Acceptability Criteria

• The acceptability of dents is currently based on the depth of the dent in comparison to the pipe OD
• For a plain dent the allowable dent depth is 6% OD
• For a dent on a seam weld or girth weld, the allowable dent depth is 2% OD
Assessment Methods

- For those dents that are not accepted based on depth criteria, ASME B31.8 recommends strain based acceptability criteria.
- However, for dents on welds, the weld quality and ductility must be assured prior to implementing strain based acceptability criteria.
- For vintage pipelines, original weld inspection records are not readily available, thus strain analysis is not always possible.

![Fig. R1 Method for Estimating Strain In Dents](TransCanada)
Caliper Results

• On a recent 100 mile long caliper run on the ANR system, 12 dents on welds were found were larger than 2% depth
• The cost of repair for these dents is > $1M
• Over the past 10 years, the 36,000 mile TransCanada system has not had any in-service leaks or ruptures due to plain dents on welds
Topics for Discussion

- The origins of the current depth based criteria for dents on welds is conservative
- Much of the previous research assesses the fatigue life of dents on welds with large pressure fluctuations
- The pressure in a gas transmission line is relatively stable
- Research evaluating the fatigue life of dents > 2% depth, under gas transmission operating conditions, may be worthwhile
Additional Topics for Discussion

- When using strain based acceptance criteria, the limiting strain is 6% for plain dents, and 4% strain for dents on welds.
- The origins of these strain limits are based on extremely conservative judgments from tests of dents under cyclic loading.
- It may be worthwhile to study the allowable strain limits for dents, under gas transmission line loading conditions, and to evaluate these limits based on a deterministic approach.
Thank You