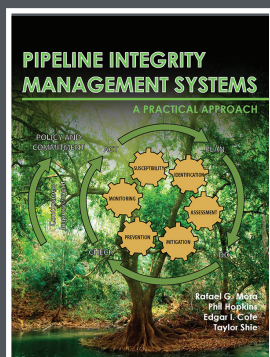




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# PIPELINE INTEGRITY MANAGEMENT SYSTEMS: A Practical Approach

By **Rafael G. Mora, Phil Hopkins, Edgar I. Cote, Taylor Shie**

The key for success of Pipeline Integrity Management resides in the dynamic linkage and interaction between a management system (MS) and an Integrity Management Program (IMP), known as *Pipeline Integrity Management System (PIMS)*, for continuously improving pipeline integrity and sustaining risk reduction.

This approach enables organizations to obtain adequacy/completeness, timely implementation, and effectiveness to achieve integrity goals, objectives, and targets towards the safety of employees and the public, the protection of the environment, and maintaining reliable service.

The contents of this book follow the PIMS process having each applicable chapter use a PLAN-DO-CHECK-ACT (PDCA) process, multiple examples from authors' experiences, and several graphs and tables. This is intended to make it easier for the reader to become the *Hero of the Pipeline Integrity Story*.

Here are some key descriptors for each chapter:

**Chapter 1** *Pipeline Integrity Management (IM) History and Framework*: purpose and definitions, first transmission pipelines, IM eras, worldwide regulatory approaches, industry and research entities.

**Chapter 2** *Engineering Concepts for Pipeline Integrity*: the essential multi-disciplinary fundamentals in the design and construction of pipelines.

**Chapter 3** *Elements of a PIMS* linking all Management System (MS) and Integrity Management Program (IMP) elements for an overarching and integrated view of PIMS.

**Chapter 4** *Integrity Hazard and Threat Susceptibility and Assessment*: hazards and threats, management cycle, process using PDCA, event tree, fault tree, what if, HAZOP and FMEA and Probability of Exceedance (POE) for ILI anomalies.

**Chapter 5** *Consequence Assessment*: categories, process using PDCA, fluid discharge and dispersion analysis, consequence classification, validation, and results content and format.

**Chapter 6** *Risk Assessment for Pipelines*: risk management process, risk assessment types, process using PDCA including risk analysis, estimation, evaluation and sensitivity analysis.



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**Chapter 7** *Pipeline Integrity Assessment Method Selection and Planning:* selection process and criteria, use of independent quality assurance and control reviewers, planning process and lessons learned.

**Chapter 8** *In-Line Inspection:* selection of technology, process using PDCA, planning, implementation, verification and report review and response, continuous improvement and technologies for non-piggable pipelines.

**Chapter 9** *Pressure Testing for Pipelines:* process using PDCA, historical evolution, mill and field testing, integrity verification, strength test, leak test, spike test, limitations, reversals and retest.

**Chapter 10** *Direct Assessment:* process using PDCA, four-step process for external corrosion, internal corrosion (i.e. dry and wet gas, liquid petroleum) and stress corrosion cracking.

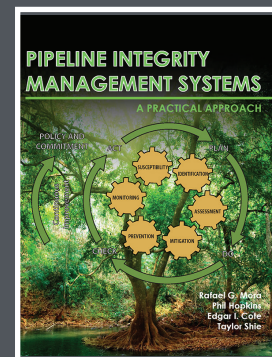
**Chapter 11** *Prevention, Mitigation, and Monitoring Measures for Pipelines:* concepts, relationships and differences, measures by integrity threat and special measures driven by threats and consequences.

**Chapter 12** *Fitness-For-Service Assessment for Pipelines:* process using PDCA, fracture mechanics fundamentals, assessment for fatigue, corrosion, cracks, mechanical damage, competence and five (5) rules of Defect Assessment.

**Chapter 13** *Conformance and Compliance Verification and Action Plans:* process using PDCA, regulatory and internal oversight approaches, program elements, verification methods, regulatory enforcement process and tools, corrective and preventative action plans and incident investigation.

**Chapter 14** *PIMS Management Review: Performance Assessment and KPIs,* process using PDCA, management considerations, integrity KPIs where to look for, their approaches, cycle stage, types and measurement units, reviewing adequacy, implementation and effectiveness, and benchmarking performance.

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