

Defining limits of applicability / Guidance for choosing the appropriate model

- Objective: Define the range of applicability within which the screening methods could be utilized
- Parameters considered could include
 - Skew angle from pipe axis
 - Depth / strain
 - OD/t
 - SMYS / % SMYS
 - Toughness / Microstructure
 - Level of corrosion
 - Presence of and type of secondary associated features
 - Pressure range
- The applicability range should not allow extrapolation outside of the modelling parameters
- ~60K / 1 yr

Burst pressure of metal loss associated with deep dents

- As per 1183, for dents less than 6% in depth, failure pressure for corrosion, if associated, needs to be calculated separately and fatigue life should account for the corrosion present using the corrosion multiplier.
- Scenarios not covered include
 - Dents deeper than 6%
 - How do we establish FPR in accordance with 192.714 (d)(2)(iv)
 - Corrosion greater than 30%
 - Can B31G or similar methods be used to calculate FPR for the corrosion?
 - Since corrosion multiplication factors are only available through 30%, how do we account for deeper corrosion when estimating fatigue life, if at all..
- 300K / 2 yr

Development / Validation of Strain Criteria

ASME / CFR192.712 ??

- Various strain calculation methods exist in the industry, both analytical and numerical. Standards such as ASME B31.8 has revised the equations for calculating geometric strain, but not the corresponding acceptance criteria. Furthermore, the tenet behind strain based assessment seems to be that once critical strain is reached, a crack may develop in the dent which can be considered a limit state.
 - Inadequate evidence is available to demonstrate the validation of the strain criteria, especially considering that fatigue is the primary failure mode for dents
 - Limited evidence exists demonstrating the initiation of cracks due to indentation strain in plain dents
 - MD-5-2 purportedly identified some potential issues and challenges, further confounding the issue
 - Extensive work may be required to reach a consensus on strain based methods
- 400K / 2 yr

Gaps in Approach

- Multi-peak Dents
 - Current definition in 1183 seems arbitrary
 - More rigorous analysis and definition needed
 - How can they be assessed?
- Dents in proximity of other deformations and bends
 - How does the presence of bends or axial strain affect dents?
 - Assessment method?
- 250k / 2 yr

Failure pressure calculation

- It is generally accepted that presence of a plain dent has minimal impact on the pressure carrying capacity of pipe.
- However, the same may not be true when secondary features exist
- When is it necessary to calculate the burst pressure of a dent feature?
- When secondary features are present, when does the pressure carrying capacity reduce and how should one calculate it.
- What are the scenarios where failure pressure estimation may not be practical at all.
- 80k / 1 yr