GALVAN INDUSTRIES, INC.
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Tech Talk Q&A

Excess silicon in filler metal greatly increases weld coating weight.

By Professor Zinc

Hot Dip News
Fall 2017

Q: "Why does hot dipping make welds seem to pop up?"

A. The answer is most likely the difference between the chemistry of the steel and the weld metal. Galvanized coating thickness primarily depends on the silicon content of the iron or steel part. The major difference between the weld metal and the structural steel is the amount of silicon in the weld rod. Excessive silicon in the weld filler material can accelerate the growth of the hot-dip galvanized coating. Because some weld rod metal contains nearly 1% silicon, the difference between the coating thickness on the weld metal and the surrounding structural steel can be significant. Excessive silicon in the weld material to be galvanized causes an accelerated formation of the zinc-iron layers that make up the hot-dip galvanized coating, greatly increasing coating weight.

When the fabricated structure is immersed in the zinc bath long enough to achieve a coating that meets the minimum thickness of the galvanizing standards (such as ASTM A 123/ A 123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products), the coating on the high-silicon weld metal can be more than two-times thicker than the surrounding coating. This thick coating on the weld detracts from the appearance of the fabricated structure and increases the possibility of the zinc coating becoming damaged in the weld area with further handling of the assembly or part.

For typical welding processes, such as shielded metal arc welding (SMAW), submerged arc welding (SAW) and flux-cored arc welding (FCAW), there are weld rod materials that will not cause excessively thick coatings.

Thanks for the question! We hope you find the answer helpful.

Do you have a question for the Professor? Submit it online at www.galvan-ize.com/mrzinc.asp.

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[Fall 2017]

VETERAN OWNED

Galvan Industries, Inc.
Hot Dip News

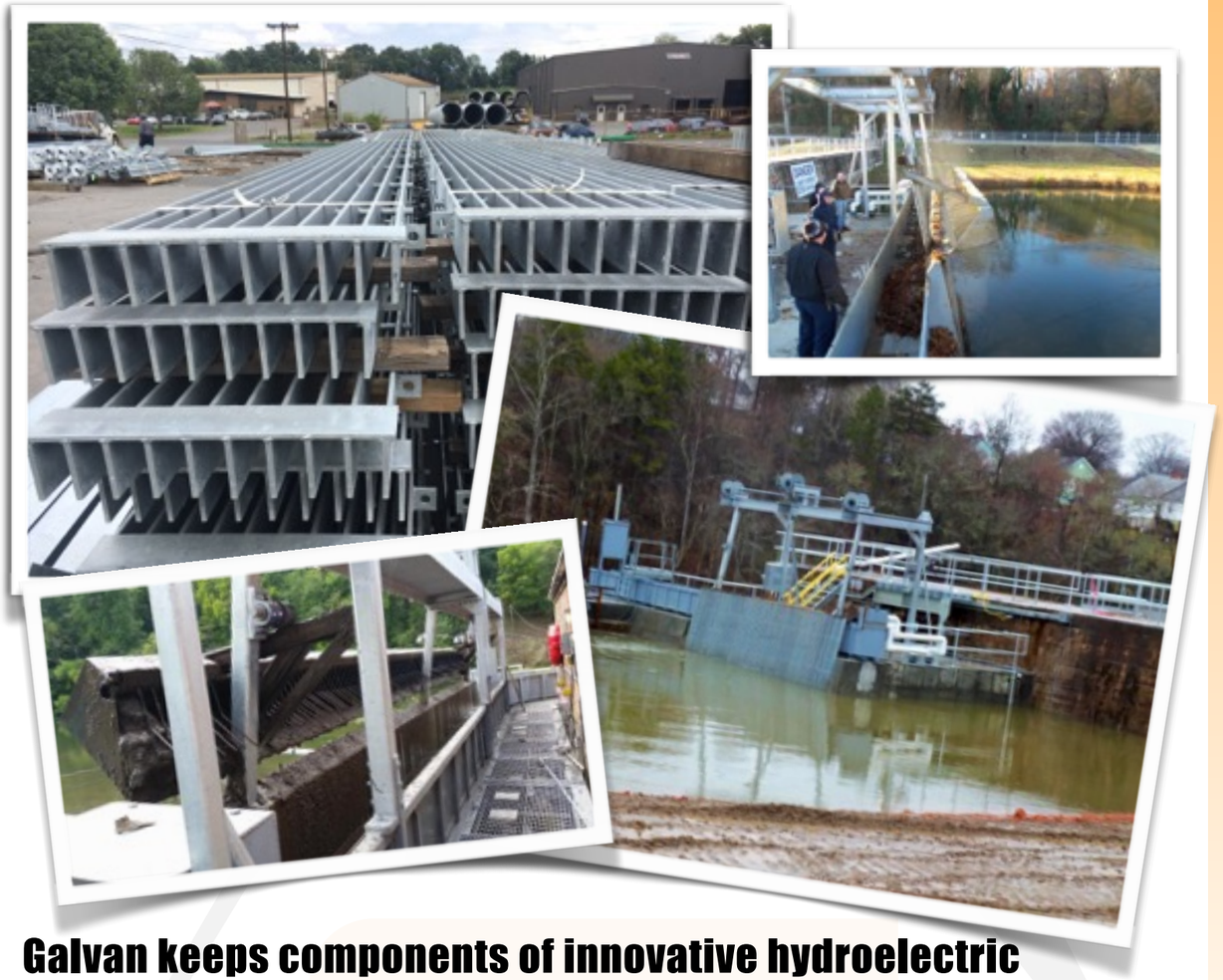
Inside:

Galvan ships corrosion protection to the islands

In the wake of a devastating hurricane season, Galvan Industries is regularly shipping container loads of galvanized reinforcing steel and other materials to builders, fabricators, and transportation systems in island nations and territories including: Bermuda, Puerto Rico, and the Caribbean Islands, to protect against costly corrosion damage. Shipping costs are a minor part of total life-cycle cost, which is considerably lower with the maintenance-free rust prevention of hot-dip galvanizing.

Moisture is highly corrosive to most metals, but galvanized coatings provide considerable protection to steel exposed to sea water and salt spray. Hot-dip galvanizing is one of the best ways to prevent rust in such applications because of its complete, uniform coverage.

Galvan can deliver a lifetime of corrosion protection to your next international project, too. Contact Ben Kelly at Galvan today to learn more.



Galvan keeps components of innovative hydroelectric dam intake cleaning system rust free for life.

More than a trash rake, the Dragrake™ improves generation capacity by 15% to 20%.

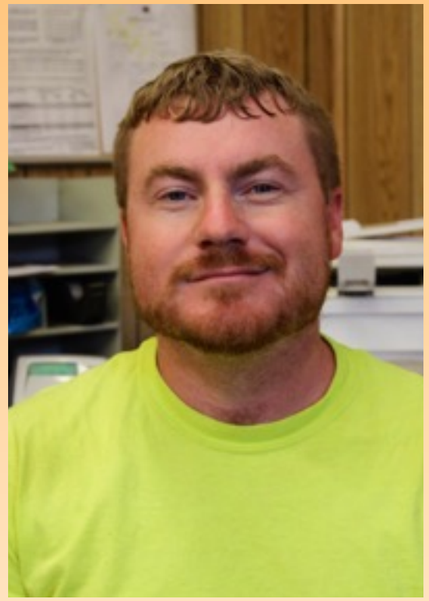
Keeping the underwater intake areas of hydroelectric dams free of trash and debris is extremely important. The Dragrake™, designed and manufactured by Galvan customer North Fork Electric, Inc. offers utilities unmatched cleaning capability. The Dragrake is available up to 45 feet wide and can clean and dredge a 60 foot deep intake in two minutes. For intakes over 45 feet in width, multiple Dragrakes can be installed. This allows thousands of square feet of intake to be cleaned in minutes, allowing greater flow so that dams can operate at maximum efficiency.

The Dragrake operates by a system of motorized cable hoists which move a raking beam across the bottom of the intake, dredging the area and picking up trash, leaves and even water-soaked logs until it reaches the “trash rack”. There, it rakes up the rack face bringing its trash load to the dumping position.

The powerful Dragrake can capture and lift thousands of pounds of trash each cycle, but rust could shorten its life. **Galvan is proud to provide the longest possible rust protection for the Dragrake trash rack (above, top left) and other steel components continually exposed to sun and moisture.**

EMPLOYEE SPOTLIGHT:

DON SMITH, QUALITY ASSURANCE



Don Smith has covered a lot of ground, first in the Marine Corps and then 14 years of driving trucks. When he started at Galvan three years ago, it was again as a driver. Today, Don is in charge of Quality Assurance, inspecting up to 320,000 pounds per day of galvanized steel.

Don inspects finished galvanized material to ensure it meets customers expectations and industry standards before it leaves the facility. Every morning begins with inspection of work completed during the second shift the night before.

MEASUREMENTS

This includes “mil readings” or coating measurements with a magnetic thickness gauge to ensure the proper thickness of the zinc coating according to the applicable ASTM standard. The specifications, such as ASTM A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products, provide minimum zinc coating requirements for given material classes and measured steel thicknesses.

VISUAL INSPECTION

An inspection of finish and appearance is done with an unmagnified visual observation of all parts and pieces of a hot-dip galvanized product or assembly to ensure specification requirements have been met.

Several factors can affect appearance of hot-dip galvanized coatings. Some of these factors can be controlled by the galvanizer while others cannot. It is important to note that the appearance of the hot-dip galvanized coating can vary from piece to piece, and even section to section of the same piece – from bright and shiny to spangled to matte gray – but these variations have no bearing on corrosion protection.

Don’s visual inspection process is to fully observe galvanized surface conditions (both inside and out) and to check all contact points, welds, junctions, and bend areas for proper coverage and adhesion. He pays special attention to surface conditions, looking for things like for bare spots, delamination or drainage spikes that need to be addressed before shipping.

If any problems are identified, Don works closely with managers and supervisors to find the proper solution. He also performs regular audits to ensure that Galvan’s established standards of quality are maintained. In addition, Don handles several administrative duties, assisting the plant manager in preparing production and quality reports, and helping manage the shipping of finished materials.

“Don is a key member of our hot dip galvanizing team,” says Galvan President Laurens Willard. “His work here pays dividends in high customer satisfaction.”

Still covering ground today, Don likes to spend his free time enjoying the great outdoors.