

Session 5

Defect Remediation/Repair/Mitigation

Leader: Dave McNeill
Leader: Gary Vervake
Facilitator: Val Bernardi

Session 5 – Defect Remediation/Repair/Mitigation

Presenters:

- Defect Remediation/Repair/Mitigation Research E.Komiskey
- Offshore Pipelines – Hurricanes in Gulf Coast M. Gagliano
- Liquids and Gas Transmission Lines D.McNeill, G.Verva
- Gas Distribution Plastic Pipe Repair A.Hamersmidt

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Attendance Breakdown

Approximate total attendance	25 persons
Federal Regulators	3 persons
State Regulators	0 persons
International Regulators	0 persons
Pipeline Industry	7 persons
Standard Organizations	0 persons
Researchers	7 persons
Academics	0 persons

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Top 3 Identified R&D Gaps

Gap #1 – Need for alternative repair methods for difficult to access areas (I.e. river and road crossings, high population density areas, environmentally sensitive, class location for natural gas pipelines) (1 - New or Improved Technology)

Gap #2 – Lack of knowledge as to why some offshore pipelines moved/failed and others did not during recent hurricanes. (3 - Creation and Dissemination of General Knowledge)

Gap #3 – Knowledge deficits regarding repair techniques/technologies from other industries...how to learn from others to accelerate transfer. (3 - Creation and Dissemination of General Knowledge)

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Associated Details (Gap #1)

Need for alternative repair methods for difficult to access areas (I.e. river and road crossings, high population density areas, environmentally sensitive, class location for natural gas pipelines)

What pipeline type(s) does the technology target?

All of the pipeline types

What operating environment(s) would the technology operate?

All of the operating environments

What are any functionality and or performance requirements?

To restore pipeline to original operating conditions

What road blocks or barriers prevent the technology deployment?

Inspectability, regulations, compatibility with product and pipeline, durability, installation techniques

What are anticipated targets or timeframes to complete this research?

ST (conceptual) LT (solution)

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Associated Details (Gap #2)

Lack of knowledge as to why some offshore pipelines moved/failed and others did not during recent hurricanes.

What pipeline type(s) does the new knowledge target?

Liquid and Gas Transmission (metallic and non metallic)

What operating environment(s) does the new knowledge target?

Offshore

What technical details are necessary and recommended?

Operators interviews, design standard reviews, interview MMS, know hydrodynamic forces via Measurements, interview experts

Can any targets or timeframes be identified to complete this research?

Short Term (1-3)

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Associated Details (Gap #3)

Knowledge deficits regarding repair techniques/technologies from other industries...how to learn from others to accelerate transfer

What pipeline type(s) does the new knowledge target?

All of the pipeline types

What operating environment(s) does the new knowledge target?

All of the operating environments

What technical details are necessary and recommended?

Identify repair techniques used by other industries and evaluate applicability to pipeline industry (ST). Adapt techniques for pipeline usage (LT)

Can any targets or timeframes be identified to complete this research?

ST (identify) LT (transfer)

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BACKUP

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Additional Identified Gaps

ONSHORE

- 1-2 Reliabilities of tools for “high strength steel” / limitations of repairs procedures 6
- 1 Restoring capacity through HCA...operate at lower pressure...reinforcing linings...restore design factors 6
- 1 Less expensive ways to repair...(stents for pipeline...non invasive)...river crossing...liners...Expandable tubular for hard to access areas (cast iron pipes/pipe busting) .. Onshore HCA areas...differences on repair tech – economics 9
- 1 SCC repair techniques...mitigate...repair 14 to 40% with existing tech....<15% recoat...>15% composite sleeve to reduce/eliminate growth...leverage Australia R&D 4
- 1 Self healing pipelines...IE CP...tech to sound alarm...tech to slow growth
- 2 Alternatives to hydro testing for new build pipelines (onshore and offshore)...(water in gas pipelines)...(unpigable) 2
- 2 Cracks with dents...what to repair 1
- 2 Pressure restrictions as a management tool/not allowed in HCA
- 3 Internal corrosion...understanding long term issues to mitigate (better understanding of the cause)
- 3 How to introduce new tech...Tech transfer...are operators aware of all the options they have...proprietary research 1
- 3 Crack remediation with hydro testing...how does hydro testing change crack detection...does the arrest SCC growth 1
- 3 How affective is CP on mitigating SCC
- ? Cracks at stress concentration (high strength steel)
- ? Strain criteria to deal with pipelines repair (ie movements)

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Additional Identified Gaps

OFFSHORE

- 1 Trend to more deep water pipe – repair methods...R&D applications to deep water for repair methods
- 2 GAPS in preventive maintenance for shallow lines
- 2 Steel pipe vs flexible pipes...RTP (reinforced thermo plastic)...no DOT standard but used in Brazil 4
- 2 Pipelines not buried (>200ft)...how to protect 1
- 2 3rd party damage...anchor drag 2
- 3 R&D why did some pipelines move/fail and not others?...what are the factors? 8
- 3 Shallow water repairs...difficulty with permits...alternatives 5

DISTRIBUTION

- 1 Tracer wire failure (plastic pipes) ...what to do
- 1 Plastic liners 5
- 1 New plastic materials 5
- 2 New Repair methods / standards / protocols / process....industry 7
- 3 How to assess repairs for different geometries...etc 1

OTHER

- 1 Advanced materials / new imaging technologies...leverage other programs 5
- 1 Emergency response and repair...rapidly stabilizing and repairing (blowing gas)...strategies to contain 4
- 3 Access to site...investigations
- 3 Repair techniques tech transfer from other industries...how to share info 13
- 3 Lessons learned made available / published 3

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Parking Lot

OFFSHORE

Methods to substantiate inspection intervals

? Hurricane response...sharing resources...vessels...additional safety measures...automatic shut offs

Leak detection

3 Affects of global warming...storm assumptions?

1 Tech that can be adapted for divers to assess damages (vs leak and basic visual)

2 Non piggable – what to do to provide same assurance for offshore

ONSHORE

1 Gas pipelines ops pressure increased to 80%...

1 Adequate tools to capture damage data...ticking time bomb

3 How to integrate CP and ILI to determine susceptible areas

? Can tools tell us what is injurious ...are “all cracks created equal”

OTHER

? Aging work force / tech transfer...industry R&D experts