



# **2013 CRUG Conference Houston, TX**

## **Pipeline Operator's Perspective**

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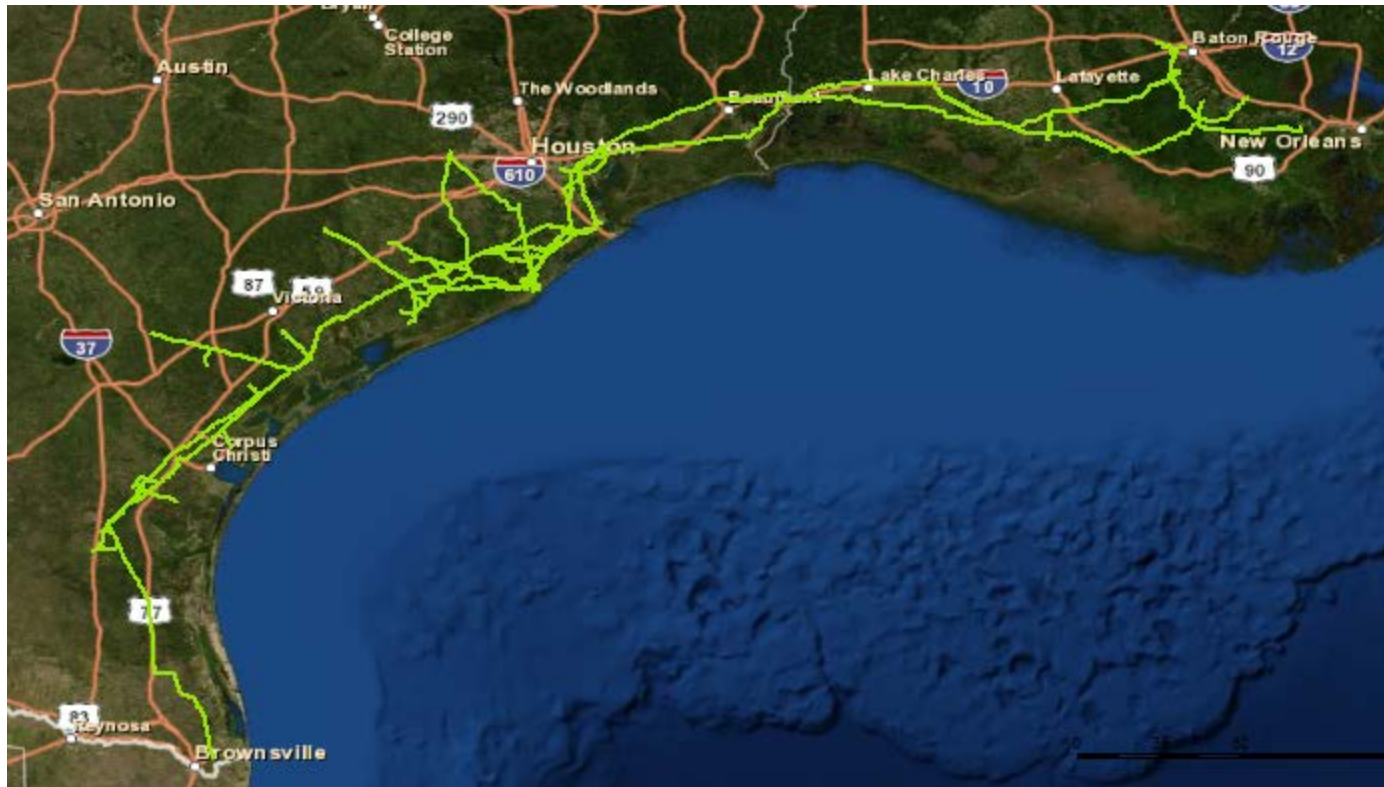
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# Dow Global Pipelines Systems

5,000 miles globally with 3,300 mile USGC

Average installation date = 1965 versus Industry = 1955



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# Operators perspective on composite repairs

## Why do operators use composite repairs?

### Cost and Ease of application

#### Operator concerns with composite repairs:

1. Qualification/Design Life of repair System
2. Qualification of composite repair applicators
3. NDT and Quality Control



## Qualification/Design Life of repair system

Operators are responsible for effectiveness of repair systems.  
PHMSA has no relationship with vendors

- ASME B31.4 Section 451.6.2.9(e) states – composites may be used for permanent repairs “**provided** that design and installation methods are proven for the intended service prior to application”
- How can vendors provide the qualification data in a clearer more consistent format?
- Operators should be requiring pressure cycle testing data to determine design life of the repair
- **Other design process analogies**  
Could other industry consensus standards be used as a guide for composite repairs? e.g. API 5L for pipeline material seems to be relative well understood and fairly consistently applied. What are the attributes of this industry spec which makes it more clear cut. An operator can order pipeline manufactured to API 5L and **it** will come stamped meeting API 5L. This is not true for ASME PCC-2.



# Qualification of composite repair applicators

- **Even well designed composite repair system have to be installed correctly**

Top tier composite suppliers have good products that are well suited for pipeline applications, however, the critical part of any composite system is the installation. In one case, there was failure of a system because the shelf life of the epoxy used had expired and no one noticed. Proper surface preparation that is essential to insure that the substrate bond will stay intact to prevent water ingress and subsequent corrosion is always a concern.

- **Options for composite repair installation**

- a. Operator employees trained by vendors on each composite repair system
- b. Operator employees trained by the operator on each composite repair system
- c. Contractors trained by vendors on each composite repair system
- d. Vendor certified contractors for installation
- e. Vendor employee crews doing composite repair installation

There are advantages and disadvantages of each method – quality, cost, scheduling



# Qualification of composite repair applicators

- **Consistency of installation for composite repair systems?**

**Could other industry consensus standards be used a qualified installer guide for composite repairs? For example, API 1104 pipeline welding standard has requirements to meet to be a qualified welder. It also has time limits before the welder has to be re-qualified.**

**Is there a standard that says what a composite repair installer has to do to show competence? How long should this qualification remain valid? It seems the typical process is for a vendor to show the installer how to apply the system. This maybe the only method since there is no NDT of composite repairs. Should we use DT?**



# NDT and Quality Control

- **NDT would be a dream come true**

The pipeline industry puts a lot of trust in NDT systems. Radiography of welds, spark testing of coatings, and hydrotesting just to name a few. These are “if all else fails” hold points that will point out serious errors. Development of an effective NDT process for composite repairs would allow the industry to have an final check of the repair system.

- **Until NDT, we have Quality Control**

The best we have at this point is quality control of the installation. e.g. critical procedures, checklists, 2<sup>nd</sup> party inspections, etc. for material expirations, surface preparation, material application, curing, coating, backfilling, and documentation. Does the industry have a best practice for managing quality control of a composite repair installation?





## High Stakes Industry – Final Thought

- **Catastrophic failure of a composite repair in the field has huge implications**

**On the positive side, we cannot think of a single composite failure in the pipeline industry that was due to a composite not being properly designed. The only failures we know about are associated with installation issues, such as the one that mentioned above.**

**As we all know, the first time that a composite repair fails and causes a reportable release, PHMSA will be looking very closely at all of the things that we have mentioned above and it will have a significant impact to the pipeline industry. All operators will feel the impact of such a failure. We need to work together to be sure it never happens.**





# Thank you

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