Sambria Engineering and Expert Services



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Curriculum Vitae of

CAMERON C. ORR, P.E., CSP, CFPHS

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CERTIFICATIONS

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

- Mechanical Professional Engineer (P.E.) licensed in Utah, #8518218-2202.
- Certified Safety Professional (CSP) from the Board of Certified Safety Professionals, CSP-35839.
- Certified Fluid Power Hydraulic Specialist (CFPHS) from the International Fluid Power Society (IFPS), #22754.
- IVES Training Group Certified Mobile Equipment Trainer for counterbalanced forklifts, Mobile Elevating Work Platforms (MEWPs), and rough terrain telehandlers, Trainer #26103.
- Pallet Jack Operator Certification from Certus
- Certified Rigger – Level 1 from American Crane & Safety
- Mobile Crane Inspector Training from the Crane Institute of America.
- Managing Crane Safety Training from the Crane Institute of America.
- Amusement Ride Inspector – Level 1 by the National Association of Amusement Ride Safety Officials (NAARSO), CN-3944.
- Certified in Lockout/Tagout OSHA compliance from the Utah Safety Council.
- Design Certifying Engineer (DCE) for hazardous material tanker trailers.
- Certified Lift Truck Operator Trainer from the Utah Safety Council.
- Commercial Driver's License (CDL) – Class C with HAZMAT endorsement

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. As a computer lab assistant and teacher's aide, he taught students engineering concepts and assisted them with hands on training. He also received multiple scholarships, including various Mechanical Engineering Department Scholarships.

ENGINEERING WORK HISTORY

Sambria Engineering and Expert Services, LLC, Oct. 2024 – Present

In 2024 Mr. Orr started Sambria Engineering and Expert Services, LLC. Sambria EES provides consulting mechanical engineering and expert witness services. The following are some key engineering projects Mr. Orr has worked on through Sambria EES.

Modified Truck Certification

Mr. Orr analyzed a modified pickup truck checking for compliance to OSHA regulations and ANSI standards for powered industrial trucks.

Sprinkler Geyser Prevention Device Design

Mr. Orr designed a device that prevents unrestrained flow from a broken sprinkler head. The device prevents sprinkler system geysers and high volume water loss when a sprinkler head is broken off.

Alpine Engineering & Design, Inc., Feb. 2008 – Oct. 2024

Mr. Orr worked as a mechanical engineer and expert witness for Alpine Engineering & Design, Inc. (AED) from February, 2008 through October 2024. As part of AED's consulting engineering work Mr. Orr has completed many design, analysis, testing, prototyping, and certification projects. The following are some of the key areas and engineering projects Mr. Orr worked on while employed at AED.

Drill Pipe Handling and Inspection

Mr. Orr has designed two prototypes of a system for moving, cleaning, and inspecting drill pipe of lengths up to 40-feet and diameters up to 6-inches. He assisted with the design of the process and order of operations, designing the structure of the equipment, and the design of the hydraulic circuits and hydraulic component selection.

Aerial Lift Trucks

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 designing and sizing components, running stress analyses, laying out the hydraulic circuit, specifying hydraulic motors and actuators, creating detailed drawings, and testing and troubleshooting prototype units.

Hazardous Material Tanker Trailers

Mr. Orr has worked extensively with the hazardous material tanker trailer industry as a Design Certifying Engineer (DCE). His 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 loading situations.

LNG Tank Testing

Mr. Orr has completed 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.

Custom Equipment Design, Fabrication, and Installation

Mr. Orr has designed one-of-a-kind systems including a hydraulically operated lift for moving an 8-foot by 15-foot LED video wall and speakers from the basement, through the floor, to the main living room of a large residence. This project included designing the telescoping lift mechanism, designing the hydraulic system, fabricating the lift components, assembling the lift, testing the

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lift, transporting the lift, and installing the lift at the residence. Mr. Orr also oversaw and approved the design of the electronic controls, machining, and installation.

THE FOLLOWING IS A SAMPLING OF OTHER PROJECTS MR. ORR HAS WORKED ON AT ALPINE ENGINEERING

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 and a battery powered squirt gun with a back-pack water tank.
- Designing a **bicycle type device** for propulsion in water.
- Designing multiple iterations of a **modular mining equipment simulator room.**
- Designing the mechanical components of a **biological sample recovery, amplification and testing apparatus** for disease and diagnostic testing.
- Designing multiple iterations and updates for a **hanging scaffolding** system.
- Designing several mechanical aspects of a 2 cubic yard **biogas harvesting system**.
- Designing several pieces of **equipment for pickleball training and practice**.
- Designing a **pool filter cleaning device**.
- Designing hydraulic equipment for **drill pipe handling and EMI inspection**.

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 U.S. DOT regulations.
- Utilizing FEA to analyze the design of a **rebar and scrap steel hauling trailer.**
- Utilizing FEA to analyze a **trailer that experienced severe cracking**.

Testing/Troubleshooting Projects

- Helping to design and rollout a **fiberglass winding operation**, including working for several weeks at the client's site to assist with winding, extracting, break testing, and burn-out testing of the fiberglass booms produced by the new process.
- **Pressure testing** and analyzing hydraulic issues with a 10-foot diameter casing rotator.
- **Drop testing** liquid natural gas (LNG) tanks from 10-foot and 30-foot heights to verify compliance with SAE J2343 standards.
- **Flame testing** liquid natural gas (LNG) tanks to verify compliance with SAE J2343 standards.
- Testing and **troubleshooting** issues with the hydraulic systems on multiple models of aerial lift trucks.
- **Cycle testing** tarping mechanisms, fiberglass booms, and trailer hitches.

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- Running a **battery of tests on many household blenders** of different configurations.
- Testing of safer alternative designs.

Prototyping Projects

- 3D printing scaled down parts of a large 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 U.S. DOT regulations.
- 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 maximize payload by determining optimal mounting position of hazmat tanks and axles.
- 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.

3D Scanning Projects

- Using a FARO 3D laser scanner to get measurements of accident scenes and equipment.
- Utilizing point cloud software to knit 3D scans together and gather accurate measurements for analysis.

Sentient Corporation, May 2007 – Feb. 2008

Sentient Corporation specialized 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.

BE Aerospace, May 2006 – August 2006

B/E Aerospace was an after-market aircraft modification company. Mr. Orr worked with a team of engineers converting old passenger airplanes into cargo airplanes. His responsibilities on the team included using 3D CAD systems to model complicated key frame structures of the airplane and then incorporate them into the overall model assembly. He also provided support in reviewing, converting and updating legacy 2D drawings.

Skinner Construction, May 2000 – Sep. 2000 & Oct. 2002 – Jan. 2003

Hal Skinner Construction was a concrete contractor specializing in pouring concrete foundations for homes, banks, and potato cellars. Mr. Orr worked as an assistant to the owner. As part of his duties, he assisted the owner in laying out footing forms according to the building plan, determining the appropriate aluminum form sizes to use for constructing the walls, constructing the forms, pouring the concrete, and

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inserting anchor bolts into the wet concrete at the designated intervals. Mr. Orr was trained on, and operated skid loaders and other heavy equipment used on the job sites.

EXPERT WITNESS WORK HISTORY

Mr. Orr has been retained as an expert in personal injury, product liability, wrongful death, and intellectual property (patent) cases. As part of his work as an expert, Mr. Orr has performed inspections, performed tests, written detailed reports, and testified in deposition and at trial.

Mr. Orr started doing expert witness work in 2015 while employed at Alpine Engineering & Design, Inc. Mr. Orr continues to work as an expert witness for Sambria EES. The following is a sampling of the expert witness projects Mr. Orr has worked on:

- Rear loader garbage truck container swinging into operator (multiple cases of similar circumstances).
- Vacuum truck lid explosive decompression killing the operator.
- Hand caught in poorly designed home-use concrete mixer.
- Belly-dump trailer doors crushing the operator's legs.
- Laundry rack falling off a liftgate and crushing the operator.
- Rolling pallet rack braking system failure.
- Dump truck brake booster repair failure caused fatal crash.
- Horizontal boring machine turnover.
- Construction elevator control system failure.
- Refuse truck packer panel track failure.
- Box trailer wall construction patent lawsuit.
- Ventilation hood installation failure.
- Air pressure in a concrete pumping truck hydraulic cylinder causing fatal damage to repairman.
- Compact excavator tip over.
- Fatal folding chair seat failure.
- Tilt-bed tow truck operator error.
- Rough-terrain telehandler tip over.
- Fatal hydraulic cylinder rupture.
- Scissor lift crushing operator.
- Fatal farm tractor transmission failure.
- Skid steer cab body motion crushing operator's feet.
- Inadequate blender component lawsuit involving hundreds of tests on blenders.
- Shaving razor patent lawsuit.
- Farm sprayer tractor visibility issues causing motorcycle crash.
- Large glass sheet hauling trailer structural failure killed driver.
- Inadequate bulldozer safety systems allowing operator to leave cab while the equipment is moving, resulting in bulldozer fatally running over operator.
- Essential oil diffuser patent lawsuit.
- Hand tool patent lawsuit involving destructive strength testing of a hand tool.
- Wheel chock mold design intellectual property infringement and breach of contract.
- Fatal forklift impingement.
- Arm crushed and burned when caught in packaging machine.
- Multiple patent lawsuits surrounding containers for hauling drilling frac sand.
- Tanker trailer explosion severely burning operator of nearby tanker trailer.
- Unexpected motion of straight truck at dock causing forklift to fall off dock and injure operator.
- Mechanical failure of amusement ride hydraulic controls causing injuries to rider.
- Fingers crushed in pneumatic snap-setting machine.

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- US International Trade Commission denying import of certain road milling machines based on allegations of patent infringement.
- Fall from diesel fuel tanker trailer.
- Applicator for liquid antiperspirant becoming dislodged causing severe injuries to user's eyes.
- Unexpected liftgate motion causing severe injuries to operator.
- Faulty CNC router E-Stop causes unexpected motion during repairs, injuring the repairman.
- Paintball gun discharge injures eye of customer.
- E-bike endo (flip) causes severe head injuries.
- Poorly maintained carwash bay results in truck falling into drainage pit.
- Load suspended by a tower crane moved by wind knocking framer off the top of a framed wall.
- Forklift attempting to dislodge pallets from flatbed tipped pallets onto truck driver.
- Ski jump air bag picked up by wind dropping young skier to the ground.
- Forklift operator killed by load tipping over.
- Lift operator fell from top shelf while lanyard not attached to lift.
- Harvest worker injured after lift machine components failed.
- Chain hoist failure caused pipe to crush worker's hand.
- Untrained helper riding near open side hatch injured by garbage truck packer panel.
- Teenage boy burned while pouring methanol fuel from a metal can.
- Heavy drill choke fell on maintenance technician's foot.
- Construction worker fatally backed over by sweeper truck with disabled backup alarm and no backup camera.
- Forklift operator ran over coworker's foot.
- Improper use of trailer booster axle allowed trailer to swing into oncoming traffic.
- High pressure hose failed and whipped operator.
- Hydraulic press failed and crushed operator.
- Roll-off cable hoist hook mount failed and swinging cable hook killed operator.
- Forklift operator hauling too many pallets had obstructed view and collided with unseen pedestrian.
- Rental facility failed to provide boom lift safety training and safety gear to renter resulting in a fall from height.
- Lack of proper maintenance of boom lift led to lift tipping over and severely injuring two workers.
- Rental trailer became decoupled while being towed down a highway causing a crash.
- Walkie stacker operator lifted stuck water heater that suddenly released and fell on truck driver.
- Roll-off hoist cable wrapped around roller which broke off and launched over 50 feet away and onto bystander.
- Forklift operator tried pushing heavy load into pickup truck causing damage to the truck.
- Stand-up forklift battery loose in compartment caused unstable operation of the forklift.
- Portal crane service personnel released trolly brakes allowing the trolley to roll while employee was tethered to it.
- Lack of communication, or implementation of wheel chocks at dock allowed truck driver to move trailer while forklift was onboard.
- Forklift operator driving with obstructed view to the front failed to see bystander and knocked him over causing severe injuries.
- Mobile crane operator failed to pay out line fast enough as he was telescoping the boom and the headache ball broke off the line and fell near workers rolling over a worker's foot.
- Forklift operator and pallet jack operator collided causing injury to the pallet jack operator's non-prosthetic leg.
- Equipment suspension frame on a hoist in a processing plant fell from hoist hook.

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- Truck driver knocked off of load as he was acting as a spotter for the front-end loader driver unloading the product.
- Forklift fell from dock when operator, working out of sequence, was unloading trailer that the driver started moving to another dock.
- Poor inspection and maintenance practices leading to tree trimmer bucket truck boom support link failure and upper boom fall.

OUTDOOR DISPLAY OPERATOR WORK HISTORY

Mr. Orr is licensed to supervise the setup, safe operation, and clean-up of professional outdoor fireworks displays. Mr. Orr has worked on 112 shows, primarily through Vortex Fireworks Artists of Salt Lake City, Utah. He has personally been the "Head Pyro" for 62 shows.

As part of his work in the fireworks industry, Mr. Orr has obtained his Class C Commercial Driver's License (CDL), with the HAZMAT endorsement, to allow him to transport fireworks over the road.

TEACHING

Mr. Orr taught a class titled "Hydraulics Safety on the Job Site" for the February, 2020 Utah Safety Conference & Expo. The conference was hosted by the Utah Safety Council, a chapter of the National Safety Council.

Mr. Orr has co-mentored the Leadership Project class of Thomas Nelson Leadership Academy, during the 2024-25 and 2025-26 school years. The class teaches youth, ages 15-18, leadership principles and public speaking skills, and helps them put the principles into action through personal and class projects.

PUBLICATIONS

Mr. Orr has coauthored a white paper titled "An Engineering Guide for Trailer Safety Chain Installation, Attachment and Use", published in 2017.

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