

Curriculum Vitae:

Michael C. Leach, MS, P.E., CWI

SUMMARY

Registered Professional Engineer with experience in welding, manufacturing processes, design and forensics. Received his master's in mechanical engineering from the University of Washington after working in manufacturing. Designed and set up manufacturing operations (machining, welding, assembly) of heavy equipment for the agricultural industry. As a consultant, managed and supported on multiple construction defect and equipment failures on legal forensic cases representing equipment owners, end users, developers, municipalities, and homeowners. Areas of specialization and/or litigation experience include welding (CWI and Welding Engineering), material testing, welding certifications (PQR and WPQ), ground and maritime transportation vehicles and equipment, construction and industrial equipment, finite element analysis (FEA), product design, structural and machine design, slip and fall analysis, building mechanical systems (plumbing, HVAC, elevators), corrosion, and accident reconstruction. Has managed and supported in research and development efforts relating to agricultural equipment, weldments, tanker trucks, material handling equipment and accessories (forks, hooks, rigging, lashing systems), crane structural and mechanical systems. Other projects include the research and development of coatings for high speed fan blades that improve the fans life and the development of mechanical mechanisms. Created testing procedure and specifications to determine design viability and improvements.

PROFESSIONAL EXPERIENCE

Kent Engineering, LLC – Tukwila, WA (July 2018-Present)

Mechanical Engineer & Project Manager

Project experience includes:

- Consultant to manufacturers, fabricators, maritime, oil industry, transportation industry, residential, commercial, contractors, property managers, legal firms and others in mechanical design/manufacturing processes, troubleshooting, materials selection, welding and forensics.
- Certified Welding Inspector (CWI)
- Performs failure analysis investigations and provides remediation designs.
- Design work includes original products, fixtures and implements meeting clients objectives, welding designations, 3D modeling, part and assembly drawings, prototyping, 3D printing, testing, and final production.
- Materials and Weld evaluation including; strength testing, Charpy-cold regions testing, metallurgical evaluation, weld type and method selection, certification testing and qualifications (Dwight Company/Kent Engineering).
- Welding Inspections and Quality Control: Performs QA inspections based on Certified Welding Inspector (CWI) credential. Writes quality documentation for manufacturing clients.
- Weld Testing and Certifications: Performs weld analysis and testing based on welding code. Procedure Qualification Records (PQR) and Welder Performance Qualification (WPQ) to certify a weld procedure and welder



KENT ENGINEERING

- Utilizes computer simulations for Finite Element Analysis (FEA) and performs on site stress analysis using strain gauging.
- Investigates slip and fall cases and related building safety issues pertaining to code compliance.
- Works with product improvements and design improvements that improve quality and streamlines manufacturing processes.
- Project management for plumbing inspections and re-piping, failure analysis, and design improvements and new product design
- Performs plumbing inspections during installation and analyzes extracted pipe to determine failures and life remaining within the system
- Performs accident reconstruction, fire investigation, investigations.

Crary Industries – Fargo, ND, (January 2016-March 2018) **Design Engineer**

- Managed the implementation of new products to market, including the original design (patents), setting up manufacturing processes (machining, welding, fastening, tolerancing), troubleshooting and QC of end product. Then field use testing and feedback.
- Presented product improvements and justifications to managers and executives.
- Created budgets for new product design and initial cost of prototyping.
- Researched current patents and worked with patent attorney on infringements and new patents.
- Patented 3 different products/designs. Created shop drawings and documented designs for use on individual part fabrication and assembly welding/installation.
- Determined weld callouts (size, shape, profile) for weldments. Produced assembly drawings including exploded view, bill of materials and installation instruction. Worked with shop on design improvements and testing. Met with customers and represented Crary at trade shows to discuss products and how they can be best implemented.
- Worked with quality control to create documentation to assist in ISO9000 certification.

Weisgram Metal Fabrication Inc. – Fargo, ND, (September 2015-December 2015) **Quality Engineer Intern**

- Analyzed part drawings and created files to be used with a Virtek Laser. Measured parts using a laser to scan parts for quality control purposes and conformity.
- Measured weldments using rover arm for determining quality of manufacturing and welding.
- Member of quality control team as a part of the ISO 9000 certification.

EDUCATION & TRAINING

University of Washington. *M.S.:* Mechanical Engineering, June 2019

North Dakota State University, *B.S.:* Mechanical Engineering, December 2015

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January 2022



PROFESSIONAL REGISTRATION & CERTIFICATION

Registered Professional Engineer, State of Washington, #20105309
American Welding Society (AWS) Certified Welding Inspector (CWI)
Registered Solidworks Professional
American Weld Society (AWS) Member
American Society of Mechanical Engineers Member (ASME)
DOT Design Certifying Engineer (Tank Specification MC331 and DOT406)

RESEARCH

- Residual Stress Testing in welded Stainless steel tanks for food products, oil, gas, road salts, etc.
- Residual stress testing and research of Weld systems.
- Tank design and material selection including Carbon Fiber and Fiber Glass
- Additive Manufacturing
- Autonomous Robot
- Patent applications
- Human factors pertaining to slip and falls

PUBLICATIONS AND PRESENTATIONS

- Multiple Forensic Case Reports and Presentations to industrial clients, law firms, Judges, and other organizations.
- Vehicle Maintenance Management Conference, 2019, Fastener Usage and Failures.
- Cracking & Distortion Control Using 7 Essential Elements Presentation, 2021
- Weld Metallurgy Specifications Presentation, 2021

PATENTS

Agricultural Harvesting Unit and Method of Harvesting Using the Unit

- Patent Number: US9848534
- Date: December 26, 2017

A harvesting unit with a combine, having a user cab. A harvesting apparatus, advanced by the combine, has a frame and a harvesting assembly on the frame configured to process severed crop over a width between spaced sides of the frame. A fluid delivery system discharges pressurized fluid in discrete streams each directed to at least one of: a) facilitate severance of crop by the harvesting assembly; and b) facilitate advancement of severed crop rearwardly in relationship to the frame for further processing. A user can selectively vary at least one of: a) a volume of pressurized fluid; and b) a direction of pressurized fluid in the discrete streams. A control system has at least one actuator accessible and operable from outside of the cab through a user input to cause the at least one of the volume of pressurized fluid discharged, and direction of the pressurized fluid, in the discrete streams to be varied.

Centrifugal Fan Rotor and Apparatus Incorporating the Centrifugal Fan Rotor

- Publication Number: 20180163742
- Date: June 14, 2018

A centrifugal fan rotor having a frame with a rotary axis and a plurality of blades on the frame at circumferentially spaced locations around the rotary axis. The plurality of blades each has a leading edge and a trailing edge radially outside of the leading edge. The plurality of blades each has circumferentially oppositely facing first and second surfaces each extending between respective leading and trailing edges. The plurality of blades each has a material bonded at the leading edge and over only a portion of the exposed surface area of one of the first and second surfaces.

Volume Extending Assembly for Combine Storage Tank

- Patent Number: US10130032
- Date: November 20, 2018

An extension assembly for a processed crop storage tank on a combine. A closure assembly for a top opening on the tank has at least one panel with one surface area that is exposed to bound a part of an exterior space above the storage space with the closure assembly open. The extension assembly has a first extension panel with a first surface with a first area and a connecting system through which the first extension panel is operatively connected to the combine. The first extension panel is changeable between a deployed position and a stored position. In the deployed position the first surface and one surface define a combined exposed surface area that is greater than the first area of the first surface. The combined surface area is exposed to confine processed crop in the exterior space with the closure assembly open.

Athletics Experience:

Student Athlete (Baseball): North Dakota State University (*NCAA Division I*)

- 3 years (*2 years starter*)
- 1st Team All-League, All-Tournament
- Summit League Champion
- NCAA Tournament Participant
- Undergrad Assistant coach for 1 year

Professional Athlete (Baseball)

- Overseas (*Europe*)
- Fargo-Moorehead Redhawks (*American Association*)

PROJECTS

Transportation

- Simi truck and 5th wheel rollover
- Food grade materials and cleaning/processing
- Suspension system analysis
- Weld procedure for food grade containers
- Lashing system on barge
- Cold weather testing for vehicles

- Streamline production for propane trucks

Plumbing

- Re-pipe inspection
- KITEC piping inspection and submittal of class action
- Failure at an angle stop caused by pipe pullout
- CPVC investigation and testing
- Physical testing of materials
- Lead in piping and fixtures

Industrial application

- Compactors
- Floor coatings to prevent concrete corrosion
- Designed and tested concrete waste bins
- Load capacities of shipping containers
- FEA on dock loaders
- Calculations for tipping moments
- FEA on bottle jack inserts
- Design and testing of lashing system
- Interior elevator inspection
- English XL Tribometry (Slip resistance testing)
- Hydraulic Rod inspection
- Scissor Lift Failure Analysis

Design

- Weld method design
- Produced documentation for transportation tank
- 3D printed parts for shape and fit testing
- 3D printing prototypes
- Created testing specifications for prototypes
- Large waste pan design and production of manufacturing drawings.

Welding

- Weld/Welder Certification to AWS, ASME, NAVSEA, Lloyds, DNV
- Dissimilar Weld Failure Analysis
- Weld testing to ASTM, AWS, ASME, NAVSEA, Lloyds, DNV
 - Metallurgical (HAZ, defect, microstructure)
 - Hardness
 - Tensile Testing
 - Charpy
 - Bend
- Underwater welding PQR and WPQ certification with Dwight Lab Co.