Practice Title

Cross vanes

Photo(s)



Rock being positioned for rock vane installation (left-above), rock vane designed to guide flow into bridge opening and ease pressure on the abutments and banks (center-above), and a fisherman seeking trout in the pool beneath a rock vane (right-above).



Laying the keyway back into the bank for a rock vane (left-above), rock vane designed to reestablish a riffle-pool sequence in a headwater stream (center-above), and high water moving over a vane, with the primary flow being moved to the center of the stream, reducing pressure on the banks (right-above).

Summary of Practice

Cross vanes are carefully placed rock structures built below the water level to control the direction of flow within a stream. Various types of in-stream rock structures are used. One or more structures can be used to direct a stream's energy toward the center of the channel and relieve pressure on an eroding streambank. On a materials basis, in-stream structures are almost always less expensive than riprap because they use less rock. However, these structures must be sized and angled properly to be effective.

Impact on Stream and Floodplain Processes and Functions

Cross vanes can be beneficial to the stream and floodplain in many ways. Their main function is to direct flow and work toward dissipating the stream's energy. This is contrary to other armoring practices, such as rip rap, that deflect flow and the associated energy downstream often destabilizing downstream banks.

Bioengineering is often used in conjunction with cross vanes. The rock structures help protect the banks from erosion and give the planted materials a chance to take root and mature. Re-creating meander pattern is also commonly used with cross vanes. The cross vanes provide the integral structure to the banks that allows the desired meander pattern to persist while the vegetation grows and provides the long-term stability. Cross vanes also cause the creation of deep pools, which are necessary for healthy fish habitat.

Impact on Your Property

Used along with re-creating channel meander geometry and bioengineering methods, cross vanes can be one of the most effective techniques for reducing erosion. If implemented correctly, the rock structures are permanent enough to reduce erosion and allow vegetation to become established. If used within a comprehensive stream management plan, cross vanes can result in a stable stream system with few catastrophic changes for many years. By directing the flow of the stream and not disconnecting it from its floodplain, property loss can also be reduced.

Impact on Neighbor's Property

Cross vanes, in conjunction with the natural channel design concept (re-creating channel meander geometry and bioengineering), can benefit the entire flood plain community. This concept takes the entire stream system as a whole into consideration. If designed and implemented correctly, the chance that cross vanes will negatively impact your neighbor's property is low, much less than with other bank protection methods.

Recommended Use

Cross vanes are recommended for use along with a comprehensive natural channel design. They can be very effective in directing flow and reducing excessive stream erosion and sediment transport. When placed correctly they are designed to collect sediment during high flow events and in doing so facilitate their own existence. However, the design of the project is very important for

their success. Expert designers and contractors are a necessary component. For these structures to perform properly they must be sized, located and constructed properly. Please contact info@catskillstreams.org to schedule a site visit from a local resource professional that can advise on the best options for your streamside.

Permits Needed

In-stream work will require a DEC Article 15 Stream Disturbance Permit. An ACOE permit is required when more than 25 cubic yards of fill material will be used below the "ordinary high water mark" (the approximate yearly flood level); the DEC can advise you about determining these limits. Please contact info@catskillstreams.org to schedule a site visit from a local resource professional that can advise on the best options for your streamside.

Resources (Links, Articles, etc.)

http://www.wildlandhydrology.com/assets/cross-vane.pdf

http://www.stormwatercenter.net/Assorted%20Fact%20Sheets/Restoration/grade_control.htm

http://www.carleton.edu/departments/GEOL/Links/AlumContributions/Antinoro_03/SMCwebsite/FlowStructures.htm

www.gcswcd.com/stream/library/pdfdocs/sr-03.pdf

www.bae.ncsu.edu/programs/extension/wqg/sri/rv-crs-4.pdf

Text Sources

Thigpen, Janet. 2006. Stream Processes: A Guide to Living In Harmony with Streams. Chemung County Soil & Water Conservation District. Available of web: http://www.chemungcountyswcd.com/homepage.html.

Photo Sources

Greene County Soil and Water Conservation District
New York City Department of Environmental Protection