

The Monthly Dirt

A monthly newsletter on the California Construction General Permit

BMP MISCONCEPTIONS

Debunking commonly practiced fiber roll myths

Oftentimes for effective sediment control, it is necessary to establish a line of defense. This line can be placed at different locations throughout the construction site but is generally placed downgradient of a source of sediment. Typically, linear measures used for sediment control are placed at the toe of a slope or at the project's downgradient perimeter. Linear controls can also be used to prevent sheet and rill erosion. In this case, they are typically installed in strategic places to slow the flow, such as along the face of a slope or where sheet flow discharges to areas of soil disturbance. Linear controls are the most prevalent of all BMPs at construction projects, but even with their popularity, they still seem not to be well understood in what they can and cannot do at a project site. In this month's edition of **The Monthly Dirt** we will be looking at common myths about linear controls we have observed in the storm water industry.

Myth: Fiber rolls filter storm water. No, they do not! And we can prove it. You probably know the story of the Three Little Pigs. What did one of the pigs use to build his house? Straw. Why, because it filters water? No. Why do many residents in developing countries around the world still use straw on their roofs? Because it, more or less, keeps the water out. Compacted straw does not filter but rather impedes water. The job of fiber rolls is to slow the flow by creating a miniature dam. When water velocity slows, particles settle out. Don't be fooled by the look of fiber rolls—they don't filter.

Myth: Fiber rolls rolled out on the surface are effective. Unfortunately, this myth is prolific and widely accepted based on the sheer number of construction sites where it occurs. It is very common to find fiber roll surrounding a site that is neither keyed-in (installed in a trench two to three inches deep) nor staked down. We have performed experiments to determine if this typical method of fiber roll installation is effective, and we found the exact opposite to be true. In many cases, instead of allowing particles to settle out, fiber roll that has simply been laid on the ground worsened turbidity. Remember, these devices do not filter water, they hold water like a dam. If the dam is not firmly secured to the ground, the head pressure of the water behind the fiber roll will cause the water to

exploit gaps between the fiber roll and the ground surface. The hydraulic pressure will cause the water to jet from these gaps, eroding the soil. Furthermore, the turbulent water keeps eroded soil particles in suspension. Our experiments show that it is better to not use fiber roll at all than to just lay it on the ground.

Myth: Doubling up fiber roll and silt fence provides better protection. If one is good, two are better. Right? Sorry, not true. Doubling up linear controls mostly just wastes money. And it might indicate that a SWPPP developer lacks confidence in the specified BMPs. Remember, the purpose of these devices is to slow the flow, not filter. When properly installed, fiber roll or silt fence sufficiently slows the flow by itself. No significant additional velocity reduction is gained by doubling up the two devices.



Myth: Fiber roll and compost socks do the same thing. Well, this is a half-truth. It is true that they both slow the flow causing sedimentation to occur. However, compost socks do something that fiber rolls cannot do. They filter the water and remove sediment particles and other pollutants by trapping these pollutants in the filter media. Compost socks are much heavier than fiber roll and become even heavier when they are saturated with water and filled up with captured particles. Because of their weight, compost socks are considered "self-anchoring," which helps them conform well to any surface without the need for keying them in and staking them down. In addition, the pass-through rate of water for compost socks helps alleviate the hydraulic pressure. This makes compost socks very effective on paved surfaces. However, when fiber roll is not secured, unlike compost socks, it will become buoyant and float

on the water's surface until it acquires a degree of saturation. And because it is lightweight and generally compacted like a tight sausage, it is very difficult for a fiber roll to conform to uneven pavement, which is something the manufacturer doesn't specify anyway.

Myth: Curb cutbacks are not BMPs. First let's define a curb cutback. A curb cutback is the transition where water flows from an exposed soil surface to a hardscape surface (e.g., asphalt or concrete). When installed correctly, the soil surface is maintained four to six inches below the surface of the hardscape to prevent water from leaving the site (which happens to be about the same height of a fiber roll). In such cases, many people want to install a fiber roll either by properly keying it in and staking it down at the transition or by improperly placing it on top of the hardscape ledge. But what does this accomplish? The curb cutback is already keeping water from flowing off the soil surface and onto the hardscape. Does the runoff know that it has been stopped by concrete instead of straw? No, of course not! It just "knows" that it stopped, and particles need to settle out. The biggest problem with curb cutbacks is that they don't look like BMPs (or at least what we picture as BMPs). This is especially true for untrained crews and an untrained inspector. If your crews don't know what you are trying to accomplish with the curb cutback, they may short circuit it by filling it in as a wheel barrow ramp. Sadly, some inspectors don't know how perimeter controls work and just want to see something that looks like a BMP on their site. Other than giving the site a great BMP aesthetic and sifting money out of your pocketbook, this fiber roll isn't accomplishing anything. It is an imposter!



Myth: Fiber rolls must always be keyed-in.

Even though some BMP fact sheets or specifications for fiber rolls seem to indicate that they must be keyed-in (or trenched), the Caltrans BMP fact sheet allows for an alternative method of achieving good surface conformity by using a lashing method. Stakes are driven into the ground on both sides of the fiber roll and a rope or steel cable is used to press the fiber roll down into the surface. This is particularly useful



for slopes that are extremely steep or have soils that make trenching impractical. In our Construction Sandbox, we have performed some trials of different types of fiber roll installations on the test slope. When comparing two side-by-side installations of fiber roll where everything was the same except one was keyed-in but the other was not, we noted similar performances except when it came to the amount of surface runoff between the two studies. The side that had the keyed-in fiber roll had less discharge because it was facilitating the infiltration of runoff into the hillside. The side that was not keyed-in had noticeably more surface flow and, therefore, less infiltration. It should be noted that both sides of the slope had been applied with 3,500 lbs./acre of hydraulic mulch, and erosion was not occurring as evidenced by the very clear runoff. This test taught us a valuable lesson. There are many hillsides which are susceptible to landslides or mass wasting, and when fiber roll, used as a linear-control, is not keyed-in, there will be less infiltration of water into the slope and, therefore, less chance of slope failure. Better yet, a linear control measure that facilitates flow-through, such as compost socks or some proprietary linear control measures, should be specified for these types of conditions.

Myth: Linear controls only need to be installed once and will last the duration of the project.

This is the belief held by most project estimators. They typically will only include one initial installation of perimeter controls in their budgets and schedules even for multi-year projects. But it won't take long until your BMP looks like flattened pancakes! All BMPs need maintenance. Fiber roll, compost socks, and silt fence will all take a



beating from the sun, wind, and construction activities. They will eventually wear out and need to be replaced. Plus, as site conditions change, the perimeter control strategy will also need to change. Fiber roll might have been a perfectly good sediment control measure during the grading phase, but compost socks or gravel bag berms may be more appropriate during the vertical phase after paving and concrete work has been completed.

Myth: Fiber rolls and silt fence are the only linear control options.

Even though you will see fiber rolls or silt fence on the majority of construction projects, they are not the only good options for linear erosion and sediment control. It is also false that they are always the most economical options. True, many SWPPP writers do tend to get in a rut and specify what is customary and familiar. But there are many options available for linear control measures. Sometimes a little creativity can provide an innovative, effective, and cost-efficient alternative to the usual control devices.

Myth: Fiber rolls are the most economical option.

Well this is half true. Fiber rolls that are not properly installed are considered by many to be the most economical BMP. While it is hard to argue the economics of this practice. It is highly questionable whether a BMP has actually been installed or if a straw-filled adornment had been placed along the perimeter. This is a disconnect many people have when it comes to BMPs and effective erosion and sediment control. Especially when it comes to "miracle roll," which is fiber roll laid on the surface and not keyed in or staked down. As covered in a previous myth, fiber rolls do not filter water but hold water like a miniature dam. When they are not keyed-in or staked-down, they will still operate as a dam but as one that has a design flaw that affects its performance. What would happen if at the base of a dam there was a weak spot where water could escape? It would not be good, right? That is essentially what happens when we have unsecured fiber roll—dam failure! The water being held back by the fiber roll will exploit the weakness at the bottom of the linear control. Head pressure will cause water to jet out from underneath the fiber roll which leads to erosion, turbulence, and increased suspended sediment.

Please contact us if you have any questions ...

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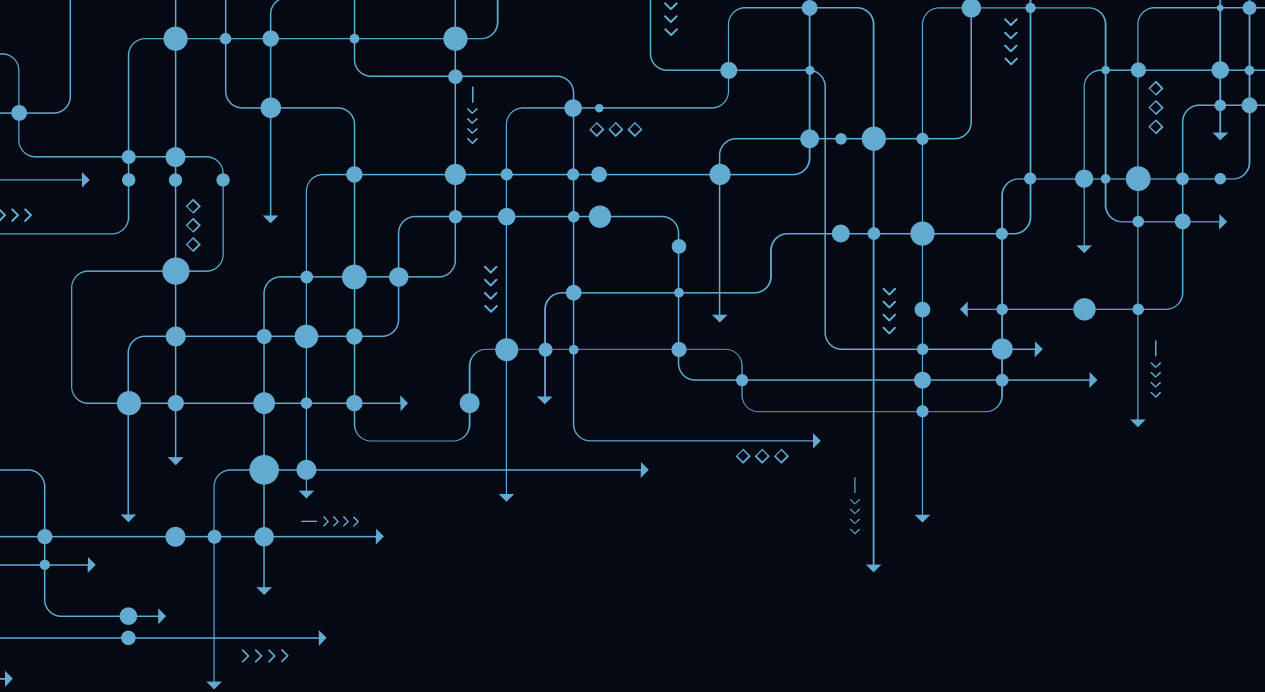
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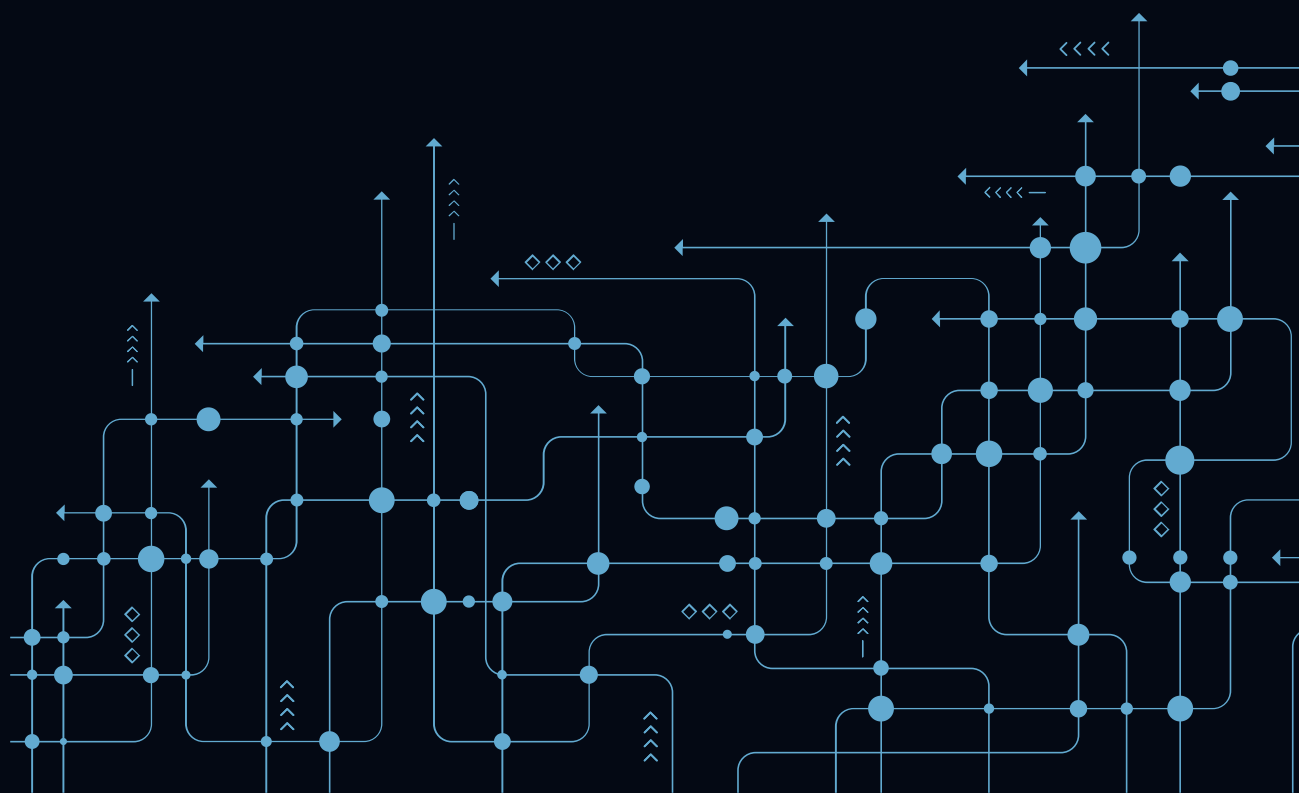




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