

- Faster erection

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- Each panel is fastened to the beams
- Can be used with or without overlay
- Differential displacement between panels leads to reflective cracking through wearing surface

Transverse Glu-lam Panels

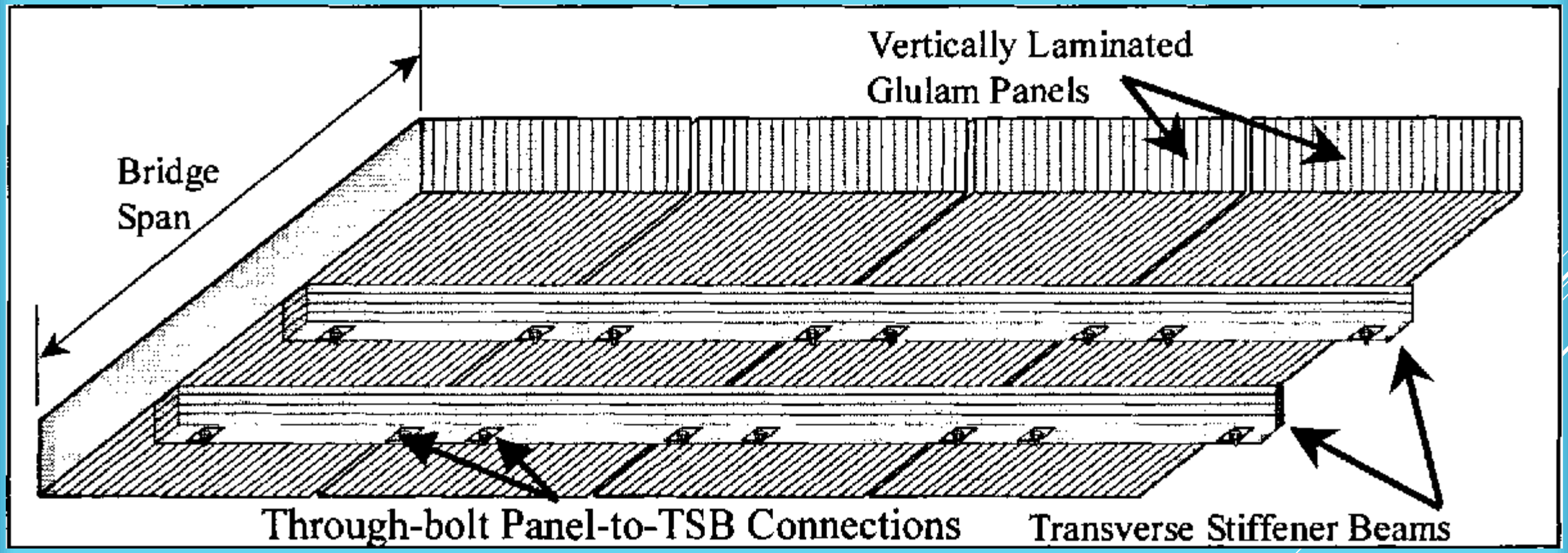






Transverse Nail-lam or Glu-lam Panels

Longitudinal Glulam Panels


Vertically Laminated
Glulam Panels
Bridge
Span
Through-bolt Panel-to-TSB Connections
Transverse Stiffener Beams

Longitudinal Glulam Panels

- Cost-effective for spans – 20 to 30+ ft

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Longitudinal Glulam Panels

- Cost-effective for spans – 20 to 30+ ft
- Differential displacement between panels may lead to reflective cracking through wearing surface
- Transverse distribution beam beneath the panels helps, BUT beware swelling of the panels


5. 3. 2007





Stress Laminated Timbers

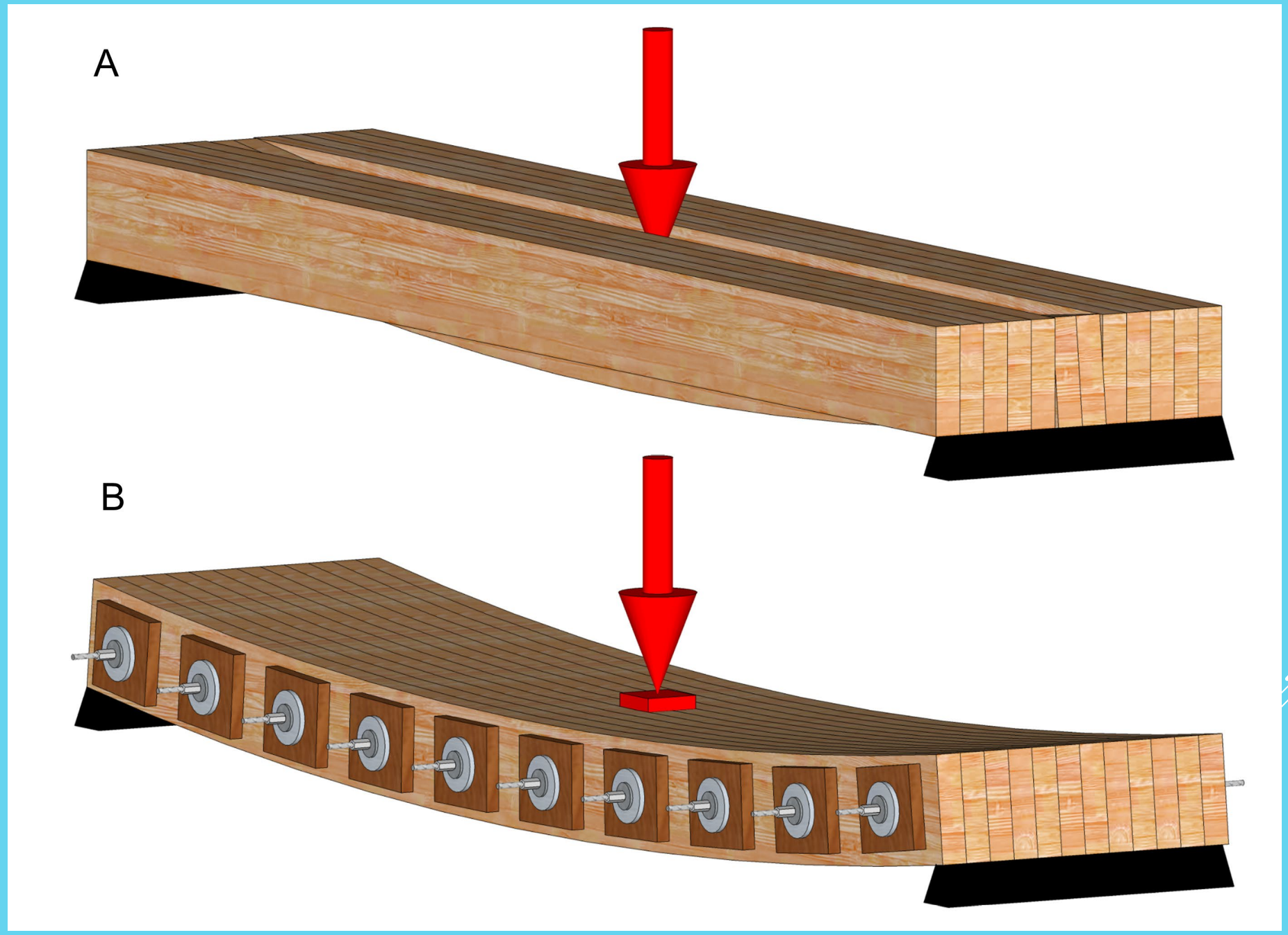
Stress Laminated Timbers

SLT decks are made from a number of timber or glulam beams positioned side by side and stressed together using high-strength steel bars.

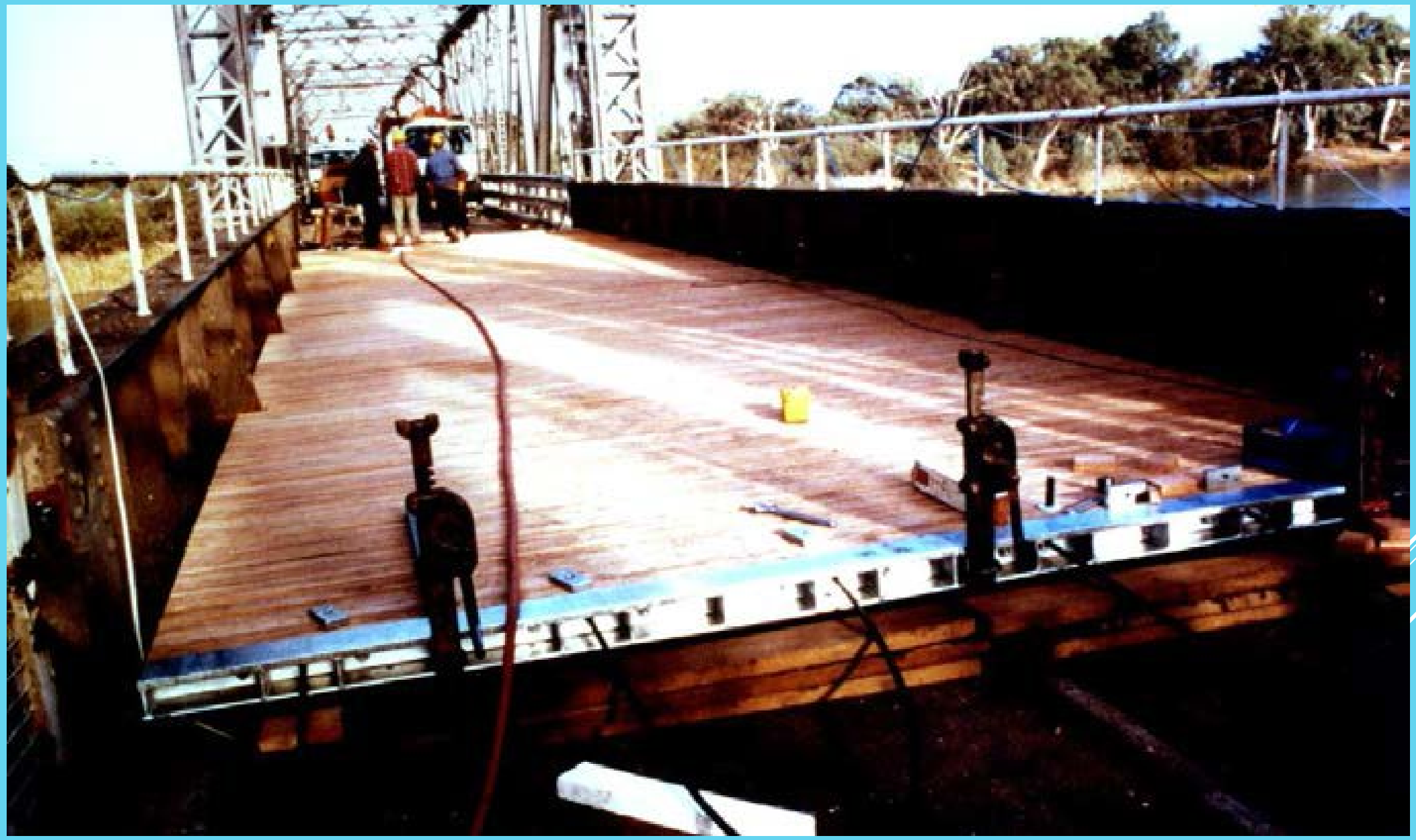
Stress Laminated Timbers

SLT decks are made from a number of timber or glulam beams positioned side by side and stressed together using high-strength steel bars.

A concentrated load can therefore be **distributed from the loaded beams onto adjacent beams** due to the resisting friction caused by the stressing.


A
B

Transverse Stress Laminated Panels on Longitudinal Beams



Stress Laminated Longitudinal Timber Deck







Built Up Sections





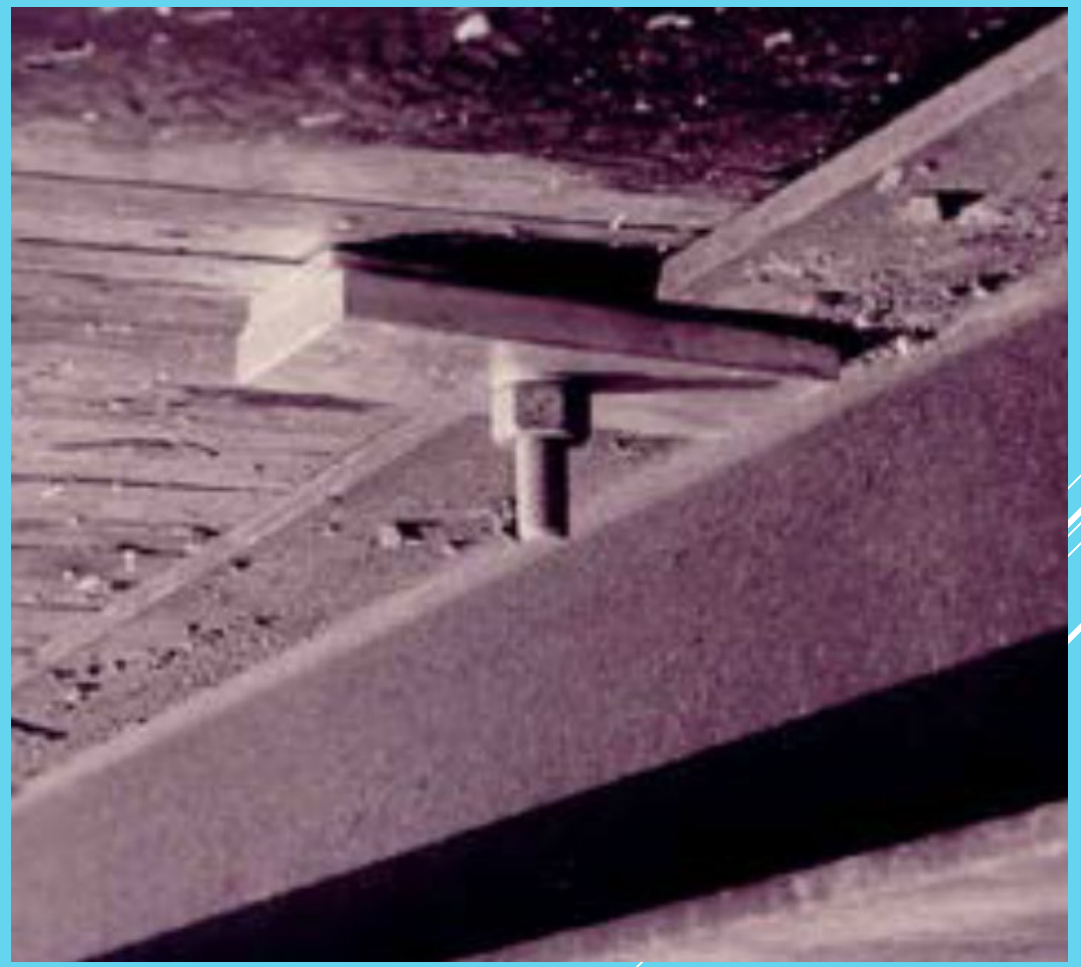
Deck/Beam Connections


6. 14. 2001









Plywood?

Bridge Ply (Australian)

Structural grade. cross-laminated plywood



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Structural grade. cross-laminated plywood

Treated to protect against termites, fungus and environmental degradation.



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Bridge Ply (Australian)

Structural grade. cross-laminated plywood

Treated to protect against termites, fungus and environmental degradation.

Bridge Ply panels are available in widths of 1200mm (47.24”), with a standard thickness of 170mm (6.7”) and in lengths to order. Panels can be produced in lengths over 10 meters (32.8’).



Cross-Laminated Timber (CLT) ?





Deck Ends







Deck Edges









Waterproof Membranes

Waterproof Membranes

Spray: Seals well - Works on uneven surfaces

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Doesn’t bond well with AC wearing surfaces

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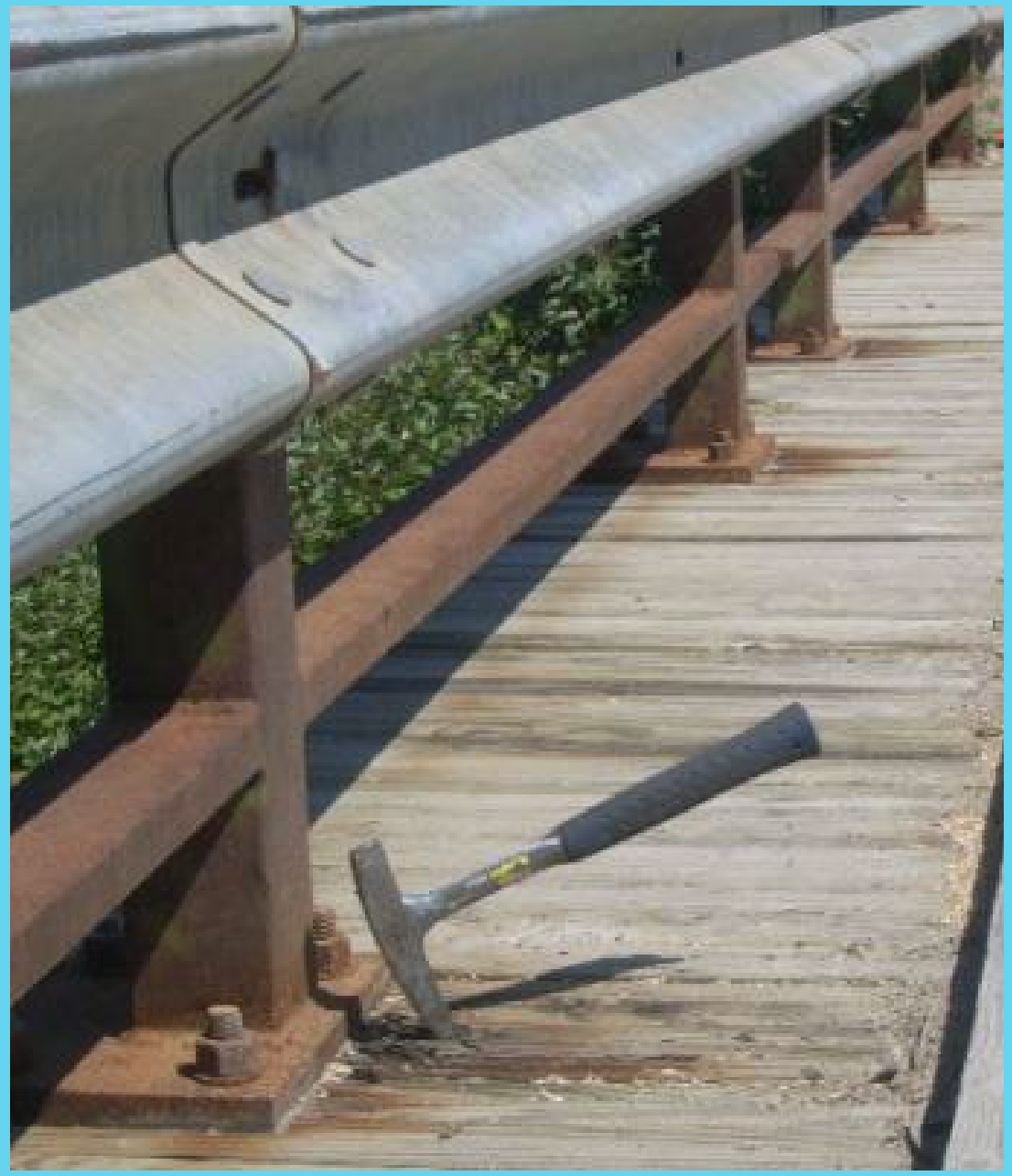
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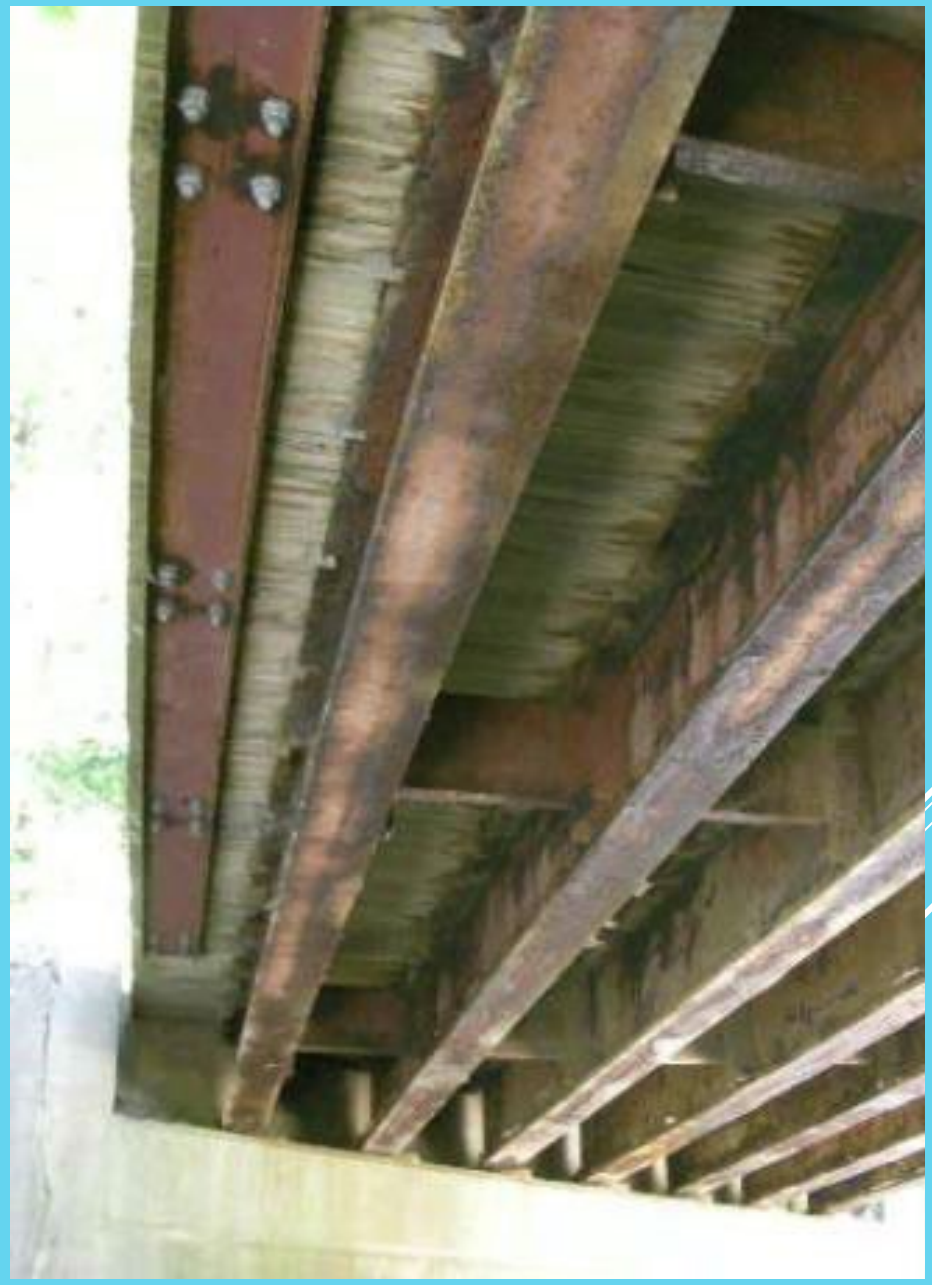
Roll: Relatively inexpensive - Can be used vertically
Doesn’t work Well on uneven surfaces
Often has leakage issues


6. 19. 2001


OVERSIZE LOAD
6. 20. 2001

Barriers






6. 19. 2001


PW1260
TAKEUCHI

Repair Projects

Labish Center Bridge, Marion County

Transverse Vertical Laid Planks,
Partial Replacement


MODERN
Wirtgen
09.05.2012 09:04


09.05.2012


09.05.2012 13:43


09.06.2012 11:53


09.06.2012 14:57


09.06.2012
PW1257
E257035


09.06.2012 14:59


E239510
09.07.2012 10:28


09.07.2012 12:02


E257035
PW1257
09.07.2012 11:10


09.07.2012 15:20

Wintel Road Bridge, Marion County

Longitudinal Stress Laminated Vertical Laid Planks, Partial Replacement




REDTAF








KNIFE
RIVER

Boones Ferry Road Bridge, Marion County

Longitudinal Vertical Laid Planks, Partial Replacement


STIHL






SENECAL CR

Bear Creek Bridge, Clackamas County

Transverse Horizontal Laid Planks on Longitudinal Beams with 2x2 Overlay Complete Deck Replacement


6. 12. 2001


6. 13. 2001


JOHN DEERE
6. 13. 2001

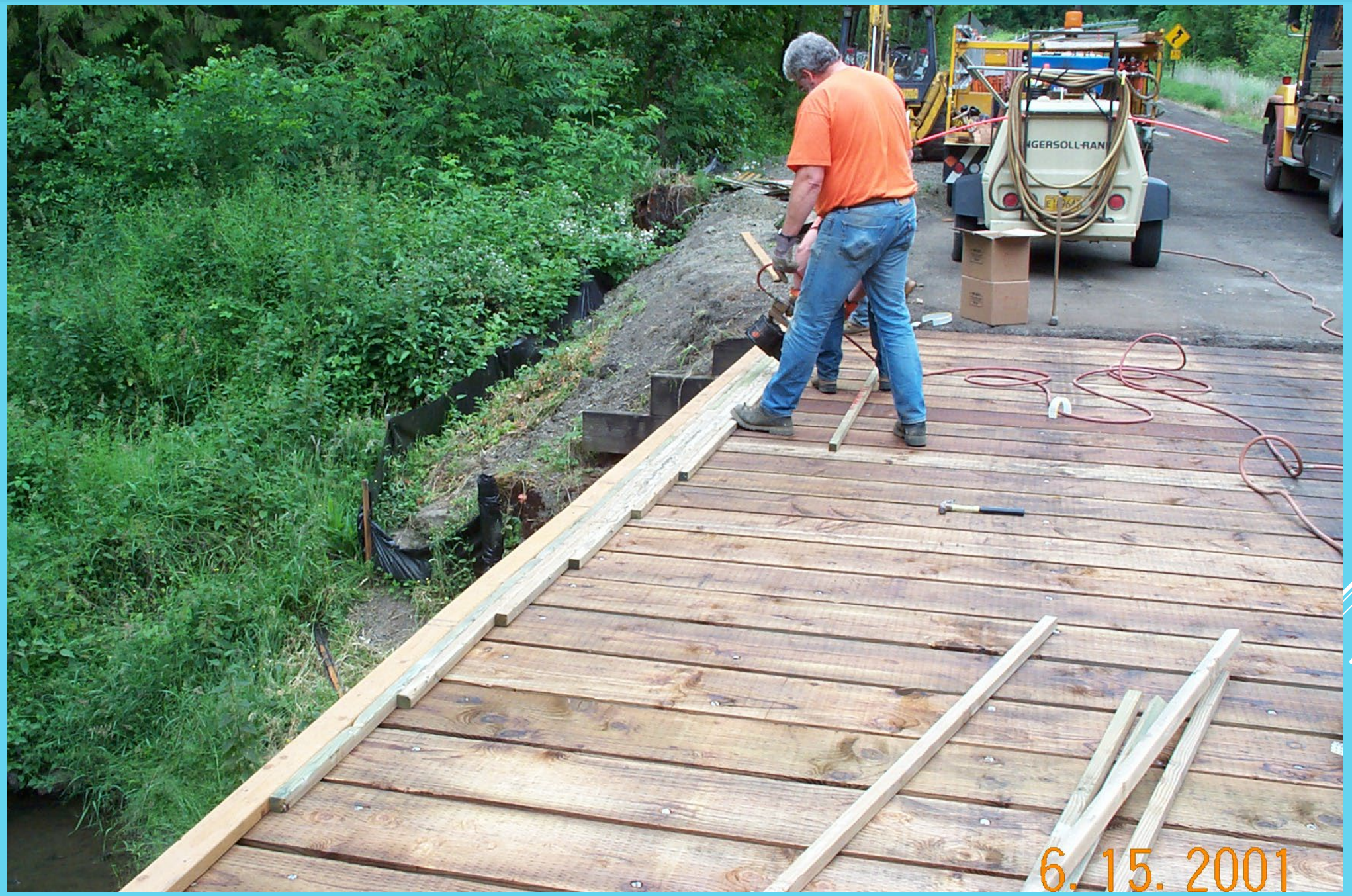

6. 14. 2001


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6. 14. 2001


6. 15. 2001


6.15.2001


6. 15. 2001


6. 19. 2001


6. 19. 2001


6. 20. 2001


6. 19. 2001


6. 20. 2001


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OVERSIZE LOAD
6. 20. 2001


6. 21. 2001


6. 21. 2001


6. 26. 2001


7. 16. 2001

Questions?

Comments?

Oregon Highway Bridge Maintenance Workshop



