TC 5-210

MILITARY FLOAT BRIDGING EQUIPMENT

HEADQUARTERS, DEPARTMENT OF THE ARMY

Chapter 9.
Float Bridge Protective Devices

Floating bridges, particularly those which will remain in place for long periods of time, must be protected against severe weather conditions and enemy destruction. When it is necessary to close a floating bridge to vehicle traffic because of flood conditions or heavy debris, the removal of pontons, floats, or raft sections will reduce the lateral pressure on the bridge. If loss of the bridge is imminent, release one end section and securely anchor the bridge parallel to the shore. This is the only protective means available in cases of severe weather. The remainder of this chapter deals with methods of protecting floating bridges against enemy sabotage.

TYPES OF PROTECTIVE DEVICES

The enemy may attempt to destroy floating lines of communications bridges in a variety of ways, including air attack, land attack, underwater demolitions teams, floating mines, or assault boats. Supporting units will normally provide some air defense protection and possibly protection against an attack on the bridge by land. It is necessary to construct floating protective devices to prevent waterborne forces from damaging or destroying the bridge. There are three types of floating protective systems:

Antimine Boom

This device is constructed to stop any mines which are sent down the river by the enemy.

Antiswimmer Net

This net is used to stop swimmers or underwater demolition teams from reaching the bridge. It is also useful in stopping submerged mines and attacks by enemy assault boats.

Impact Boom

The impact boom is designed to withstand the impact of large natural or man-made debris and to stop the enemy from attacking the bridge by boat.

PLANNING CONSIDERATIONS

There are, generally, four elements to consider in determining what types of protective devices to install at a given site. These elements include the tactical situation, time, manpower, and materials and equipment. Regardless of the type of system which is installed, it is critical that the bridge and its protective devices are constantly covered by fire. Post security details and holds them responsible for maintaining surveillance on both banks of the river, as well as on the bridge.

Tactical Situation

This is the most important element in the design of a protective system. Some considerations include –

- The likelihood of any enemy waterborne attack.
- Whether or not the river is controlled by friendly forces on the upstream and/or downstream side of the bridge.
- The importance of the bridge in supporting future operations.
- The bank and river conditions.

A good understanding of the tactical situation will help in determining the type, number, and proper location of protective devices. *As a minimum, protect bridges with antiswimmer nets placed both upstream and downstream from the bridge and an antimine boom placed upstream of the bridge.*

Time

This is a critical factor in several ways. The amount of time that the bridge must remain in place will definitely impact upon the degree of protection that is required. Additionally, because of the shortage of engineers on the battlefield, only a limited amount of time will be available to construct devices prior to the receipt of another mission. When time is limited, devices should be installed in the following sequence:

- Upstream antimine boom.
- Antiswimmer nets upstream and downstream, placing the one on the enemy's most likely avenue of approach first.

- Impact boom upstream (if needed).
- Impact boom downstream (if needed).

Manpower

The time required to construct a protective system depends largely upon the manpower available. Give consideration not only to the number of personnel needed to construct the system, but also to the size of the force required to maintain and guard the protective system once it is in place. If manpower is limited, construct the system in the same sequence as stated above.

Materials and Equipment

There are no available prefabricated or standardized bridge protective devices. Devices must be constructed from materials available at the bridge site and/or from barrier materials which are readily attainable through the supply system.

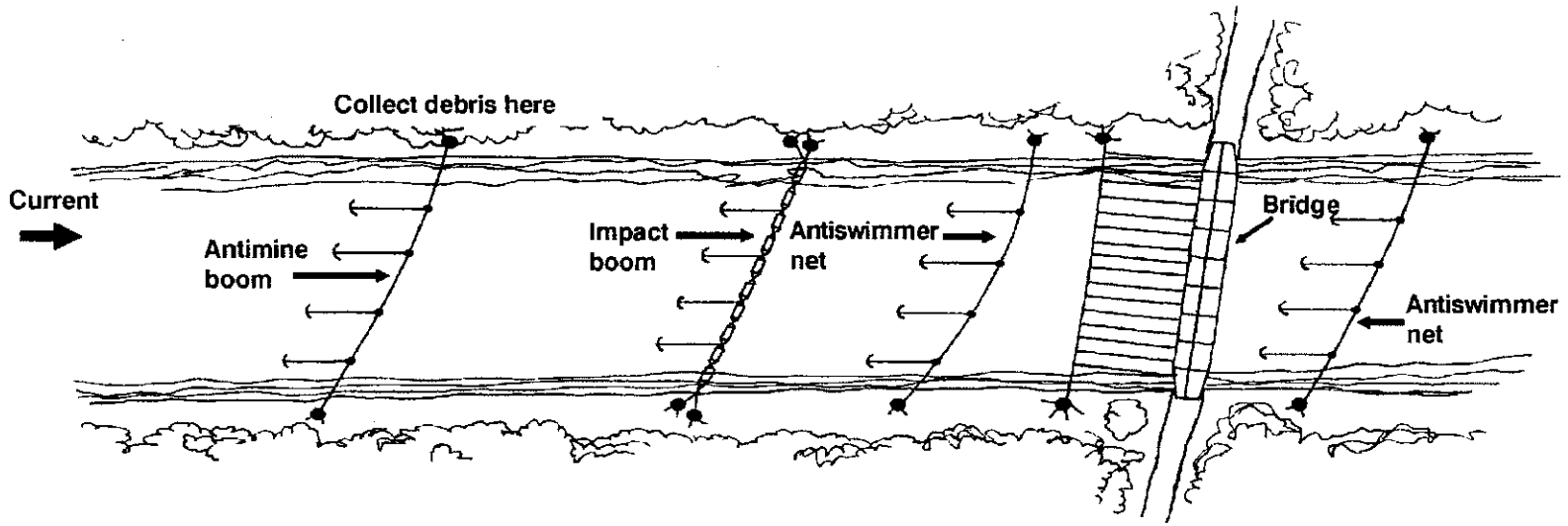
CONSTRUCTION OF PROTECTIVE SYSTEMS

Basic Design

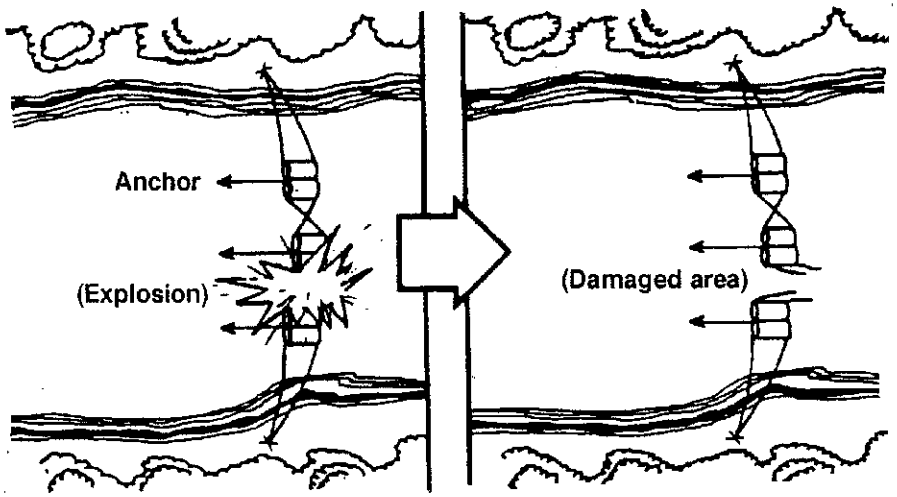
The figure shows a typical protective system. The antimine boom is placed first, in the most vulnerable position since mines are the simplest method available to the enemy for destroying the bridge. The antimine boom protects the other protective devices, as well as the bridge.

When the antimine boom is completed, the antiswimmer net can be installed. Place this net closest to the bridge and locate it within the fields of fire of the bridge guards. The antiswimmer net is the only device that extends from the surface of the river to the riverbed. Lastly, the impact boom is installed between the antimine boom and the antiswimmer net. Place all three types of barriers across the water at an angle. Locate the end placed farthest upstream on the side of the river where the current is swiftest. When the barriers are placed in this manner, the current will tend to push any debris to one shore for easy collection. The angle of the barrier will also tend to disorient underwater swimmers. Anchor all three types of

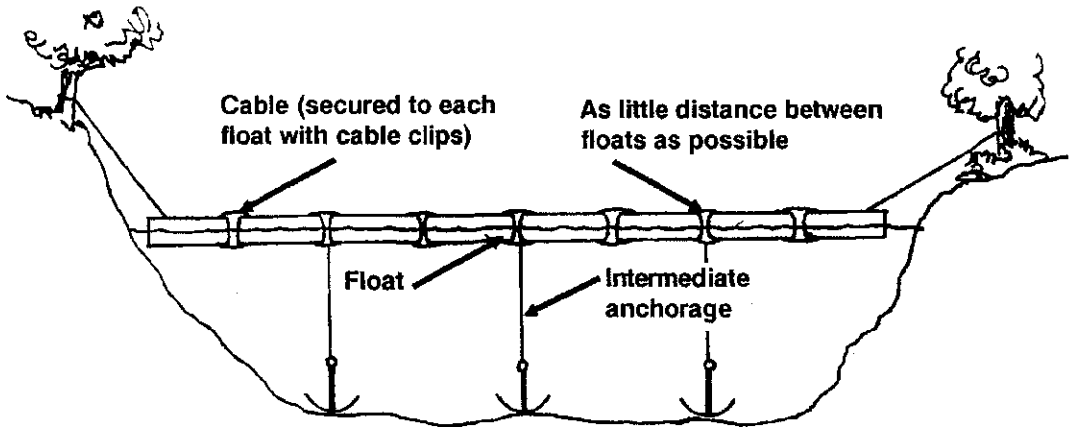
Placement of protective devices to ease collection of debris



Use of midstream anchors to prevent complete destruction of float bridge protective devices



Antimine boom



protective devices in position using an anchor cable held above the surface of the river using intermediate floating supports. Use midstream anchors to supplement the capabilities of the main anchorage cable. An additional benefit of the use of midstream anchors is that if one section of the protective device is cut or damaged, the remainder of the device will remain intact. Never use the anchorage system which holds the bridge in place to anchor a protective device.

Construction of the Antimine Boom

The antimine boom consists of a number of logs, M4T6 balk, or other large floating structures attached to a cable running across the river. Concertina is normally placed along the length of the boom. The M4T6 balk is the best material for constructing the boom because it is simple to thread cable through the lugs and the balk is airtight and fairly massive.

Attaching balk or logs to the boom cable

There are several methods of attaching the balk or logs to the cable:

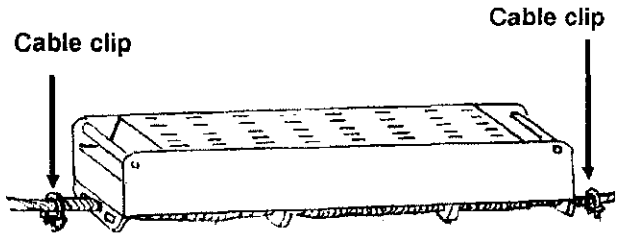
1. Attach cable clips to prevent the cable from slipping through the balk lugs.
2. Thread and loop the cable through the balk handles.
3. Fasten cables to logs or railroad ties.

Note. Before using timber logs or railroad ties, ensure that the log or railroad tie will float and is not waterlogged.

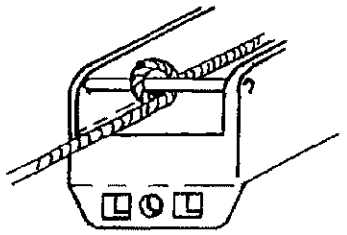
Other guidelines for construction

Build the antimine boom close to the shore. The weight of the boom will make it difficult to position the boom once it is constructed. A BEB is the best means available for towing the boom across the river. Once the boom has been positioned, anchor it on both shores using deadmen or some other holdfast. Install adequate anchorage to prevent the boom from floating downstream and damaging the bridge that the boom is intended to protect. Once the antimine boom is installed, inspect it frequently to prevent debris from building up and collapsing the boom.

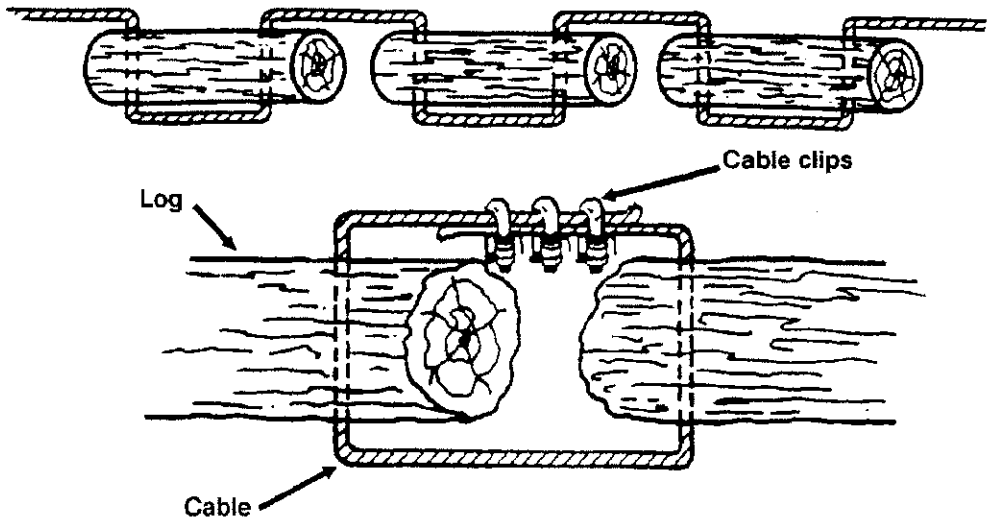
Attachment of cable clips



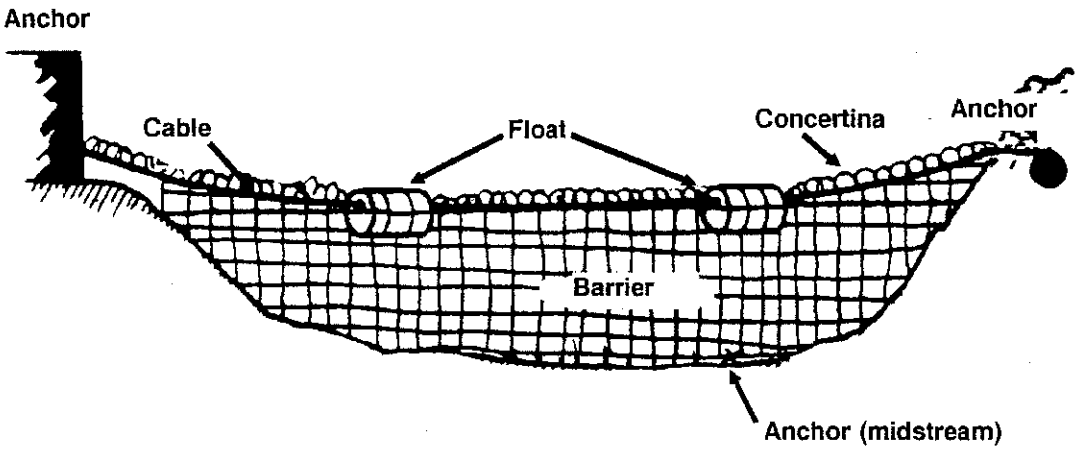
Attachment of the cable to M4T6 balk



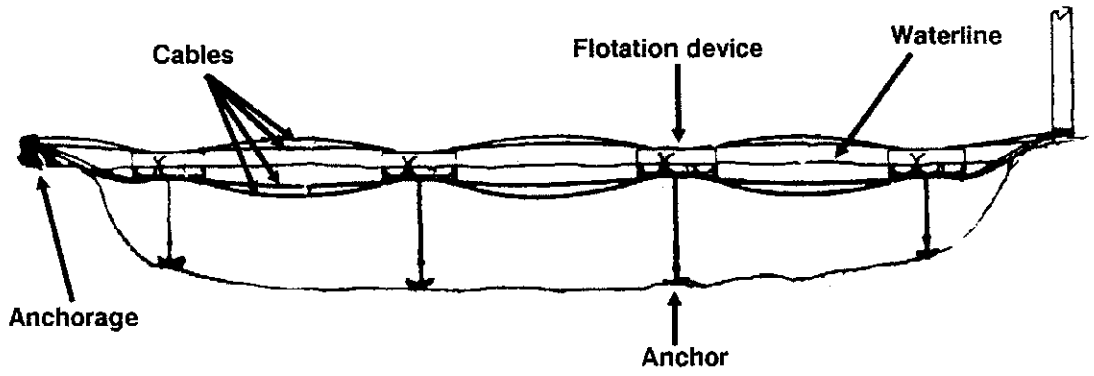
Attachment of logs to the anchorage cable



Antiswimmer net



Impact boom



Construction of an Antiswimmer Net

Construct the antiswimmer net by suspending a mesh or net barrier from an anchorage cable to the river bottom. A number of materials may be available to construct the net. The best expedient is the naval antimine net which is available through the supply system. Other expedients include wire mesh (used for reinforcing concrete), chainlink fence, or other types of fencing material such as barbed tape, barbed wire, or concertina. The material used should form a strong net that is not easily cut. The net should not restrict the flow of water or small bits of debris. The antiswimmer net must also be light enough that it can be positioned with little effort. Once the net is constructed or obtained, thread the anchor cable through the net and the intermediate floating supports. Use floating drums as floating supports. Concertina may also be connected to the cable and net to prevent swimmers from climbing over the net. Position the cable across the river (using a BEB) and anchor it into position. Finally, fully extend the net to the river bottom and anchor the net into position using any available means.

Note. If the net is not firmly affixed to the river bottom, enemy divers can easily go under the net.

Construction of an Impact Boom

The impact boom is designed to prevent large floating structures or boats from destroying the bridge. It is constructed by placing a series of floats and cables across the river. The cables absorb the impact of the debris or boat and restrain it until it can be removed or destroyed. Cable size and float spacing can vary. Increasing the size of the cables and the number of floating supports will increase the level of protection for the bridge.

One means of constructing the impact boom is to fabricate booms consisting of four 1-inch cables supported every 78 feet or less by timber-framed buoys so that two crisscrossed cables are above the water and two crisscrossed cables are below the water. Construct the buoys as shown in the figure. Prefabricate buoys and attach all cables along the shore and maneuver them into place using a BEB. The buoy design for a given protective system will largely depend upon the materials that are available for construction purposes.