

IOWA VANES

Iowa vanes are structures placed in an eroding streambed that cause the flow to be redirected, which results in the deposition of sediment on the eroding bank. When erosion occurs in the bend of a stream, the outside bank is significantly undermined by the flow from the straight portion of the stream colliding with the bank. The outside edge of the streambed is deepened as the bank erodes, but vanes stabilize the stream without affecting the sediment load and velocity of other parts of the stream.

Advantages and Disadvantages

- The toe of the bank is stabilized.
- Soil bioengineering should be used with the vanes to stabilize the bank. Once the sediment has been deposited at the bank, natural revegetation often occurs.
- The area of the channel or the sediment load upstream or downstream is not changed significantly.
- Iowa vanes are impractical for use in a narrow stream channel; the channel should be 15 to 20 feet wide.
- The vane system requires professional design.
- Iowa vanes should only be used in a sand bed channel.
- Vanes can tolerate ice flows and other debris because they are often submerged below the surface of the water.
- Vanes can cause damage to boats. Therefore, they should be clearly labeled with signs and buoys.
- Various types of materials can be used to create a submerged vane.

Materials

- Purchased, preformed Iowa vanes.
- Planks and pipe to construct vanes.
- Crane to lower prefabricated vanes into the water.
- Ram or hammer to drive the pipe into the streambed.

Preparation

- The simplest way to construct a stable vane is to use two metal tubes or pipes driven securely into the streambed.
- The pipes should be 6 to 9 feet apart and angled 20° to 25° toward the bank to establish the alignment of the vane against the stream.
- Planks should then be fastened between the tubes. Use the water surface as a reference point to level the planks.
- The length of each vane should be between 6 and 9 feet long.
- The height of each vane should be about 1 foot above average bed level or between 2 and 3 feet.

- Each vane should be no less than 1 to 3 inches in thickness at the top of the vane.
- Each vane should be completely submerged in average flow.

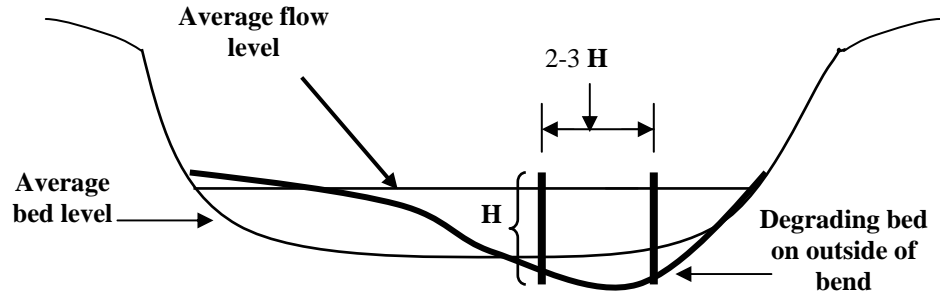


Figure 24. Installation of concrete lowa vanes at low flow

Installation

- Installation of the vanes should begin at least one channel-width upstream from the bend where erosion is occurring.
- An array is a group of vanes next to each other; there should be 2 to 3 vanes in each array and at least three arrays before the area needing protection.
- The vanes within an array should be spaced 2 to 3 times the height of the vane.
- Between each array, there should be a distance of 15 to 30 times the height of a vane. The most upstream arrays can have a smaller amount of space between them, while those further downstream should have a greater distance between them, but not exceeding 30 times the height of the vane.
- Vanes do not need to be installed past the bend where erosion is occurring.

**Cross-section
view of stream
channel**



H = Height of vane used as a reference length for orientation of vane.

**Plan view of
stream channel**

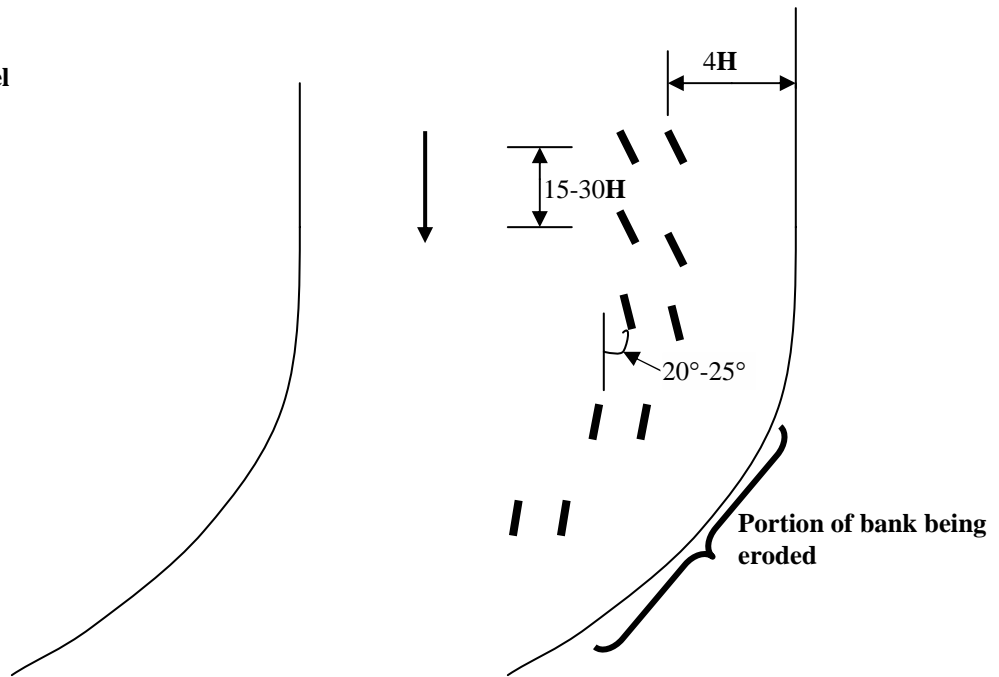


Figure 25. Iowa Vane placement details



Figure 26. Replacement of sediment on bank from Vanes