Curriculum Vitae
CAMERON C. ORR, P.E., CFPHS

CERTIFICATIONS

Mr. Orr is a Mechanical Engineer who has earned the following certifications:

- Mechanical Professional Engineer (P.E.) licensed in Utah, #8518218-2202
- Certified Fluid Power Hydraulic Specialist (CFPHS) from the International Fluid Power Society

Mr. Orr is also currently working on becoming a Certified Safety Professional (CSP).

EDUCATION

Mr. Orr attended college at Brigham Young University-Idaho in Rexburg, Idaho where he earned his Bachelor of Science degree in mechanical engineering and graduated in December of 2007. While at BYU-Idaho, Mr. Orr took part in the local chapter of the American Society of Mechanical Engineers (ASME) serving as the Treasurer. Mr. Orr also worked as a computer lab assistant and teacher's aide, assisting other students in learning engineering concepts and answering their questions about the lesson material. He also received many scholarships, including multiple Mechanical Engineering Department Scholarships.

INTERNSHIP

As part of his bachelor's degree studies Mr. Orr completed a summer internship at B/E Aerospace in Marysville, Washington. B/E Aerospace is an after-market aircraft modification company. Mr. Orr worked on a team of engineers who were converting old passenger airplanes into cargo airplanes. His responsibilities on the team included using 3D CAD systems to model key frame structures of the airplane in question and then insert them into their proper positions in the overall model assembly. He also provided support to another engineer on the team in converting, reviewing and updating legacy 2D drawings of the airplane in question.

ENGINEERING WORK HISTORY

Sentient Corporation

While working on his bachelor's degree, and for a short time after graduation, Mr. Orr worked as an engineer in training for Sentient Corporation in Idaho Falls, Idaho. Sentient Corporation specializes in small business government contracts involving the analysis, diagnostics, and prognostics of mechanical bearings, such as ball bearings, roller bearings, and the like. Mr. Orr's work at Sentient Corporation included:

- bearing test monitoring
- preparing test fixtures for operation
- test fixture design
- test fixture fabrication
- safety shield design and fabrication
- equipment selection and purchasing
- inspection and documentation of tested bearings and grease using a microscope and camera
- writing reports

Alpine Engineering & Design, Inc.

Mr. Orr has worked as a mechanical engineer for Alpine Engineering & Design, Inc. (AED) in Alpine, Utah since 2008. During his time at Alpine Engineering he earned his Professional Engineering license in the state of Utah, and became a Certified Fluid Power Hydraulic Specialist. Mr. Orr is also certified as a lift truck operator trainer and a Design Certifying Engineering (DCE) for hazardous material tanker trailers.

As part of AED's consulting engineering work Mr. Orr has worked on many design, analysis, testing, prototyping, and DCE projects. The following are some of the key areas and engineering projects Mr. Orr has worked on while employed at AED.

Mr. Orr has worked extensively in aerial lift truck design. This work has included designing aerial lifts from the ground up. He has done everything from sizing components, running stress analyses, laying out the hydraulic circuit, specifying hydraulic motors and actuators, creating detailed drawings, and testing and troubleshooting prototype units.

Mr. Orr has also worked extensively with the hazardous material tanker trailer industry as a Design Certifying Engineer (DCE). Work included verifying compliance to the U.S. Code of Federal Regulations (CFR) and Department of Transportation (DOT) regulations regarding the repair and modification of hazardous material tanker trailers. He has also performed detailed analyses of full trailer designs to verify the strength of the trailer in various situations.

Mr. Orr has also done work at AED involving the testing of liquid natural gas tanks to verify compliance with Society of Automotive Engineers (SAE) standards. This included managing and performing the safe operation of drop tests and flame tests.

Design Projects

- reverse engineering a **pick-up truck dump mechanism**
- designing **aerial lift trucks**, both modifying current models and designing new models from the ground up
- designing automated **refuse truck lifting arm** mechanisms
- reverse engineering a **refuse truck body**
- designing a **liftgate spring assist** mechanism
- design of **fiberglass boom molds** for making aerial lift truck booms
- designing **small consumer products** such as an emergency radio or a battery powered squirt gun with a back-pack water tank
- designing a **bicycle type device** for propulsion in water
- designing a **lifting mechanism** to quickly move a large (8 ft x 15 ft) video wall and speaker system from the basement, through the floor, to the room above in a home
- designing multiple iterations of a **modular mining equipment simulator room**
- designing the mechanical components of a **sample recovery, amplification and testing apparatus** for disease and diagnostic testing

Analysis Projects

- utilizing finite element analysis (FEA) to analyze several **aerial lift** models for compliance to applicable ANSI standards
- analyzing several **spreader bar designs** for compliance to ASME Below the Hook (BTH) standards
- utilizing FEA to analyze **large personnel support structures** used for maintenance access to large aircraft
- utilizing FEA to analyze the design of a **chandelier** for strength and code compliance
- analyzing the design of propane **and diesel heater trailers** for compliance to USDOT standards
- utilizing FEA to analyze the design of a **rebar and scrap steel hauling trailer**

Testing Projects

- **drop testing** liquid natural gas (LNG) tanks from 10 ft and 30 ft to verify compliance with SAE J2343 standards
- **flame testing** liquid natural gas (LNG) tanks to verify compliance with SAE J2343 standards
- **cycle testing** tarping mechanisms, fiberglass booms, and trailer hitches

Prototyping Projects

- 3D printing scaled down parts of a large dragon statue
- utilizing 3D printed parts to prototype a bicycle type device for propulsion in water
- building prototypes and production models of a modular mining equipment simulator room

Design Certifying Engineer Projects

- over 30 projects involving the review of repairs and modifications to hazardous material tanker trailers to ensure compliance with USDOT standards
- assisting hazardous material tanker repair facilities in obtaining their ASME R-stamp certification that authorizes them to repair hazmat trailers
- reviewing and approving welding procedures used in the repair and modification of hazmat trailers
- performing axle load analysis for trucks and trailers to determine optimal mounting position of hazmat tanks
- running fill level calculations in order to create fill level calibration charts
- performing the LNG tank drop and flame tests noted in the testing section above

EXPERT WITNESS WORK HISTORY

Mr. Orr has been retained as an expert in product liability cases. As part of his work as an expert he has performed inspections and written detailed reports. Mr. Orr has also testified in court as a fact witness.

As part of his work at Alpine Engineering Mr. Orr has assisted the owner and president, Mr. Fred P. Smith, with his work as an expert witness. This work involved reviewing documents and helping to prepare reports for product liability and patent lawsuits where Mr. Smith was retained as the technical expert. Mr. Orr has also assisted Mr. Smith with many tests and inspections in connection with these lawsuits.

Mr. Orr has worked on the following expert witness projects:

- rear loader garbage truck container swinging into operator
- vacuum truck lid explosive decompression killing operator
- hand caught in poorly designed home-use concrete mixer
- belly-dump trailer doors crushing the operator's legs
- laundry rack falling off liftgate and crushing the operator
- rolling pallet rack braking system failure
- fatal dump truck brake booster repair failure
- horizontal boring machine turnover
- construction elevator control system failure
- refuse truck packer panel track failure
- box trailer wall construction patent suit
- ventilation hood installation failure
- air pressure in a hydraulic cylinder causing fatal damage to repairman
- small track-hoe tip over
- fatal folding chair seat failure
- tilt bed tow truck operator error
- rough terrain forklift tip over
- fatal hydraulic cylinder rupture
- scissor lift crushing operator
- fatal farm tractor transmission failure
- skid steer body motion crushing operator's feet
- visibility issues of heavy equipment causing fatal rollover
- inadequate forklift wheel guard causing foot injury

- inadequate blender component suit involving hundreds of tests on blenders
- shaving razor patent suit
- farm sprayer tractor visibility issues causing motorcycle crash
- fatal large glass sheet hauling trailer structural failure
- inadequate bulldozer safety systems allowing fatal operator motion
- essential oil diffuser patent suit
- hand tool patent suit involving destructive strength testing of hand tool
- wheel chock mold design IP infringement and breach of contract
- fatal forklift impingement

PUBLICATIONS

Mr. Orr has coauthored a white paper titled "An Engineering Guide for Trailer Safety Chain Installation, Attachment and Use".

NON-ENGINEERING WORK AND CERTIFICATION

While working at Alpine Engineering, but independent of his work there, Mr. Orr also became a licensed Outdoor Fireworks Display Operator in the state of Utah. This license allows Mr. Orr to be in charge of the setup, safe operation, and clean up of professional fireworks displays. Mr. Orr has assisted with 36 shows, primarily through Vortex Fireworks Productions of Salt Lake City, Utah. He has personally been the "Head Pyro" for 15 shows.