



TIMBER REHABILITATION

During the past 40 years, changes to building codes have resulted in increased loads being applied to buildings. At the same time, the allowable code capacity of timber components has been lowered. Also, greater loads are often placed on a structure through the installation or replacement of mechanical apparatus, such as HVAC components. As a result, many timber buildings fail to meet current code requirements, and often require structural upgrades to handle these loads.

Additionally, timber members that have been damaged, or subject to decay, can be repaired in order to restore capacity. Western Wood Structures (WWS) has developed specific methods to repair and upgrade most timber structures in place, without reducing existing floor space. Our four-step process for repairing or upgrading a timber structure consists of: 1) an on-site inspection to ascertain the condition and configuration of the structure, and to determine the existing dead loads and code-required applied loads, such as live loads and snow; 2) a structural analysis to determine whether the members and connections meet the current loading requirements; 3) a repair/upgrade design for all members and connections found to be deficient, and; 4) providing labor, materials and equipment to implement the repairs.

Our innovative engineering solutions, combined with our experienced field personnel, make WWS your complete resource for the repair and rehabilitation of timber structures.



Alaska Airlines Hangar; Anchorage, AK



Horse Arena; Sherwood, OR



Tinora High School; Defiance, OH



Trout Lake Farms; Trout Lake, WA

The above repairs were designed and implemented by WWS. **Top:** WWS provided top chord strengthening, web strengthening and replacement, and lower chord replacement and post tensioning for these failed bowstring trusses. **Left:** WWS installed steel dowels in epoxy-filled holes to repair a radial tension failure in these peaked and cambered glulam roof beams. **Center:** WWS installed a post tensioning system to these failed glulam beams to bring them to current code. **Right:** WWS installed FirP[®] laminations to these glulam arches in order to meet current code loading requirements.

TIMBER BEAM, TRUSS, ARCH AND COLUMN INSPECTION, EVALUATION AND REPAIR SPECIFICATIONS

I. GENERAL REQUIREMENTS

The timber rehabilitation contractor shall have a minimum of (5) five years of experience in the inspection, evaluation and repair of timber structural systems, members and connections. Approved contractors include:

Western Wood Structures, Inc.
P.O. Box 130
Tualatin, Oregon 97062-0130
503-692-6900
800-547-5411
Contact: Steve Turner

II. INSPECTION

A. Personnel:

The timber rehabilitation contractor shall provide inspection personnel qualified by training and experience in the inspection of timber members and connections. All inspections shall be performed by or under the supervision of a Registered Engineer, State of *(specify)*.

B. Execution:

The inspection shall include as a minimum the following:

1. Assessment of the condition of each timber member including:
 - a) Significant checking
 - b) Broken members
 - c) Member splitting
 - d) Water and decay damage
 - e) Fire damage
 - f) Member warping
 - g) Other damage
2. Assessment of the condition of each timber connection.
3. Moisture content determination of representative members.
4. Assessment of all loads supported by timber members including
 - a) Roof dead loads
 - b) Roof live/snow loads
 - c) Ceiling dead loads
 - d) Floor dead loads
 - e) Floor live loads
 - f) Mechanical unit loads
 - g) Other applied loads
5. Assessment of timber member configuration and member sizes.

C. Report:

The engineer responsible for the timber inspection shall prepare a report including the findings of the inspection. The report shall include:

1. A description of general configuration of the timber members including member sizes, grades and connections.
2. A description of the current loading conditions of the timber members.
3. A description of the current condition of the members and connections.

III. EVALUATION

The timber rehabilitation contractor shall perform a structural analysis of the timber members and check the capacity of each member and connection for conformance to the requirements of the current building code. This analysis shall account for all eccentric joint connections and member continuity as applicable.

IV. REPAIR DESIGN

The timber rehabilitation contractor shall prepare and submit for approval a repair design for any member or connection that fails to meet the requirements of the current building code. Repair designs shall include the procedure for rehabilitating the timber and for protecting the existing structure throughout the repair process. Repair designs shall be performed by or under the supervision of a Registered Engineer, State of *(specify)*.

V. REPAIR

The timber rehabilitation contractor shall provide the labor and equipment to perform the necessary repairs. Repair personnel shall be qualified by training and experience to perform the repairs. The engineer shall make periodic inspections of the work to certify that the work is accomplished in conformance with the approved repair design.

VI. FINAL REPORT

The timber rehabilitation contractor shall submit a final report indicating that the work was performed in conformance with the approved repair design, and shall indicate any deviations from the design as well as the conditions that required the deviations from the initial report.

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