



BUSTING THE MYTHS ABOUT COMPOSITE REPAIRS

Matthew Green, CSNRI (Henkel), USA, considers why misconceptions persist, and how modern composite repair solutions are reshaping critical pipeline infrastructure.

Myths have power. They shape decisions, influence budgets, and often stand in the way of innovation. In the world of pipeline and infrastructure repair, myths and misconceptions about composite technology have persisted for decades. Steel sleeves have long been the default solution, while composites were dismissed as temporary fixes or niche

Figure 1. Installation of CSNRI's Atlas composite wrap.

products. But times have changed. Today, composites are engineered to outperform traditional pipeline repair methods in many scenarios, yet misconceptions remain which may be based on something other than reality.

Why do these myths stick? Because every myth begins with a kernel of truth. Over time, that truth gets twisted through miscommunication, honest mistakes, and echo chambers where familiar opinions reinforce themselves. This article aims to bust the top 10 myths about composite repairs (as determined by the many questions our teams are routinely asked), explain the realities behind them, and show why properly tested and designed composite repair solutions are critical for safe, sustainable infrastructure management.

Myth #1: composites are not approved by regulators

The belief: if it's not listed in the regulations, it can't be used.

Kernel of truth: standards do not list composites by name or may restrict their use.

The reality: standards like ASME PCC-2 and ISO 24817 do exist for organisations to successfully implement composite repair solutions into their operating and repair specifications. Numerous other standards and certification bodies also have dedicated documentation around composite repairs which can be used today. US regulations permit repairs proven by properly engineered and thoroughly tested solutions.



Figure 2. Proper training and installation techniques ensure a successful application.

Regulatory language can be intimidating, but most standards are written as minimum criteria and may not always be exhaustive lists. Government bodies rarely endorse specific products to avoid conflicts of interest. Instead, they require proof of performance. Composite systems meet these requirements when properly tested and documented. The takeaway? Approval isn't about name-dropping in a regulation, it's about proper testing, engineering know-how, and technical integrity.

Myth #2: steel is always better

The belief: steel sleeves have been used 'forever', so they must be best.

Kernel of truth: steel sleeves work well in many cases.

The reality: composites offer unique advantages over steel sleeves: no hot work, adaptability, reduced downtime, and directional strength tailored to stress loads. In addition, the technology is now at a point where many testing programmes have been successfully completed to prove their effectiveness and longevity for a wide range of defect types.

Steel sleeves have served the industry for decades, but they're not a one-size-fits-all solution (and to be fair, neither are composites). Composites, however, can excel in scenarios where steel struggles: odd geometries, restricted hot-work zones, and environments where downtime costs millions. When you factor in labour, cooling time, and post-weld inspections, composites often deliver a lower total cost of ownership.

Myth #3: composites are temporary

The belief: if it's not welded, it won't last.

Kernel of truth: composites have design lives, but so does everything else.

The reality: composite repairs can last decades when designed and installed correctly.

The word 'permanent' isn't clearly defined in most standards. Composite repairs are designed for specific service conditions, and in many cases can exceed 20, or even 50 years of life. For external corrosion or low-fatigue defects, composites are often the go-to permanent solution. Instead of asking 'Is it permanent?', ask 'Does it meet my service life requirements?'

Myth #4: composites can't handle high pressure

The belief: composites are just plastic; they can't handle high stress.

Kernel of truth: many plastics are weak, but composites aren't plastics.

The reality: with the right architecture, composites can match or exceed steel strength in certain directions, and strength may not always be the most critical property anyway.

Composite repair systems combine fibres and resins for tailored performance. In hoop stress applications, they act much like steel. Increase thickness, and you increase pressure retention capability. Leak repairs, however, may have limits, and wrapping over an active leak without containment can be a recipe for failure.

Myth #5: training isn't necessary

The belief: it's so easy, anyone can do it.

Kernel of truth: composite repairs look (and usually are) easy to apply.

The reality: human error is the number one cause of failures. Standards such as the ASME PCC-2 and ISO 24817 require hands-on training at least every three years, along with annual renewals.

Composite systems are designed for ease of use, but shortcuts lead to failures. Although they are typically easy to install, they are not necessarily simplistic in requirements. Proper training ensures installers understand the materials, resin behaviour, cure times, and hold points. Additionally, composite repair systems are unique systems – being trained to install doesn't make you a trainer, and being qualified for one composite repair system doesn't qualify you for all of them.

Myth #6: surface prep doesn't matter

The belief: clean and shiny equals good preparation.

Kernel of truth: composites can bond to imperfect surfaces.

The reality: poor surface preparation reduces adhesion, lowers pressure capability, and increases risk of failure and/or potential leaking.

Surface preparation is a critical component of composite repair. Unknown inputs lead to unknown outputs. If ideal prep isn't possible, set realistic expectations and ensure all risks are known and evaluated, but never skip the basics.

Myth #7: installation pressure doesn't matter

The belief: lowering pressure is optional.

Kernel of truth: install pressure may be irrelevant for burst conditions with certain defect types.

The reality: for heavy cyclic conditions, as well as for certain defect types, install pressure may matter a lot for composite repairs.

For burst conditions, install pressure doesn't seem to matter much when talking about some defects such as general corrosion or pitting. For cyclic fatigue, however, it's critical. Lowering pressure reduces stress range per cycle, improving fatigue performance, and ensuring the expected service life can be met.

Myth #8: composites can stop active leaks

The belief: just wrap it and forget it.

Kernel of truth: composites can contain pressure even with a through-wall defect.

The reality: wrapping over an active leak traps liquid resin, creating a leak path, which is usually developed well before the resin can complete its curing process.

Composites need a stable surface to bond and cure properly. Temporary clamps or depressurisation are essential before applying a composite repair. Many variations have been successfully implemented over the years and composites are many times the first choice of refining, industrial, and chemical plants for this very reason.

Myth #9: ambient cure means universal performance

The belief: once it's hard, it's good for everything.

Kernel of truth: a resin that hardens at room temperature isn't automatically suitable for high-temperature service.



Figure 3. CSNRI's ThermoWrap MT restores through-wall defect.

The reality: polymer chemistry matters; cure schedules and cross-link density determines the strength and thermal resistance of a composite material. But more importantly, if chemical resistance is required, it becomes one of the most important aspects of the repair and can be the determining factor in success vs failure.

Marketing sheets don't replace engineering judgment. Always match the product to the application through testing and design based on the specific scenario at hand.

Myth #10: composites can't be inspected

The belief: inspection isn't possible.

Kernel of truth: there's no mandated NDE process or tools like for welds.

The reality: composites can be inspected visually or with ultrasonic methods; standards account for imperfections with safety factors.

Top-coats protect composites from UV, chemicals, and impact. When in doubt, add protection. Redundancy is good when safety is on the line.

Why these myths persist

Echo chambers tend to reinforce existing beliefs, creating resistance to change, and while composite repairs have been around for almost four decades now, there is still little formal training or education on these materials as applied to pipeline repair. In technical fields, metallurgists often place unwavering trust in steel based on experience, and customers naturally gravitate toward what feels familiar. Breaking this cycle requires a commitment to education and a disciplined approach to inquiry, asking 'why' repeatedly until the answer is grounded in verifiable data, rigorous testing, and proven experience.

The bigger picture

Although composite repair systems are not a silver bullet, they're a powerful tool when used correctly. They extend asset life, reduce downtime, and eliminate the need for disruptive repairs, while also typically being the most cost-effective option at hand. At CSNRI, we combine proven technology with engineering expertise and field know-how to deliver safe, sustainable solutions for critical pipeline and piping infrastructure. 