

**WESTERN WOOD**



**STRUCTURES, INC.**

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February 27, 2015  
Walker Residence Bridge Inspection  
Fall Creek, Oregon  
WWSI# 157008

Dave Walker  
2272 Meadowbrook Ave.  
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Dave,

I inspected the residence bridge located at 39950 Little Fall Creek Rd. on February 26, 2015. I also have completed a load rating of this bridge. My inspection was performed from on top of the bridge deck and from below the bridge on both ends.

The bridge is a timber bridge with two side spans and one main span. The north and south side spans are 25 feet long and 26 feet long respectively. The main span is 54'-0" long. The north side span has six 6x22 stringers spaced at approximately 2'-9" on center at the north end and at 24" on center at the north pier. The south side span also uses six 6x22 stringers. The main span uses two 11" x 39" glued-laminated stringers spaced at 7'-3" on center. 4x12 deck planks are used for the entire bridge.

#### **Bridge Condition Observations**

##### **General**

This bridge appears to have been constructed from materials that were salvaged from other structures. The east main stringer has a metal sign attached to the soffit which states that it is the property of the US Forest Service. The stringers on the side spans have several holes in the tops that look like they were previously drilled for fasteners.

##### **Deck.**

A few of the deck planks on the north side span have damaged edges. A few other planks have been replaced with pressure treated 4x12s. There are a few deck planks on the south span that are not spiked into the stringer on the west side of the bridge.

##### **Stringers**

The stringers on the north span all appear to be in good condition. These members do not appear to be pressure treated. I did not see incising marks on these members. The ends of these girders bear on a small timber sill. There is a significant amount of dirt debris on at the bearings that should be removed. This debris will trap moisture next to the wood and will promote decay.

At the main span, the members do not show any signs of decay. The west stringer has a crack in it at about the mid height of the member. An attempt has been made to stitch the member back

together with bolts installed vertically and spaced about 4'-0" on center. These stitch bolts are located across the majority of the span. See photo 1. This bolt pattern is not sufficient to restore the stringer to its original capacity. This stringer has a noticeable sag to it. The sag can be seen by sighting along the soffit and from the top of the bridge. The sag is consistent with the reduced stiffness corresponding to two stringers each 19 1/2" deep. There is no intermediate lateral support for these members. Typically intermediate blocking or diaphragms are installed at 25'-0" on center.

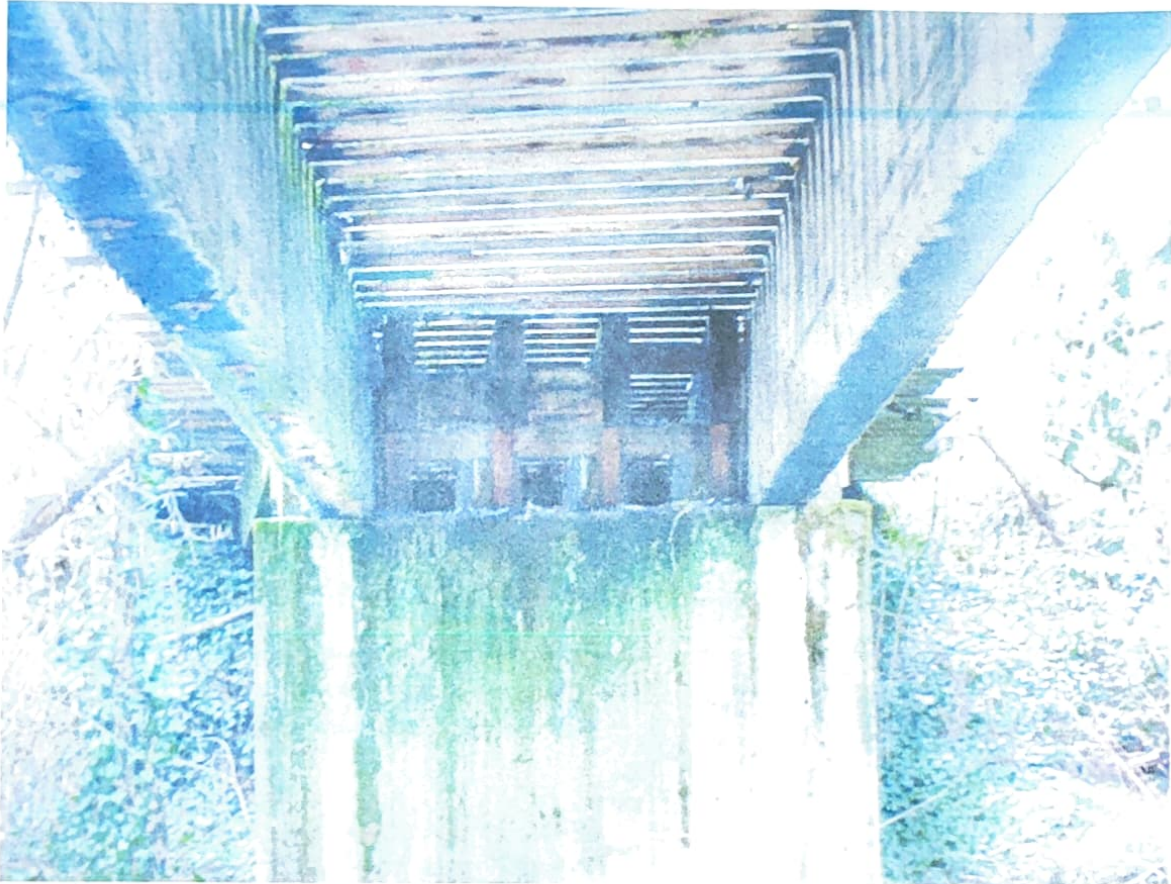


Photo 1 = Stitch bolts on west main span stringer

The stringers on the south side span have varying amounts of decay on the tops of the members. I was able to insert my awl about 2" deep in several places. The second stringer from the west side of the bridge has a significant amount of decay at the mid height of the member. This appears to start at the south end of the member and extend about 6 feet. Several of these members have side pieces bolts to the members. This is apparently an attempt to repair the bearing capacity of the members. See photo 2.



Photo 2. The second stringer from the right has an area of decayed wood where the wood is darker. This decay will continue to propagate. Not also the timber side members attached to the second and third stringer from the right.

#### Stringer bearing at the piers.

The two main span stringers bear directly on the concrete piers. There is a reinforcing steel bar located on each side of these stringers. The reinforcing bars provide some level of lateral support for the stringers. The stringers from the side spans are supported by a short timber bent made with 6x6s and by a timber block. This bearing conditions does not provide resistance to lateral loads due to wind or wind or seismic ground motion. See photo 3.



Photo 3. side span stringers are supported by small timber bent and timber blocks.

### **Bridge Load Rating**

A load rating analysis was performed for this bridge to determine the capacity of the bridge. This analysis determined that the capacity of the bridge is controlled by the damaged west stringer on the main span. The maximum two axle vehicle weight on this span is limited to 7 tons. The maximum axle weight is limited by the decking which is rated for 4 tons. The deck rating assumes that the vehicle is driven down the center of the bridge so the wheels travel almost directly over the stringers.

### **Conclusions and Recommendations**

The timber bridge at 39950 Little Fall Creek Rd. has several areas of degradation such as decay in several of the stringers on the south side span and a crack midheight in the west main span stringer. The decay in the south span stringers is not extensive and does not decrease the bridge rating at this point. However, the decay will propagate over time to the point where it affects the load capacity of the bridge. These stringers should be observed over time and replaced when noticeable deflections of the bridge deck become apparent. There is a significant amount of dirt and debris surrounding the side span stringers at each end of the bridge. I recommend that the ends of the bridge be excavated and pressure treated mudsills and backwalls be installed which will keep dirt and debris from collecting at the bearings.

The crack in the west main stringer can be repaired by jacking the stringer back into the original position and installing shear dowels to repair the crack. A steel cable post-tensioning system can be designed and installed to restore the carrying capacity of the member. If this member were to

be repaired, the bridge would then be rated for 10 tons on a three axle vehicle such as a small dump truck. The limiting axle weight of 4 tons will still be in effect.

Broken or decayed deck planks can be replaced with pressure treated timber planks as has already been done in a few locations.

The timber bents between the main stringers at the piers could be made to provide lateral support by installing plywood on both sides. Solid blocking could be installed between the side span stringers to provide lateral support for these members at the bearing.

Respectfully Submitted,  
Western Wood Structures, Inc.



Paul C. Gilham, P.E., S.E.  
Chief Engineer



3.2.15