

# Brian D. King, P.E.

**Professional Mechanical Engineer**  
**Certified Amusement Ride Safety Inspector, Level III (Senior)**  
**Certified Maintenance Technician, Level II**  
**Certified Operations Technician, Level II**  
**Certified Ride Inspector**

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**Recreation Engineering, Inc**  
**PO Box 26407**  
**Prescott Valley, AZ 86312**  
**(928) 778-6211**

**King@RecreationEngineering.com**

**Education:** Illinois Institute of Technology, Chicago, Illinois  
Bachelor of Science, Mechanical Engineering, 1987

**Continuing Education:**

Discrete Devices and Semiconductors

Digital Electronics

Microprocessors and Microcomputers

AIMS International Safety Seminar - 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009.1, 2009.2, 2010, 2011, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2022

NAARSO Safety Seminar – 1995, 2019

American Welding Society – Welding Inspection Technology, 2001

American Welding Society – D1.1 Code Clinic, 2001

American Welding Society – Visual Weld Inspection Workshop, 2001

**Professional Organizations, Certifications and Registration:**

-Licensed Professional Engineer, Illinois (1991- ), Florida (1994- ), Nevada (1994- ), Kentucky (2022- ), California (2022- ) and Arizona (2022- )

-American Society of Mechanical Engineers (1985-1994)

-American Society of Safety Engineers (1985-1994)

-American Welding Society, Certified Welding Inspector (2001-2007)

-International Association of Amusement Parks and Attractions

-Amusement Industry Manufacturers & Suppliers International, LTD.  
President (2008-2009)

Charter Member; Board of Directors.

Safety Seminar Planning Committee (1997-2015)

Chairman of Certification Committee (2005-2015)

Certified Maintenance Technician, Level II

Certified Operations Technician, Level II

Certified Ride Inspector, Level II

-ASTM International, F-24 Committee for

Standards on Amusement Rides and Devices, Voting Member

Vice Chairman of Maintenance & Inspections Subcommittee, (2000-2001)

Task Group Chairman on Biodynamic Testing, (1998-2001) (2009- )

F-24 Committee Chairman, (2002-2008)

F-24 Committee Past Chairman (2008- )

-National Association of Amusement Ride Safety Officials, Certified  
Amusement Ride Safety Inspector, Level III (Senior) (1999- )

-Annual Inspector #167-0301, State of Florida

-Authorized Amusement Ride Inspector, State of Missouri

-Qualified Safety Inspector (QSI), DOSH Amusement Rides Unit, State of California

-Listed in Clark County, Nevada for the following services:

### Experience:

1994 to Present

Recreation Engineering, Inc.

(formerly Triodyne Recreation Engineering, Inc.)

President / Mechanical Engineer

- Provide inspection services to the amusement industry.
- Provide engineering and safety services to the amusement and recreation industries.
- Assist in code and standard compliance and certification in various jurisdictions.
- Safety audits of amusement rides and amusement centers.
- Litigation support.
- Rider position acceleration measurement on amusement rides.
- Dynamic testing of Amusement and Recreational Equipment
- Accident and incident investigation and documentation.
- Consultation on Amusement Ride Restraint System Design

2005 to 2018

US Technical Training Center

- Develop on-line website for continuing education for NAARSO, AIMS and CA QSI certificate holders
- Write technical training modules and on-line tests

1983 to 1994

Triodyne, Inc.

Consulting Engineers and Scientists

Director of Laboratory Sciences/Mechanical Engineer

- Provide technical support during on-site and laboratory examinations of equipment, artifacts, etc., for litigation.
- Safety analyses of mechanical and electrical devices and systems.
- Provide expert engineering testimony.
- Historical code and standard research and analysis.
- Prepare technical reports.
- Design courtroom exhibits.
- Write computer programs in BASIC and FORTRAN languages for data analysis and presentation.
- Design and fabricate radio remote controlled and automated systems for static and dynamic testing and accident reconstruction.
- Design numerous hydraulic, pneumatic, mechanical and electrical systems for various motion and/or force controlled test situations.
- Design and fabricate transducers.
- Responsible for forensic video-taping; set-up, and editing.
- Set-up for forensic displays.
- Conduct test programs on products and proposed safety devices.
- Adaptation of digital data acquisition and control systems for test programs.
- Author training programs for OSHA compliance officers.
- Professor's assistant for Safety for Design of Machines at Illinois Institute of Technology.
- Conducted research and test projects including:
  - Head impact attenuation of playground surfaces.
  - Accelerometry for measurement of forces acting on amusement ride passengers.
  - Industrial lift truck stability and roll over.
  - Alternative roll over protection systems.
  - Pneumatic hand tool vibration.
  - Stability of commercial literature display.
  - Static and dynamic characteristics of television carts.
  - Low temperature effects on snow thrower controls.
  - Dynamics of variable height office chairs.

Operator response to head-on impact in lift truck.  
Cooling of commercial deep fat fryer.  
Hindrances of seat belts on evacuation.  
Comparison of structural integrity of industrial shelving.  
Fender/pedestrian interaction on mobile gantry cranes.  
Failure modes of roller bearings subjected to compression.  
Comparison of ropes on industrial cable pullers.  
Bridging of grain on grating.  
Guard opening vs. distance to hazard.  
Fatigue fractures in conveyor systems.  
Ocular motions of pedestrians.  
Release torques for ski bindings.  
Explosiveness of propellants in aerosol cans.  
Flow through hypodermic needles.

1988 to 1990

Precisioneering, Inc.

Technical Maintenance and Safety Consulting  
President

- Conduct inspections and safety analyses of amusement rides.
- Perform integral maintenance activities on Aerial Tramways during annual inspections and certification to ANSI B77.1 consensus standard.
- Write and review operation manuals and standard operating procedures for amusement rides.
- Provide engineering services for initial erection of amusement rides.
- Furnish technical documentation of services performed.
- Provide amusement ride safety inspection services.

1977 to 1983

North Pole Corporation

Santa's Village Amusement Park  
Grounds Maintenance Manager

- Supervised, trained and scheduled 15 to 19 employees.
- Assisted engineer in construction and annual inspection of cable chair lift.
- Designed and redesigned mechanical and electrical systems for increased efficiency and safety.
- Assisted mechanics staff in daily inspection, annual erection and emergency repairs of 35 amusement rides.

**Professional Activities:**

- Lead ASTM F24 Committee on Amusement Rides and Devices in formulating, authoring, updating and publication of numerous safety standards.
- Testify to Illinois State Amusement Park Safety Board and California State Assembly on proposed amusement statutes.
- Attend various society meetings concerning amusement ride safety.
- Instructor AIMS International Safety Seminar; "Manufacturers' Written Documents" - January 1995.
- Instructor AIMS International Safety Seminar; "Attending to Riders Under Special Circumstances" - January 1996.
- Instructor AIMS International Safety Seminar; "Math and the Amusement Ride" - January 1997.
- Instructor AIMS International Safety Seminar; "Plan for Safety" - January 1998.
- Instructor AIMS International Safety Seminar; "Safety by Design" - January 1998.
- Instructor AIMS International Safety Seminar; "Biodynamic Accelerometry" - January 1999.
- Instructor AIMS International Safety Seminar; "River Rapids Rides Round Table"

- January 2000
- Instructor AIMS International Safety Seminar; “Attending to Riders with Special Needs”  
- January 2000.
- Instructor AIMS International Safety Seminar; “Dynamic Ride Forces” - January 2000.
- Instructor AIMS International Safety Seminar, “Calamity’s Points of View”  
- January 2001
- Instructor AIMS International Safety Seminar, “Math and the Amusement Ride”  
- January 2002
- Instructor AIMS International Safety Seminar, “Incident Investigation”  
- January 2002
- Instructor AIMS International Safety Seminar, “Systems Troubleshooting”  
- January 2002
- Instructor AIMS International Safety Seminar, “Dynamic Ride Forces - Introduction”  
- January 2003
- Instructor AIMS International Safety Seminar, “Incident Investigation”  
- January 2003
- Instructor AIMS International Safety Seminar, “Dynamic Ride Forces - Advanced”  
- January 2003
- Instructor AIMS International Safety Seminar, “Dynamic Ride Forces - Introduction”  
- January 2004
- Instructor AIMS International Safety Seminar, “Incident Investigation”  
- January 2004
- Instructor AIMS International Safety Seminar, “Dynamic Ride Forces - Advanced”  
- January 2004
- Instructor AIMS International Safety Seminar, “Incident Investigation”  
- January 2005
- Instructor AIMS International Safety Seminar, “Introduction to ASTM Standards”  
- January 2005
- Instructor AIMS International Safety Seminar, “Incident Investigation”  
- January 2006
- Instructor AIMS International Safety Seminar, “Incident Investigation”  
- January 2007
- Instructor AIMS International Safety Seminar, “Incident Investigation”  
- January 2008
- Instructor AIMS International Safety Seminar, “Incident Investigation”  
- January 2009
- Instructor AIMS International Safety Seminar, “Water Slide Inspection”  
- January 2009
- Instructor AIMS International Safety Seminar, “Incident Investigation”  
- November 2009
- Instructor AIMS International Safety Seminar, “Water Slide Inspection”  
- November 2009
- Instructor AIMS International Safety Seminar, “Incident Investigation”  
- November 2010
- Instructor AIMS International Safety Seminar, “Inspection Beyond the Steel”  
- November 2010
- Instructor AIMS International Safety Seminar, “ASTM Case Study”  
- November 2010
- Instructor AIMS International Safety Seminar, “Dynamic Ride Forces”  
- November 2011
- Instructor AIMS International Safety Seminar, “Inspection Beyond the Steel”  
- November 2011
- Instructor AIMS International Safety Seminar, “ASTM Introduction and Standards Update”  
- November 2011
- Instructor AIMS International Safety Seminar, “ASTM Case Study”  
- November 2011
- Instructor AIMS International Safety Seminar, “Dynamic Ride Forces”  
- January 2013
- Instructor AIMS International Safety Seminar, “Inspection Beyond the Steel”  
- January 2013

- Instructor AIMS International Safety Seminar, “Systems Troubleshooting”  
– January 2013
- Instructor AIMS International Safety Seminar, “ASTM Case Study”  
– January 2013
- Instructor AIMS International Safety Seminar, “Dynamic Ride Forces”  
– January 2014
- Instructor AIMS International Safety Seminar, “Inspection Beyond the Steel”  
– January 2014
- Instructor AIMS International Safety Seminar, “Systems Troubleshooting”  
– January 2014
- Instructor AIMS International Safety Seminar, “ASTM Case Study”  
– January 2014
- Instructor AIMS International Safety Seminar, “Dynamic Ride Forces”  
– January 2015
- Instructor AIMS International Safety Seminar, “Inspection Beyond the Steel”  
– January 2015
- Instructor AIMS International Safety Seminar, “Systems Troubleshooting”  
– January 2015
- Presentation of ASTM F2291 Acceleration Analysis Method  
ASTM International Meeting, Hong Kong, China  
– June 2015
- Presentation International Association of Amusement Parks and Attractions  
Case Study  
– November 2015
- Instructor AIMS International Safety Seminar, “ASTM Case Study”  
– January 2016
- Instructor AIMS International Safety Seminar, “Dynamic Ride Forces”  
– January 2016
- Instructor AIMS International Safety Seminar, “Inspection Beyond the Steel”  
– January 2016
- Instructor AIMS International Safety Seminar, “Systems Troubleshooting”  
– January 2016
- Instructor AIMS International Safety Seminar, “ASTM Introduction and Standards Update”  
– January 2016
- Instructor AIMS International Safety Seminar, “Math and the Amusement Ride”  
– January 2016
- Instructor AIMS International Safety Seminar, “Last Chance Math Review”  
– January 2016
- Instructor AIMS International Safety Seminar, “Dynamic Ride Forces”  
– January 2017
- Instructor AIMS International Safety Seminar, “Inspection Beyond the Steel”  
– January 2017
- Instructor AIMS International Safety Seminar, “Inspection Beyond the Steel”  
– January 2018
- Instructor AIMS International Safety Seminar, “ASTM Introduction and Update”  
– January 2018
- Instructor AIMS International Safety Seminar, “Dynamic Ride Forces”  
– January 2018
- Instructor AIMS International Safety Seminar, “Dynamic Ride Forces”  
– January 2020
- Instructor AIMS International Safety Seminar, “Inspection Beyond the Steel”  
– January 2020
- Instructor AIMS International Safety Seminar, “Dynamic Ride Forces”  
– January 2022
- Instructor AIMS International Safety Seminar, “Inspection Beyond the Steel”  
– January 2022
- Instructor AIMS International Safety Seminar, “Math and the Amusement Ride”  
– January 2022
- Instructor AIMS International Safety Seminar, “ASTM Case Study”  
– January 2022

- Presentation of ASTM F2137 Acceleration Data Acquisition and ASTM F2291 Acceleration Analysis Method  
ASTM International Meeting/IAAPA Safety Institute, Hong Kong, China – June 2015
- Presentation of ASTM F2137 Acceleration Data Acquisition and ASTM F2291 Acceleration Analysis Method  
ASTM International Meeting, Shanghai, China– June 2016
- Presentation of ASTM F2137 Acceleration Data Acquisition and ASTM F2291 Acceleration Analysis Method  
ASTM International Meeting, San Jose, Costa Rica– June 2018,
- Served on ISO Technical Committee TC 254 for Amusement Rides  
– November 2013 – Orlando, FL  
– September 2014 – Delft, Netherlands Work Group Leader  
– October 2015 – Copenhagen, Denmark Work Group Leader
- Invited Lecturer; University of Utah, College of Engineering; “Special Topics in Product and Industrial Engineering.” ; “Case Study” – November 2014
- Invited Lecturer; University of Utah, College of Engineering; “Special Topics in Product and Industrial Engineering.” ; “Using ASTM Standards for Acceleration Acquisition and Analysis” – November 2017
- Invited Lecturer; University of Notre Dame Department of Aerospace and Mechanical Engineering; ASME Student Section; “The Role of Mechanical Engineers in the Amusement Industry” - February 1995
- AIMS International 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2008, 2009, 2010, 2011. 2013, 2014, 2015  
Seminar Planning Committee.
- AIMS Certification Committee, Chairman: Design Certification Program and Prepare Maintenance, Inspection, Aquatics and Operations Certification Exams
- IAAPA 1995 Maintenance Committee.

#### **Publications:**

- Ferrone, Christopher W., and King, Brian D., "An Experimental Method for Determining Occupant Loading in Heavy Trucks and Equipment," SAE Technical Paper Series 933049. Presented at the International Truck and Bus Meeting and Exposition of the SAE, Detroit, MI, Nov. 1-4, 1993.

#### **Honors:**

- Who's Who in the Safety Profession, 1990
- Acknowledged in preparation of Manufacturing Engineering and Technology text; Prof. Serope Kalpakjian
- Harold Chance Award for best presentation at 2000 AIMS Safety Seminar
- Dr. Richard H. Brown Memorial Exceptional Service Award from ASTM International F-24 Committee for Amusement Rides and Devices, 2007
- John Allen Award for Most Outstanding Contribution to Amusement Ride Safety in The Park Industry, AIMS International 2007
- Award of Merit from ASTM International and honorary title of Fellow - 2016

#### **Personal:**

- Married - 1990, 1 Daughter, 1 Son
- Boy Scouts of America - Wood Badge Adult Leader Training, 2008
- Boy Scouts of America – Assistant Scoutmaster, Troop 7007, 2007 to 2011

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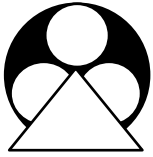
## **Brian D. King, P.E.**

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Brian D. King is the president of Recreation Engineering, Inc. He holds a Bachelor of Science Degree in Mechanical Engineering from Illinois Institute of Technology and Professional Engineer's Licenses in Illinois, Nevada, Florida, Kentucky, California and Arizona. His consulting and research interests include instrumentation, electronics, mechanical design, amusement rides, recreation equipment and general machine safety. He came to REI with experience in operation and maintenance of amusement rides and devices. Mr. King has testified to various states' amusement ride safety boards and is an active member in the ASTM International Committee which is responsible for writing and maintaining the nationally recognized amusement ride standards. Mr. King served as chairman of the ASTM International F-24 committee for Amusement Rides and Devices. He served on the ISO technical committee TC254 for amusement rides. He also served on the board of directors of Amusement Industry Manufacturers and Suppliers International. He is the past chairman of the AIMS Certification Committee. Mr. King has written standard operating and maintenance procedures for the amusement ride industry. He has participated in on-site amusement ride safety and maintenance inspections for both private organizations and governmental agencies.

Mr. King is listed by Clark County, Nevada and the City of Las Vegas as an Amusement Ride Quality Assurance Inspector. His Professional Mechanical Engineering license allows Recreation Engineering, Inc. to be an approved amusement ride quality assurance inspection agency for Clark County. He is a Level III (Senior) Certified Amusement Ride Safety Inspector by the National Association of Amusement Ride Safety Officials. He is an AIMS International Certified Maintenance Technician (Level II) and an AIMS Certified Operations Technician (Level II). Mr. King is a Missouri State Authorized Amusement Ride Inspector and is a Florida State Authorized Amusement Devices and Amusement Attractions Inspector. He is recognized by the State of California as a Permanent Amusement Ride Quality Safety Inspector. He has prepared and presented curriculum at annual AIMS International amusement ride safety seminars and was presented the 2000 AIMS Safety Seminar Harold Chance Award for best presentation and the 2007 John Allen Award for the Most Outstanding Contribution to Amusement Ride Safety in the Park Industry. In 2007, he was presented the Dr. Richard H. Brown Memorial Exceptional Service Award from the ASTM International F-24 Committee for Amusement Rides and Devices. In 2016 he accepted the Award of Merit from ASTM International and was granted the honorary title of Fellow.

Mr. King has been consulted to render opinions in amusement ride and recreational equipment litigation as well as on general mechanical engineering issues. Mr. King has been a member of the American Society of Mechanical Engineers, American Society of Safety Engineers, International Association of Amusement Parks and Attractions, the American Society for Testing and Materials International and Amusement Industry Manufacturers and Suppliers International.



# Recreation Engineering, Inc.

PO Box 26407, Prescott Valley, AZ 86312

Tel (928) 778-6211

## RECREATION SAFETY AND ENGINEERING CONSULTANTS

BRIAN D. KING, P.E. / Professional Engineer, IL, FL, NV, KY, CA, AZ; NDT Level II, CMT II, COT II, CRI, NAARSO III, QSI  
 JEFFERY W. ABENDSHIEN / ASNT NDT Level III, CMT II, COT II, CAOT, PRI, NAARSO III, QSI  
 BARTHOLOMEW J. MUELLER / NDT Level II, CMT II, CAOT, CRI, NAARSO II, ETCP-RT, QSI  
 KEVIN D. GARRISON / CWI, NDT Level II, CMT II, CAOT, PRI, NAARSO III, OPS I, QSI  
 JESSE MONREAL / BS Industrial Engineer, CMT I, NAARSO I, CPO, QSI  
 AUSTIN S. MUFF, P.E. / Professional Engineer, CA; CMT I, NAARSO I, QSI  
 AARON SCUDDER / CMT I, NAARSO I  
 JAN A. KING / AB, Director of Administrative Services

Mechanical Analysis and Design  
 Maintenance and Safety Audits  
 Mechanical Testing and Dynamic Analysis  
 Maintenance and Safety Program Development  
 CA QSI inspections  
 Incident Investigation  
 Non-Destructive Testing  
 Quality Assurance Auditing

## SERVICE FEE SCHEDULE

Effective 1/1/22

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Professional Engineering Litigation Support .....	\$300/Hour, \$2400/Day
Principal Licensed Professional Engineers.....	\$300/Hour, \$2400/Day
Licensed Professional Engineers .....	\$250/Hour, \$2000/Day
Level III Certified Amusement Ride Specialists .....	\$200/Hour, \$1600/Day
Level II Certified Amusement Ride Specialists .....	\$200/Hour, \$1600/Day
Licensed Engineering Interns .....	\$200/Hour, \$1600/Day
Project Engineers .....	\$200/Hour, \$1600/Day
Level I Certified Amusement Ride Specialists .....	\$200/Hour, \$1600/Day
Technicians/Interns.....	\$125/Hour, \$1000/Day

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- Total fees include the sum of the hourly charges plus expenses.
- Large projects are quoted on a per-case basis.
- Expenses are billed at not more than 110% of actual.
- Projects are normally billed on a monthly basis.
- Past due accounts are assessed a 1.5% charge per month.

Recreation Engineering, Inc. Federal Tax Identification Number 36-3959144