

# CFES

**CARBON FIBER ENGINEERED SOLUTIONS**



**RESTORING RELIABILITY AND EXTENDING THE  
LIFE OF YOUR AGING INFRASTRUCTURE.**

- POWER GENERATION
- TRANSMISSION AND UTILITIES
- OIL AND GAS
- MANUFACTURING
- CHEMICAL
- WATER AND WASTE WATER
- MINING
- HEALTHCARE AND UNIVERSITIES

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# THE AMERICAN SOCIETY OF CIVIL ENGINEERS GAVE U.S. INFRASTRUCTURE A **D+ GRADE** ON THEIR 2017 REPORT CARD.



## CARBON FIBER ENGINEERED SOLUTIONS HAS THE ANSWER

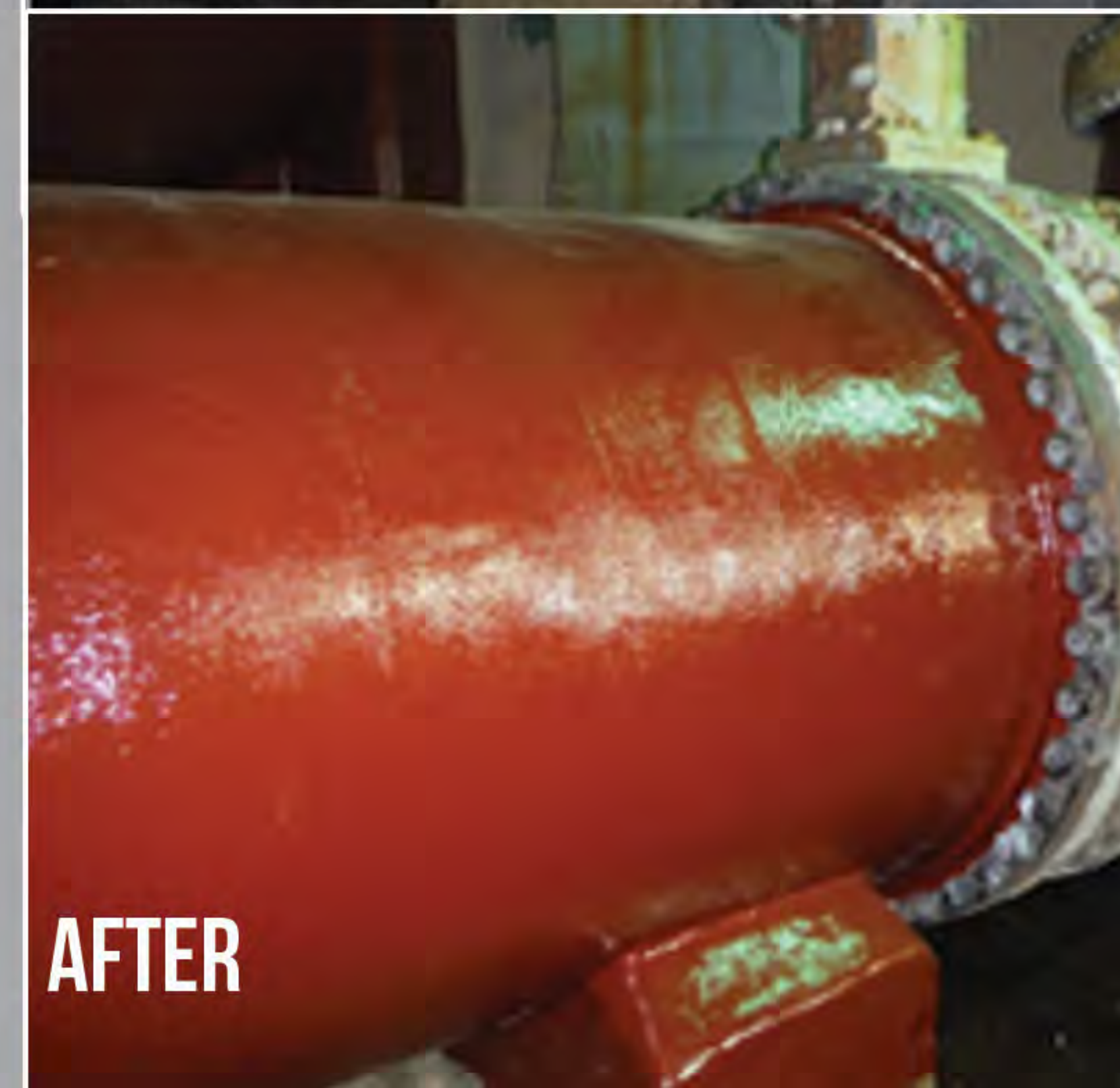
Carbon Fiber Engineered Solutions has developed a life extension and repair program for aging infrastructure. Our engineered systems are designed to be installed internally or externally above or below ground and in vertical or horizontal configurations. Using both proven and innovative techniques our professional crews install engineered solutions designed to restore system reliability and extend the life of your system.

Our engineered carbon fiber solution is the only composite carbon fiber system that meets *ASME PCC-2 Repair of Pressure Equipment and Piping* requirements and has been successfully installed on systems throughout the country.

- ✓ Our team has 50+ years of industrial carbon fiber experience.
- ✓ Our engineers have 20+ years of reliability and life cycle management experience.
- ✓ We offer a full-service solution including inspection, data analysis, repair recommendations, life cycle management, installation and quality control.
- ✓ Our Managed Area Program (MAP) has been successfully utilized for 10+ years for life cycle management and life extension.
- ✓ We offer an ASME PCC-2 compliant QC program customizable for your applications and desired oversight.
- ✓ All applicators and repair systems are certified via our ASME PCC-2 compliant QC program.
- ✓ Inspection and testing services include failure analysis, visual, traditional UT, guided wave, ACGV, 3D Optical scanning and Dynamic Response Spectroscopy.

### CARBON FIBER ENGINEERED SOLUTIONS PROVIDES RESULTS THAT IMPROVE THE RELIABILITY AND EXTEND THE LIFE OF YOUR SYSTEM. UTILIZE **OUR ENGINEERED & TESTED SOLUTIONS** TO PROTECT **YOUR ASSET**.

- Faster and more economical than traditional pipe replacement.
- Solutions installed on live systems minimizing downtime.
- Internal repairs can be done without excavation.
- No hot-work required.
- Extend the life of your system by 30+ years.
- Restore or increase design strength, stiffness or fatigue resistance to your pipe, tank or feeder.
- Our solutions can add up to 1,000 psi of strength to your existing system.
- High temperature systems available for up to 400°F
- Eliminates corrosion, erosion, impact, weather and UV concerns.
- Repairs cracks, leaks, holes, dents or thin areas.
- Encapsulates existing coatings including ACM, lead, coal tar or other mastics.
- Our uniquely designed process can be installed over previous barrel repairs, clamps, or patches and is lighter weight than traditional repairs.
- Eliminates leaks and emergency repair costs.
- Eliminates environmental remediation and reporting.



## QC PROGRAM

When you partner with CFES you can customize a QC program that fits your need. All our technicians are certified in each installation process and authorized under our standard QC program. Our standard program can be expanded based on your project specifications. You can select what options you want including hold points, specific testing and timing. CFES works with independent third-party laboratories to ensure our processes meets the highest standards and most importantly your standards.

### AVAILABLE TESTING INCLUDES:

- Ultrasonic Thickness Testing
- Tensile Strength Testing as governed by ASTM D303
- Adhesion Testing as governed by ASTM 4541
- Dynamic Response Spectroscopy
- Hardness Testing as governed by ASTM D-2583-13A

Are you redirecting capital and O&M dollars for emergency repairs and costly environmental cleanup?

Can you afford a total system replacement?

Why replace your entire system when only part of it may be in trouble?

Why not target the bad areas for replacement and preserve the rest of your capital budget for your primary business?

Carbon Fiber Engineered Solutions delivers customized life enhancement solutions, while you remain focused on your primary business. Our engineers have 20+ years of experience in reliability and life cycle management. Utilizing our Managed Area Program (MAP), they will provide you with the tools to restore reliability and stop unproductive spending.

Our MAP process relies on advanced inspection techniques and data analysis to intelligently identify and rank the severity of at-risk areas within your system. Our engineers utilize data to determine root cause, define failure populations and identify repair/replacement strategies to manage your areas before they fail. Your customized MAP will include system vulnerability analysis, identification of potential failures, proven engineered repair/replacement options, durations and installation costs. Your MAP provides you with proactive solutions to establish budgets and schedules that meet your goals.

Why guess where your next failure will occur? Why not target areas and manage your system instead of it managing you?

## MARKETS

Our vast experience and innovative solutions allow us to serve a multitude of industries including:

- Power Generation (Nuclear, Coal, Gas, Hydro, Wind, Solar)
- Transmission and Distribution
- Petrochemical and Chemical Processing Plants
- Manufacturing
- Pulp and Paper
- Mining
- Municipal Water and Wastewater
- Healthcare and Universities

## APPLICATIONS

Our products have been successfully utilized for a variety of applications including:

- Electrical feeders (above and underground)
- Piping, Penstocks, Conduits
- Tanks
- Scrubber Vessels
- Culverts
- Utility tunnels, Vaults, Manholes
- Structural Reinforcement Applications

## CAPABILITIES

Carbon Fiber Engineered Solutions can deliver any size project, in any configuration throughout the country.

- Large scale capital projects consisting of entire systems.
- Enhancement programs upgrading sections of system over multiple years.
- Spot type O&M repairs including cracks, leaks, holes, dents or thin areas.
- Internal or external repair options are available.
- Above ground or underground
- Vertical or horizontal
- Live or Locked out systems

## MANAGED AREA PROGRAM





# CFES

*CARBON FIBER ENGINEERED SOLUTIONS*

Through commitment to quality and integrity, our team provides the answer to your aging infrastructure. Using both proven and innovative methods, we deliver safe, efficient, cost effective and minimally disruptive repairs that improve the reliability and extends the life of your system.

## **CARBON FIBER ENGINEERED SOLUTIONS**

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