

SHULER COX

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Professional field: Metallurgical and materials engineering.

Specific Expertise and Knowledge: failure analysis, corrosion and degradation of materials, materials selection. materials engineering standards, line pipe manufacturing, pipeline technology, pipeline fitness for service and risk analysis, pipeline fracture control, technical training, solving special metallurgical and corrosion problems including manufacturing defects, sour service, environmental cracking and microbiologically influenced corrosion; excellent computer and communications skills.

Work Experience

2004 to present

Principal Engineer, Metallurgy and Pipelines, Roberts & Roberts Risk & Reliability Engineering, San Diego, California.

Consultant on corrosion, metallurgy, pipeline issues and risk analysis.

2004 to present

Advisor (contract engineer), Becht Engineering Co., Liberty Corner, New Jersey.

Lead engineer for a study on upgrading and rerouting pipelines at a Kuwait refinery. Hazard identification, consequence analyses and quantitative risk analyses were performed in order to study the routing of 21 pipelines. A recommendation was made for an alternate pipeline corridor that would result in lower risk and significantly lower cost.

1991 to 2003

Senior Metallurgical Engineer and Metallurgical Engineering Specialist, Materials Engineering & Corrosion Control Division, Consulting Services Department, Saudi Arabian Oil Company (Saudi Aramco), Dhahran, Saudi Arabia.

Engineering Standards. Chairman of Materials and Corrosion Control Standards Committee with responsibility for standards, specifications, and procedures for piping materials and corrosion control. Personally involved writing standards for line pipe, fittings, induction bends, material selection of piping components, positive material identification (PMI), low temperature service, sour service, and fracture control. Materials consultant for valves, pressure vessels and other equipment. Administered and processed interpretations and waivers to standards. A major contributor to a company handbook on "Pipeline Inspection and Defect Evaluation." Member of Offshore Structures Standards Committee.

Pipeline Technology. Initiated Saudi Aramco membership in Pipeline Research Council International. Saudi Aramco member on PRCI Board of Directors. Previously

member of PRCI Line Pipe Supervisory Committee and Materials Technical Committee with special interests in stress corrosion cracking and fracture control.

Failure analysis. Numerous metallurgical failure analyses on a variety of systems including pipelines and oil company upstream and downstream operations. Work characterized by ability to investigate and determine specific causes of failures and recommend practical solutions. Numerous investigations of sulfide stress cracking (SSC), stress corrosion cracking (SCC), hydrogen induced cracking (HIC), and one case of stress-oriented hydrogen induced cracking (SOHIC).

In-house consulting. Frequent email, telephone and personal consultations with loss prevention, inspection, projects, materials supply, operations, and maintenance personnel to solve problems in areas such as pipeline and plant risk assessment, materials selection, pipeline fitness for service evaluations and repair recommendations, corrosion control, and engineering standards.

Project support. Reviewed a variety of design packages for technical merit and compliance with industry and Saudi Aramco standards. Supported Project Management, Purchasing, and Inspection with implementation of engineering standards and specifications.

Professional Engineering Development. Presented papers and led discussions at company seminars and regional conferences on topics such as stress corrosion cracking of pipelines, microbiologically influenced corrosion, and other failure analysis case studies. Monitored and critiqued in-house courses related to materials engineering. Lead instructor for Saudi Aramco Professional Engineering Development course in Failure Analysis and Material Selection. Featured in videotape montage computer-based version of Material Selection module in Corrosion Basic course. Extensive mentoring of Saudi engineers.

Professional societies. Member ASM and NACE. Active in local NACE chapter and Past Secretary, African and Middle East Region. Technical Committee of 8th Middle East Corrosion Conference and 9th Middle East Corrosion Conference.

1979 to
1991

Staff Metallurgist and Metallurgical Section Supervisor, Tennessee Gas Pipeline and Tenneco Gas Transmission, Houston.

Staff consultant. Supported management decisions by making recommendations dealing with materials, corrosion, welding, and pipeline integrity.

Technical supervision of three other metallurgists and a metallurgical laboratory. Technical guidance and approval of reports concerning failure analysis, materials selection and welding.

Failure analysis. Investigated a variety of pipeline failures. Macro-examinations,

photography, metallography and mechanical testing were employed as required for the investigation. A written report was submitted for each project with specific recommendations.

Coordinated with Quality Assurance Section. Mutual support in areas such as nondestructive testing required for failure analysis, welding inspection, pipeline inspection including stress corrosion cracking.

Coordinated with corrosion control personnel. Special problem areas included external and internal microbiologically influenced corrosion, stress corrosion cracking, and internal corrosion of offshore lines.

Administration. Section supervisory duties included personnel matters, communication with management, purchasing of equipment and supplies, and recommending annual capital budget items.

Industry Committees. Gas Research Institute Biocorrosion Task Group, American Gas Association PRC Line Pipe Research, instructor for Southern Gas Association Transmission Construction Inspectors Course.

Corrosion research. Managed research projects concerned with stress corrosion cracking and internal corrosion of gas pipelines in offshore areas.

Member of Pipeline Emergency Task Force. Dispatched at short notice a number of times to the scene of major service ruptures to assess the damage and initiate failure analysis investigations to determine the cause of the failure.

Prepared and taught seminars for pipeline personnel. Subjects have included welding inspection, pipe and weld defects, and codes, standards and specifications.

1972 to
1978

Instructor, Miami-Dade Junior College.

The Marine Science Technology Department administered a two year Associate of Arts program to train marine engineering technicians. Taught oceanography, oceanography lab, seamanship, and marine surface operations

1966 to
1969

U. S. Army Chemical Corps.

Enlisted, commissioned through Infantry OCS and accepted branch transfer to Chemical Corps. Served as 1) *Company Commander* of 200-man training company with responsibility for complete unit administration for successive groups of students, 2) *Chemical Staff Officer* involved in chemical, biological and radiological (CBR) warfare and CBR defense, target analysis for tactical weapons, CBR training, maintenance of protective equipment, and radiation safety, 3) *Instructor*. Officer in charge of CBR Training Range, 4) *Chief Instructor* supervising six ranges, including

six other officers and twenty non-commissioned officers.

1962 to
1965

Engineering Trainee, NASA.

Co-op student while attending University of Florida. Worked every other semester at Propulsion & Power Division, Johnson Spacecraft Center, Houston.

Education

Bachelor of Science in *Metallurgical Engineering*, University of Florida, 1966.

Master of Science, University of Miami, 1972.

Major: *Ocean Engineering, corrosion option.*

Master of Education, University of North Florida, 1975.

Major: *Vocational-Technical Education*