

# EROSION CONTROL

## September-October 2009 Gabions and Hard-Armor Solutions

### It's All About Orientation

Alongside interstate I-90 just north of Rockford, IL, sits a small drainage channel that would often fill with water, causing significant erosion. The Illinois State Toll Highway Authority hired engineering firm V3 Consultants to design a solution. The contractor and installer was Dunn Rite Landscaping.

The decision was made to use articulated concrete blocks as the main weapon against erosion for this project, but an interesting problem arose in the process.

Doug Buch of Submar Inc. provides some background: "One of the problems that we often come across—and I've been doing this for about 15 years—occurs when engineering firms try to do what is called a mat layout. The individual concrete blocks get fabricated into mats, and the layout or dimensions of the mat are laid out by the supplier. That layout is done according to several things, one being site access. With the big mats, can you get in there? If it's a tough site, you may have to use small mats. Another site like this one might be wide open, where you can get large mats in. The size of the mats was not the problem on this project. The other issue is the equipment. What equipment does the contractor have at its disposal? That is how suppliers can size the mats, so it can suit the contractor's equipment."



Photos: Submar

One advantage that articulated blocks have over concrete is that the blocks move as the ground shifts and settles.

the mat layout."

So what was the problem in this case? "What happened on this one was that the engineering firm laid out the mats and called out the mat sizes," Buch says. "The problem was the mat sizes that were called out. For example, an 8-foot-wide by 5-foot-long mat is different from a 5-foot-wide by 8-foot-long mat. They're both 40 square feet, but the problem when you're using concrete mats is that cables stick out of the ends. When cable loops meet up against one another, that gap is historically grouted. If you're going over a thousand linear feet, and every 5 feet you have a grout joint; that adds up. That adds a significant cost to the contractor. It's all about the orientation. So what we did was to orient it differently from what the firm had, and it threw everybody out of whack."

"That wasn't what we had drawn up," the engineers told Buch, but they ultimately went along with the changes. The solution didn't cost anybody anything, he notes. "At the end of the day, the square footage supplied was the same. The dimensions of the mats were the same. It's just that the orientation of the mat allowed for no grouting, which made the project look a lot nicer. Instead of a grout joint every 5 feet, there are grout joints only on the turns. It made for a much, much easier installation for the contractor."

Buch adds, "Engineering firms don't do this on a day-to-day basis; suppliers like us, Submar, we do. This is what we do. So we try to beg and push the engineering firms to just save themselves some work. Just call out the hatch pattern where you want the blocks to go and let the experts, the people who do it every day, provide

One engineer remarked to Buch that it appeared his firm's design would require more mats, but Buch explained that the same square footage was still being used. "It was all the same," he says, "but the orientation made a big difference. Who we helped the most on the whole thing was the owner and the contractor. The contractor got a much easier install, and the owner got a much better end product. And the only thing it cost was some time."

He explains why articulated concrete blocks were selected for this project. "The Illinois State Toll Highway Authority, up until about 1998, used exclusively grout-filled pump mats. After 1998, they became more and more interested in vegetating their channels. One of the big drawbacks to grout-filled mats is they don't vegetate. The toll authority wanted to green up the tollway as much as they could and to look for vegetated options. Realizing they couldn't just go to pure grass, or even a turf reinforcement mat, because of the velocities that they were receiving on some of their channels, they began to use an open-cell articulated concrete block. These open-cell articulated concrete blocks have been the product of choice for erosion protection in channelways for the toll authority since the late 1990s or early 2000s. The reason? It's all about green—getting vegetation, getting green. Then the Illinois Department of Transportation started following suit. The two agencies work with each other, and employees transfer back and forth, and now we're seeing a lot more vegetation. In addition to looking better, maintenance is much easier. Once you get vegetation established on these things, you can drive on it, mow it, and maintain it."

Although the articulated concrete blocks formed the core of the solution for this channel, they weren't the only treatment. "The other thing used was a rolled erosion control blanket. Here's why they do it this way—everything has a place in the toolbox," Buch notes. "What the engineering firm did was very smart. They put the blocks in where they're going to have the majority of the water flowing, but to the sides of that, they went to a much cheaper, much more economical rolled erosion control product."

Other potential solutions had their drawbacks. "Where the water is going to be continuously flowing, you can't really put an erosion control blanket down there because it's just going to degrade. And nobody wants concrete down here because of the freeze-thaw cycle causing busting up and cracking. The big advantage to articulated concrete blocks over concrete is that we already have our cracks built into the system—the blocks move. As the ground settles and things move around, the blocks move with it. It's a very forgiving system. It's ideal for these types of applications. You're probably going to pay a little more than you would for rock, but as soon as you have to come back and re-do the rock, add more in, move it around, then you're paying more for it."