Abstract

This paper gives a brief summary of a packable bridge that was installed in the Selway-Bitterroot Wilderness. This type of bridge is defined as "packable" as it is designed to be packed on stock animals, delivered to the site, and then easily assembled using simple hand tools.

The Project

The Holter Cut Bridge project was initiated by the Bitterroot National Forest as the current structure was showing signs of failure. The forest commenced this task by first sending out a scoping letter to see if any public concerns would arise. The scoping did not receive any feedback so the only paperwork that was undertaken was a Decision Memo and a Minimum Tool Analysis. The Minimum Tool was completed in case there was the need to drill inside of wilderness. As it turned out the Minimum Tool was not needed and the Holter Cut Bridge was constructed wholly by traditional tools and skills.

This 28-foot bridge was installed on the Bitterroot National Forest, in the Selway-Bitterroot Wilderness. It was packed in just over nine miles up the Big Creek Trail and took the Region 1 Pack String four days to transport to the work site. The nine mule string did one trip a day and was loaded not only with the bridge, but with rigging equipment, as well as personal gear for a four person crew. No bridge component exceeded eight feet in length or weighed more than 100 pounds.

Block and tackles, as well as a grip hoist, were a necessity for the project as they were used when moving the assembled stringers which weighed approximately 1000 pounds each. Once the bridge was on location, it took four people twelve days to finish. During this time they moved rock using rigging, built abutments, constructed and filled approaches, and assembled the bridge. The total project cost of the bridge was $17,106.

Problems and Benefits of Using a Packable Bridge

The Forest Engineers were the driving force behind the choice of using this type of bridge instead of utilizing native materials that were on site. With increased liability, and the fact that it is hard to do the math using native products, the use of a pre-fabricated structure gave engineers hard base line numbers so that they can figure out a max load for the bridge.

The main benefit of this type of bridge is that it is easy and relatively quick to assemble using non-motorized tools and transportation. When it is set up, it is a sturdy structure with an estimated lifespan of 50-75 years. The longest span for a bridge depends on loading. For lighter loads, around 85 pounds per square foot, the current maximum design length is 36 feet.

There are some basic maintenance tasks for this structure, including checking the torque of the bolts, cleaning the deck, and having engineers inspect the continued structural integrity of the bridge.

There were several problems that this bridge provided for the crew putting it together. First off, the set dimensions forced the abutment locations and left no leeway if there would have been an unforeseen predicament with their placement. When the bridge was delivered and then assembled in the parking lot of the Ranger Station, it was obvious that the contractor had not included all of the parts. This lack of organization on the part

of the bridge contractor necessitated going out and purchasing the needed bolts, washers, and nuts that were forgotten in the original package.

Another problem was the chemical used to treat the bridge, penta chloro phenol. This is a nasty compound that needs to dry for at least six months after treatment. This bridge did not appear to have dried for any significant amount of time and was saturated with the chemical. Not only were the crew and their clothes covered, but when the bridge was being assembled at the work site there was the additional problem of the boards dripping this chemical into the stream.

While buying the bridge was an expensive one time purchase, the extended price of time and personnel used in planning, purchasing, delivery, unloading, assembly and disassembly to ensure that the entire product was there, loading and transporting to the trailhead, then the transport via mules to the worksite, and finally the installation, incurred a lot of unforeseen costs that added up quickly.

While these costs were great, the long term picture is that the bridge will not have to be replaced for over 50 years. In that same time frame, a structure built out of native materials will have been replaced three or four times. In addition to the personnel costs of replacing a bridge that many times, the native materials around the bridge site may be exhausted by the time it needs to be replaced for the fifth time.

Packable bridges in wilderness are a quandary for wilderness managers as constructing a large, pre-fabricated structure in wilderness may not fit in with the ethics of other managers and factions of the public. Of course not using packable bridges may do more damage to the resource and leave unsightly stumps for wilderness users. The ubiquitous question remains, “Bolts or stumps?”

Contacts

Stephen Bull
Bitterroot National Forest
West Fork Ranger District
6735 West Fork Road
Darby, MT 59829
406-821-1245
sbull@fs.fed.us