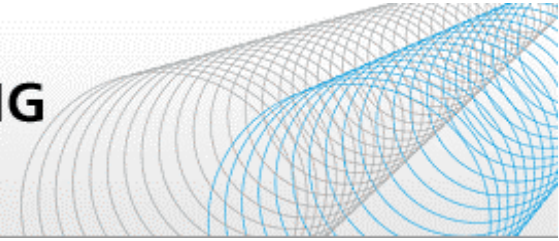




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# 17<sup>th</sup> BIENNIAL JOINT TECHNICAL MEETING ON PIPELINE RESEARCH WORKSHOP 2 – Pipe materials

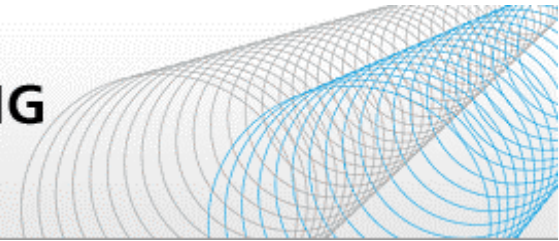


- **Group Topic:** *Pipe Materials*
- **Co-Chairs:** David Horsley, Hans-Georg Hillenbrand
- **No of Attendees:** about 25
- **Top 3 R&D Gaps:**
  - **1 Fracture Arrest Prediction**
  - **2 Deep Water Pipes**
  - **3 Strain Based Design**
- **Other R&D needs, gaps, issues and opportunities:**
  - **H2 Pipelines**
  - **CO2 Pipelines**
  - **Strain Aging Phenomena**
  - **HAZ Testing**
  - **Arctic Pipes**
  - **DWT Testing**
  - **HIC Acceptance Criteria**
  - **Database of Material Properties**

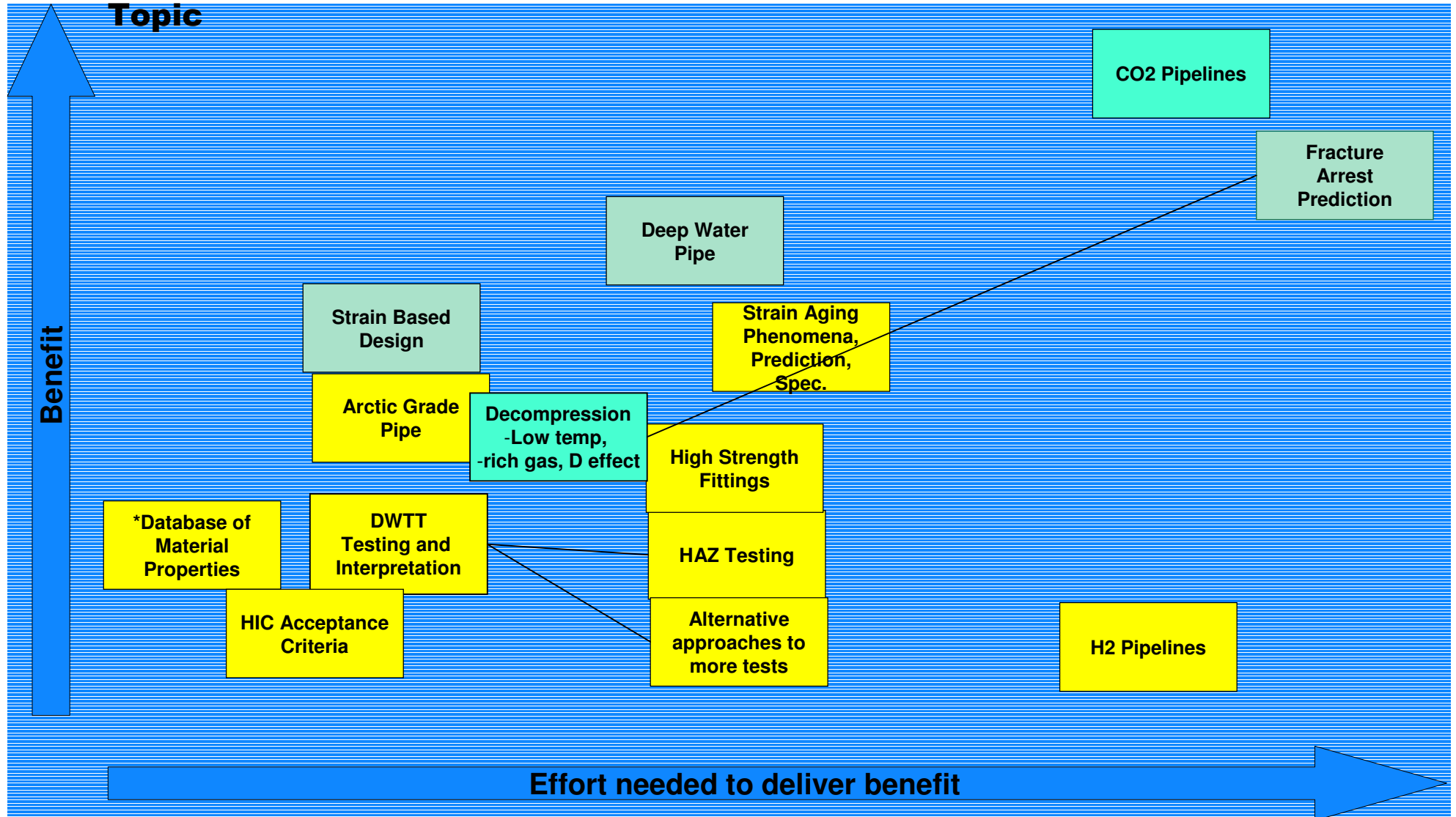


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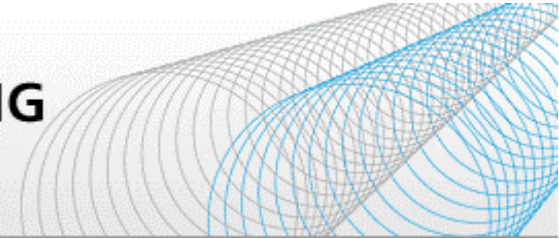
## **RANKING OF NEEDS/GAPS, BENEFITS AND EFFORT**





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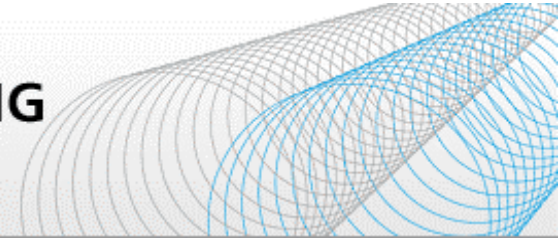


- R&D Need/Gap No 1: Fracture Arrest Prediction
  - *Develop fracture arrest prediction methodologies to accommodate high-toughness, high strength materials.*
- Current status of technology:
  - *Models don't fit current materials or account for microstructure, texture, stress-strain behaviour*
  - *Diameter effects on decompression velocity are uncertain*
  - *Decompression model not validated for low temps, high pressures, or for alternate products (CO<sub>2</sub>, N<sub>2</sub>, etc.)*
- Deliverables and tasks required to address the need/gap:
  - *Understand phenomena, develop solution, develop "resistance" parameter*
- Who benefits?
  - *Onshore operators, Pipe makers, Standards bodies, Public (eg safety, reliability)?*



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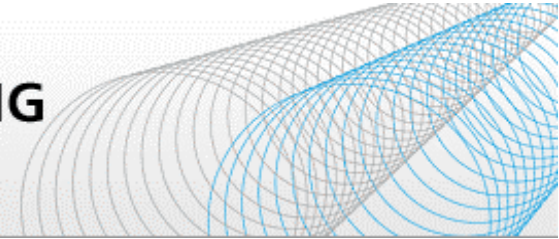


- R&D Need/Gap No 2: Deep Water Pipe
  - *Materials for Deep Water Pipelines*
- Current status of technology:
  - *Codes limit states poorly understood*
  - *Effect of low temperature strain aging*
  - *Cumulative strains from installation*
- Deliverables and tasks required to address the need/gap:
  - *Review of methodology for selecting materials*
    - *WT*
    - *Coating/aging vs. Collapse capacity*
- Who benefits?
  - *Offshore operators, Pipe makers, Standards bodies*



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- R&D Need/Gap No 3: Strain Based Design
  - *Pipe for strain based design application*
- Current status of technology: *what do we know already?*
  - *Capacity depends on strength (stress-strain), toughness, geometry*
  - *Properties change due to aging*
  - *Pipe properties affect strain demand*
  - *Pipe requirements depend on design requirements – project specific*
- Deliverables and tasks required to address the need/gap:
  - *How to define pipe properties required for high deformability*
  - *How to ensure properties remain for life of pipeline*
  - *Linked to "Design" requirements – need to understand factors affecting limit states prior to developing pipe*
  - *PRCI currently working on tensile, and demand. Compressive LS needs work.*
  - *Pipemakers to lead.*
- Who benefits?
  - *Onshore/offshore operators, Pipemakers, standards bodies, Public (eg safety, reliability)?*