

REPAIR OF TIMBER BRIDGE STRINGERS

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Project Description:

Timber stringers tend to exhibit five types of damage:

1. Interior decay along the span.
2. Top, bottom, or corner damage, with full width vertical splits inclined toward the bottom face.
3. Side or corner damage with full width corner splits inclined toward the side face.
4. Horizontal splits not within three inches of the top and bottom faces through the full width.
5. Any damage within 15 inches of the face cap, including interior decay, side damage, crushing and splitting.

These damage types are shown in Figure 1.

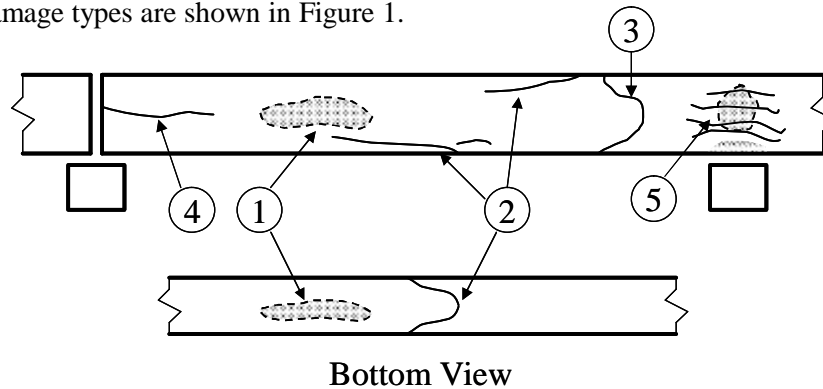


Figure 1: Stringer damage types.

The most commonly encountered damage type in timber stringers in bridge structures is type 4. These splits can often stretch the entire length of the span. This cracking is induced by shear stresses and severely impacts the strength of the timber member.

Project Objectives:

The objective of the proposed research is to investigate the feasibility of repairing timber bridge stringers that show signs of horizontal shear cracking along the length of the member. Existing repair techniques will be examined, and the feasibility and efficiency of attaching fiber reinforced polymer (FRP) strips to the sides of the stringers with mechanical fasteners will be investigated.

The LAMP student will assist a graduate student in repairing timber stringers, setting up laboratory instrumentation, and running tests. The LAMP student will also assist in analyzing the results.

Prerequisites

1. ENGR 241 Statics or equivalent
2. ENGR 243 Mechanics of Materials or equivalent
3. Ability to lift 50 pounds
4. Experience or willingness to work with power tools