

# D a v i d E . H e n d r i x , P . E .

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RESUME

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## Experience:

2013  
1990

**President, The Hendrix Group Inc.**, A material engineering consulting organization serving the chemical, refining, oil & gas, pipeline, pulp & paper, and insurance and legal industries. Provides metallurgical engineering consulting and laboratory testing services to clients in: ▽ root-cause failure analysis ▽ corrosion investigations, ▽ fitness-for-service assessments ▽ corrosion control document development ▽ API 580 Risk-Based Inspection (RBI) program development and implementation ▽ equipment and piping inspection programs and procedures, ▽ coatings and linings specifications ▽ equipment fabrication troubleshooting and problem resolution.

David Hendrix consults internationally and internationally in projects involving materials failure and selection, corrosion investigations and corrosion control, fitness-for-service and risk based inspection programs. David was a lead independent consultant on a major accident investigation project for the United States Chemical Safety and Hazard Investigation Board (CSB) involving mechanical integrity issues and has served as a testifying expert on mechanical integrity. He has unique expertise with: ▽ failures and fractures, ▽ storage tank assessments, ▽ corrosion investigations and control, ▽ water-related corrosion, ▽ risk-based inspection program development, ▽ equipment fitness-for-service.

David has developed corrosion control documents (CCDs) for refining and chemical plant clients to identify, control and inspect for damage mechanisms in processing units. These documents include identification of integrity operating windows (IOWs) for processing, metallurgical and operational parameters that are designed to control the damage mechanisms within acceptable limits. This CCD development has been done for most of the refining processes and many of the major industrial chemicals.

2005  
2002

**RBIT Consulting, LLC, Houston, TX, Vice-President, Engineering** • RBITech is a diversified engineering and inspection company specializing in Risk Based Inspection, Mechanical Integrity, Fitness-for-Service and Risk Management solutions for the refining and chemical industries. Responsible for directing, coordinating, and exercising functional authority for planning, organization, control, integration, and completion of engineering projects within the company. Accountability for all Engineering and technical matters. Directly supervise four professional employees and other staff, in addition to all personnel assigned to projects with Engineering or technical content. More than 25 years experience in the process industries, including over 15 years experience in Mechanical Integrity, including Risk Based Inspection.

1990  
1988

**Manager, Houston office and Principal with Bryant-Lee Associates**, a materials engineering consulting company providing materials and corrosion engineering services to the petrochemical, refining, O&G, insurance, and legal communities. Responsible for Houston area clients involving materials and corrosion technology, equipment inspection, failure analysis and materials selection and fitness-for-service related projects. Participated in a leading role in client capital projects with equipment/piping fabrication issues, field QA/QC implementation, including specifying and implementing positive material identification (PMI) inspection to assure equipment/piping compliance with owner specifications.

1988  
1986

**Manager, Metallurgical Engineering and NDT, Law Engineering** in their Houston, TX. office, a national multi-disciplinary engineering firm. Responsible for company-wide materials engineering consulting, business development and management of client equipment inspection projects.

1986  
1980

**Principal Materials Engineer, ARCO Chemical Co.** In their corporate Specialty Engineering Department. Responsible for materials technology at ARCO's Texas Gulf Coast plants. Performed failure analysis of plant equipment, acted as technical advisor for materials, coatings, and fabrication and inspection related issues on capital projects, developed corrosion monitoring programs, and specified equipment materials of construction for new processes. Initiated and developed a test program to in-situ evaluate state-of-the-art radiant-tube materials for ethylene cracking heaters.

1980  
1976

**Materials Engineer, Texaco Inc. Port Arthur, TX. Research Laboratory.** Provided materials engineering and failure analysis support for Texaco's worldwide drilling, exploration, production, refining, and petrochemical operations. Developed the technical specifications and acted as resident technical advisor and supervisor of a Japan-based inspection/QA program during the fabrication of high strength, sour gas production tubing and casing for resistance to H<sub>2</sub>S stress corrosion cracking.

**Education:**

- University of Alabama - Bachelor of Science - Metallurgical Engineering, Cum Laude, Tau Beta Pi, 1976.

**Affiliations/  
Positions:**

- NACE International
  - Chair: NACE International: Houston Chapter 1999-2000
  - Vice-Chair: Gulf Coast Corrosion Control Conference (GCCCS), Houston, TX., 1993.
  - Vice-Chair: NACE Central Area Conference, 2003.

- ASM International
  - Chair, ASM International Houston Chapter, 2006-2007
  - Education Committee Chair: ASM Houston Chapter 2001-2002.
  - Chair: Process Equipment Reliability session for ASM International Houston Materials Conference, Houston, TX 1993.

**Accreditations:**

- State of Texas Professional Engineer, #62945
- NACE Materials Design/Selection Specialist, #3491
- API 653 Certified Aboveground Storage Tank Inspector, #1316
- Advanced Knowledge of API 580 Risk-Based Inspection Certification, #37586

**LinkedIn Biography:**

<http://www.linkedin.com/in/davidehendrix>

**Papers/Presentations:**

1. *Metallurgical Investigation of a Methanol Furnace Tubing Failure, Corrosion/84, Paper No. 13* (Houston, TX: NACE, 1984).
2. *Contributing Factors to the Unusual Creep Growth of Furnace Tubing in Ethylene Service, Corrosion/85, Paper No.21,* (Houston, TX: NACE, 1985).
3. *High Temperature Wrought Alloys, Process Industries Corrosion-The Theory and Practice,* (Houston, TX: NACE, 1986).
4. *Ongoing Failure of Potable Water Piping in a High-Rise Hotel- Causes and Cures,* ASPE, February 1993 meeting.
5. *Paint Standards for Large Capital Projects, Protective Coatings for Petrochemical Facilities, Proceedings from the SSPC Petrochemical Conference, Houston, TX. June 2-5, 1993.*
6. *Revising Corporate Standards for Capital Projects: A Case History,* JPCL, 10, 11: (1993), p. 27.
7. *Engineering Alternatives to Repair After An API 653 Tank Inspection,* International Liquid Terminals Association, 14th International Operating Conference, June 13-16, 1994.
8. *Hazardous Chemicals Process Equipment: Assuring Reliability from Design Through Installation, Hydrocarbon Processing's 3rd International Conference on Improving Reliability in Petroleum Refineries and Chemical Plants, Houston, TX., Nov. 15-18, 1994.*
9. *Improve Storage Tank Inspections, Hydrocarbon Processing, January 1995.*

10. *The Influence of Water Cycle Chemistry in the Failure of Water-Wall Tubes in a High-Pressure Boiler Due to Hydrogen Attack*, Corrosion/95, Paper No. 613, (Houston, TX: NACE, 1995).
11. *Hydrogen Attack on Waterwall Tubes in a High-Pressure Boiler*, MP 34, 8 (Houston, TX: NACE, 1995), p. 46.
12. *Risk Based Inspection: A Qualitative Risk-Based Methodology for Ranking Fixed Equipment on the Probability of Internal Failure*, The 4th International Conference on Process Plant Reliability, Hydrocarbon Processing, Houston, TX, November 14-17, 1995.
13. *Caveats in the Selection and Installation of Elastomeric Materials for Gasketed Joints*, Energy Rubber Group, Winter Technical Meeting, Houston, TX, January 18, 1996.
14. *Update Aboveground Storage Tank Inspections*, Hydrocarbon Processing, November 1996.
15. *Inspecting Process Equipment Based On Probability-of-Failure Rankings*, Energy Week Conference, January 28-30, 1997, Houston, TX.
16. *Proper Selection and Installation of Elastomers in Petrochemical Systems*, NACE International Central Area Conference, September 28 - October 1, 1997, Galveston, TX.
17. *Hot Corrosion Failure of a 25 MW Land-Based Gas Turbine in a Marine Environment*, NACE International Central Area Conference, September 28 - October 1, 1997, Galveston, TX.
18. *Hydrogen Embrittlement of High-Strength Fasteners in Atmospheric Service*, MP 36,12 (Houston, TX: NACE, 1997) p. 54.
19. *Hot Corrosion of a 25 MW Land-Based Turbine in a Marine Environment*, Corrosion/98, Paper No. 203, (Houston, TX: NACE, 1998).
20. *The Comparative Performance of Six Cast Tube Alloys in an Ethylene Pyrolysis Test Heater*, Corrosion/98, Paper No. 430, (Houston, TX: NACE, 1998).
21. *Revise Aboveground Storage Tank Inspections*, (Houston, TX: Hydrocarbon Processing, October 1998), p.105.
22. *High Strength Fasteners In Atmospheric Service*, Fatigue and Failure of Fasteners, TechEdge Series, Corrosion/99, (Houston, TX.: NACE).

23. *Performance of Cast Tube Alloys in an Ethylene Pyrolysis Test Heater*, MP 38, 6 (Houston, TX: NACE, 1999)
24. *Effects of Heater Operation on Creep Rupture of Carburized Cast Ethylene Heater tubes and The Results of a Test Program to Optimize Heater Tube Alloy Selection*, Eighth International Process Plant Reliability Conference, Hydrocarbon Processing, October 24-28, 1999.
25. *Analysis and Remediation of a CO<sub>2</sub> Pipeline Failure*, D. E. Hendrix, R. D. Kane, K. E. Kueter, Corrosion/2000, Paper No. 9, (Houston, TX: NACE, 2000).
26. *Aggressive Corrosion of 316SS in an Amine Unit: Causes and Cures*, D. E. Hendrix, F. Addington, Corrosion/2000, Paper No. 698 (Houston, TX: NACE, 2000).
27. *Brittle Fracture of an Underground Gas Gathering Pipeline at ERW Weld Groove Defects*, D. E. Hendrix, Steve O'Toole, Richard Mueller, Ronald Frishmuth, Corrosion/2002, Paper No. 02101 (Houston, TX: NACE, 2002).
28. *Benefits and Challenges Associated with CRA Injection Tubing in Corrosive Gas Wells*, D. E. Hendrix, R. B. Sullivan III, D. L. Hinson, SPE Annual Technical Conference and Exhibition, Houston, Texas, 26-29 September 2004.
29. *Corrosion of Copper and Copper Alloys in Potable Water Systems*, NACE Central Area Conference, 2006.
30. *Corrosion of Metals in Contact with Preservative-Treated Wood, An Update*, June 2006 (printed by ARCH Wood Protection)
31. *Guidance for Plant Personnel in Gathering Data and Samples for Material Failure Analyses*, Materials Technology Institute (MTI) Book, 2009.
32. *Corrosion Control Documents, An Essential Element of a Mechanical Integrity and Risk-based Inspection Program*, API Inspection Summit 2011, January 24-27, 2011, Galveston Island Convention Center, Galveston, TX.
33. *The elusive goal of "Root Cause" failure analysis – the importance of persistence, as illustrated by O&G production corrosion case histories: (1) Distinguishing between MIC, CO<sub>2</sub> and H<sub>2</sub>S pitting and, (2) the accelerated corrosion of alloy 625 injection tubing in wet gas production wells*. ASM Houston Chapter Failure Analysis Seminar, April 2-3, 2012

*34. Essential Elements of a Piping Reliability Program:  
Development and Management of Corrosion Systems and Circuits,  
API Inspection Summit 2013, January 7-10, 2013, Galveston Island  
Convention Center, Galveston, TX.*