# Development of New Pipeline Integrity and Failure Assessment Tool

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Not all pipelines are created equal. Pipelines have different characteristics, and would therefore show different levels of integrity and fail differently. The failure mode and cause of a given pipeline depends on several factors including the design, operating and environmental parameters. A new tool was developed to evaluate pipeline integrity and assess its potential failure mode, patterns, and rate based on the critical pipeline parameters. These parameters include the pipeline material of construction, wall thickness, operating pressure, service material, backfill medium/material, age, coating, pipeline size and other relevant parameters.

The new tool was developed using pipeline data collected from the European Union, UK, and USA for pipeline failures over four decades. Failure models and patterns were analyzed, and over 60,000 failure modes/pattern combination were identified. The tool predicts the failure mode and patterns in terms of failure rate distribution by size of leak and its causes. It also shows the relative Pipeline Risk Index, defined as the pipeline's potential failure rate relative to average pipeline population in the industry within similar pipeline categories. Ignition probabilities for pipeline failures were also analyzed and are predicted by this tool for each pipeline leak depending on the leak characteristics.