

33 yrs. EXPERIENCE

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LARGE MACHINERY • DRILLING RIGS • PIPE-HANDLING • CRANES • HEAVY EQUIPMENT • CUSTOM GEARS
MECHANICAL • METALLURGY • STRUCTURAL • WELDING • HYDRAULIC • CONTROL • PROJECTS

3D DESIGN • CERTIFICATION • FEA • SIMULATION
FIELD & SHOP SUPERVISION, TEST & REPAIR

EXPERT WITNESS & TESTIMONY
FAILURE ANALYSIS • FMEA

PATENTS & IP

EDUCATION

Bachelor of Science, Mech. Engineering
TEXAS A&M University, 1983

REGISTRATION

Professional Engineer:
Registration, TEXAS #81118

AFFILIATIONS

Amer. Society of Mech. Engineers (**ASME**)
Amer. Inst. of Steel Construction (**AISC**)
Amer. Assoc. of Drilling Engineers (**AADE**)
Project Management Institute (**PMI**)

EMPLOYMENT HISTORY

ORGERON ENGINEERING, PLLC, OE
President, 2013-present; drilling equipment
R&D and design, patenting, FEA & gearing

TECHMAR INDUSTRIES, LLC, Vice President,
Engineering, 2015-2016; Drilling rig
equipment R&D, design & manufacturing

T&T ENGINEERING Services, Inc. (T&T), Vice
President (role: chief), *Engineering*, 2003-13;
Drilling rig equipment design & consulting

INTEGRA ENGINEERING, Inc. (of T&T),
President, 1998-2002; Drilling rig equipment
& crane design verification, FEA consulting

SEATRAX, Inc., Sr. Project & Lead Engineer,
1994-98; Offshore cranes design, FEA,
certification, construction, PM

DRECO, Inc. (of NOV), Sr. Engineer, 1991-94;
Drilling rig equipment design, FEA,
certification, construction, PM

MP&L (of ENERGY), Sr. Welding Engineer,
1987-91; Power plant equipment reliability,
FEA, turbine, boiler, pp & valve repairs, PM

LETOURNEAU (of CAMERON), Mechanical
Engineer, 1983-86; Jack-ups, gears, cranes

PROFESSIONAL SUMMARY

Mr. Orgeron is a recognized leader for *delivering innovation and solving problems*[™] in engineering and manufacturing over his **30 year** multi-disciplinary career of practice & management in upstream O&G. He has specialized design & manufacturing knowledge of most land and offshore API drilling equipment and cranes, custom gear elevating systems for jack-ups & lift-boats, and rig structures, including welding, assembly, repairs, transport, raising, walking, BOP & pipe handling systems.

His hands-on skills in managing teams & projects, 3D design, laser field-survey, strain-gage or load testing & controls troubleshooting have been augmented by extensive FEA simulation work helping him to develop a clear understanding of the subtle physics governing product behavior in various conditions. Clear and timely communication of such product intelligence supports solid project decisions.

As V.P. Engineering, executing the role of Chief Engineer, he contributed greatly to banner revenues for his former employer of 11 years by assembling a top-notch engineering team, much mentoring and structuring cost-effective processes centered on 3D model-based design & drafting, with FEA validation. His focus on intellectual property development added significant enterprise value leading to a 2015 sale of T&T to Schlumberger, who now owns the strategic patents supporting key product offerings. Orgeron has been awarded **40 US patents** protecting rig equipment designs used today.

HIGHLIGHTED PROJECTS | LAND & OFFSHORE DRILLING RIG EQUIPMENT

PATTERSON UTI DRILLING | ~2011, PM/responsible engineer/co-inventor (at **T&T**) for the API-based design & fab of **3 NEW T&T Maverick®** fast-moving land rig mast & substructure design packages including all transport, raising, walking & handling functions. Signed >1200 drawings to deliver over 20 rig sets (>\$80M est.) in ~3 years.

ENSIGN DRILLING | ~2008-2012, PM/Lead engineer (at **T&T**) for most of Ensign's API-based ADR 1500 rig design & verification including a **NEW** automated racking board for a **NEW Iron Derrickman®** racker, **NEW 27" & 37"** powered rotary spiders, a **NEW 5-axle** auto-steering highway dolly (**invented** by Orgeron) for rig mast highway transport.

TRANSOCEAN DEEPWATER CHAMPION | ~2006, PM/lead engineer (at **T&T**) for 3rd party design review of a **NEW** drillship's dual-derrick by NOV. API-based review of complete structure included instability, fatigue & vibration and beat the budgeted costs.

BP THUNDER HORSE | ~2005, PM/lead engineer (at **T&T**) for 3rd party API-based design review of a **NEW** semi-submersible's dual-derrick by NOV, the world's largest drilling rig. Proposed, designed & conducted the shipyard derrick load-test to 3,000,000 lbs. on both hooks. Also reviewed dynamic HAZOP braking of NOV drawworks to rerate system.

SPECIALIZED PROFICIENCY

Analysis | FEA | Nonlinear & Dynamic
32 yrs. Finite element analysis (FEA) expert & trainer solving for nonlinear material, large displacement behavior or transient dynamic responses to variation in loads or constraints; drops, shocks or vibration; AutoDesk Simulation Mechanical (was Algor MES nonlinear), SACS, Strucad*3D, other

Design | Large, Welded-frame Machines
28 yrs. Design/verification of land & offshore drilling rigs, cranes, handling or other heavy equipment requiring configuration transformations and sensitive to vibration, fatigue or welding distortion

Design | Machine Design & Mechanisms
15 yrs. Design/verification of positive motion-control heavy handling mechanisms, grippers & connections for pipe-handling to achieve fast & safe payload motion

Design | Gearing, Large or Nonstandard
15 yrs. Custom design/verification of jack-up & lift-boat elevating gear units & rack, planetary & compound gearing for rig-up, skidding, rotary tables, crane slewing, winches, drawworks, elevator drive systems; cycloidal/trochoidal roller-pinion gearing.

Management | Engrg. Design & Projects
12 yrs. Team recruiting, engagement, training, design process & alignment; multi-disciplinary project scoping, planning, resourcing, field surveys & execution requiring complex interfaces where breadth & depth of engineering dominated decisions

Software Development | Engineering
11 yrs. Matrix methods in Mathcad interfacing Excel & AutoCAD, AutoLISP, FEA & OS macros, FORTRAN 77 & BASIC

Patenting | Intellectual Property (IP)
8 yrs. Heavy machinery IP competitive assessment, new research, strategy & detailed patent application development

HIGHLIGHTED PROJECTS | BOP & PIPE HANDLING, CRANES JACK-UP GEARS

SHELL MARS B. OLYMPUS DVA RIG | ~2013-2015, Sr. Consulting project engineer (at **OE**) for a **NEW** API-7K BOP handling system design & stack procedure, & bulk systems integration & control packages. Earlier in 2009, PM/lead engineer/**inventor** (at **T&T**) of the **NEW** Pipe Boss® pipe handling system with a novel drilling rig arrangement.

ALLIS CHALMERS | ~2009, PM/Lead engineer (at **T&T**) for design, fab & commissioning of a **NEW** hydraulic catwalk requiring design novelty sufficient to avoid infringing Weatherford's patent. They now operate over a dozen of these machines in South America.

T&T ENGINEERING | ~2008, PM/Lead engineer/**inventor** for R&D, design, fab documents & verification of **NEW** Pipe Boss® complete pipe handling system & a **NEW** Stand Boss™ vertical racking & stand-building system. (R&D>\$3M estimated.)

H&P DRILLING | ~2007, Lead engineer (at **T&T**) for transient dynamic FEA simulation & verification of a **NEW** automated pipe handling fleet (>\$10M) incl. electro-hydraulic valve power & control parameters to limit damaging accelerations & vibration.

SEDCO-FOREX (of SCHLUMBERGER) | ~1997, Sr. project/lead engineer (at **SEATRAX**) for DNV design, test and certification of the **NEW** Prisa lift-boat elevating gear units' rack & pinion (>\$5M/vessel estim.); performed all calcs, wrote & coded Mathcad software.

CONOCO-PHILLIPS EKOFISK II | ~1995-96 PM/Lead engineer (at **SEATRAX**) for proposals, design & fab of **4 NEW** API-2C designs for a 12-crane Seatrax offshore crane supply (>\$20M) constructed under license in England, including design of a **NEW** 1000 HP winch. Performed FEA-based fatigue analysis to dispel DNV fatigue life concerns.

LETOURNEAU | ~1985-86 PM/Lead engineer for R&D, design, fab, test and ABS certification of a **NEW** elevating gear unit rack & pinion having 1/3 higher capacity requiring nonstandard design calculation software. Letourneau's modern rigs use this gear design.

ORGERON CLIENTS - Direct & Indirect

For **T&T ENGINEERING** | 2003-2013, API-based design & verification & failures of Rig structures, transport, raising, BOP & pipe-handling - **H&P, ENSIGN, PATTERSON, ROWAN, TRINIDAD, NABORS & PRECISION.**

For **INTEGRA ENGINEERING (of T&T)** | ~1996-2005 **IRI** rigs & **BOWEN** power swivels (both of **NOV**), **FAVELLE-FAVCO** cranes, **DOVER** compressors, **DIESTER** mining machines, **CO SCH. OF MINES** research, **STEWART & STEVENSON** Rubicon rig, **FMC TECH** valves.

EXPERT TESTIMONY | SUPPORTING POTENTIAL LITIGATION

LAND DRILLING RIG MAST FAILURES (~6) & PATENT INFRINGEMENT, for drillers & OEMS on issues of collapse as after jarring, raising cylinder failure or raising wireline failure. Projects involved field surveys, FMEA & transient dynamic FEA simulations & 3D models.

COMMERCIAL FISHING & BARGE VESSEL ACCIDENTS for independent companies. Projects involved field surveys, FMEA & transient dynamic FEA simulations.

SPECIAL FAMILIARITY CODES & STANDARDS

API | 4F rigs, 8C equipment & 2C cranes
AISC | Steel construction
AWS | Welding of Fe-Ni, Fe-Cr & Al Alloys
ASCE | Structural wind loading
ASME | B&PV, PP & GD&T, Welding
AGMA | Nonstandard Gearing
WRC | Welding & PV FEA
ASTM | SS, Fe-Ni, Fe-Cr & Al Alloys
ASNT | Weld & material testing (NDT)
ABS | Jack-ups, rigs, offshore cranes
DNV | Jack-ups, rigs, offshore cranes
LLOYDS | Jack-ups, offshore crane

SPECIAL EDUCATION

TEXAS A&M UNIVERSITY

Mechanical Metallurgy & Welding
Numerical Methods & FEA
Power Hydraulics

FEA SIMULATION software (Autodesk)
Steady & Turbulent Fluid Flow
Nonlinear Statics & Dynamics
Steady & Transient Heat Transfer
Linear Statics & Dynamics

ASME

Geometric Dimensioning & Tolerancing
Steam Turbine-Generator Maintenance
ASME B&PV Code Compliance

HYDRAULIC CONTROLS

By Jack Johnson, for H&P Drilling
Custom class - Power hydraulics, motion control for automated pipe handling

COURSE(S) INSTRUCTED

Orgeron, Keith J., **7-STEP FINITE ELEMENT ANALYSIS- BEST PRACTICE GUIDELINES FOR PERFORMANCE & VALIDATION**, given in Houston & Orlando, and offered by University of Calgary.

PUBLICATIONS AND PRESENTATIONS

- Orgeron, K J, "**BOLTED OR WELDED ASSEMBLY SIMULATIONS** – Overcoming Serious Obstacles to Advanced FEA Value", presented at NAFEMS World Congress, 2003, Orlando, Florida, USA
- V. Petr, G.W. Mustoe, K.J. Orgeron, T.G. Rozgonyi, 2002, "Experimental and **NUMERICAL STUDIES OF TRANSIENT SHOCK WAVE PROPAGATION** in a Geomedium" Annual Conference on Explosive and Blasting Technique, Las Vegas, Nevada, USA
- Orgeron, K J, "**VALIDATION OF FEA OPTIMIZATION PROJECTS: Cost Effective Procedures**", presented at NAFEMS Seminar: Advances in Optimization Technologies for Product Design, October, 2001, Chicago, Illinois, USA
- Orgeron, K J, "**HYDROGEN-INDUCED CRACKING** in Cr-Mo Super-heater Header Tube-stub-to-Header Welds: A Case Study using Thermal Stress FEA", ASME 1991 Pressure Vessel & Piping Conference, San Diego, California, USA

AWARDS, SPECIAL ACHIEVEMENT

"**EAGLE**" Award, by MP&L, of Entergy, 1990, for leadership in engineering support services implementing thermal-stress FEA for pressure vessel & piping repairs
"**CHOICES**" 1,000 Award by MP&L, 1991, for presenting program to 1,000 9th graders encouraging them to make the choice to graduate high school

PATENTS AWARDED & PENDING

40 US PATENTS AWARDED ('08-Present), covering

- Drilling rig | fast-moving design of mast, substructure & raising system
- Drilling rig | walking, rig-up, cable-handling & BOP handling
- Highway dolly | 5-axle articulating, auto-steering with manual, parking
- Pipe handler | horizontal-to-vertical delivery & stab
- Pipe handler | horizontal pipe joint/stand feeding, positioning & make-up
- Gripper/tongs | auto-centering, locking
- Large machine | raising actuation & energy recovery
- Large mechanism | stiffening, adjustment & alignment
- Anchor chain fairlead | having removable pockets, submerged
- Pipe handling | vertical racking & stand-building, transport & raising systems
- Pipe handling | horizontal-to-vertical delivery subsystem (of above)
- Various | zero-clearance pivot pins

3 US PATENTS PENDING, including

- Zero-clearance mechanical rotary pin-connection & others