

Professional Profile

Mr. Muhlbauer is an internationally recognized authority on pipeline risk management. In this field, he is an author, lecturer, consultant and software developer. Techniques developed by Mr. Muhlbauer are in use by the largest pipeline operators in the U.S. and in pipeline operations in many other countries. Mr. Muhlbauer is an advisor to private industry, government agencies, and academia, as well as a frequently invited speaker at industry conferences worldwide. Mr. Muhlbauer also has an extensive background in pipeline design, operations, and maintenance, having held technical and management positions in a pipeline operating company for over 13 years prior to becoming a full time pipeline consultant.

Professional Experience

WKM Consultancy, LLC – Since 1986 Mr. Muhlbauer has been owner and principal of WKM Consultancy where he has advised and consulted internationally in the specialized areas of pipeline risk management, pipeline quality management, regulatory compliance, and technical aspects of pipeline designs and operations. As an independent consultant, Mr. Muhlbauer has been a primary investigator and consultant in numerous pipeline technical projects for over 50 clients*. Clients include major pipeline operators in the U.S. and overseas, consulting engineering companies; academicians; government regulatory agencies; attorneys engaged in pipeline issues; and insurance companies. In addition to consulting and engineering services, Mr. Muhlbauer serves as an expert witness in legal proceedings and conducts conference talks and workshops on pipeline risk management internationally, as well as publishing books, articles and software.

Dow Chemical Company – From 1982 to 1994, Mr. Muhlbauer held a variety of positions at Dow Chemical's Pipeline Division in Texas. As an operations engineer for a pipeline district field office, Mr. Muhlbauer was responsible for the technical aspects of 800 miles of hazardous liquids and gas pipeline, as well as a water reservoir and transportation system. As project engineer and project manager, he was responsible for estimation, design, construction, and cost control for numerous projects. He also prepared pipeline technical guidelines, procedures, operating manuals and performed start-up/safety audits.

In several management positions, Mr. Muhlbauer was responsible for various aspects of pipeline system operations and maintenance for Dow Chemical's Pipeline Division, including natural gas, ethylene, propylene, LPG, styrene, benzene and chlorine pipelines. As Pipeline Quality Manager, Mr. Muhlbauer was responsible for implementing a Total Quality Management program in the pipeline and products storage departments. This included the design of all tracking systems and employee training in all aspects of the Quality Process. As Control Center Supervisor, and Regional Operations and Maintenance Manager, he directly managed operations of a control center for 3,000 mile (9 systems) pipeline network handling multiple gas and liquid products and managed a pipeline field office responsible for operations and maintenance of 1,200 miles of pipeline throughout southern Louisiana.

* *Key professional accomplishments, project-specific work summaries; expert witness testimony experience, and client contacts are available*

Software

Mr. Muhlbauer was the primary designer and programming supervisor in the development of the following software products:

- Pipeline Risk Controller, commercial software package, 1994, 1997.
- PipeCalc version 4.0, commercial software package, 1995.
- Pipe Line Rules of Thumb CD, commercial software package, 1998 & 2002.
- Various custom software applications.

He was also the primary designer of the following software package:

- Risk Management Toolkit, Baseline Technologies, Calgary, Alberta, 2002

Books

- • Pipeline Risk Management Manual, 1992, Gulf Publishing Company, Houston, TX.
- Pipeline Risk Management Manual, 2nd Edition, 1996; Gulf Publishing Co., Houston, Texas, 1996

Journal Publications

- "The Move to Formal Risk Management", published in Trade Journal Article, by *Flow Control Magazine*, Aug 2001, Austin, TX
- "A Proactive Approach to Pipeline Risk Assessment", published in Trade Journal Article, by *Pipeline Industry* magazine (Gulf Publishing Company), Jul 1992, Houston, TX
- "Economic Considerations for Pipe Line Risk Management", published in Trade Journal Article, by *Pipeline Industry* magazine (Gulf Publishing Company), Feb 1994, Houston, TX
- "Pipeline Risk Management: A Resource Allocation Model", published in Trade Journal Article, by Hart's *Pipeline Digest*, Feb 1996, Houston

Conference Papers and Presentations

- "Key Note Address: Pipeline Risk Management", published in Conference Proceedings, by API Workshop, Sep 2001, Houston
- "Scheduling Integrity Re-verifications", published in *Pipeline Pigging, Rehabilitation, and Repair* Conference Proceedings, by *Pipes and Pipelines International*, January 2002, Houston
- "Lessons Learned in Pipeline Risk Management", published in Conference Proceedings, by Minerals Mgmt Service; C-Core, Nov 1999, Anchorage, AL
- "RIPS Identifies Pipeline Risks", published in Conference Proceedings, by 3rd International Conference on Pipeline Pigging and Inspection Technology: *Pipe Line Industry* magazine (Gulf Publishing Company), Feb 1991, Houston

- "RIPS Identifies Pipeline Risks", published in Conference Proceedings, by Pipeline Risk Assessment, Rehabilitation and Repair: *Pipeline Industry magazine* (Gulf Publishing Company), May 1991, Houston
- "Risk Assessment, Rehabilitation and Repair Conference", published in Conference Proceedings, by *Pipes and Pipelines International*, May 1992, Houston
- "The Economics of Risk Management", published in Conference Proceedings, by 3rd International Conference on Pipeline Risk Assessment, Rehabilitation and Repair: *Pipeline Industry magazine* (Gulf Publishing Company), Sep 1993, Houston
- "Pipeline Risk Management and Operating Discipline", published in Conference Proceedings, by *7th Annual International Pipeline Monitoring and Rehabilitation Seminar*: Systems Integrity, Inc, Feb 1995, Houston
- "Risk Analysis--The Methodologies and Their Effects", published in Conference Proceedings, by *Natural Gas in the Americas II: The Emerging Giant* (IGT (Institute of Gas Technology)), May 1995, Caracas, Venezuela
- "Pipeline Risk Management--A Resource Allocation Model", published in Conference Proceedings, by 5th International Conference on Pipeline Reliability--*Pipeline & Gas Industry magazine* (Gulf Publishing Company), Sep 1995, Houston
- "Pipeline Risk Management Programs", published in Conference Proceedings, by *Gas Industry Risk Management*, IGT (Institute of Gas Technology), Nov 1995, New Orleans, LA
- "Pipeline Risk Management presentation at NACE Gulf Coast Corrosion Control Seminar", published in Conference Proceedings, by NACE (National Association Corrosion Engineers), Feb 1996, Houston
- "Pipeline Risk Assessment Seminar", published in Conference Proceedings, by *API Pipeline Conference*, Apr 1996, Dallas
- "Pipeline Risk Assessment and Risk Management", published in Conference Proceedings, by International Pipeline Conference: ASME (American Society of Mechanical Engineers), Jun 1996, Calgary, Alberta, Canada
- "Risk Assessment and Resource Allocation in System Maintenance", published in Conference Proceedings, by *Emergency Response Planning*: IGT (Inst. Gas Technology), Jun 1996, Washington, DC
- "Pipeline Risk Modeling--Exploring the Controversy", published in Conference Proceedings, by Pipeline Reliability Conference and Exhibition--*Pipeline & Gas Industry magazine* (Gulf Publishing Company), Nov 1996, Houston
- "Pipeline Risk Management: A Resource Allocation Model", published in Conference Proceedings, by 9th Annual International Pipeline Monitoring and Rehabilitation Seminar: *Hart's Pipeline Digest*, Feb 1997, Houston
- "Managing Pipeline Risks", published in Conference Proceedings, by IGT (Institute of Gas Technology), Jun 1997, Washington, DC
- "Picking the Right Pipeline Risk Management Approach", published in Conference Proceedings, by *Pipeline Week 1997 International Conference*, Sep 1997, Houston
- "Picking the Right Pipeline Risk Management Approach", published in Conference Proceedings, by *22nd Annual Gulf Coast Corrosion Control Seminar*: NACE (National Association of Corrosion Engineers), Feb 1998, Houston, TX.
- "Lessons Learned in Pipeline Risk Management", published in Conference Proceedings, by *2nd International Pipe Line Week Conference*, Oct 1998, Houston
- "Qualitative Risk Assessment as a Basis for Pipeline Integrity Maintenance Planning", published in Conference Proceedings, by *Offshore Pipeline Risk Assessment and Management*, Nov 1998, Clear Lake, TX

- "Pipeline Risk Assessment and Risk Management", published in Conference Proceedings, by American Society of Civil Engineers (ASCE) Specialty Technical Conference, Jun 1992, Seattle, WA.
- "Economics of Pipeline Risk Management", published in Conference Proceedings, by ASCE Pipeline Crossings Specialty Conference, Jun 1995, Denver, CO

Workshops and Courses

- "Pipeline Risk Management and Integrity Planning Workshop *Preparing you for filing your formal Risk Management Plan*", 2-day workshop sponsored by Mustang Engineering, October 16-17, 2001, Houston, Texas
- "11 day workshop on Pipeline Risk Assessment", & Training Manual, sponsored by *Pertamina Petroleum*, May 1994, Indonesia
- "7 day workshop on Pipeline Risk Assessment, & Training Manual, sponsored by *Ecopetrol*, May 1998, Bucaramanga, Colombia
- "Pipeline Risk Management: Modeling for Risk Assessment and Resource Allocation (2-day workshop)", & Training Manual, sponsored by *8th International Pipeline Pigging Conference--Pipeline & Gas Industry magazine* (Gulf Publishing co), Feb 1996, Houston, TX.
- "Pipeline Risk Mgmt Workshop (2 days)", & Training Manual, sponsored by *IPS, Inc* Kingwood, Tx for delegation of Russian pipeline professionals, Nov 1996, Houston, TX.
- "Pipeline Risk Management: Modeling for Risk Assessment and Resource Allocation (2-day workshop)", & Training Manual, sponsored by *Pipeline Reliability Conference and Exhibition--Pipeline & Gas Industry magazine* (Gulf Publishing co), Nov 1996, Houston, TX.
- "Pipeline Risk Management: Modeling for Risk Assessment and Resource Allocation (2-day workshop)", & Training Manual, sponsored by *Pipeline Week 1997 International Conference*, Sep 1997, Houston
- "4 day workshop on Pipeline Risk Management", & Training Manual, sponsored by *The National Gas Company of Trinidad and Tobago Ltd*, Oct 1997, Republic of Trinidad and Tobago, WI
- "2 day workshop on Pipeline Risk Management", & Conference Proceedings, sponsored by *Pipeline Pigging Conference*, Feb 1998, Houston, TX.
- "Pipeline Risk Management 2 Day Course", & Training Manual, sponsored by *The Pipeline Pigging Conference*, Jun 1998, Kuala Lumpur, Malaysia.
- "2 day workshop on Pipeline Risk Management", & Training Manual, sponsored by *2nd International Pipe Line Week Conference*, Oct 1998, Houston, TX.
- "Pipeline Risk Management 2 Day Course", & Training Manual, sponsored by *Enbridge Pipeline Inc*, Oct 1999, Duluth, MN
- "4 day workshop on Pipeline Risk Management", & Training Manual, sponsored by *Transredes Pipeline Company*, Nov 2000, Santa Cruz, Bolivia.
- "Safety and Loss Prevention", sponsored by Brazosport Community College, Aug 1989, Lake Jackson , TX.
- "Land Surveying", sponsored by Brazosport Community College, Aug 1990, Lake Jackson , TX.
- "Computer Applications--Spreadsheets", sponsored by Brazosport Community College, Jan 1992, Lake Jackson , TX.

Training Sessions

- "Statistical Process/Quality Control workshops and presentations for employees", sponsored by Dow Chemical, 90-91, Freeport, TX
- "Gas Distribution Engineering Course—Pipeline Risk Management Session", sponsored by IGT (*Inst. Gas Technology*), Jul 1996, Chicago, IL.
- "Pipeline Risk Assessment Methodologies", sponsored by DOT OPS (*Office Pipeline Safety*), Jun 1997, Washington DC.
- "Fundamentals of Pipeline Risk Assessment", sponsored by NARUC (*National Association of Regulatory Utility Commissioners*), Jun 1997, East Lansing, MI
- "Fundamentals of Pipeline Risk Assessment", sponsored by NAPSRS (*National Association of Regulatory Utility Commissioners*)-SW, Aug 1997, San Antonio, TX
- "Fundamentals of Pipeline Risk Assessment", sponsored by NAPSRS (*National Association of Regulatory Utility Commissioners*)-Eastern, Aug 1997, Portsmouth, NH
- "Fundamentals of Pipeline Risk Assessment", sponsored by NAPSRS (*National Association of Regulatory Utility Commissioners*)-Central, Sep 1997, Omaha, NE
- "Fundamentals of Pipeline Risk Assessment", sponsored by NAPSRS (*National Association of Regulatory Utility Commissioners*)-Western, Sep 1997, Seattle, WA
- "Fundamentals of Pipeline Risk Assessment", & Conference Proceedings, sponsored by NAPSRS (*National Association of Regulatory Utility Commissioners*)-Southern, Oct 1997, AK
- "Pipeline Risk Assessment for Hazardous Liquids", sponsored by American Petroleum Institute (API), May 1998.
- "Risk Assessment for Pipeline Surface Facilities", sponsored by Williams Energy, Oct 2000, Tulsa, OK.

Education

- B.S., Civil Engineering (Summa Cum Laude), University of Missouri, 1981
- Certified Quality Engineer (C.Q.E.) by A.S.Q.C.
- Post-graduate and continuing education in areas of Business Administration, Total Quality Management and Engineering.

Registrations & Affiliations

- Professional Engineer, Registered in Texas, 1988
- Member, American Society of Civil Engineers (Technical committee chairman)
- Member, National Society of Professional Engineers, (Committee Chairman)
- Past Member, American Society of Quality Control