

## Forensic Engineering Vitae

James M. Green, P.E., DEE

GE ENGINEERING, INC.

120 Kalmia Dr.,

Asheville, NC 28804

Mobile Phone: (828) 216-0518

Fax: (828) 214-5584

E-mail: [green@bikereconstruct.com](mailto:green@bikereconstruct.com)

Web: [www.bikereconstruction.com](http://www.bikereconstruction.com)

### EDUCATION

- B.S. Physical Science, University of Maryland/East Tennessee State University
- M.S. Environmental and Occupational Health, East Tennessee State University
- M.S. Civil Engineering, University of Tennessee - Emphasis on Operations Research

### EXPERIENCE

- President of GE Engineering, Inc. (formerly Resource Engineering) – A Forensic Engineering firm that emphasizes general accident reconstruction as well as the principles of conspicuity. In that regard, the firm has reconstructed many accidents, during the last 35 years, that involved bicycles, pedestrians, motorcycles, mopeds, motor vehicles, transit authority vehicles, tractor trailers and construction equipment.
- The emphasis in these Professional Engineering efforts has been on the movement of the various entities and the reaction times available to the operators under the lighting conditions available at the time. An unusual area of expertise has been the application of Engineering Principles to determine causation to entities involved in athletic competition where an accident is involved.
- As a Fellow in the American Society of Civil Engineers and the National Academy of Forensic Engineers, Mr. Green has actively provided critical information, from the reconstruction of accidents, to the Engineering Design community for use in needed design changes.
- Competitive USA Triathlon racer for 25 years; including National and World qualifier and 5 time Ironman finisher. .
- United States Cycling Federation and Regional Bicycle Racer for approximately thirty-five years.
- Competitive Bicycle Racer and Rider for 46 years.

### PROFESSIONAL REGISTRATION

- Registered Professional Engineer (2005), North Carolina, South Carolina, Virginia, New Jersey, Washington State, Maine, Massachusetts, Maryland and Colorado.

## **PROFESSIONAL SOCIETY MEMBERSHIP (2004)**

- National Academy of Forensic Engineers (Fellow)
- Professional Engineers of North Carolina
- National Society of Professional Engineers
- American Society of Civil Engineers (Fellow)
- Professional Engineers in Private Practice
- Institute of Transportation Engineers

## **COMMITTEE MEMBERSHIP**

- ASTM E30.05 Forensic Engineering - Deals with standards for the practice of Forensic Engineering.
- ASTM F09 Sports/Bicycles – Deals with standards for bicycles and their components.
- Human Powered Transportation Committee, Transportation Research Board, American Society of Civil Engineers – Deals with standards in the Nation’s Infrastructure for pedestrian and cycling safety.
- Past Chairman of the Ethics Committee, National Academy of Forensic Engineers and Past President – Deals with the practice of Forensic Engineering.
- Institute of Transportation Engineers – Member of those committees dealing with pedestrians and bicycling.
- Visibility Committee, Transportation Research Board A3A04, American Society of Civil Engineers – Deals with visibility issues through the National Academy of Sciences.

## **MISCELLANEOUS MEMBERSHIP (2005)**

- **Fellow, National Academy of Forensic Engineers (NAFE)** – Elected Vice-President in 1993 by a vote of Professional Engineers in the Academy which is chartered by the National Society of Professional Engineers. Was Co-Chairman of the Ethics Committee from 1992-1995. Was one of the writers of the Code of Ethics for Forensic Engineering. Was President of the Academy for 1995 and was a member of the Board of Directors. The goal of the National Academy of Forensic Engineers is to promote the ethical practice of Forensic Engineering and to exchange technical information through peer reviewed papers and seminars.

## **AREAS OF EXPERTISE**

- I have testified, or provided technical support, on behalf of both Plaintiff and Defendant in hundreds of cases involving fatal and non-fatal bicycle, motor vehicle, transit authority, motorcycle, moped, vehicles, tractor trailers and construction equipment and pedestrian accidents. A great deal of work has also been accomplished in the area of infrastructure design, construction and operation where the movement of these entities is concerned. Of particular interest is the movement of these entities under certain environmental and sight constraints (conspicuity). Due to proprietary agreements, in the Civil Engineering design area, and the desire of most attorneys, in the Forensic Engineering area, not to release case information, only a description of the areas in which I have worked is provided. Further details may be obtained upon permission from the case attorney. Expertise in the design area, as well as the Forensic Engineering area, include, but are not limited to, the following:
- **Cyclist and Pedestrian Movement** – Several Civil Engineering design projects have been completed, and are ongoing, on the design and safe operation of facilities where the safety of cyclists and pedestrians are of concern. These projects generally deal with the

proper design parameters to allow safe movement of cyclists and pedestrians in traffic. Since intersection design parameters are critical in this movement, a great deal of time has been spent in identifying these parameters in daylight and nighttime conditions (conspicuity).

- **Conspicuity** – The application of principles of conspicuity in determining the causal factors of accidents has been given a great deal of study by GE Engineering, Inc. (formerly Resource Engineering). Utilizing field test data, as well as a detailed compilation of engineering literature, the areas of conspicuity that are directly applicable to reconstructing accidents have been refined, published, and accepted by the engineering community. These principles of conspicuity have also been utilized in reconstructing all types of motor vehicle accidents.
- **Ongoing Work** - Determining the causal factors of bicycle accidents, as well as all types of motor vehicle accidents, continues on an ongoing basis (2005). This includes modeling accidents utilizing the data developed through actual on site measurements of thousands of accidents. This information is developed from input from engineers throughout the United States and the rest of the world on a continual basis.
- **BMX tracks** – An evaluation of the design integrity of BMX race tracks. This includes the evaluation of berm design as it relates to rider accidents. A determination of the vector forces placed on a rider during a jump. This includes determining the trajectory of the bike rider as well as the biomechanics of the rider during the jump. An evaluation of the structural design and integrity of BMX off-road dirt, 10- and 12- speed racing and touring bicycles, including a determination of structural failure associated with impacts from riders jumping or falling.
- **Failure to Warn** - Failure to warn analysis has also been conducted on those issues relating to the Manual of Uniform Traffic Control. Forensic and design analysis have been conducted on the design of roads and streets, traffic signals, painting on roadways, sign retroreflectivity; as well as all areas relating to design criteria needed for the general public to perceive, react and avoid stimuli (conspicuity). A definition of those areas where failure to adequately warn the public of design constraints which was a causal factor in bicycle structural failure/operation. This failure to warn was determined to be, in some instances, a causal factor of an accident from improper bicycle assembly. Other analyses have shown failure to warn not to be a causal factor in certain bicycle accidents.
- **Crush Profiles** - A determination of the velocity of impact from the deformation of bicycles, motor vehicles, mopeds, motorcycles, transit authority equipment, and off road equipment, has been quantitatively determined in the laboratory or on the roadway under controlled conditions. From the Engineering literature, the speed of impact can actually be determined. In the case of bicycles, frames from the major manufacturers were utilized to get actual speed of impact.
- **Ethics** – Conducted and taught seminars in Professional Engineering ethics at North Carolina State University, University of Tennessee, Clemson University and at Professional Engineers of North Carolina seminars.

## PUBLICATIONS

*Bicycle Accident Reconstruction for the Forensic Engineer*, published by Bicycle Books, Inc., 1<sup>st</sup> Ed., James M. Green, P.E., 1991.

*Bicycle Accident Reconstruction: A Guide for the Attorney and the Forensic Engineer*, published by Lawyers and Judges Publishing Co., James M. Green, P.E., 1992.

“Nighttime Bicycle Accident Reconstruction,” accepted for publication in the *American Society of Civil Engineering Transportation Engineering Journal*, James M. Green, P.E., 1993.

“A Determination of the Causal Factors of Bicycle Accidents,” James M. Green, 1990.

“Bicycle Accident Reconstruction Techniques,” *Journal of National Academy of Forensic Engineers*, James M. Green, P.E., 1989.

“A Determination of the Causal Factors of Bicycle Accidents at Railroad Crossings,” *Journal of the National Academy of Forensic Engineers*, James M. Green, P.E. and Robert T. Hintersteiner, P.E., 1990.

“Determination of the Reaction Times Available to a Cyclist at Different Intersection Configurations,” James M. Green, P.E., 1990.

“Highway Intersections – Killing Fields for Cyclists,” James M. Green, P.E., 1990.

“The Effect of Conspicuity on Bicycle Accident Reconstruction,” James M. Green, P.E., 1990.

“The Role of Component Failure on Bicycle Accident Reconstruction,” James M. Green, P.E., 1990.

“The Employee Relationship Between Helmets and Bicycle Accident Reconstruction,” James M. Green, P.E., 1991.

“The Impact of Roadway and Cycle Path Design on Bicycle Accident Reconstruction,” James M. Green, P.E., 1991.

“A Determination of Braking Distance for Cyclists in Emergency Stopping Situations,” James M. Green, P.E., 1993.

“A Determination of the Reaction Times Available to a Motor Vehicle Driver Overtaking a Cyclist at Night,” James M. Green, P.E., 1992.

“A Determination of Force onto the Cycle Rider or Pedestrian During the Impact of a Motor Vehicle,” James M. Green, P.E., 1992.

“A Determination of the Actual Point of Impact in Bicycle Accident Reconstruction Involving Motor Vehicles,” James M. Green, P.E., 1994.

“The Derivation of a Formula for Determining the Speed of a Bicycle Rider Down an Incline,” James M. Green, P.E., 1992.

“Basic Engineering and Physics Applicable to Bicycle Accident Reconstruction,” James M. Green, P.E., 1992.

“Reconstruction of Bicycle Accidents at Night Utilizing the Principles of Conspicuity,” James M. Green, P.E., 1992.

“A Determination of the Correct Method for Developing Motor Vehicle Speed of Impact in Bicycle Accident Reconstruction Collisions Using Engineering Literature and Field Verification,” James M. Green, P.E., 1994.

“Determination of the Velocity of a Cyclist From Deformation of the Cycle From a Frontal Impact,” James M. Green, P.E., 1994.

“The Engineering Dynamics of a Cyclist Being Thrown Over the Front of a Cycle During a Sudden Stop,” James M. Green, P.E., 1994.

“A Determination of the Structural Integrity of Bicycle Frames Subjected to Frontal Static Force,” James M. Green, P.E., 1994.

*Bicycle Accident Reconstruction and Litigation*, published by Lawyers and Judges Publishing Co., 4<sup>th</sup> Ed., James M. Green, P.E., Paul F. Hill, Esq., & Douglas Hayduck, 1996.

“The Causal Factor of Bus Wheel Injuries and a Remedial Method for Prevention of these Accidents,” *Journal of the National Academy of Forensic Engineers*, Vol. XVIII, No. 1, June 2001.

*Bicycle Accident Reconstruction for the Forensic Engineer*, published by Trafford Publishing, 5<sup>th</sup> Ed., James M. Green, P.E. and contributing authors, 2001.

“Forensic Engineering Analysis of Total Reaction Time,” *Journal of the National Academy of Forensic Engineers*, Vol. XX, No. 1, June 2003.

## BICYCLE RACING EXPERIENCE

I continue to test components and frames in high stress situations both in the laboratory and in racing situations.

- State of Tennessee Road Racing Bicycle Champion – 1982, 1983.
- Hawaiian Ironman Qualifier and Finisher – February 1981, February 1982, October 1982
- Winner, Veterans Jonesborough 3-day State Race, United States Cycling Federation sanctioned, 1984.
- Team Winner, Tennessee Pro Classic Stage Race, 1984 – First professional road race held in the United States since the 1930's
- Winner – Regional 25-mile Time Trial Championships – Course Record Holder, 1981-1986
- National United States Cycling Federation Qualifier for the National Road Racing Championships, 1982-1988
- Top Ten United States Cycling Federation Time Trial Times, 1982-1987
- Member of the Tri-Cities Road Club and Coors Racing Team, 1981-1989
- Winner, Warriors Path Triathlon in age group, 1981 – 1984, First overall in Bicycle Time Trial
- Fourth, Warriors Path Triathlon in age group, 1986, Second overall in Bicycle Time Trial
- First in Age Group, State of Franklin 100 Mile Road Race, 1987, 1989, 1990
- Fifth in Age Group, Cascade Falls Triathlon, Bend, OR, 1987
- Third, Tullahoma Triathlon, 1990 – Southern Regional Championships; qualified for Nationals, 1.5 K swim, 40 K bike, 10 K run
- Second, Chattanooga Triathlon, 1990, 1.5 K swim, 40 K bike, 10 K run
- First Tennessee State Championship Triathlon, Fort Loudon, TN, 1990, 1.5 K swim, 40 K bike, 10 K run
- Fourth, Muncie, IN, Midwest Regional Triathlon Championship, 1990, 1.2 mile swim, 56 mile bike, 13.1 mile run
- First, Southeastern international distance Triathlon Championship, 1991, Cummings, GA, 1.5 K swim, 40 K bike, 10 K run, Qualified for Nationals
- Third, Tullahoma Triathlon, 1991, 1.5 K swim, 40 K bike, 10 K run
- Eighth, Muncie Endurathon, Triathlon, Muncie, IN, July 1999
- First in Age Group, Double Dam Triathlon, Lenoir, TN, July 2000, 1.5 K swim, 40 K bike, 10 K run
- Fourth in Age Group, Long Course National Triathlon Championships, Tupper Lake, NY, July 2000, 1.2 mile swim, 56.1 mile bike, 13.1 mile run
- First in Age Group, Festival of Flowers Triathlon, Greenwood, SC, June 2000, International Distance
- First in Age Group, Long Course Mid-Atlantic Triathlon Championships, Raleigh, NC, October 2001, 1.2 mile swim, 56.1 mile bike, 13.1 mile run
- Second in Age Group, Boulder Ironman, Boulder, CO, September 2001, 2.4 mile swim, 112 mile bike, 26.1 mile run
- Sixth in Age Group, Long Course National Championships, Tupper Lake, NY July 2001, 1.2 mile swim, 56.1 mile bike, 13.1 mile run
- First in Age group, Pinehurst International Triathlon, Pinehurst, NC, October 2001

- Third in Age Group, White Lake Half-Ironman, White Lake, NC, May 2001, 1.2 mile swim, 56.1 mile bike, 13.1 mile run
- Eighth in Age Group, Eagleman Half-Ironman, Cambridge, MD, June 2001, 1.2 mile swim, 56.1 mile bike, 13.1 mile run
- Qualified for the United States Long Course Triathlon Team in 2000, 2001, and 2003.
- Second in Age Group, USC French Broad River Classic Time Trial, August 2001.
- Fourth in Age Group, USCF French Broad River Classic Time Trial, August 2003.
- First in Age Group, Kings Mountain, NC, International Distance Triathlon, July 2003.

The United States Cycling Federation (USCF) road races where I served as Course Engineer or as Race Promoter are as follows:

- Tennessee Pro Classic – This is a one day road race held in the United States since the 1930's. The race consisted of several stages, including a criterium and stage races.
- Johnson City Spring Classic – This is a one day road race held on a completely closed course.
- District USCF Championships – This was a 100 mile road race held over mountainous terrain with multiple support vehicles and multiple classes of racers.
- Greeneville Fun Fest Race – This was a closed course road race involving support crews and multiple classes of racers.
- Kingsport Criterium – This was a closed criterium course consisting of all classes of racers as well as a technically demanding course.