

Sealing Rock Weirs with COIR (coconut fiber stuffing)

One of the problems of constructing a series of rock weirs or steps for fish passage or for channel restoration is that weirs can be difficult to seal immediately after construction. The traditional technique has been to use a variety of chinking rock and fine sediment to block the larger voids created during the placement of keystone boulders of the structure. This technique is time consuming and washing fine material into the rock voids can be messy and have impacts on the adjacent channel. This technique has varying amount of success.

Recently during a fish passage project designed by Streamline Engineering in the Russian River basin, this problem surfaced while constructing a series of weirs below a culvert out of 4- to 6-ton stone. An early season rain storm had created flow conditions after the first weir was constructed. **Photo 1** below shows flow going over and through the structure.

*Photo 1. Rock weir
(Goldridge RCD)*

This would have some implications for the performance of the structure. A classic problem, getting the weirs to seal immediately after construction, came up. A novel and simple solution was put forth by Questa and implemented by the contractor, Prunuske Chatham, that utilizes COIR fiber as stuffing to promote the trapping



of fine material and greatly speed the ability of the structure to seal and maintain the seal. The COIR fiber can be purchased from the manufacturer or can be attained by removing the COIR fiber interior of COIR fiber logs **Photo 2**.



Photo 2. COIR log and stuffing

Once the boulder keystones are placed, smaller 4" to 18" diameter rock is placed in the voids. This reduces the void space but does not seal the weirs. Usually a finer grained mix of sediment is then washed or placed in these smaller voids to attempt to seal the weir. This can be difficult and time consuming. The COIR

material is stuffed into the voids behind and around the larger chinking rock (**Photo 3**). This material can be packed tightly using a steel bar or other tool. After all voids have been stuffed with the material, finer grained backfill material is placed behind and amongst the packing. The COIR packing material does two things: 1) it tightly and quickly fills void space, greatly reducing permeability, and 2) it traps and holds finer grained material that greatly speeds up the sealing process. The COIR material is very durable and will likely not decompose for many years, by which time finer grained material will have been transported into the project, making the sealing relatively permanent.

Photo 3. COIR stuffing into larger voids

An additional benefit of the COIR material is that it expands and becomes tighter in the voids when it becomes saturated, providing an even greater seal for the structure. We believe this technique could be used in a variety of ways to seal constructed rock and boulder structures.

