

*North Dakota  
Association of  
County Engineers*

## 76<sup>th</sup> County Roads Conference





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© CMC

# InQuik<sup>®</sup> Bridges

# Agenda

- ❖ InQuik + CMC
- ❖ InQuik Bridge System
- ❖ Project Case Studies
- ❖ Project Delivery & Procurement
  
- ❖ Questions



# InQuik®



RECYCLING



MILL PRODUCTS



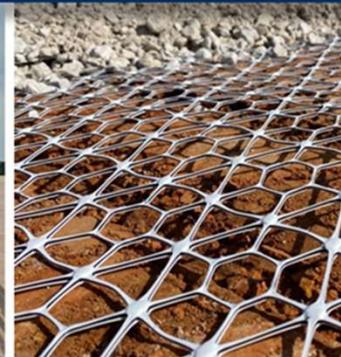
FABRICATION



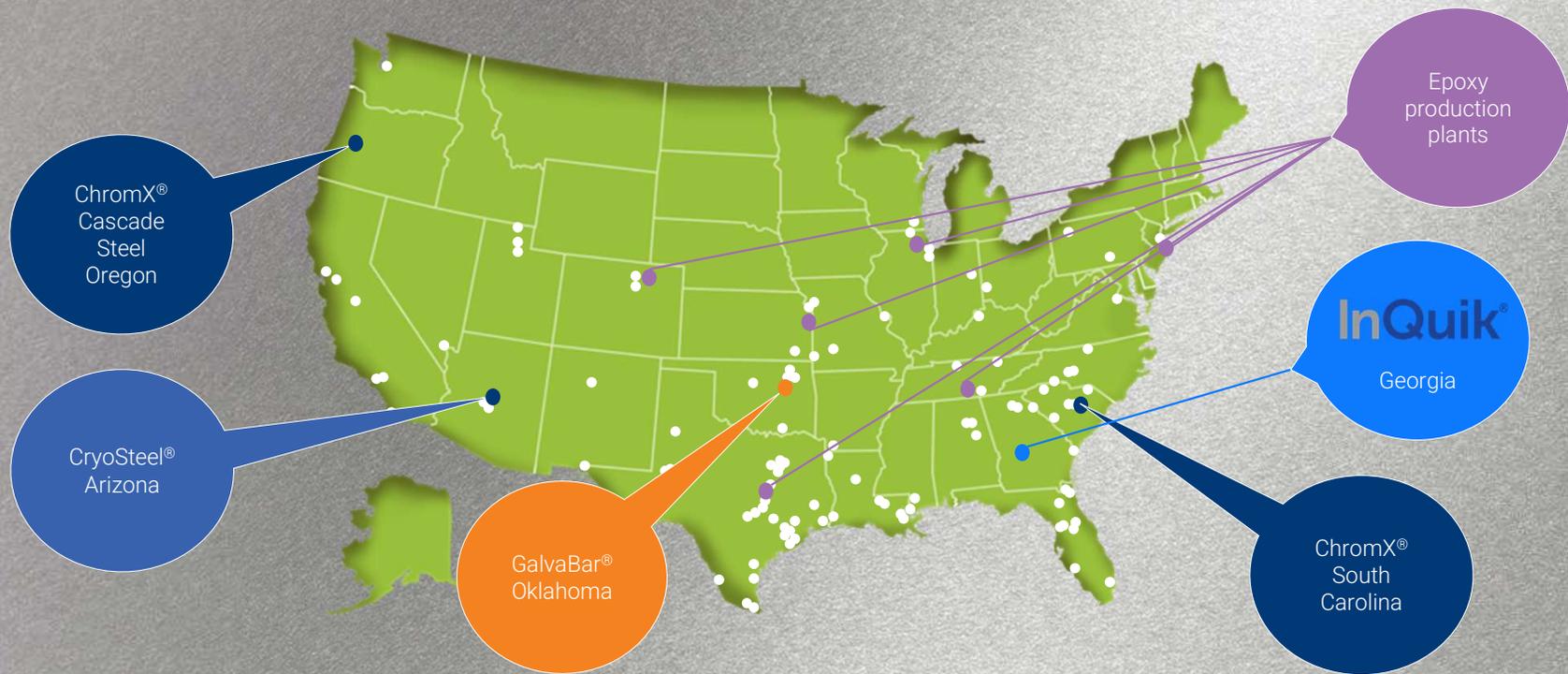
ANCHORING SYSTEMS



TENSAR GEOGRID



# CMC's GLOBAL LOCATIONS

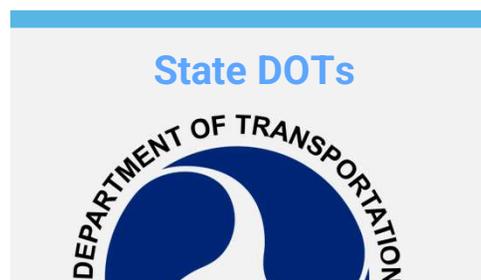
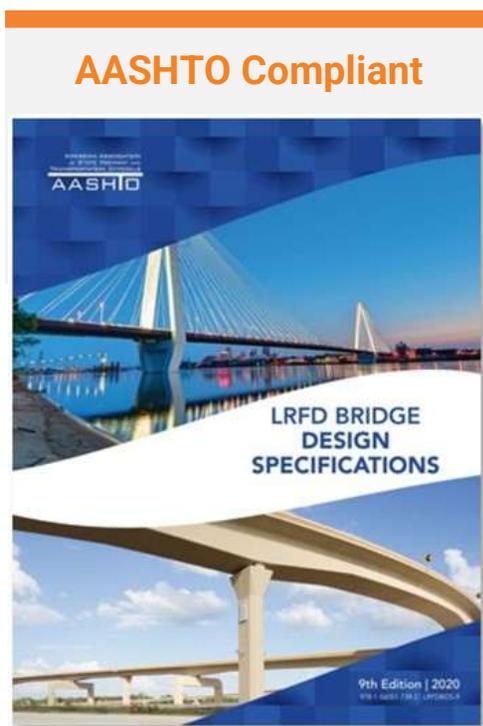


## UNITED STATES

- RECYCLING
- MILLS
- FABRICATION
- FENCE POST
- PERFORMANCE STEEL
- CONSTRUCTION SERVICES

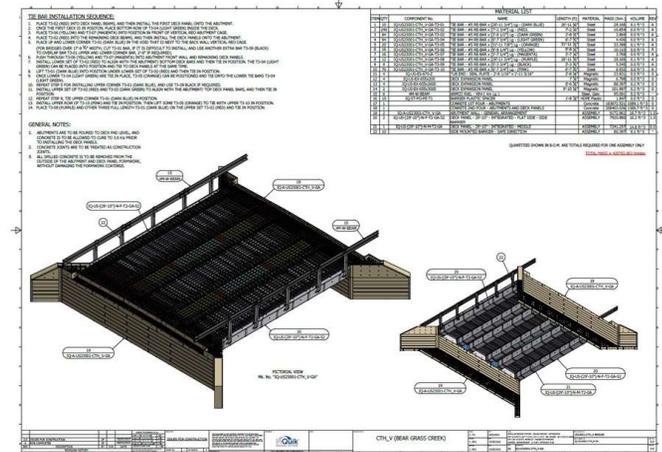
# Endorsements & Compliance

InQuik Bridges comply with all state & federal standards, and Buy America



- ❖ Approved/Accepted by 25+ states
- ❖ DOT projects using InQuik Bridges:
  - ❖ West Virginia DOH
  - ❖ Arkansas DOT
  - ❖ PennDOT
  - ❖ V-Trans

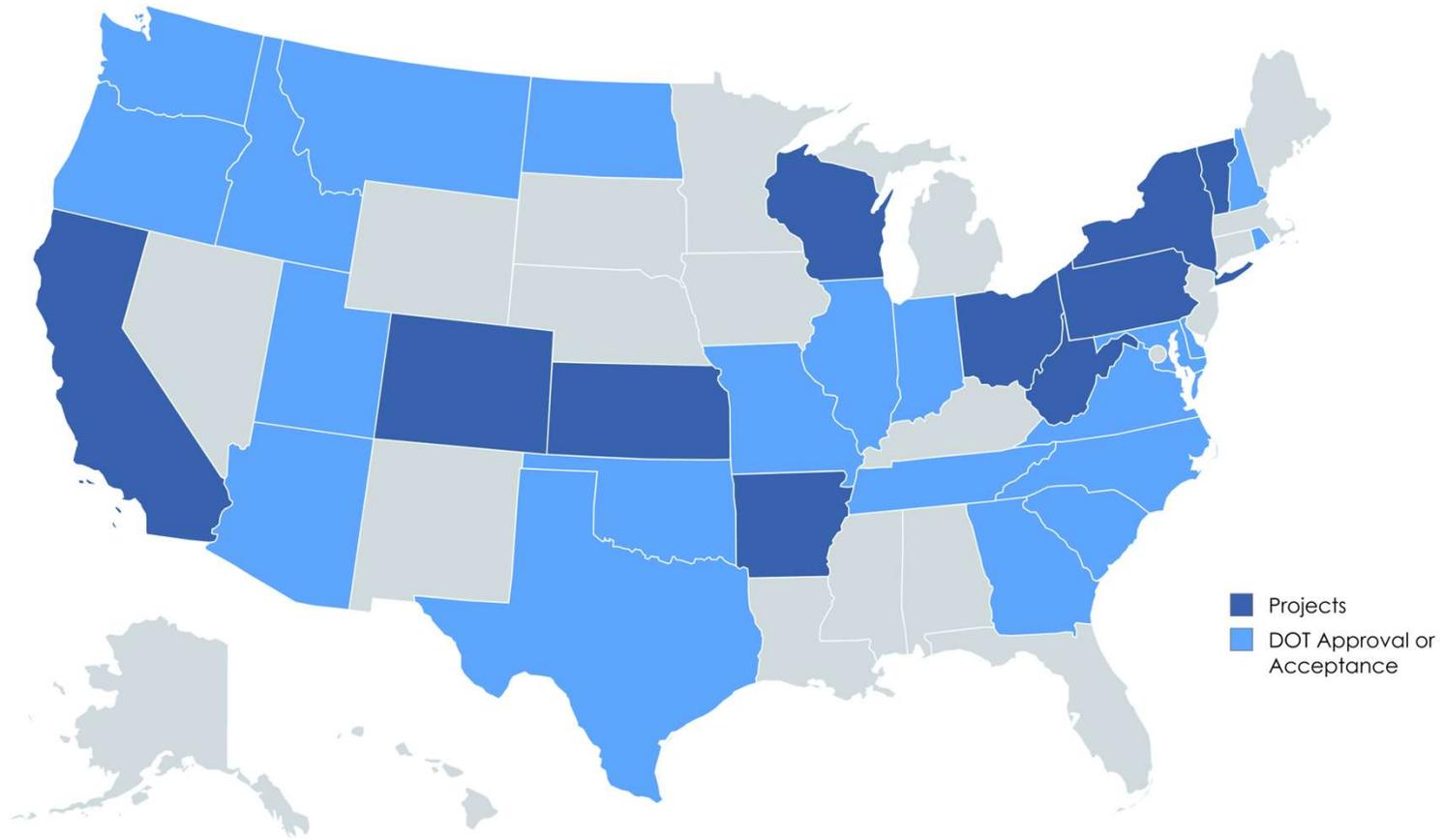
## Design



- ❖ Stamped Design Plans
- ❖ Shop Drawings & QC docs
- ❖ BrR Load Rating package



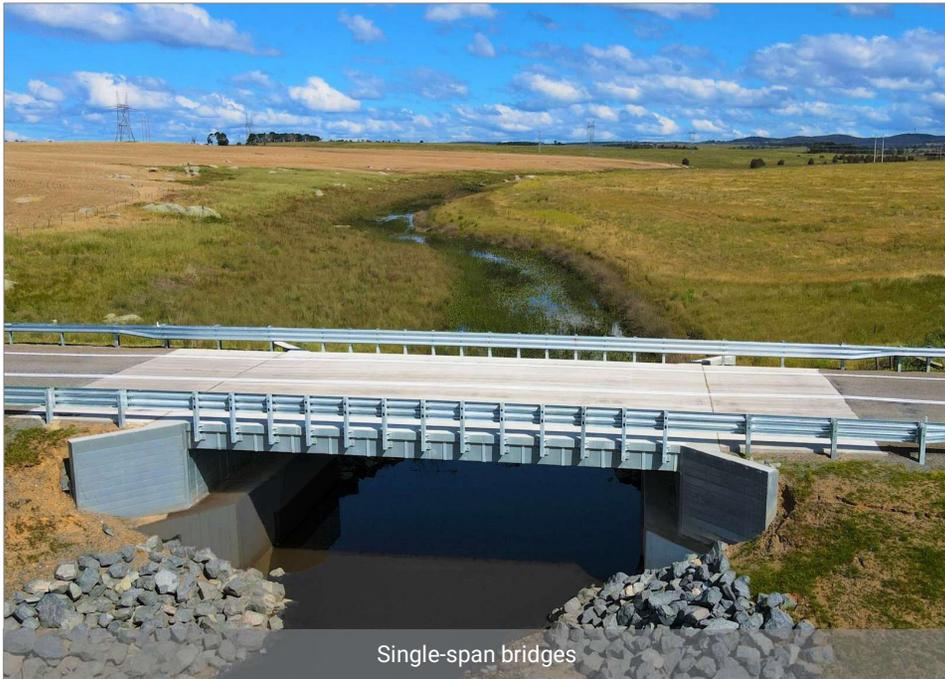
# InQuik Project Locations & DOT Approval/Acceptance



What is an  
InQuik<sup>®</sup> Bridge?



# Reinforced-Concrete Structure



# Modular Bridge System

A complete solution about the foundation comprising prefabricated components:

- ❖ **abutments,**
- ❖ **wingwalls,**
- ❖ **pier caps for multi-span, and**
- ❖ **superstructure.**

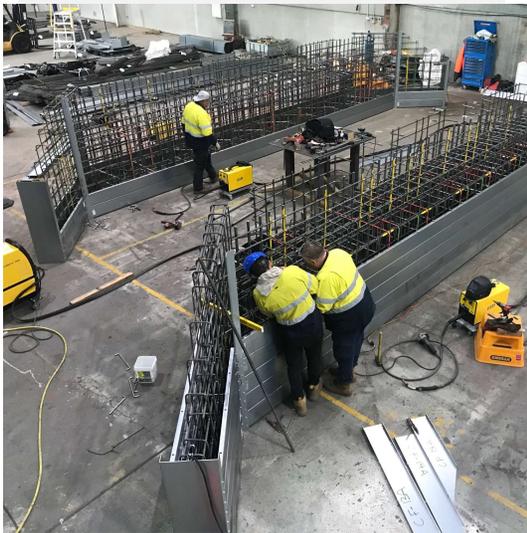
- ✓ reinforcing steel & formwork (no concrete)
- ✓ lifted onto the foundation, spliced together and cast-in-place
- ✓ reinforced-concrete structure



# InQuik<sup>®</sup> Abutments

Designed for your project and compatible with deep/shallow foundation

## Manufactured in Fab-shop



❖ Consistency & QC assured

## Transport without Permits



❖ Lightweight components

## Simple & Quick Installation

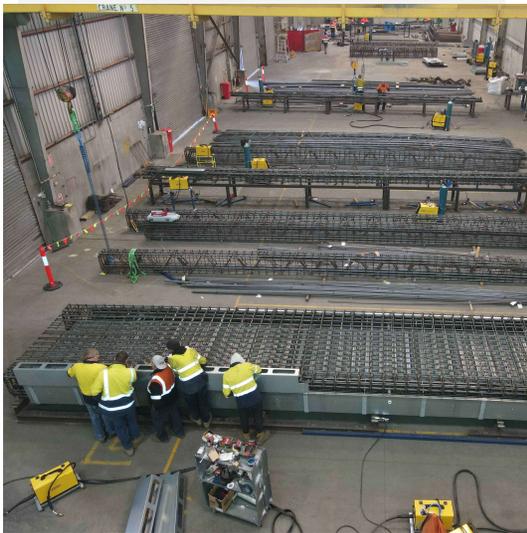


❖ Small Crew

# InQuik<sup>®</sup> Superstructure

8' wide panels / standard lengths: 21' 30' 40' 45' 53' 61'

## Manufactured in Fab-shop



❖ Fabricated on a jig

## Common Transport



❖ 1 bridge (3 panels) on a truck

## Simple & Quick Installation



❖ No temporary shoring required

# InQuik<sup>®</sup> Spacer Section & Splice Bars

Minimal field work required to connect modular components

**18" wide Spacer Section**



- ❖ Non-structural 18" spacers installed in-between 8' panels

**Color-coded Splice Bars**



- ❖ Transverse & Longitudinal splice bars supplied to tie deck mats

**Cast-in-place**



- ❖ Monolithic concrete mass
- ❖ No joints, no grout required

# Self-Perform Case Studies

- ❖ Inexperienced road crews have installed InQuik Bridges.
- ❖ Imagine how efficient an experienced contractor can be.



# Eau Claire County Wisconsin

4-man county maintenance crew  
self-perform first InQuik Bridge  
installation in the U.S.A in 4 weeks.

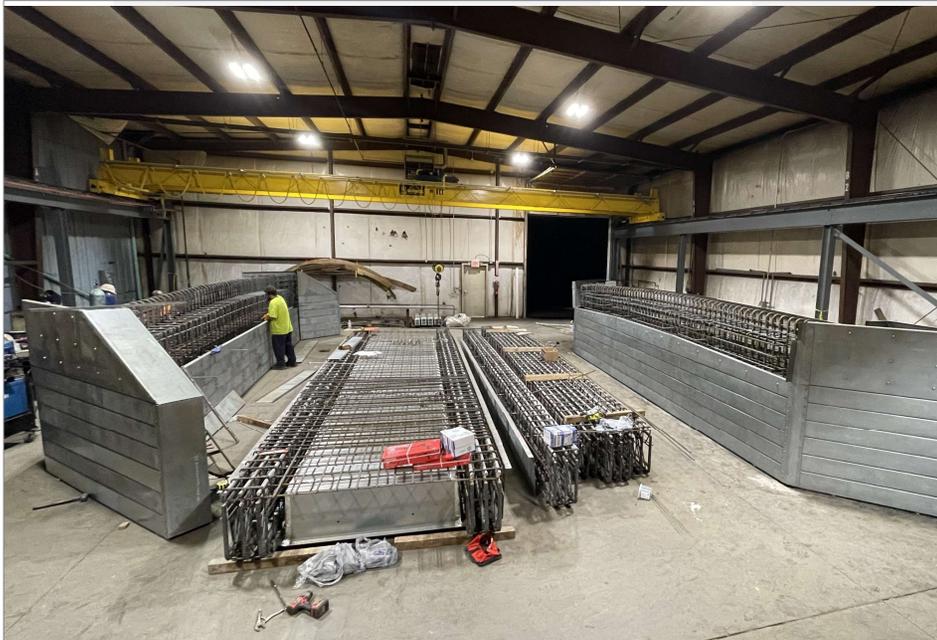




# Pre-construction

## Offsite Fabrication & Transport

Our old InQuik fab-shop in Virginia



Abutment weighed 9000 lbs.



# Foundation

Designed by local P.E. Consultant

County demolished culvert and prepared site



Contractor drove piles / concrete pad non-structural



# Abutments & Wingwalls

County 4-man crew used own equipment to install & placed ready mix next day

Picked up delivery truck, swung 180 & installed



Standard DOT mix design



# Roadway Backfill / Riprap

County 4-man crew self-performed work with own equipment

Can keep working while ready-mix cures



Each superstructure panel weighed 7000 lbs.



# Superstructure

County 4-man crew self-performed installation with own equipment

Guard rail installed before lifting onto abutment



3 x 8' wide IQ panels installed same day



# Splicing Integral Design / Cast-in-Place Bridge

Color-coded splice bars and install guide provided by CMC

18" spacer plate installed & deck spliced



Complete: 33' length x 27' wide



# Chelan West Virginia

West Virginia Dept. of Highways  
maintenance crew self-performed  
InQuik Bridge installation in 8 days  
including foundation.

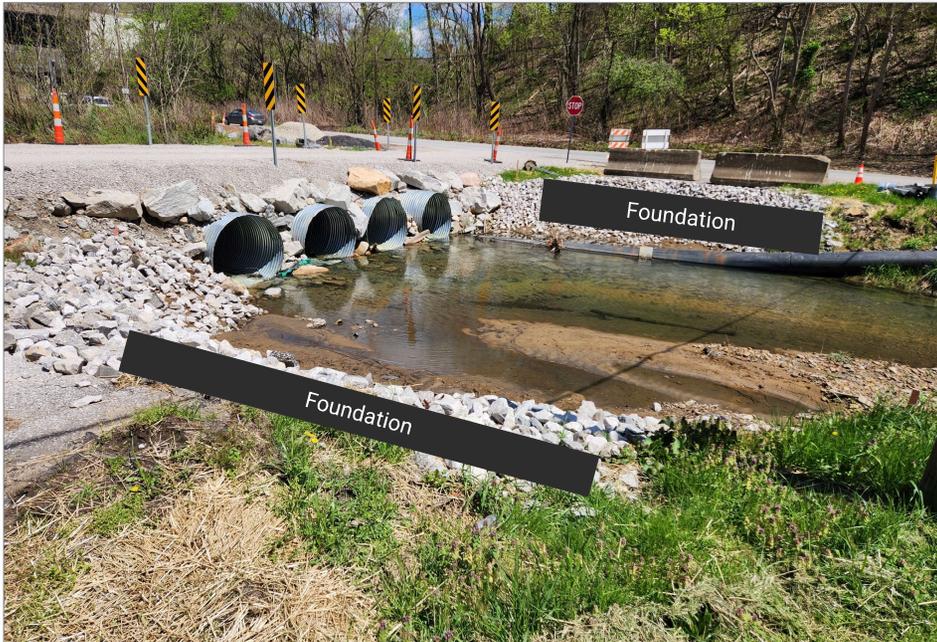




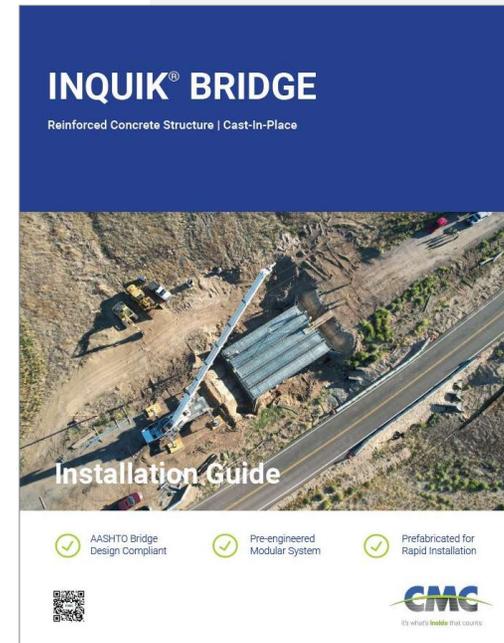
# Pre-construction

Temporary causeway built & old structure demolished in March

Only road in/out of WV community



Training for Crew on Tue Apr 29 / Mobilize Wed Apr 30



# Foundation

Designed by WV-DOH District-1 Engineer

May 1<sup>st</sup> – Pre-drilled piles



May 2<sup>nd</sup> – H-piles backfilled with concrete



# Abutments & Wingwalls

DOT crew used own equipment to install & place ready mix

Monday May 5



Tuesday May 6



# Roadway Backfill / Riprap

3-man crew kept working while concrete cured

Backfill with aggregate... and Rip-rap



Wednesday May 7



# Superstructure

Day 4 of bridge system installation: Thursday May 8

2 x 12,000 lbs. panels lifted directly from delivery truck



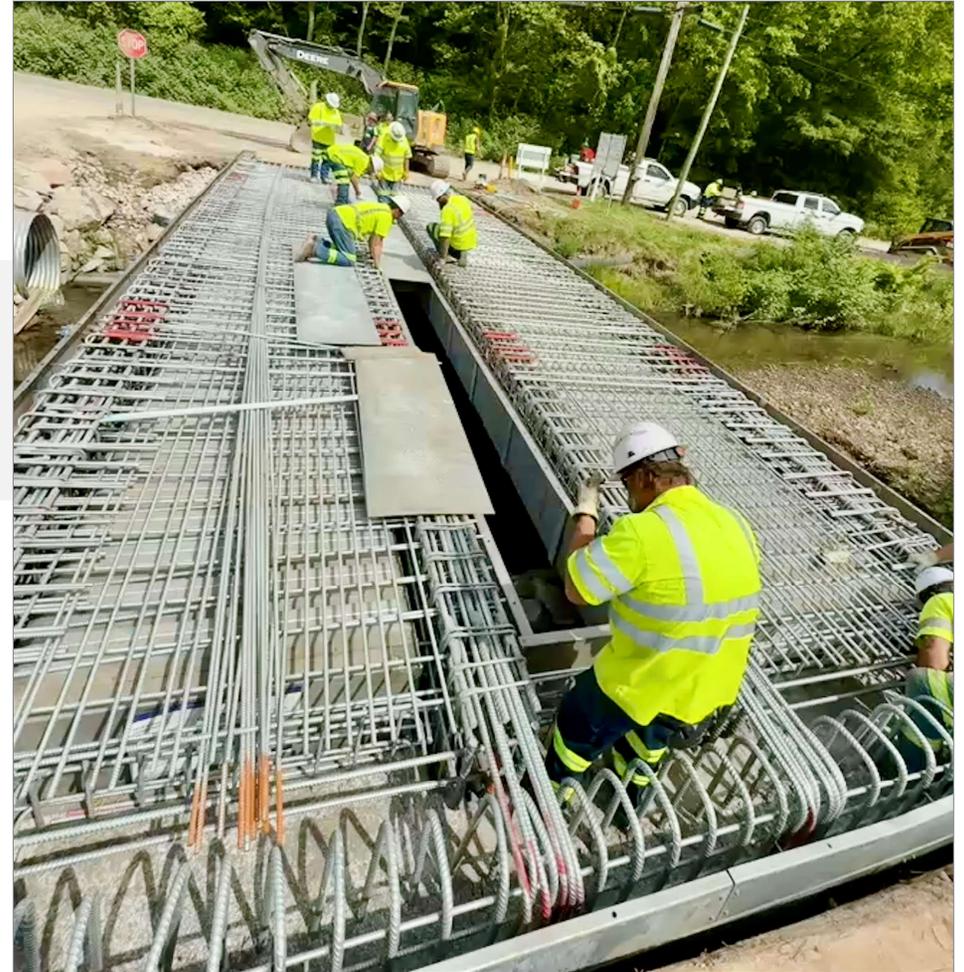
4-man crew & own equipment



# Splicing Integral Design

Friday May 9

Loose splice bars are color-coded



# Cast-in-Place Bridge

Complete: 48' length x 17.5' wide

DOT standard mix design



Anchor bolts ready for guardrail posts



# Testimonial

Jimmy Wriston P.E., former WV-DOT Secretary of Transportation & Commissioner of Highways



*"Everything shows up real time, exactly when its needed... I've never seen a perfect construction project, but this is about as good as it gets."*

*"To be able to just show the crews a short presentation, something they've never seen before, and then have this go that smoothly... it's amazing, how it all came together, even on the design side... it truly performs as advertised."*

# Marathon County Wisconsin

County maintenance crew self-performed InQuik Bridge installation from demolition to reopening in 17 days.

Gnatt Chart



# County Highway N over Scotch Creek

Complete: 43' length x 35' wide

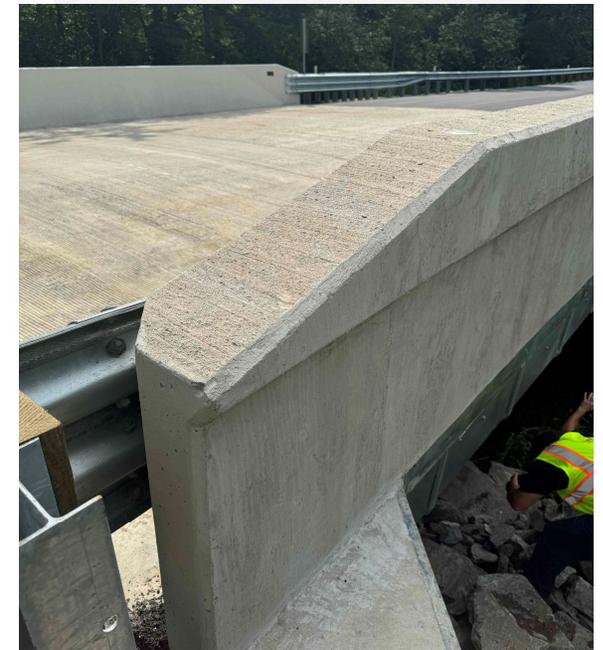
Installed & Ready-mix same day



4 IQ Panels installed in 1 day

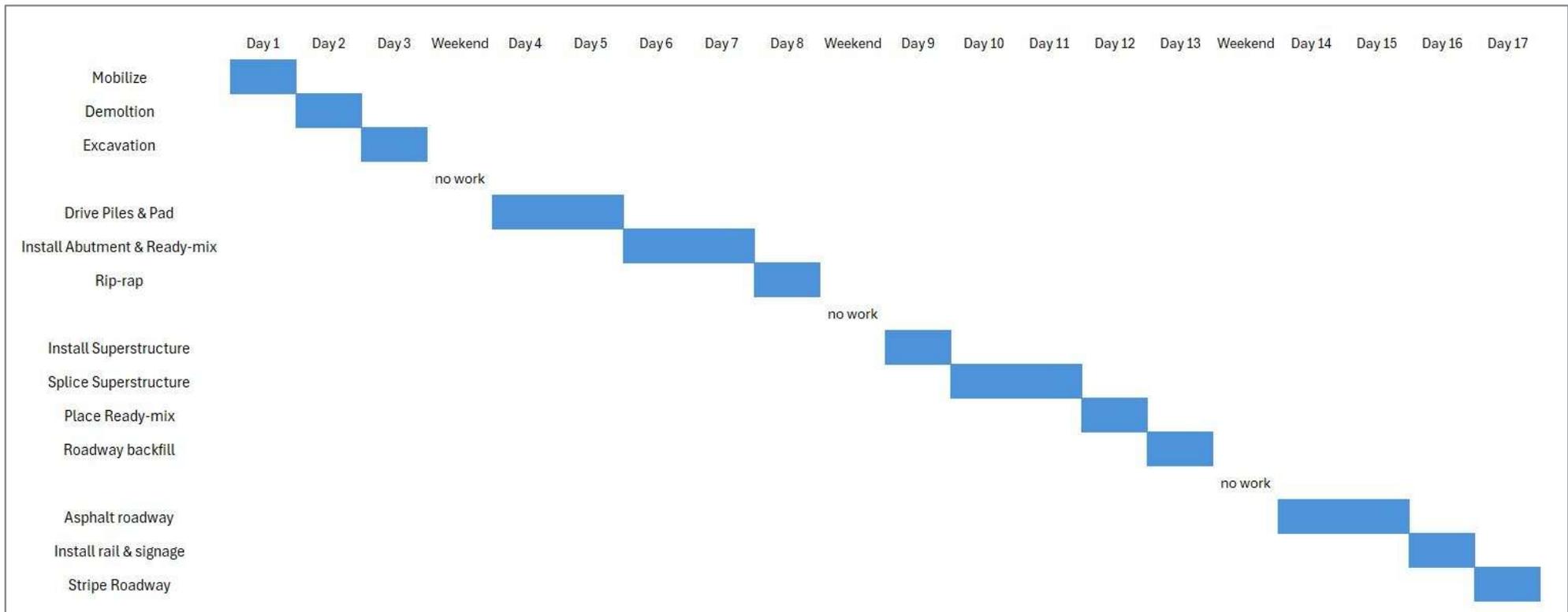


TL-4 Concrete Barrier



# Construction Gantt Chart

From mobilization to completion in 17 days with weekends off / Road closed: 23 days



# Procurement & Project Delivery



# Project Delivery

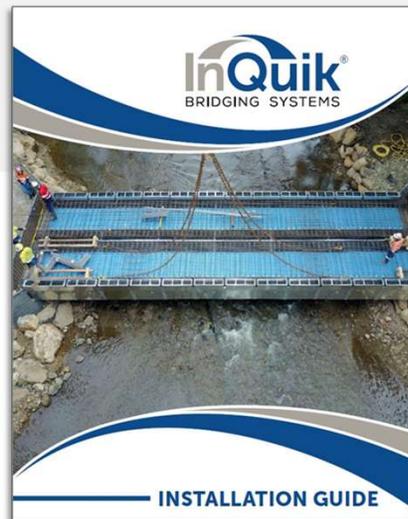
Dedicated support from concept to completion

## Design



- ❖ Collaboration for Foundation Design
- ❖ Shop Drawings & Load Rating

## Pre-construction



- ❖ Attend Pre-bid Meetings
- ❖ Training for Installation Crew

## Installation



- ❖ CMC | InQuik rep is onsite during the installation of the InQuik components

# Procurement

CMC complies with all competitive bid processes

21' in Pennsylvania



❖ Design-bid-build

40' in Wisconsin



❖ Sole source / Self perform

61' in Colorado



❖ FHWA's Construction Manager / General Contractor (CM/GC)

# Maintenance



# Compare Maintenance Requirements

Precast & Steel Bridges need maintenance. InQuik Integral Bridges are essentially maintenance free.

## Precast Bridges



Longitudinal joints need grout, which deteriorate & require continual maintenance.

## Steel-Beam Bridges



Steel beams corrode & require on-going maintenance or worse – replacement.

## InQuik Integral Bridge



Cast-in-place reinforced-concrete bridge without joints, and consistent concrete coverage protecting reinforcing steel.

# Why choose InQuik<sup>®</sup> Bridges?

- ❖ Safety No work under the structure is required, so safer for workers.
- ❖ Proven InQuik Bridges are a conventional reinforced-concrete structure.
- ❖ Quality Prefabricated components and cast-in-place monolithic concrete structure.
- ❖ Efficiency InQuik Bridges can be installed in less than a week.
- ❖ Complete Solution includes abutments, wing-walls, pier-caps & superstructure.
- ❖ Environment Not working in the waterway so less impact on the environment.
- ❖ Support From concept, thru design and construction to completion, we are there!

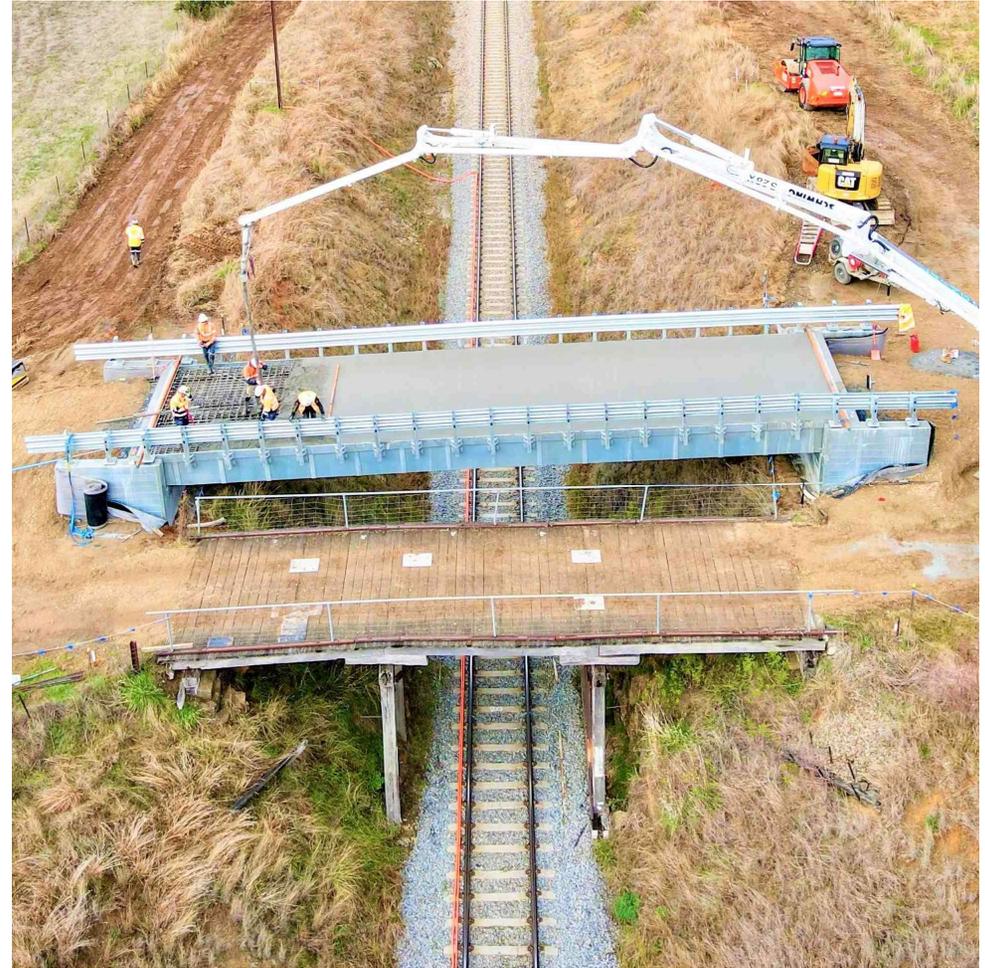
# Questions

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it's what's **inside** that counts



[CMC.COM](http://CMC.COM)

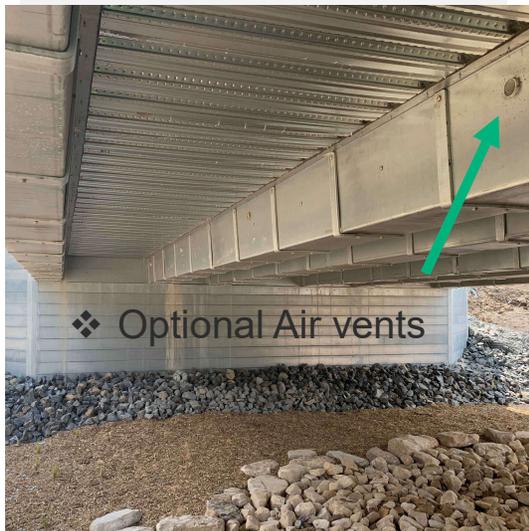
# Formwork



# Formwork / Concrete / Inspection

Formwork is non-structural so it can be removed

Underside of InQuik Bridge



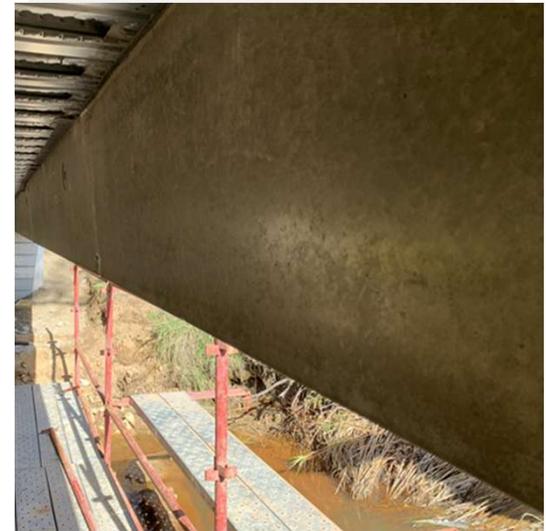
- ❖ Formwork is 1/8" corrosive-resistant steel & the straps highlight the sections which can be removed

Section of formwork removed



- ❖ Standard concrete mix design
- ❖ Local ready-mix supplier

Concrete in a beam



- ❖ No Voids & No Honeycombing
- ❖ No construction debris

# Concrete Deck Meets Formwork

Cast-in-place monolithic concrete superstructure

61' x 40' InQuik Bridge in Adams County, CO



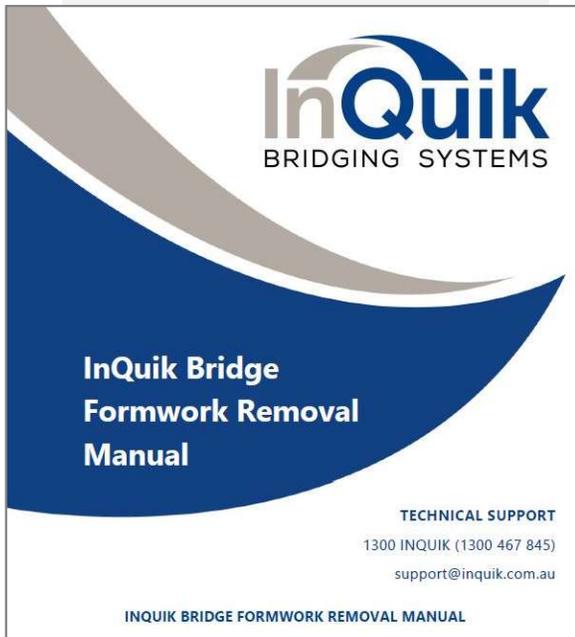
Zoomed in / Ready-mix seepage under curb formwork



# Formwork Removal Guide

Release agent can be used to assist the process

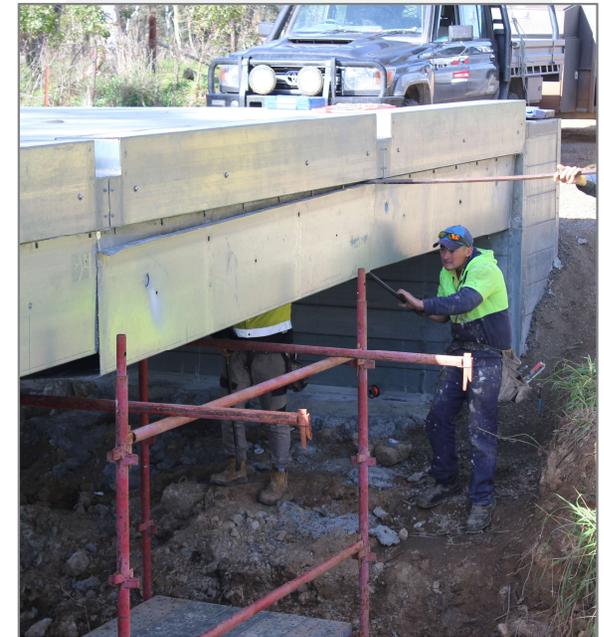
## Manual



## Unscrewing / Removing Straps



## Removing a Section of Formwork



# Options for Formwork Material

Off-the-shelf system, yet versatile to customize but without the cost

## ZAM®



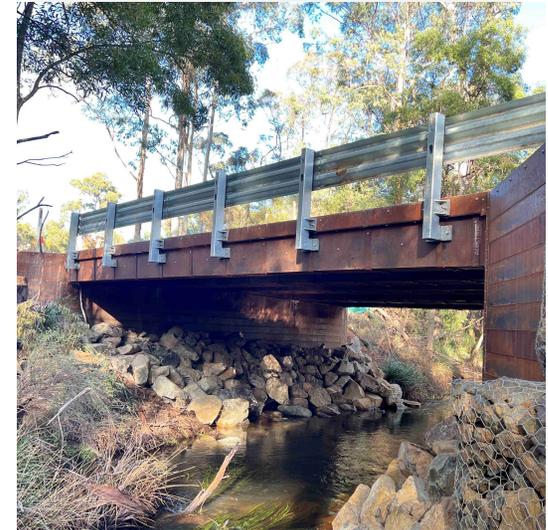
- ❖ Alloy coated steel
- ❖ 100-year design life

## Stainless Steel



- ❖ Marine environment
- ❖ Protect the underside from boat spray

## Weathering Steel



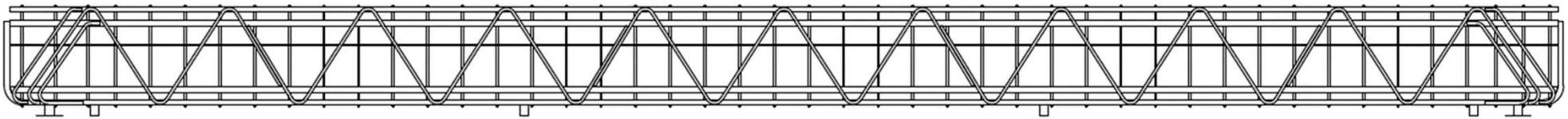
- ❖ COR-TEN steel has been used and proven for 50+ years

# Technical Presentation

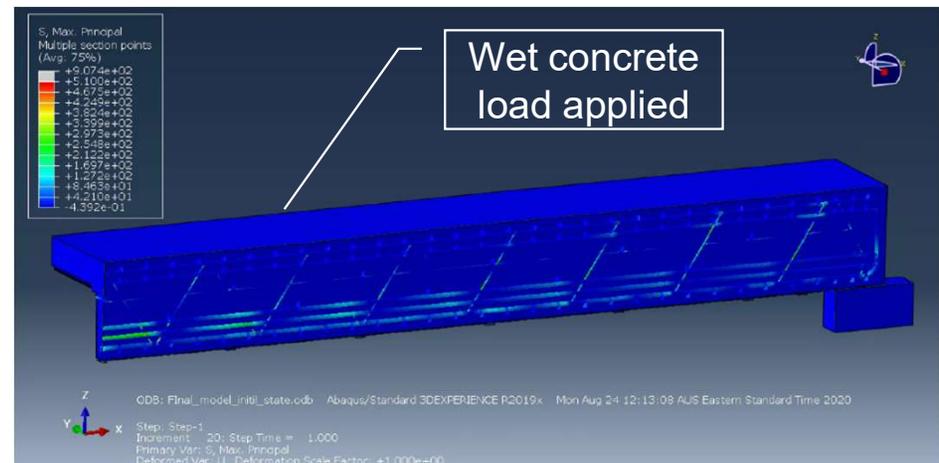
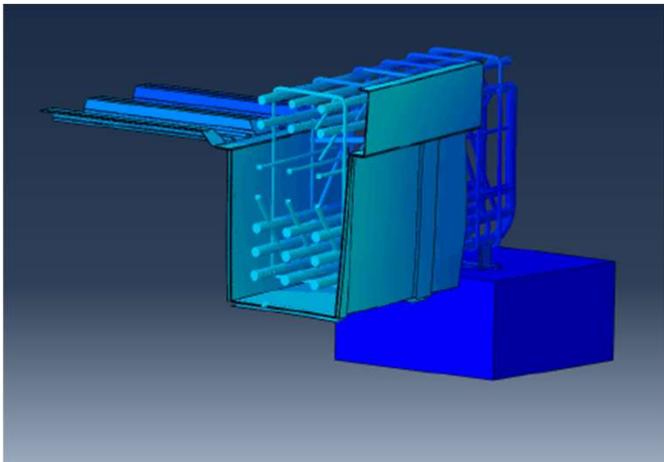


# What is the InQuik innovation?

Construction site efficiency of pre-cast + the “fit & finish” of CIP



US Patent No. 11053647



# Rail, Curb & Barrier



# Rail, Curb & Barrier

InQuik deck systems are verified for up to TL-4 rating & can comply with each state DOT requirements

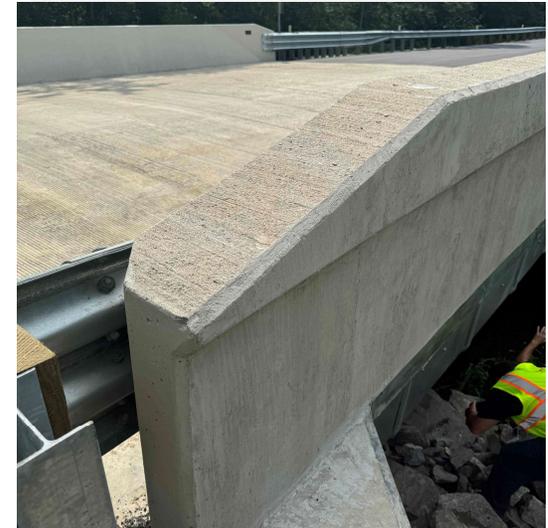
Side-mounted Rail



Concrete Curb & top-Rail



Concrete Barrier



# Sustainable & Resilient Bridge Construction

Building Smarter, Greener, and  
Stronger Infrastructure



# Why does *Sustainability* and *Resiliency* matter?

## Sustainability

Minimize environmental impact & resource use



## Resiliency

Withstand climate & disaster related stresses



## Regulation & Demand

Both aim to reduce long term costs & risk



# Principles of Sustainable Bridge Design & Construction

- Material Selection:
  - ✓ CMC is the leading processor of scrap metal with 40+ recycling facilities.
- Energy Efficient:
  - ✓ InQuik Bridges are fabricated in a controlled & efficient manufacturing facility.
- Minimal Environmental Impact:
  - ✓ Temporary bracing / falsework is not required, so no work in the waterways.
- Lifecycle & Maintenance Considerations:
  - ✓ Superior corrosive rebar and formwork materials used. Integral bridge design reduces costs.
- Modular Systems:
  - ✓ InQuik Bridges can be rapidly deployed and installed, without onerous equipment – less CO2.
- Climate Adaptability:
  - ✓ InQuik Bridges are proven to withstand significant flood events & debris flows.

# Case Study: 144th Ave Bridge | Adams County, CO

Emergency replacement within 5 months of catastrophic flood

30' length x 24' wide destroyed



63' length x 40' wide replacement



# 61' Span: Adams County, CO

Disaster replacement with 5 months

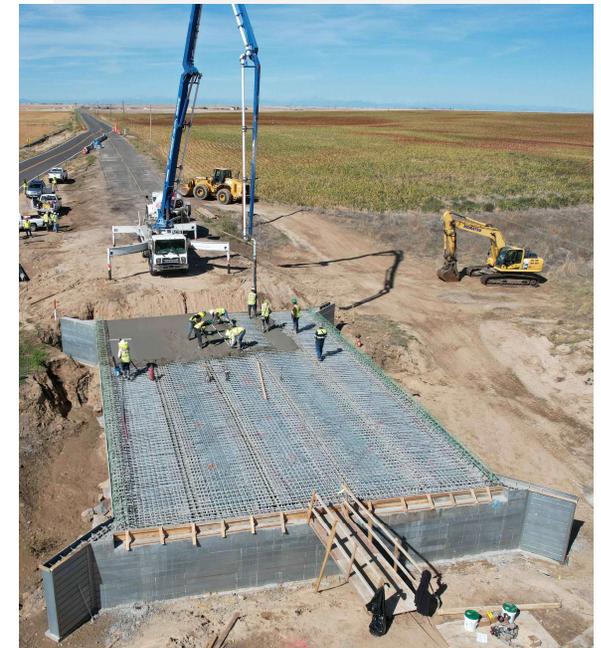
**Monday: Abutments**



**Friday: Superstructure**



**Wednesday: Ready-mix**



# Case Study: 144<sup>th</sup> Ave Bridge | Adams County, CO



## Cost Savings

- ✓ \$3m saved (Total Cost \$2m vs Budget of \$5m)
- ✓ Saved 2500+ man hours (450 vs 3,000)

## Environmental Savings

- ✓ More efficient manufacturing process in fab-shop compared to on-site construction
- ✓ Integral bridge with a 75-year design life and superior corrosive-resistant materials
- ✓ Smaller machinery required for installation
- ✓ No need to build temporary false work
- ✓ No debris, machinery, or other pollutants in the waterway

# Fabrication

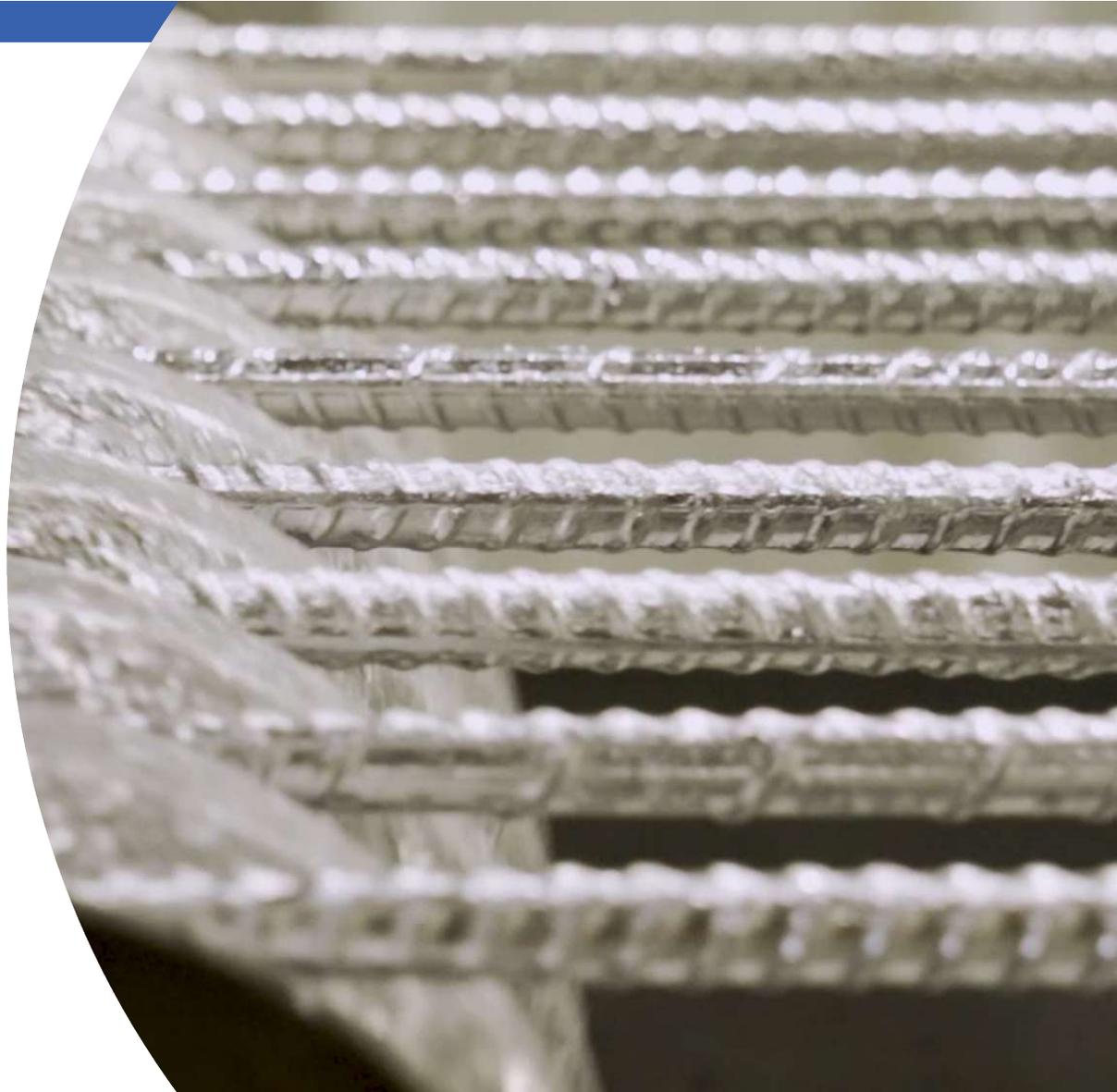


**GALVABAR®**

## ASTM A1094

Continuous Galvanized Reinforcement

- ❖ The continuous process yields consistent, formable & thicker zinc coating.
- ❖ Galvanize then fabricate.
- ❖ Bends without cracking, peeling or flaking.

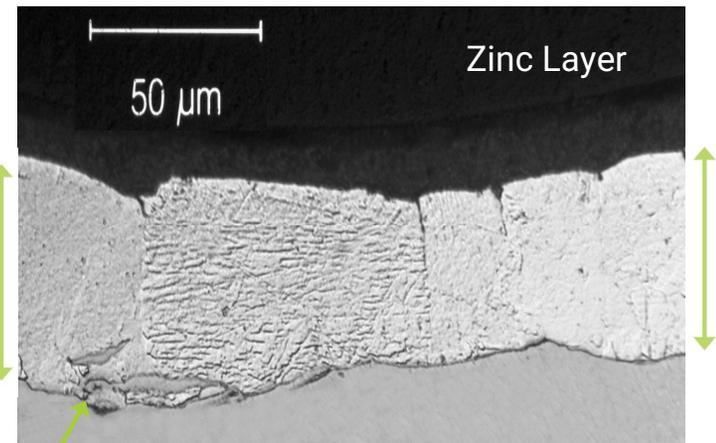
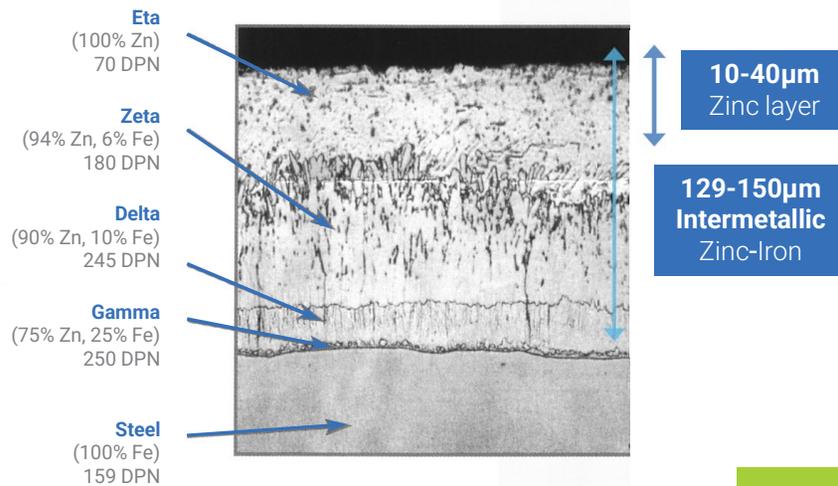


# Composition and Materials Comparison

Pure zinc coating on A1094 is thicker than HDG

Hot-Dip Galvanized - 129µm min.  
(ASTM A767)

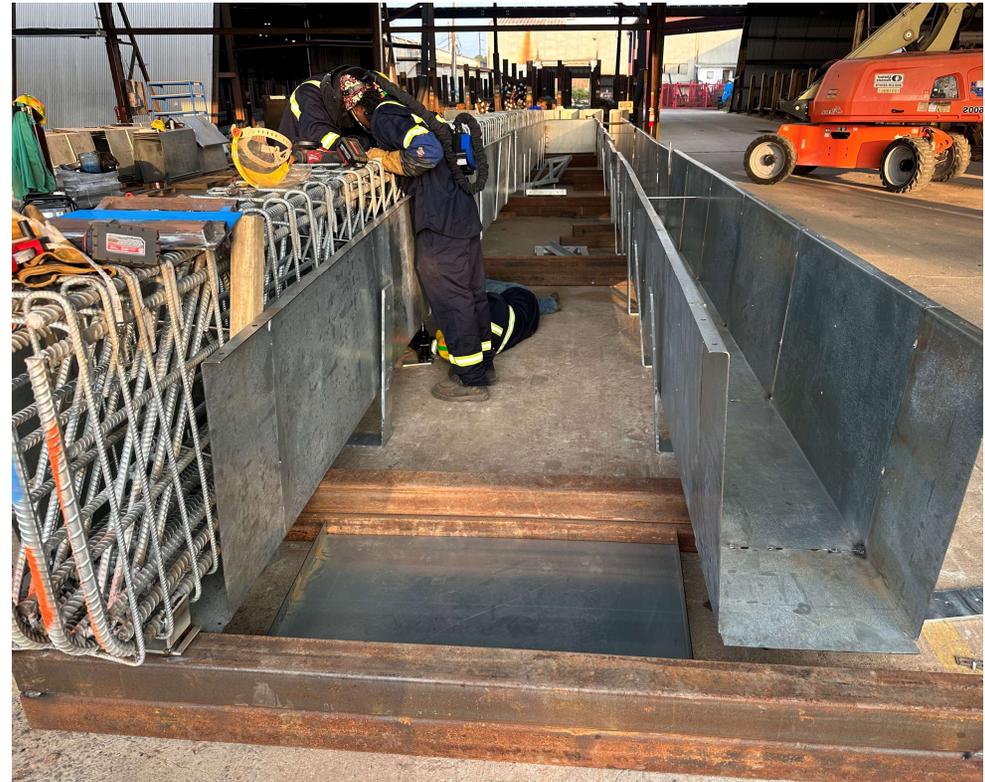
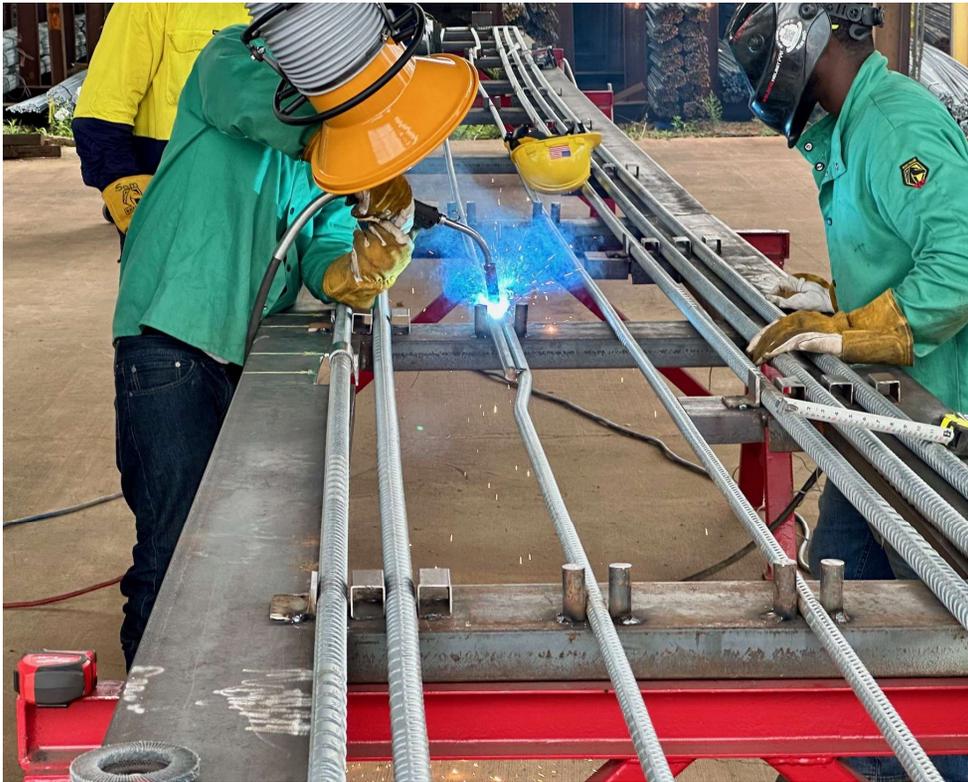
Continuously Galvanized - 50µm min.  
(ASTM A1094)



**Ternary Layer**  
 $Fe_2Al_5-XZn_x$

# Fabrication

**GALVA BAR®**



# Fabrication Facility

Lawrenceville, GA



# Designed for Disaster

Case Studies



# InQuik Bridges are Proven Disaster Resilient

One 1:100 floods over-topped the Sinclair's bridge in 2023



# Designed to withstand Disasters

Three 1:100 floods over-topped the Silo-Farm bridge in 2023

**Tuross River**

**305' Silo-Farm Bridge**



**Flood water brought debris**



**After clean-up**

