



A low cost portable skidder bridge in Eastern Kentucky

Kentucky has over 89,431 miles of rivers and streams and over 637,000 acres of wetlands. In fact, in 1998 when a number of logging jobs were surveyed as part of BMP study, over 93% of them had some type of stream or drainage channel present. These numbers indicate that the odds of you having to cross a stream or channel on your next logging job are quite high.

Improper stream crossings can be a major source of sediment and disturbance to streams during timber harvests. To avoid excessive sediment deposits in streams, you should keep the number of stream and channel crossings to a minimum and cross using appropriate techniques.

Compliance with the Kentucky Forest Conservation Act requires that you use or install bridges or culverts to cross streams (perennial or intermittent) or ephemeral channels where feasible. While both bridges and culverts allow crossing with a minimal amount of stream impact compared to unimproved crossing, bridges are generally considered the best option from an environmental standpoint. This article will give you information on a safe, environmentally effective and affordable option for stream crossings, portable bridges.

Why Should You Consider Using a Portable Bridge?

There are a number of advantages to using portable bridges. These bridges can be easily removed and transported from site to site, resulting in savings of time and money with repeated use when compared to culverts or log stringer bridges that are built on site. You may be thinking that installing a bridge is a hassle you don't want to have to deal with on your logging job, but you may find it easier than you think. Loggers from North Carolina

reported that these types of bridges were more convenient to install than culverts or bridges built on site.

So What Exactly is a Portable Bridge?

Portable bridges for skidding can be made using a wide array of materials and techniques, including welding bridges from pipe, using old railroad cars or converting army surplus bridges for use in skidding operations. However, most common types of portable bridges are made from wood. There are many different styles and names of portable wooden bridges including dragline mats, crane mats, skidder mats, bridge mats, skidder bridges, timber bridges, solid sawn stringer bridges, and portable glulam panel bridges. The construction materials for these bridges can range from simple cants, to high-tech engineered lumber. All of the bridges, no matter their name or construction materials, have the same general design. Typically they consist of 2 or 3 fabricated panels placed side by side to form a bridge.

3 bridge panels placed side by side



When constructed in the simplest form, the bridge panels are made from hardwood cants, fastened together with threaded rods. The panels are generally 4-6' wide, 8-10" thick and 16-32' long. The size you choose would depend on the width of the stream crossings you are likely to encounter, the size and type of your equipment and the load you need the bridge to support. In general the longer

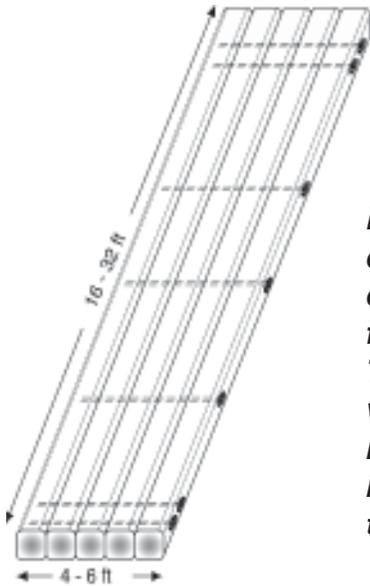


Diagram of a low cost panel constructed from five 10" cants. Threaded rods with countersunk nuts are used to hold the cants together

the panel the better; however you also need to take into account weight and ease of transport. Bridges are also available which are made from engineered lumber such as stress-laminated, glue-laminated, or dowel-laminated. Both the engineered lumber bridges as well as the cant bridges are available from commercial vendors. All bridges vary in cost, ease of installation, and durability. If you are planning on investing in one of these bridges, you need to carefully consider which type of bridge will best suit your needs. When selecting a bridge it is important to understand the bridge's limitations and work within those limits.

Bridge Placement and Getting Permits

All portable bridges should be installed on stream crossing sites that are flat, straight, and stable as possible. Be aware that if you are installing culverts or bridges, even portable ones, across a stream that drains over 1 square mile (640 acres), you will need to obtain a permit from the Kentucky Division of Water (contact the KY DOW Water Quality Certification Dept. at 502 -564-3410). If possible, choose a crossing location where the stream banks are well defined and the stream is running a relatively straight course. Finding a site with these charac-

teristics will help ensure a smooth crossing, keep the load on the bridge, and will reduce the amount of muddy water entering the stream. If the bridge panels are placed on uneven ground, there will likely be gaps between the panels that will allow sediment to fall into the stream. Generally panels can be used on stable stream banks and solid soils without any abutments or sills; the panels should extend 4 to 6 feet onto each side of the stream bank to provide support. Some site work may need to be completed before the bridge panels can be installed. Where possible the panels should rest about 3' above the stream bank; this will reduce the possibility of the bridge

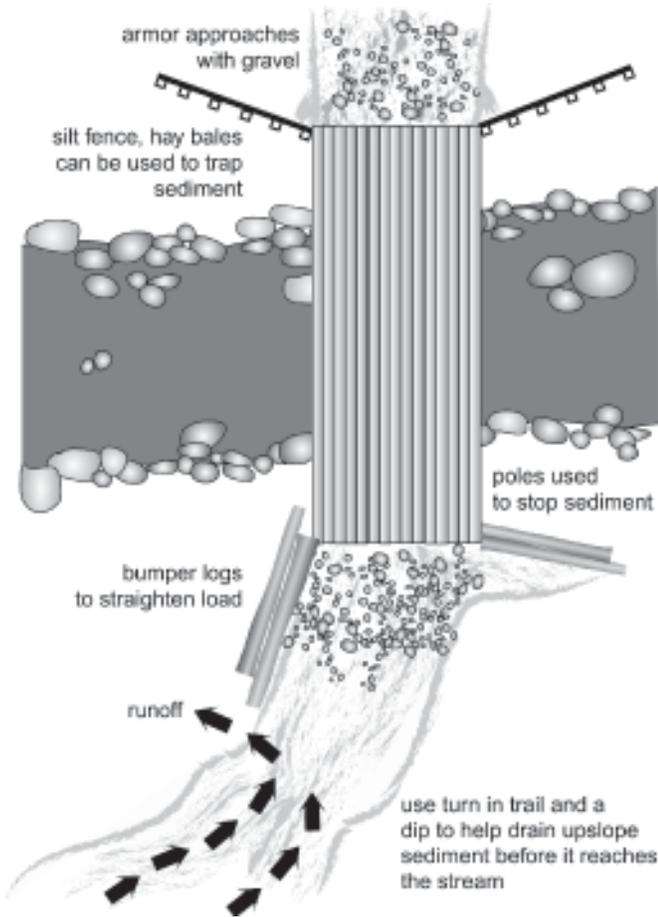


Dozer aligning bridge panels across an intermittent stream in Eastern Kentucky

being washed away during a storm. However, if the bridge is only going to be in place for a short time, it may be possible to install the bridge closer to the stream. Normally the weight of the panels are enough to hold them in place; if there is concern about movement of the panels they can be fastened together or to other support structures. Having enough room to turn onto the bridge from the skid trail, and leaving bumper trees are good ways to make sure your load makes it onto and across the bridge. Installing some type of surfacing material such as crushed rock on the approaches can reduce the potential for sediment being washed into the stream, and increases traction. On relatively flat ground, water diversion structures such as turnouts or wing ditches should be installed on either side

of the stream to prevent drainage from the trail entering directly into the stream. When skidding on steeply sloping ground, do not run the trail directly down the hill onto the bridge. Plan the trail so that a gentle turn can be placed in the trail prior to the approach; this will allow water to be easily shed off the trail before turning onto the approach.

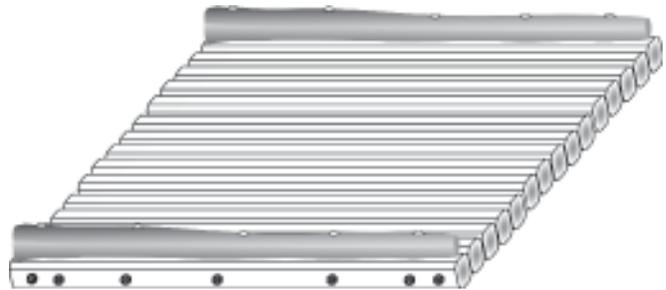
Skidder bridge installation and water control structures



Bridge installation

Bridge panels are installed one at a time. They can be lifted into place with a knuckleboom loader, backhoe, or winched into place with a skidder or dozer. Grapple skidders can drag bridge panels to stream crossing site, turn around and, using their grapples, pick the panels up and set them across the stream. With a grapple skidder installation time can take as little as 30 minutes. A cable or chain and a dozer blade can also be used to lift a panel and set it across a stream. The blade is pushed against one end of a panel and a cable attached from the top of the blade to the other end of the panel. When the blade is raised the cable tightens and lifts the panel. While the bridge can be sloped along its length it is very important that it is level across its width; this is important not only for prevention of water pollution but also for the skidder operator's safety. As a last step, cull logs or cants can be placed on each side of the bridge to act as bumpers.

Portable bridge with bumper logs



Use and Maintenance

Bridges need to be checked frequently for areas of weakness or excessive wear. You should also frequently check to make sure that the bridge panels have not separated; this would not only be unsafe but could also contribute to increased sediment entering the channel.



Bridge Panels should extend 4-6 feet on each side of the stream bank for support.

Retirement

Streambanks may need to be stabilized after removal. Seeding and mulching the disturbed ground will usually reduce the amount of sediment that enters the stream. The water diversion structures such as wing ditches or turnouts, which were installed during bridge placement, should be left in place to prevent runoff from going directly into the channel.

Removal and Transport

After the crossing is no longer needed, the bridge panels can be removed in the reverse order of installation. Before removal, dirt should be cleaned off the bridge surface so that sediment is not dumped into the channel.

List of Vendors

Listed below are sources of portable bridges. This listing was developed from information sent to the LogJam and obtained through a search of the Internet and does not indicate an endorsement by the authors, the Kentucky LogJam, the University of Kentucky Cooperative Extension Service, or the KY Division of Water. It is provided solely as a service to the reader. If you know of other vendors, please contact the KML office at 1-800-859-6006.



Geary Brothers, Inc.
Livermore, KY
(270) 278-2700

All-Star Forest Products
Gulfport, MS
(228) 896-4117

Hopewell Hardwood Sales
Hopewell, VA
(804) 458-5178

Charles Bates
Gretna, VA
(804) 656-6684 Evenings

Carolina Mat Company
Plymouth, NC
(800) 624-6027

American Mat and Timber
Baton Rouge, LA
(800) 671-0694

Johnson Lumber Co., Inc.
Easton, MD
(410) 822-5476

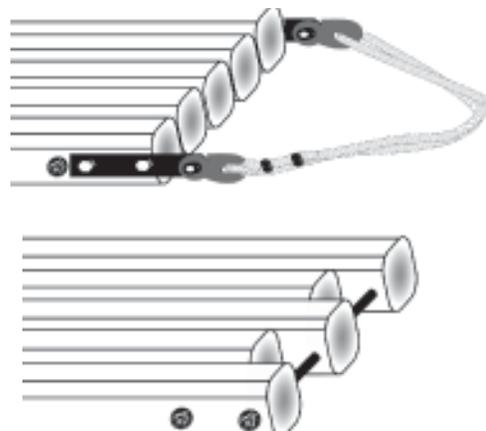
Hanna Mats
Winnfield, LA
(800) 336-3950

Building Your Own Portable Bridge

If you choose to build your own portable bridge, one of the most easily constructed designs involves the fastening together of 8" x 8" x 24' cants made from local timber. While heavier species such as oak will last longer, lighter species are generally preferred to aid in transportation and placement. Below are the general instructions for construction of a bridge panel fastened together with five threaded, high-tensile rods.

- 1) Square cants to proper length
- 2) Lay out cants for drilling holes for threaded rods
- 3) Drill holes, which are 25% - 50% larger in diameter than the threaded rods; this will make assembly easier
- 4) The outermost cants will need to be countersunk to accommodate the washer and nut that will hold the fastening rod.
- 5) Make sure that holes are drilled straight so that cants line up correctly
- 6) Line up cants, insert threaded rods, attach washers and nuts, tighten nuts
- 7) If there is excess rod sticking out of the panel, it should be cut or ground off
- 8) Check and tighten nuts frequently while panels are in use and always after transporting them to a new site.
- 9) Generally cable, chokers, or grapples from skidders can be used to move panels. However, metal plates can be attached to end of panels so that a chain can be attached. Also one or two of the cants can be shortened to expose rods for fastening a chain.

Options for Attachment Equipment





Continuing Education Credit Test Portable Skidder Bridge

Name: _____
KML Card# _____
Address: _____

Phone #: _____

Complete test and send to:
Kentucky Master Logger
University of Kentucky
Department of Forestry
213 T.P. Cooper Building
Lexington, KY 40546-0073

Circle the letter that best answers the question

1. What percentage of logging jobs have some type of stream or drainage channel present?
 - a. 62%
 - b. 46%
 - c. 93%
 - d. 12%
2. From an environmental standpoint, what is generally considered the best option for stream crossings?
 - a. culverts
 - b. bridges
 - c. ford
3. Portable bridges for skidding can be made using
 - a. pipe
 - b. cants
 - c. high-tech engineered lumber
 - d. all of the above
4. A good way to make sure your load stays on the bridge while skidding across it is
 - a. leaving bumper trees along side the skid trail near the bridge
 - b. install the bridge down as close to the stream channel as possible
 - c. push mounds of soil up around either side of the bridge
 - d. all of the above

True or False: Circle the correct answer

5. According to loggers that have used portable skidder bridges, they are much harder to install than culverts.
True False
6. For streams that drain more than 1 square mile you will have to get a permit to install a bridge of any kind.
True False
7. Using portable bridges, repeatedly, will cost me more time and money compared to using culverts.
True False
8. Bridge panels need to extend at least 10 feet on either side of the stream bank for support.
True False
9. When skidding on steeply sloped ground, I should have my skid trail come directly down the hill onto the bridge avoiding turns.
True False
10. One advantage to using a bridge is that I will not have to stabilize the streambank upon retirement of the site.
True False
11. With a grapple skidder, flat ground installation of portable bridges can possibly take as little as 30 minutes.
True False
12. The Division of Water should be contacted for information on obtaining a stream crossing permit.
True False
13. There are no vendors, in Kentucky, which sell portable bridges.
True False
14. Bridges are only recommended for crossing perennial channels.
True False
15. One advantage to using portable bridges is that no routine maintenance is needed.
True False