



## Curriculum Vitae:

### Randy K. Kent P.E., M.S.

#### SUMMARY

Registered Professional Engineer with over 41 years of experience in failure analysis, corrosion engineering, maritime, product design, plumbing, medical implants, power and construction industries, Crane-heavy equipment-lift equipment trouble shooting and inspection (state certified). Research and development of self- patented alloys, Stainless Steel, Cast Irons, Brasses, Plastics, along with the development of heat exchanger systems, plumbing system and component design, heat treatment processes, dissimilar metal weldments, underground drilling, Steel/Stainless Steel fabrication, and foundry processes. Experienced in forensics in the maritime, construction defects, boiler and machinery, crane and heavy equipment, piping systems, implants, aircraft, transportation, pulp & paper, printing, product defects, recreational equipment, and power industries. Designed and managed technical operations of rubber gasket manufacturing and plastics injection molding product design. Offers expertise in multiple publications and presentations including the industry standard ASM Handbook series and International Fatigue Congress publications, with over 100 depositions, trials and arbitrations. Editing and contributing to ASM Handbook Failure Analysis/Forensic Investigation processes.

Plumbing Systems: Expert in multiple national class action litigations and precedent setting trials/cases in the areas of plumbing system component design and leaching problems. Retained by Judge, as national engineering laboratory in PEX brass class case.

#### PROFESSIONAL EXPERIENCE

##### **Kent Engineering, LLC - Seattle, WA (1982-1997, 2006 - present) Principal**

**Registered Professional Engineer-** Failure analysis/inspection of materials and components used in manufacturing process design and troubleshooting. Forensic investigations include materials testing and failure analysis of metallic, rubber, and plastic components and construction defect analysis in plumbing and mechanical systems. Forensics in the maritime, plumbing, tower cranes, mobile cranes, heavy equipment, boilers, turbines, construction defects, piping, aircraft, recreational equipment, diesel engines, cathodic protection; water, sewer, and chemical piping; and storage tank systems (potable water, fuels, chemicals, and wastes); and underground mining and construction equipment. Provided design and troubleshooting of batch treatment processes for the removal of heavy metals. Simulations of various systems, including; fire protection, building envelope, hydraulic and water piping, tanks and heaters, dynamo for engines, etc.

##### **Kent Crane Inspection Services, LLC – Seattle, WA (2007-present) Principal**

**Registered Professional Crane Inspector/Certifier (Past Washington State and Federal) -** inspection, troubleshooting, design and failure analysis of maritime and construction cranes. Inspection and certification to ASME, ANSI, ASTM, ISO and OSHA standards. Investigation of crane and heavy equipment accidents- U.S.A.

##### **University of Washington - Seattle, WA (1996 to 2003)**



**Guest Lecturer-Material Science and Engineering Dept.** – Selection of materials in design of water, sewer, gas, chemical plant mechanical transfer systems, including piping and HVAC. Manufacturing methods and their effects on material behavior.

**University of Washington - Seattle, WA (2003 to 2023)**

**Faculty- Mechanical Engineering Department** (Affiliate) – Professor of Materials Engineering Class for upper level engineering students. Topics include materials properties and selection, corrosion, failure analysis, fatigue, electro-chemical processes, and surface treatments of materials.

**Haward Technology Middle East (2008 to 2010)**

**Faculty** – International Classes - curriculum development (Russia, Kuwait, Saudi Arabia, Abu Dhabi, Dubai, United Arab Emirates) – Topics include: Metallurgy, Corrosion, Failure Analysis/Prevention.

**MDE Engineers, Inc. - Seattle, WA (1997 to 2006)**

**Vice President and Principal** - Failure analysis/inspection of materials and components used in various mechanical systems, the construction industry as well as manufacturing process design and troubleshooting. Forensic investigations include and construction defect analysis. Forensics in the maritime, plumbing, construction, heavy equipment piping, pulp & paper, aircraft, and other transportation industries.

**Kent Engineering - Seattle, WA (1982 - 1997)**

**Metallurgical Engineer and Principal** - Responsible for investigations of failed components and systems, and the processing of raw materials and manufactured goods. Projects include evaluations of marine systems; diesel engines; aircraft engines and structures, heavy equipment and all types of cranes; computer hardware systems; heat exchanger systems; fasteners; various transportation systems;

**Romac Industries, Inc. - Seattle, WA (1983 - 1997, concurrent with Kent Engineering)**

**Quality Assurance and Metallurgical Engineering Manager** - Responsible for corporate quality assurance efforts, as well as design, research and development of dissimilar metal weldments, foundry metallurgy and process troubleshooting (cast iron, brass, stainless steel), corrosion processes (underground and atmospheric), rubber compounding, pipe fittings, and machinery design. Implementation of ISO 9000 criteria (certified lead Auditor) and other improvement process programs. One of the company's directors for strategic planning and implementation. In charge of staff within the fabrication, machinery, and foundry divisions that oversaw supplier certification (NSF, ISO), internal quality assurance, environmental affairs, and product returns, mediations and arbitration. Responsible for product certification and maintenance with National Sanitation Foundation (NSF), Underwriters Laboratories (UL), and Factory Mutual (FM). Manufacturers consortium for the drafting of NSF St. 61, research and development of red and yellow brasses for NSF St. 61-SWDA (Safe Water Drinking Act).

**Cascade Designs, Inc. - Seattle, WA (1980 - 1983)**

**Quality Assurance Technician** - Responsible for testing physical properties of various materials used in backpacking and mountain climbing equipment. Designed and manufactured dedicated equipment for testing. Assisted in the installation of pneumatic and hydraulic systems for large presses. Performed and managed various manufacturing processes.

**Shiloh Construction - Seattle, WA (1977 - 1980)**

Assistant to framers, plumbers, mechanical system installer, roofers, electricians, and finish carpenters.

**General/Subcontractor - Residential (1977 – 1987) (Plumbing subcontractor-2 years)**

Heavy equipment operator, built and assisted in five homes; plumber, electrician, framer, foundation, etc.

**PROFESSIONAL REGISTRATION & CERTIFICATION**



Registered Professional Engineer, State of Washington, #26530  
Registered Professional Engineer, State of Alaska #104472  
Registered Residential Plumbing Inspector No. 5270226-P1 ICC ('03-'07)  
Registered Certifier/Inspector, Maritime Cranes, WA Dept. Labor and Industries, #100162 ('07-'12)  
Register Certifier/Inspector, Construction Cranes, WA Dept. Labor and Industries, #100162 ('07-'12)

### **EDUCATION & TRAINING**

B.S. Metallurgical Engineering, University of Washington, 1983  
M.S. Metallurgical Engineering, University of Washington, 1986s  
Failure Analysis (ASM)  
Principles of Failure Analysis (ASM)  
Cathodic Protection and Corrosion Protection (NACE)  
Weld Design and Analysis (AWS)  
Physical Properties of Metals (ASM)  
Plastics Fracture Analysis (SPE)  
Plastics Failure Analysis/Prevention and Testing (SPE)  
Microbiological Control in Oil Industry Operations (NACE)  
Microelectronics Failure Analysis (International Symposium for Testing and Failure Analysis)

### **PROFESSIONAL ASSOCIATIONS**

Member - American Society of Metals (ASM)  
Member - Society of Plastics Engineers (SPE, past)  
Member - National Association of Corrosion Engineers (NACE)  
Past Chairman of Regional Chapter (NACE)  
Member - American Foundrymen Society (1983-1997)  
Member - National Committee for the Development of Lead Free Brasses (1987)  
Member - National Sanitation Foundation (NSF), Standard 61 (1995-1997)  
Member - American Waterworks Association (Romac Industries Corp., 1983-1997)

### **PUBLICATIONS & PRESENTATIONS**

-ASM Handbook Volume 11 rev.10, 2002

- Uniform Corrosion
- Intergranular Corrosion
- Velocity-Affected Corrosion

-ASM Handbook Volume 11 rev. 10, 2002 Editing of "Stages of a Failure Analysis"  
-Failure of a Swing Bridge Hydraulic Cylinder, Fatigue 2002 Volume 2/5, International Fatigue Conference  
-Authored paper for American Water Works Assoc. Intl. Conf.: "Extend the Life of DI up to 55%," 1987.  
-Authored paper for NACE Intl. Conference: "Anodic Polarization Measurements of Alloyed DI," 1987.  
-Master's Degree Thesis: Corrosion and physical property effects of the minor elements in iron base alloy systems.  
-Presentations at various regional conferences/ meetings of: ASM, NACE, AWWA, Boiler Association, Marine Surveyors.  
-Failure Analysis: Presentation of Evidence, 30th Annual Pacific Northwest Aviation Law and Insurance Seminar, 2003  
-Guest Lecturer, University of Washington, Material Science Engineering Department forensics class.  
-Tolt River Pipeline Failure Analysis-Seattle Water Dept. (Seattle Prof. Engr. Society, etc.)  
-C-901 Stripper 4" Pipeline Failure Analysis (API National Convention, 2000)  
-Manufacturing Based Failure Assessment (1998, WA Defense Trial Lawyers Assoc.)  
-Microbial Effects of Stressed and Non-Stressed Components in Closed Water Sys. (2000 Assoc. of Water Tech.)  
-Plumbing Defect Analysis (2000 Association of Property Managers)  
-International Conference on Engineering Failure Analysis (Investigation/Litigation of an Upgraded 5000 Ton Press That Failed by Fatigue-West Seattle Bridge Failure-2000)



- Vehicle Maintenance Management Conference, 2010, Fastener Usage and Failures.
- Vehicle Maintenance Management Conference, 2011, Basic Metallurgy (Failure Analysis)
- Vehicle Maintenance Management Conference, 2012-2015, Weld design-failure analysis in truck frames.

**PATENTS**

U. S. Patent, #4,702,886, Nickel Alloyed Ductile Cast Iron, 1987

Canadian Patent, Nickel Alloyed Ductile Cast Iron, 1992