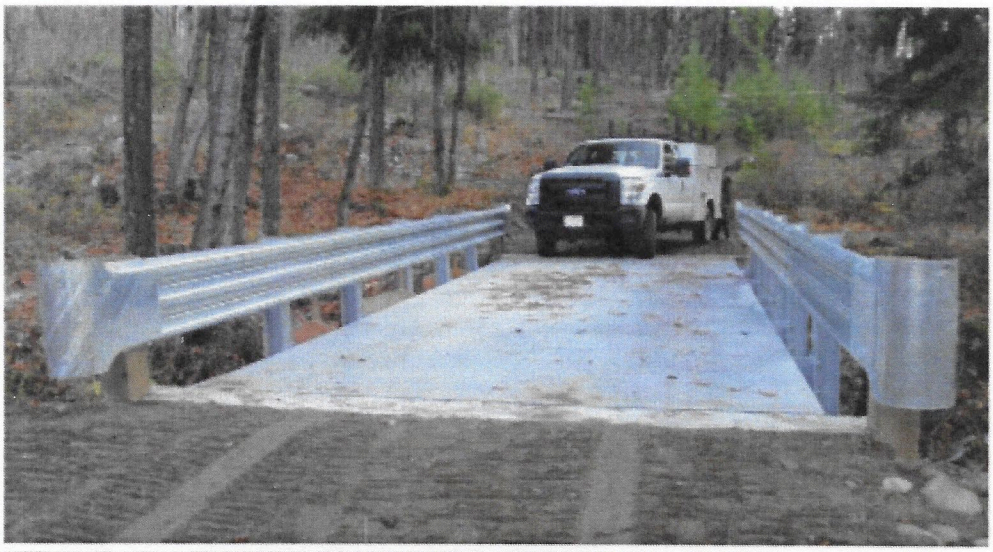
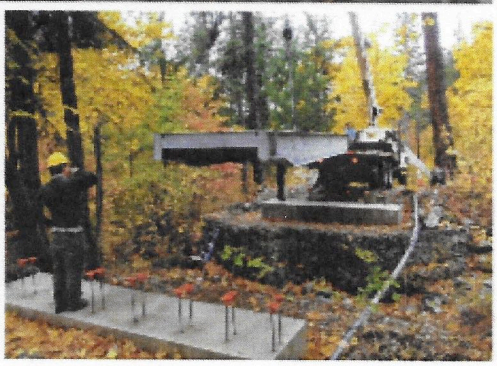
PURPLE CREEK BRIDGE REVITALIZED WITH GALVANIZING





The scenic unincorporated community of Stehekin, Wash., in Chelan County is nestled just south of the North Cascades National Park. Inland, remote and landlocked, it is reachable only by ferry boat, floatplane or hiking, and has become a favorite destination for adventurous campers, fishers and hunters.

When the timber Purple Creek Bridge became unsuitable for light vehicles and pedestrians to traverse, the National Park Service (NPS) put out a competitive best value procurement specification of a modular steel bridge. Due to the limits of local equipment, the HS-20 specified bridge could be no heavier than 10,000 lb per piece. Acrow Bridge was able to design a custom solution and go above the requirements of weathering steel, providing a galvanized 30-ft x 12-ft roadway-width bridge system. The NPS installed the bridge with its own crews and formed abutments on top of the existing gabion baskets.

Unique to this bridge was that Acrow and AZZ partnered to provide an innovative anti-skid spray metalized surface. SafTrax TH-604 has an extremely high frictional coefficient of 1.1, and Purple Creek Bridge is one of the first applications of this technology on a bridge superstructure. The combinations of high skid resistance, low profile and light weight make this an ideal fit for the pedestrians and light utility vehicles that use the bridge.

GALVANIZED IN THE 1970s, THE BRIDGES OF STARK COUNTY CONTINUE TO STAY CORROSION-FREE

The bridges of Stark County in Ohio have been standing proudly galvanized now for more than 40 years. It is a far cry from the early 1970s, when 110 of the county's bridges were considered deficient and 50% of its budget was often dedicated to repainting bridges.

Then-bridge engineer Rich LaRocco made the decision to dismantle the county's deficient bridges in order to sandblast and galvanize the beams rather than continue to repaint. After this process was complete, the bridge would be reinstalled in place. Of the 442 total bridges in Stark County, 335 of them are maintained by the county; many are short-span, low-clearance steel bridges in rural areas.

Once LaRocco's efforts to hot-dip galvanize the county's deficient bridges were complete, the county's repainting budget took up only 10% of the entire budget rather than 50%. They never had to repaint an old bridge again, and the beams and trusses for new steel bridges are now dipped in galvanizing paint.

In addition to sandblasting and galvanizing the Stark County bridges, LaRocco utilized the technology to solve corrosion issues with the county's painted guardrails, which were installed in the 1950s and 60s. After nearly 10 years, every piece of painted guardrail on Stark County roads was removed, sandblasted, galvanized and reinstalled.

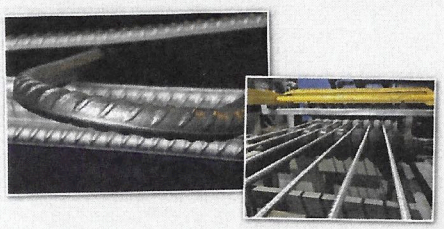
By the time of LaRocco's retirement in 1998, all of the 110 formerly deficient county bridges were repaired, and none remained deficient.

Hot-dip galvanizing continues to be specified for Stark County today, and the bridges and guardrails galvanized during LaRocco's time continue to be rust-free and in service today.

In 2014, Stark County and AZZ Galvanizing Services received a Lifetime Achievement Award from the American Galvanizers Association for three of the interstate bridges that were galvanized in the 1970s. They remain, along with all the other galvanized bridges in the county, corrosion-free.

GALVABAR™ AT A GLANCE

New from AZZ Galvanizing, GalvaBar is the most durable and economical corrosion-resistant rebar available to prevent concrete failure. GalvaBar can be formed after galvanizing with no flaking, peeling or cracking. During the process there is no loss or gain in ductility of the reinforcing bar, and all steel grades of reinforcement can be galvanized. GalvaBar passivates faster and corrodes at a slower rate than ASTM A767 galvanized reinforcing bar. It is continuously galvanized in individual pieces to ensure unparalleled quality. Research shows that galvanized rebar has superior concrete bond strength to black bar and stainless steel, and is equivalent to or better than epoxy.



Features and Benefits:

Durability and Formability
Can be bent after galvanizing without cracking, peeling or flaking.

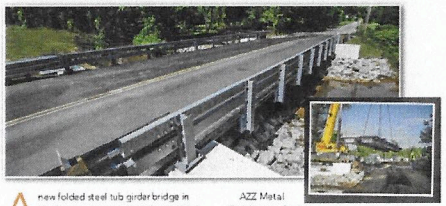
Bond Strength
Metallurgical bond between zinc alloy and steel plus the same bond strength to concrete or better than black bar.

Corrosion Protection
Zinc alloy layer increases corrosion protection 1.7 times more than the traditional zinc-iron alloy.

Quality
ASTM A1094/A1094M standard specification for continuous hot-dip galvanized steel bars for concrete reinforcement.

Cost
Competitive with ECR and less expensive than non-ferrous, high-strength and stainless rebar, as well as lowest total cost of ownership over the life of a structure.

MUSKINGUM COUNTY BRIDGE IN OHIO ACHIEVES FULLY METALIZED DESIGN WITH ACCELERATED CONSTRUCTION



A new folded steel tub girder bridge in Muskingum County, Ohio, that took just 20 minutes to erect is anticipated to last for up to 100 years. Installed in summer 2017, the replacement bridge features a metalized SPS deck and hot-dip galvanized press-brake tub girders.

The original bridge was located above a low-lying acidic stream that often flooded. Tree limbs and debris often collected underneath, resulting in extensive deterioration to the bridge beams and deck.

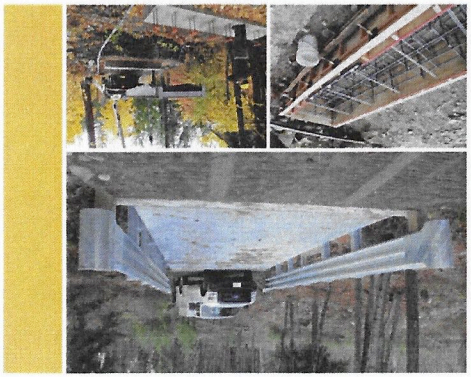
After about six months of designing, the replacement bridge project began with 30 days slated for construction. The general contractor, U.S. Bridge, completed the bridge in about 26 days, finishing four days ahead of schedule.

The accelerated bridge construction timeline was made possible by its unique design, which meant the prefabricated, lightweight deck and beams were constructed off-site, delivered to the location on two trucks and set in place with cranes. The superstructure, designed for a 100-year service life, was erected in just 20 minutes.

AZZ Metal Coatings worked on galvanizing and metalizing the bridge, which is the first in the country to have a fully metalized surface and beams. The county is always looking for innovative ways to build bridges for longevity and with as little inconvenience to the public as possible, so the accelerated construction timeline and metalized design allowed them to fulfill both needs at once.

The bridge is durable and capable of withstanding changing levels of the creek it stands over without deteriorating or rusting. Should a huge log or root come down the creek, it would not damage the bridge regardless of impact. And as the bottom of the bridge is considered smooth, anything that gets sucked underneath would continue to go downstream and dissipate.

The project has gained significant recognition. In March 2018, the bridge won a National Steel Bridge Alliance Special Award for Technological Advancement.



PURPLE CREEK BRIDGE REVITALIZED WITH GALVANIZING

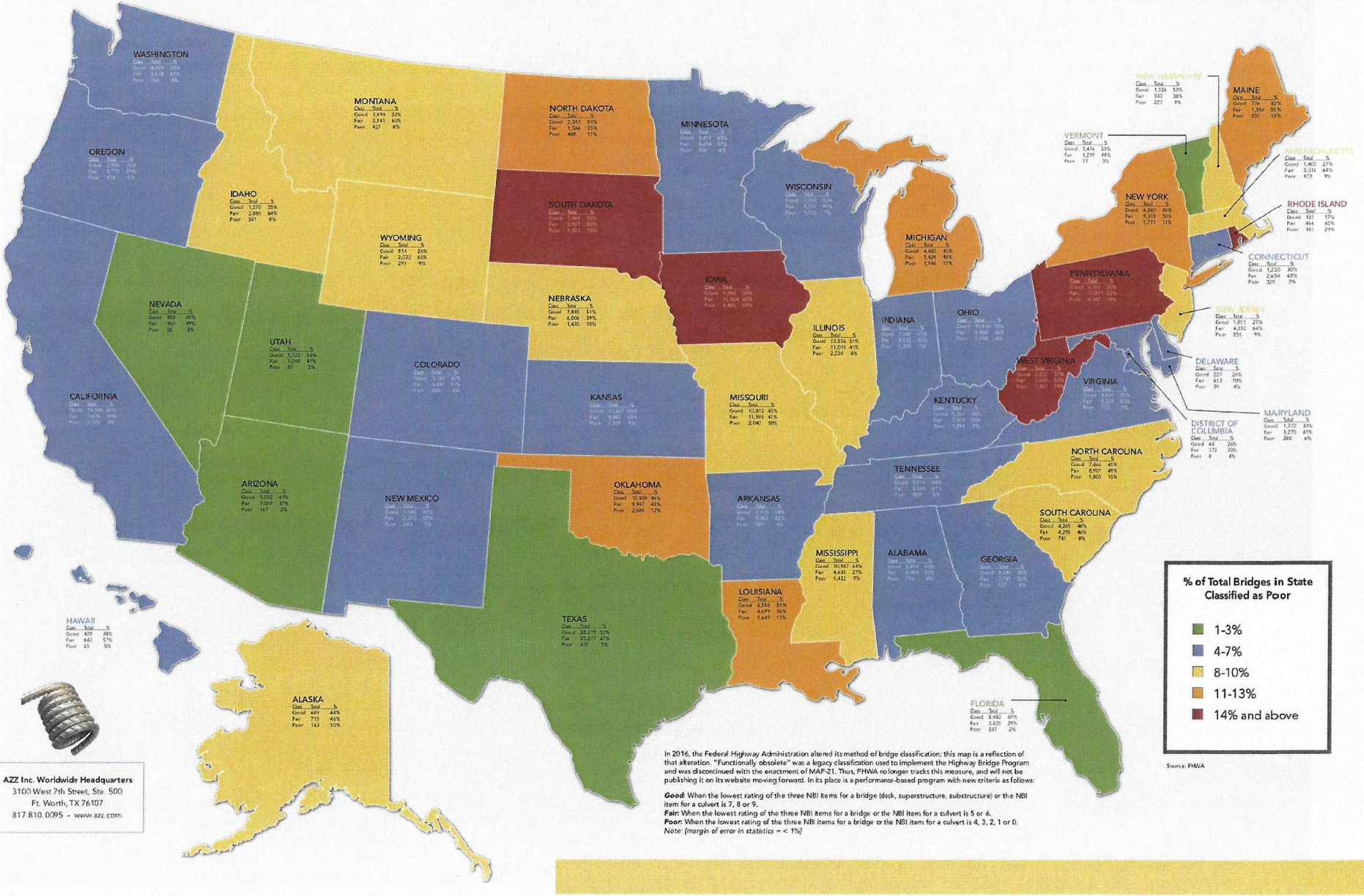
The scenic unincorporated community of Bethel, Wash., in Clallam County is nestled just south of the North Cascades National Park. Island, remote and landlocked, it is reachable only by ferry boat, floatplane or hiking, and has become a favorite destination for adventurous campers, hikers and hunters. Unsuitable for light vehicles and pedestrians to traverse, the National Park Service (NPS) put out a competitive best value procurement specification of a modular steel bridge. Due to the limit of local equipment, the HS-20 specified bridge could be no heavier than 10,000 lb per piece. Acme Bridge was able to design a custom solution and go above the requirements of weathering steel, providing a galvanized 30-ft. x 12-ft roadway-width bridge system. The NPS installed the bridge with the existing gabion blocks.

Unique to this bridge was that Acme and AZZ partnered to provide an innovative anti-skid spray metalized surface. Saltfast TH-604 has an extremely high kinetic coefficient of 1.1, and Purple Creek Bridge is one of the first applications of this technology on a bridge superstructure. The combinations of high skid resistance, low profile and light weight make this an ideal fit for the pedestrians and light utility vehicles that use the bridge.

ROADS&BRIDGES

2018 BRIDGE INVENTORY

A State-by-State Look at Current National Bridge Conditions



Source: FHWA

In 2016, the Federal Highway Administration altered its method of bridge classification; this map is a reflection of that alteration. "Functionally obsolete" was a legacy classification used to implement the Highway Bridge Program and was discontinued with the enactment of MAP-21. Thus, FHWA no longer tracks this measure, and will not be publishing it on its website moving forward. In its place is a performance-based program with new criteria as follows:

Good: When the lowest rating of the three NBI items for a bridge (deck, superstructure, substructure) or the NBI item for a culvert is 7, 8 or 9.
Fair: When the lowest rating of the three NBI items for a bridge or the NBI item for a culvert is 5 or 6.
Poor: When the lowest rating of the three NBI items for a bridge or the NBI item for a culvert is 4, 3, 2, 1 or 0.
Note: (margin of error in statistics = < 1%)

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