



## Curriculum Vitae:

**Bradley S. Capatch, P.E.**

### SUMMARY

Registered Professional Engineer in multiple states with experience in failure analysis, forensics, troubleshooting, and design. Testified in multiple depositions, mediations, and arbitrations. A certified crane and heavy equipment inspector through the state of WA and a certified plumbing inspector. Past lecturer of mechanical and corrosion engineering at the University of Washington. Areas of specialization and/or litigation experience include construction defects, building mechanical systems (plumbing, HVAC, elevators, building maintenance units (BMU)), boiler and machinery, building envelope, corrosion, welding, maritime vessels and equipment, construction and industrial equipment (tower cranes, mobile cranes, facility cranes, material handling), dam and power industry machinery, pipelines and process piping, accidents and explosions, recreational equipment, transportation vehicles. Has managed and supported in the research and development of building mechanical systems such as plumbing, HVAC, and elevators. Has also managed and supported research and development efforts pertaining to weldments, coatings, crane structural and mechanical systems, maritime vessel corrosion and mechanical systems.

### PROFESSIONAL EXPERIENCE

#### *Forensic Engineering and Design – Project Management, Testing and Failure Analysis*

**Kent Engineering, LLC. - Tukwila, WA (2012 - 2021), Honolulu, HI (2021 to present)**

#### **Registered Mechanical Engineer**

Construction defect investigation, testing, analysis, and specifications for redesign. Failure analysis/inspection of materials and components used in manufacturing of products. 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, heavy equipment, boilers, construction defects, piping, recreational equipment, diesel engines, cathodic protection; water, sewer; and storage tank systems (potable water, gas, and wastes); and construction equipment. Crane certification inspections and engineering support. Simulations of various systems, including; residential plumbing systems, tanks and heaters, bicycles, etc.

#### *Coating Systems-Installation & Management*

**College Works Painting, Tacoma/Puyallup, WA (2011): Branch Manager (Internship)**

Defined and selected materials for corrosion resistant applications on commercial and residential buildings. Managed installation of coating systems and performed business management operations Marketing planning and implementation, training, estimating,



***Academia-College/University: Assistant Professor/Tutor & Instructor***

**Pierce College, Puyallup/Steilacoom, WA (2008-2010): Physics Instructional Assistant;**

Assisted in lecture and labs, host study sessions; assist in tutoring, prepare practice exams.

Math Instructional Tutor at two campus locations; Exam preparation, homework assistance;

**University of Washington, Seattle, WA, 2012-2013: Mechanical Engineering, ME406,**

**Instructional Assistant;** Presented documentation engineering review to senior and graduate level forensic engineering class. Assisted in evaluating engineering students and grading midterm exams, research papers and final exams.

***Landscape Design, Maintenance and Installation***

**Living Waters, Edgewood, WA (2003-2010):**

Landscape design assistance. Installed and maintained water features and grounds, business management of store, water quality and maintenance of water features.

**PROFESSIONAL REGISTRATION & CERTIFICATION**

Registered Mechanical Engineer, State of Washington, #55035

Registered Mechanical Engineer, State of Hawaii, # 18855-M

Washington State Department of Labor and Industries Division of Occupational Safety and Health Accredited Crane Certifier for: Construction Cranes (Derricks, Mobile Cranes, Tower Cranes) and Mobile Cranes, Portal & Pedestal Cranes, Tower Cranes, Conveyors and Cargo Handling Gear in the Maritime Industry, State Certifier #119218 (Expired)

International Association of Plumbing and Mechanical Officials (IAPMO) Certified in 2018 UPC Residential and Commercial Plumbing Inspector Test. No. PI927975

FAA UAS Remote Pilot Certification No. 4942601

**EDUCATION & TRAINING**

B.S. Mechanical Engineering, University of Washington, 2012

Associates of Science; Pierce College, 2010

SolidWorks trainings

Fall Protection

Confined Space Entry

Watts Pressure Reducing Systems

**PROJECT EXPERIENCE:**

**Plumbing:**

- PEX plumbing system analysis
- CPVC plumbing system analysis



- Plumbing rubber degradation analysis (ASTM D6284, ASTM D2240)
- Shower valve/cartridge failure analysis, testing, and simulations
- Tempering/Mixing valve failure analysis
- KITEC IPEX plumbing analysis
- Failure analysis of failed brass tub valve stem, engineered plastic PEX fitting, failed brass faucet valve stem, and fitting solder joint failure on copper supply manifold.
- Hydroelectric plant Pelton Wheel generator distributor pipe cast iron failure analysis
  - Project management
  - Application and use of over 50 strain gauges (rosette and bi-axial)
  - Pressure testing
  - Metrology (laser tracking and digital photogrammetry)
  - Bolt torque measurements
  - Temperature effects
  - FEA analysis
- Full building re-pipe investigation (potable and DWV), scope of repair formation, and project support.
- Review of SPS, PQR, and SPQR documents
- Septic Tank Failure analysis
- Pipe lining project coordination and code analysis
- Temperature crossover evaluation and troubleshooting
- Recirculation system balance and design evaluation

#### **Maritime:**

- Fork lift fracture analysis
- Ferry diesel engine corrosion/degradation and analysis (Alaska Marine Highway Systems)
- Ferry hull repair weld inspection and failure analysis (Alaska Marine Highway Systems)
- Clamshell dredger failure analysis
- Marine engine piston failure analysis
- Hawsepiped Buoy failure analysis
- Material handler spreader bar inspections and load testing
- RTG and spreader bar inspections and load testing
- Container Crane and spreader bar inspections and load testing

#### **Insurance:**

- Acrylic jellyfish aquarium tank joint failure analysis
- PVC plumbing end cap failure
- Cement plant 430 ton ball mill bearing and lubrication failure analysis
- Cement plant raw material roller mill roll fracture failure analysis
- Cement plant raw material roller mill gear tooth failure analysis
- Cement plant finish roller mill gear box failure analysis
- Gold mine sagg mill bull gear tooth crack failure analysis
- 28,000 ton forging press cylinder failure analysis



- 40,000 ton forging press cylinder failure analysis
- Ore refinery reactor PGH pipe failure
- Ore refinery reactor shell failure

#### **Legal:**

- Nail salon scalding investigation
- Concrete floor failure and structural analysis
- MRI room floor failure analysis
- Carbon fiber composite bike steer tube failure analysis
- Hospital boiler failure analysis
- High rise condominium evaluation and
  - Drain-Waste-Vent (DWV)
  - Potable Water
  - Boiler Room
  - Pressure Reduction System
  - Ventilation System
  - Fresh Air System
  - Fire Safety Piping and Supply
  - Window IGU Evaluation
  - Concrete Cracking, Reinforcement, and Spalling Failures
  - Coating Failures
  - Wood Deck failure evaluation
  - DEFS failure evaluation
  - Low slope roof evaluation
  - Scopes of repair and bid document formulation
  - Reviewed project drawings
  - Specifications
- Dishwasher hose blow off testing and analysis
- Condo fenestration and building envelope investigation analysis
- Reviewed AIA contracts
- Bridge crane seismic evaluation and design review
- Walker buckling and tipping
- Hydroelectric turbine failure analysis
- AC system buried line set failure analysis
- Overhead crane remote safety design evaluation
- Automobile Accident Scene Documentation

#### **Lift Equipment:**

- Telehandler hydraulic line failure analysis
- Telehandler boom weld failure analysis
- Telehandler post fire structural integrity evaluation
- Construction elevator failure analysis

#### **Construction:**



- Inclined conveyer belt backstop (sprag clutch) failure analysis
- Balcony glass rupture failure analysis
- Concrete tile roof evaluation
- Lanai guardrail corrosion and structural evaluation and repair
- Concrete spalling and slab cracking repair
- Glass pool tile delamination failure
- Conveyor layout CAD drawings for high rise pit excavation sites
- Fire suppression pipe corrosion inspection and analysis
- Tower Crane Over sail Evaluation for airspace trespassing

#### **Food Processing:**

- Stainless steel paddle whey dryer fracture failure analysis
- Apple product drying roller chrome plating failure analysis
- Bulk food transport trailer design
- Apply chips dryer fire investigation
- Cold storage floor heating pipe leak investigation

#### **Fire Cause and Origin:**

- CSO barge explosion and fire investigation
- Wildfire origin investigation
- Evaluated and updated building fire stopping

#### **Transportation:**

- Amphibious vehicle axle failure analysis
- Tank baffle support failure analysis
- ASSHTA HS-20 Loading compliance compression testing
- Bulk raw food tanker filter failure analysis

#### **Crane Engineering & Inspection:**

- Tower crane inspections and load testing
- Mobile crane inspections and load testing
- Forklift inspections and load testing
- Rigging inspection and certification
- Seattle tower crane collapse failure investigation
- Rigging failure investigation and testing
- Barge mounted crane inspection and testing
  - Strain gage and analysis
- Derrick capacity evaluation
  - Confirmation of current capacity with FEA
  - Design changes to increase capacity by 25% using FEA
- Crane failure analysis and repair procedure formulation/review
- Mobile crane swing out jib additional support design
- Mobile crane lattice boom main chord repair procedure
  - Material specification



- WPS confirmation
- Chord splice repair design confirmation
- Mobile crane gantry back stay failure analysis and repair procedure
  - Material specification
  - WPS confirmation
  - Repair design confirmation
  - 3D modeling and 2D fabrication drawing formulation
- Rooster Tip design, stress analysis, and fabrication drawings
- Powerhouse bridge crane controls update and overhaul design
- Safety binder peer review and consultation
- Tower Crane failure during dismantle

### **Testing:**

- Ultrasonic testing
- Magnetic particle testing (ASTM E144 and E709)
- Florescent magnetic particle testing (ASTM E165, E1417)
- Macro and Micro Etching of Metals (ASTM E340 and E407)
- PEX testing (ASTM F876, F877, F1807, F1906, F2080, F2023))
- Radiographic testing
- MIC Testing
- 3D scanning/modeling
- WPS review
- Weld evaluation
- UT and RT test result review
- Weld failure analysis
- Fitting composition analysis
- NSF14/ISO6509 testing
- New material properties testing (Tensile ASTM E8, Metal hardness E18& E92, stress relaxation ASTM 2991)
- Degraded material properties testing (tensile ASTM E8)
- ASTM D2846 Flattening tests
- Elbow stress tests
- Fracture analysis
- FTIR analysis
- Rheological testing
- Anchorage and Performance of Metal Railings (ASTM E894, E935, E985)
- Finite Element Analysis (FEA)
- Strain gage testing and analysis
- Pressure, Temperature, and Flow Meter Data Logging and Evaluation
- Tensile Testing of Plastics (ASTM D638)
- Density of Liquid Coatings (ASTM D1475)
- Volatile Content in Coatings (ASTM D2369)
- Window quality inspections (ASTM C1036, C1048, C1376, C1464)



- Concrete Tile Testing (ASTM 1492, C140)
- Rubber Durometer Testing (ASTM 2240)
- CPVC material testing (ASTM 2846)
- Coating Quality and Adhesion Testing (ASTM D3359, D3363, D4414, D4541, D5162)
- SPCC Standard Inspection and Testing
- ASCE 7 Wind Load calculations for window pressure rating
- In-situ testing