



No Two Curves Alike

Refacing 27 Aging Spillways on a Century-Old Mississippi River Dam

Keokuk, Iowa

Restoring a Mississippi River Landmark

The hydroelectric dam at Keokuk has stood on the Mississippi River for nearly a century. It generates clean power and helps manage the flow of water between the Iowa and Illinois shorelines. Over the decades, all that river water wore down the concrete faces that guide the water across the dam. Michels Construction, Inc. is now restoring those faces, 27 spillways in all. Each one is an S-shaped curve known as an ogee. The work brings a vital piece of regional infrastructure back to like-new condition, keeps clean power flowing, and preserves a landmark the region has relied on for generations.



A Partnership Suited to Complex Work

Michels Construction is a heavy-civil contractor built for tough projects, with years of experience on demanding water and infrastructure work. The Keokuk restoration is a multi-year project, exactly the kind of challenge that rewards that expertise. When the company started planning, it turned to EFCO, a partner it has worked with for a long time. The challenge was tougher than it sounded: reface dozens of worn, curved spillways while anchoring the forms to the dam's existing walls. EFCO's answer started with REDI-RADIUS® panels with Pour windows, giving each ogee a steel-faced curved finish. E-BEAM & SUPER STUD® components formed the support framework behind them. Instead of building one-off custom pieces, EFCO used standard catalog equipment throughout, a choice that helped with cost, schedule, and long-term value.

The restoration tackles a deceptively complex challenge, refacing dozens of curved spillway surfaces while securely anchoring formwork to the existing aging dam structure.





Building a “Skeleton” for Compound Curves

An ogee is an S-shaped curve laid on its side, and no two on the dam are exactly alike. A century of river flow has worn each one a little differently. The curves were too sharp to form in one pour, and the new concrete had to tie into the old structure. So EFCO split every spillway into two parts: a lower assembly and an upper one. That added up to two pours per ogee, or 54 pours across all 27 spillways. The REDI-RADIUS® panels shaped the curve. Shaped just once on the table, the steel panels hold that radius pour after pour, so crews never had to reshape them between uses.

E-BEAM & SUPER STUD® formed a rigid backbone that ran straight across the form, which the crews nicknamed the “skeleton.” The backbone kept the assembly true to its radius as it traveled from the table to the barge and out to the dam. The panels hung below it, with Heavy-Duty Pipe Braces holding them from above and she-bolts anchoring them from below, so the wet concrete couldn’t push the forms upward as it filled and set. Because the backbone remained attached throughout the pour, it also served as the picking frame for lifting each section into place.



The same structural backbone that keeps the forms rigid during placement also serves as the picking frame for crane operations, simplifying the entire forming sequence.

Crews finish the steel face of a REDI-RADIUS® spillway form in the yard. Shaped just once, it holds the ogee’s radius pour after pour, with the E-BEAM & SUPER STUD® ‘skeleton’ keeping the assembly true from the yard to the barge.



Standard Equipment, Lasting Value

The business case came down to keeping things standard. EFCO built the solution from off-the-shelf components instead of one-off fabrications. That held down both equipment costs and lead time, a direct path to the Lowest In-Place Concrete Cost (LIPCC), which guides every EFCO project. Michels bought the equipment outright. Because the SUPER STUD® framework is standard gear, it keeps its value long after Keokuk and can go right to work on the company’s next jobs. EFCO also supplied two complete sets of formwork. That allowed crews to build the next assembly while the last one was being poured, maintaining steady progress on a job expected to run for years. The systems were also designed to be ganged and cycled repeatedly without losing accuracy, so crews could reface one ogee after another with less labor and more predictable results. That kind of repeatable process is what keeps a multi-year restoration on track.

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Engineering Around a Barge and a Crane

Access shaped nearly every decision on this job. The work sat out over the river, and crane capacity was tight. Each form had to move from the assembly area to a barge and then out to the dam, so it had to be rigid yet easy to handle. EFCO's engineers modeled the unusual geometry in Revit. The software produced clear 3D drawings that showed how the assemblies fit together before any piece reached the water. The shaping called for a new approach too. Crews normally shape REDI-RADIUS® panels flat on the shaping table. Here, EFCO Field Service scribed the profile and had the team shape the panels while standing up. A better fit for the steep S-curve and a method rarely seen on a jobsite. As the work went on, the team built a steel fixture that each panel dropped into after stripping. Because the REDI-RADIUS® held its radius, the fixture worked as a quick check: crews could confirm a form was still true and correct any small deviation, without measuring it from scratch each time. Through all of it, EFCO kept an engineer, field supervisor, district manager, and territory manager involved in the planning, with Field Service on-site alongside the crews to keep the work safe and efficient.

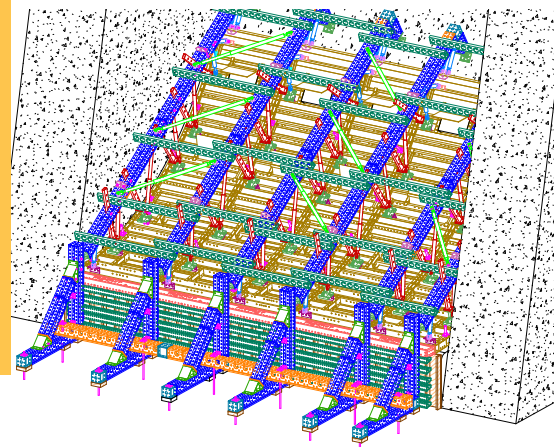


Why Michels Chose EFCO

Michels chose EFCO for Keokuk because the job needed more than rented forms. It needed an engineering partner ready to work through an unusual problem from the first planning meeting to the last pour. EFCO delivered a steel-faced system precise enough to recreate dozens of one-of-a-kind curves. It was light enough to move by barge under tight crane limits, and it was built entirely from standard equipment Michels can reuse for years. Just as important, EFCO pushed for a clear plan on how each spillway would be built, set, and poured. That meant bringing real engineering and field know-how to the table, not just dropping off equipment. This mix of practical problem-solving, steady on-site support, and standard, reusable systems is how EFCO helps contractors reach the Lowest In-Place Concrete Cost. It is also why Michels continues to trust EFCO with its toughest concrete work.



Working over the river with limited crane capacity meant every form had to balance rigidity with portability, traveling from assembly area to barge to final position without compromise.



EFCO EQUIPMENT
REDI-RADIUS®, E-BEAM & SUPER STUD®

**EFCO FORMWORK SPECIALISTS -
DES MOINES/CHICAGO**

Louis Daschler District Manager
Paul Huisinga Senior Field Supervisor
Tom Procich Territory Manager

MICHEL'S CONSTRUCTION, INC

Travis Schulte Project Manager
Lars Olsen Project Manager
Dawson Dionne Project Manager
John McCardle Project Engineer