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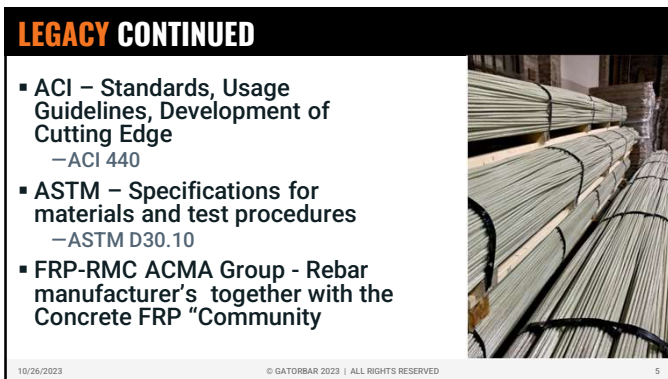
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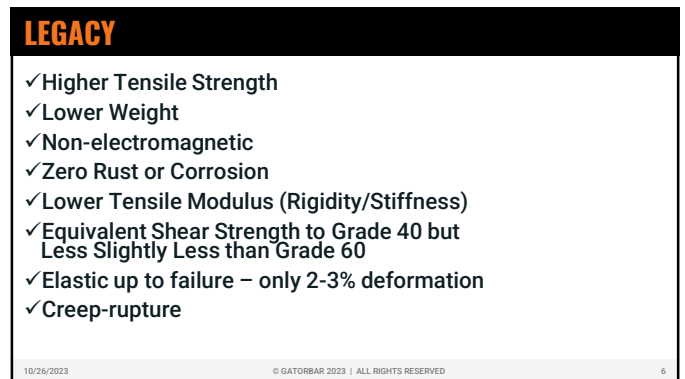
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AMERICAN MADE. START TO FINISH.

- 100% USA sourced
 - In-house equipment design and engineering
 - In-house product development
 - All raw material components USA produced
 - Global plans
- Strategic partners
 - GATORBAR**
 - materia**™ An ExxonMobil Subsidiary
 - NEG** Nippon Electric Glass

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COMMERCIAL PRODUCTS

- #3 and #4 Diameters
 - #5 Coming in 2023
- Higher Performing
 - 2X Higher Tensile Strength
 - 4X - 7X Lighter Weight
 - 30% - 45% Labor Savings
 - Zero Rust or Water Absorption
- Basic bends
 - 24" Leg 90°'s

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225,000,000 FEET IN CONCRETE

- Target Application
 - Concrete placed on the ground reinforced for shrinkage and crack control
 - Civil site work
 - Paving
 - Commercial/Industrial floors
 - Dikes, Curbs, Gutters
 - Slope paving

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GATORBAR ESR-4526

- ICC certified
- 1st to do so
- QC audits

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ICC CERTIFIED. ZERO RECALLS. ZERO FAILURES.

- ✓225,000,000' installed across North America
- ✓100's of stocking dealers
- ✓Nationwide approvals and acceptance
 - 3rd Party testing ASTM and ICC compliance

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**WANT HIGHER MARGINS?
HOLD MY BAR.**

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AMERICAN INNOVATION

- **Total Cost**
 - Material Savings
 - Labor Savings
 - Transportation/Logistics Savings
 - Improved Safety
- **Better Performance**
- **Price Stability**
- **Availability**
- **Lowest Carbon Footprint**

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LOGISTICAL ADVANTAGE

- Full semi-truck equivalent delivered with pickup truck
- Equivalent of 7 flatbeds of steel delivers on 1 semi-truck
 - Less site traffic
 - Lower fuel consumption
 - Lighter equipment
 - Safer handling
 - Prefab opportunity
 - Form, place and pour same day





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THINK DIFFERENT

- 30% - 45% labor savings typically
- Pre-tied grids
- Fewer laborers needed
- Less lost time due to injury
- Lower work-comp rates
- Better employee retention



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THINK IMPROVEMENT

What do better crack control and zero corrosion mean?

- Structure life – Studies claim 2x but time will tell
- End of Life – Crush with concrete and put down as recycled agg

Sustainability and Life Cycle

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THINK DIFFERENT

- Start small <https://gatorbar.com/projects/halls-bayou-hike-bike-trail>
- Deploy <https://gatorbar.com/projects/brays-bayou-hike-bike-trail>
- 1 day vs 7 day <https://gatorbar.com/projects/retention-pond-project>

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Frequently Asked Questions?
REINFORCEMENT'S FUTURE.

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AMERICAN GRIT

- **PPE**
 - Long sleeved shirt, glasses and mask when cutting.
- **Cutting**
 - Same as steel except for shearing. Diamond cut-off blade recommended. No fire risk.
- **Tying**
 - Same as steel.
- **Chairing**
 - Chair or dobie for best results.





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AMERICAN INGENUITY

- **Can GatorBar be driven on?**
 - Absolutely. Even chaired, they will spring back to original position without deformation.
- **Can GatorBar be bent?**
 - Sweeping bends are easily flexed and then tied into place in the field.
 - 90° x 24" x 24" bends are available from the factory and many distributors.

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DELIVERING PROJECTS DAILY
SEEKING INNOVATORS.

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COMMERCIAL PAVING

- **Commercial Steel Building → Michigan 2022**
- *Application of #4 GatorBar*
- Pre-fabricated grids for slab
- Footers and Foundations
- *Value Added*
- Composite rebar ensures consistent placement as concrete is poured
- Low weight and zero corrosion






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MDOT CURB AND GUTTER

- First project with 2016
- Transition from Contract Special Provision to FUSP
- FHWA Reviewed and Approved

GATORBAR HAS BEEN USED IN MDOT PROJECTS ACROSS MICHIGAN SINCE 2016




Sault Ste. Marie, MI Sept. 2019
Quincy Street, Hancock, MI

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INDUSTRIAL HEAVY USE SLABS

- HCTRA - 2016
- 20,000 SF of 8" concrete
- Engineer – H2b
- Contractor - Roy Jorgenson

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COMMERCIAL PAVING, SIDEWALKS, AND BUILDINGS

- Commercial site-work
- Application – 2019 project
- 450,000+ LF of #3 GatorBar
- Sidewalks, park lots, and driveways
- Engineering Firm – H2B Engineers
- Contractor – Precision Siteworks




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FAITH BRIDGE

- Value Added
- Low weight reduced labor, transportation, and equipment needs for major project




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MARCEL TOWN CENTER


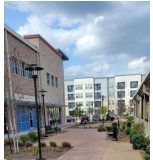


- Commercial site-work
- Application – 2018 project
- 200,000 ft2 concrete
- Sidewalks, parking lots, driveways, and building pads
- Engineering Firm – Ward, Getz & Associates
- Contractor – Cudco Solutions LLC




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MARCEL TOWN CENTER

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CAPPS VAN & TRUCK RENTAL

- Commercial site-work
- Application
- 150,000+ SF of concrete
- Sidewalks and Parking Lots
- Engineering Firm – Alpine Engineering
- Contractor – Cloyd Concrete
- Location – 9977 Gulf Fwy

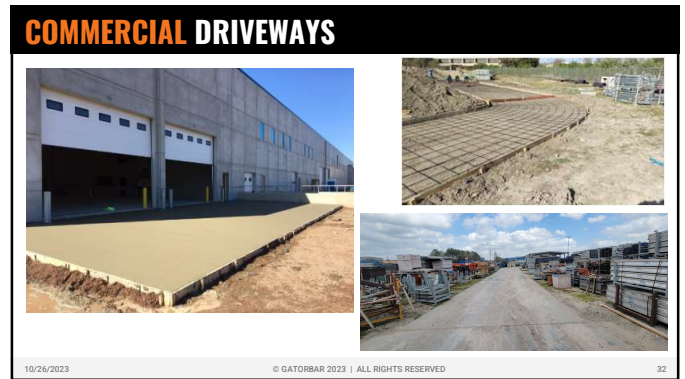



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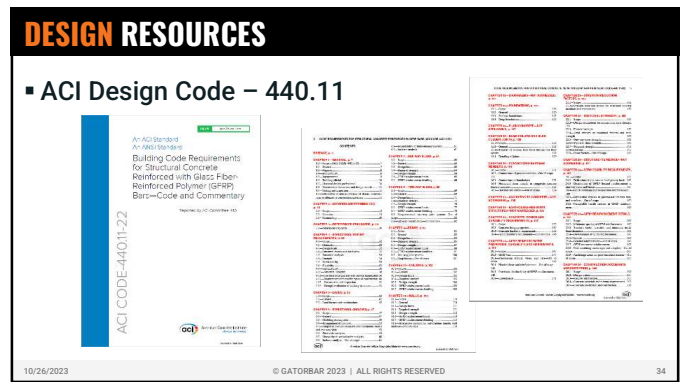
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DESIGN RESOURCES

Design Codes and Design Manual

- Design Code
 - Covers beams, one-way slabs, two-way slabs, columns walls, foundations, joints/connections, and more
- Design manual
 - NEx – ACI Center of Excellence for Nonmetallic Building Materials
 - Will be released in March of 2023
 - Will include prescriptive designs

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ASTM UPDATES – NEW DEVELOPMENTS

- WK 74691 – Specification for Solid Round Glass Fiber Reinforced Polymer Dowel Bars for Load Transfer
 - Voted this year and final version coming soon
 - Will cover large diameter highway dowels and lane ties
- ASTM 8505 Standard specification for FRP Bars
 - High modulus spec
 - Designed for structural applications

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DESIGN RESOURCES

1st Edition
**Reinforced Concrete with FRP Bars
 Mechanics and Design**
 By Antonio Nanni, Antonio De Luca, Hany Jawaheri Zadeh
 Copyright Year 2014



Antonio Nanni
Antonio De Luca
Hany Jawaheri Zadeh

- Upcoming 318 Style code
 - More design examples
- Upcoming standards for more composite rebar
 - More performance requirements coming

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DESIGN RESOURCES

FDOT Transportation Innovation Initiative: FRP – Design Innovation



Fast Facts:
 Glass Fiber Reinforced Polymer


Project Location: Florida Department of Transportation

Project Name: I-75 and I-95 Interchange

Project Description: Bridge and Deck Rehabilitation

Project Impact & Benefit: Bridge Rehabilitation

FDOT Transportation Innovation Initiative: FRP – Design Innovation



Fast Facts:
 Glass & Carbon Fiber Reinforced Polymer

Project Location: Florida Department of Transportation

Project Name: I-75 and I-95 Interchange

Project Description: Bridge Rehabilitation

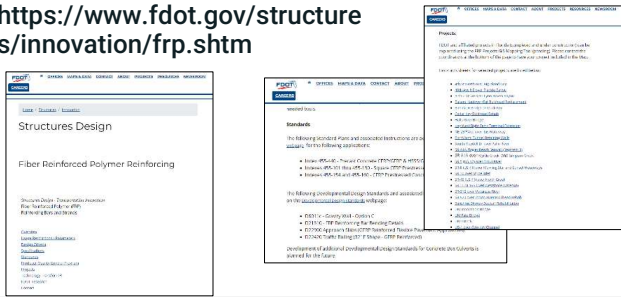
Project Impact & Benefit: Bridge Rehabilitation

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DESIGN RESOURCES

▪ <https://www.fdot.gov/structure/s/innovation/frp.shtm>



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DESIGN AND USE OF COMPOSITE REBAR IN FLATWORK

Step 1

- ACI Drag Equation, A-2b from ACI 440.1R-15

$$A_{f,sh} = \frac{\mu L w}{2(0.012 + E_f)}$$

- μ = coefficient of subgrade friction
- L = Distance between joints, ft
- w = dead weight of slab, lbs/ft²
- E_f = Elastic modulus of FRP rebar
- $A_{f,sh}$ = cross-sectional area of FRP reinforcement

Step 2

- Assumptions
 - Modulus – 6.81 Msi
 - Dead weight – 145 lbs/ft²
 - 1.5 CoF
 - 10' control joint

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DESIGN AND USE OF COMPOSITE REBAR IN FLATWORK

Step 3


- Results
 - 4" concrete – 30" ocw #3, 53" ocw #4
 - 6" concrete – 20" ocw #3, 35" ocw #4
 - 8" concrete – 15" ocw #3, 27" ocw #4

Step 4

- Review local needs, codes, expectations
- Review further calcs, for example crack width, crack spacing

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GENERAL DESIGN DIFFERENCES.

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ACI 440.11 DESIGN DIFFERENCES

- **Fire Resistance**
 - Code currently limited to structures not requiring a fire resistance rating
 - Proper detailing and use of insulation can provide fire resistances in excess of 2 hours
- **Serviceability**
 - This can control design
 - Deflections need to within acceptable limits
 - In structural applications equal reinforcement can result in larger crack width

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ACI 440.11 DESIGN DIFFERENCES

- **Design tensile strength, rupture strain, transverse reinforcement for straight bars**

$$f_{ru} = C_E f'_u \quad f_{ft} = C_E f'_b \leq 0.005 E_f$$

$$\epsilon_{fu} = \frac{e'_u}{E_f}$$
- **Moment of Inertia**

$$I_s = \frac{I_{cr}}{1 - \gamma \left(\frac{0.8 M_{cr}}{M_u} \right)^2 \left(1 - \frac{I_{cr}}{I_g} \right)} \leq I_g$$

$$\gamma = 1.72 - 0.72 \frac{0.8 M_{cr}}{M_u}$$
- **Cracking Control**

—Kb factor

$$s \leq \frac{0.032 E_f}{f_{rs} k_b} \left| - 2.5 c_c \leq 0.026 \frac{E_f}{f_{fs} k_b} \right.$$

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GENERAL ENGINEERING AND DESIGN

Our goal...

- Teach composite rebar specs and standards
- Guide the design process
- Utilize GatorBar® in projects that can benefit as an alternative to steel
- We do not provide EOR seal but we can assist

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Questions?

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GATORBAR®

GatorBar based in Ahmeek, MI...the Hinterlands of Michigan's Upper Peninsula...is the only 100% Made in the USA composite rebar using entirely 100% Made in the USA materials. All of GatorBar's manufacturing processes, custom production lines, control systems and technologies were designed and constructed from scratch using American know how, ingenuity, grit, determination and American trained engineers, designers, fabricators and service companies. GatorBar unapologetically bootstrapped itself into a product segment where no one had gone before and became what it is today...

AMERICA'S REBAR BETTER BAR.

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