

# Issues – Construction, Materials, Welding

1. Pipeline materials resistant to SCC
2. Flaw Tolerance /Determine Critical Flaw Size – Fracture Initiation Models for High Strength Steels
3. Local Buckling (High Strength Steel)
4. Quality Control of Materials
5. Keeping Costs Down while meeting reqm'ts of new materials
6. Yield Strength vs Tensile Strength. Uniform Elongation
7. Standardized Tensile Tests applicable to High Strength pipe
8. Non-destructive equipment for testing plastic pipe joining
9. X-rays – Improved imaging and interpretation of film (films or other automated processes, ultrasonics)
10. Field Construction practices including welding consumables
11. How to inspect CRA clad pipe
12. Large/thick walled plastic – testing with different temperatures instead of just room temperature. Fracture susceptibility.
13. Standards and Tests
14. Composite materials, and composite over steel for a safer pipe (leak before rupture)
15. Education and Communication to Public, Press and State regulators regarding new sitings

# Issues – Construction, Materials, Welding (Cont.)

---

16. Focus on Safety by examining all new projects and informing the public
17. Better Data Collection for Communication of Risk to the Public
18. Deep water technology, light weight materials for pipe systems
19. Design procedures for SCR systems
20. Consideration of pipelines as an integrated engineering system
21. Hydrogen Economy
22. Cross-Industry R&D Information sharing (intra-company – offshore vs onshore & liquid vs gas)
23. Welding Issues in high strength steel
24. Materials that are resistant to outside force
25. CP in high strength steel
26. Hydrogen embrittlement in high strength pipe
27. Mechanical properties of heat affected zone & how to measure
28. Residual magnetization from pipe making and coatings (affects ILI)
29. Alternative-Based Design
30. Trenching in Artic Regions
31. External Loads – Frost Heave

# Issues – Construction, Materials, Welding (Cont.)

---

**32. Restoration, one-step pavement, etc.**

**33. Alternatives to Pressure Testing (when water not available or cold, Water Disposal Issues)**

**34. Locating Plastic Pipe without Tracer Wire**

**35. Issues of re-grind material in extrusions in plastic pipe**

**36. HDD in perma frost or protected marsh, protected inland areas**

# New Opportunities

---

- **Research in Mechanical Properties and Performance of High Strength Steels and Welds**
- **Research on High Pressure Large Diameter Plastic Pipe (Joining and non-uniform Materials)**
- **Research on Alternative Design Methodology**
- **Fraction Mechanics of Composites (Performance, Inspection)**
- **Technology Assessment of high strength steel and composites**
- **Construction and operations of composites (field bending or Alternatives, joining, CP, Inspection, Repair, Degradation over time)**
- **Technology Assessment of SCC**
- **Crack Growth Model for SCC and Remediation**
- **HHP Service, Design, Fabrication, Testing**

## **New Opportunities (Continued)**

---

- **NDT for Welds and Inspection**
- **NDT for inspection of Plastic Pipe Fusions**
- **Evaluation of High Productivity Welding Technologies**
- **High Pressure Liners for cross-country (Assess Off-Shore Approaches)**
- **Innovative Approaches in Pipe Joining**
- **New Approaches for Cheaper, Faster, Better Construction and Fabrication of Pipe**
- **New Techniques to lessen Costs of Wetland Crossings and Erosion during Construction**
- **New Methods of Transporting LNG and CNG other than Pipelines (Off-Shore Regasification)**
- **New Approaches to Communicating Risk (Communication with Public and Local Officials) Proactive vs Reactive**
- **New Approaches to Communicating the Value and Merit of Pipeline Systems to Local and Regional officials and public**

## **New Opportunities (Continued)**

---

- **Approaches to Dealing with Encroachment Issues**
- **Cross-Industry Research regarding Materials**