# Richard A. Mink, MSME, PE

Senior Consultant

Mr. Mink is a Senior Consultant in the Automotive Practice Group at Engineering Systems Inc. (ESi). His work at ESi focuses on vehicle crash investigations and analyses, including the retrieval and analysis of vehicle crash data, and vehicle crash reconstructions. He performed similar work while employed as a consultant by Brach Engineering, which became part of ESi in 2014. He earned a Master of Science degree in Mechanical Engineering from Purdue University and a Bachelor of Science degree, Cum Laude, in Mechanical Engineering from The University of Toledo.

Before joining ESi, he was employed as a mechanical engineer by Navistar, Inc., an original equipment manufacturer (OEM) of heavy trucks and buses. Initially, while working in Navistar's Applied Mechanics Laboratory, he conducted numerous tests and analyses pertaining to the performance, strength, or durability of various heavy truck systems and components, including cab structure, occupant seating, occupant restraint systems, and various chassis components. Later, while working in Navistar's Product Integrity Group, he investigated numerous heavy truck crashes and fires and provided technical consultation and testimony in numerous product liability matters pertaining to heavy truck crashworthiness, compliance with federal regulations and industry standards, and the performance of heavy truck systems and components.

Before working as an engineer, Mr. Mink was a commissioned officer (Lieutenant) in the United States Navy. He served primarily as a copilot and weapons systems operator in a carrier-based jet aircraft (Lockheed S-3 Viking) performing airborne antisubmarine and antishipping warfare and various carrier air wing support roles. In addition to flying, Mr. Mink served as his squadron's Occupational Safety and Health (NAVOSH) officer and hazardous materials officer.

Mr. Mink is a licensed Professional Engineer (PE) in Indiana and Ohio and an SAE-certified accident reconstructionist. He also holds a Class A Commercial Driver's License in Indiana, with endorsements for tank vehicles, double/triple trailers, passenger transport, and school buses.

## Licenses & Certifications

- State of Indiana License No. PE10201218
- State of Ohio License No. PE.84922

**Richard A. Mink**
Senior Consultant

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**ESi**
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Aurora, IL 60504

**Education**

Master of Science (MS) in Mechanical Engineering; Purdue University, West Lafayette, Indiana

Bachelor of Science (BS) in Mechanical Engineering, Cum Laude; The University of Toledo, Toledo, Ohio

**Areas of Specialization**

Vehicle Crash Data Retrieval and Analysis for Heavy and Light Vehicles

Vehicle Crash Investigation, Analysis, and Reconstruction

Commercial Vehicle Cab Structure, Seats, Occupant Restraints, Steps, and Grab Handles

Compliance with Federal Motor Vehicle Safety Standards, ECE Regulations, and Industry Standards

Compliance with Federal Motor Carrier Safety Regulations

## Positions Held

### Engineering Systems Inc.–Aurora, Illinois

- Senior Consultant, 2022 – present
- Senior Staff Consultant, 2019 – 2021
- Staff Consultant, 2014 – 2019

### Brach Engineering, LLC–Granger, Indiana

- Consulting Engineer, 2012–2014

### Navistar, Inc.–Fort Wayne, Indiana

- Mechanical Engineer, 1995–2012

### Purdue University–West Lafayette, Indiana

- Graduate Student, 1993–1995

### United States Navy–Pensacola, Florida and San Diego, California

- Naval Flight Officer, 1987–1993

## Publications

### Contributor to SAE International's Dictionary of Vehicle Accident Reconstruction and Automotive Safety,

By R. Matthew Brach, PhD, PE, Publication R-556, SAE International, 2023

### "Videogrammetry in Vehicle Crash Reconstruction with a Moving Video Camera,"

Manuel, E., **Mink, R.**, and Kruger, D., SAE Technical Paper 2018-01-0532, 2018, doi:10.4271/2018-01-0532.

### "Nonlinear Optimization in Vehicular Crash Reconstruction,"

Brach, R., Brach, R., and **Mink, R.,** SAE Int. J. Trans. Safety 3(1):2015, doi:10.4271/2015-01-1433.

## Continuing Education Courses Completed

- **Event Data Recorder Update and Analysis**, Ruth Consulting, September 2023
- **Advanced Applications of Heavy Vehicle EDR Data**, SAE, 2022
- **Bendix Advanced Technology Training**, Bendix Spicer Foundation Brake LLC, 2021
- **Traffic Signal Timing Records Interpretation and Analysis**, The University of Tennessee, 2020
- **Applying Automotive EDR Data to Traffic Crash Reconstruction**, SAE, 2019
- **Applied Vehicle Dynamics Course**, Precision Auto Research, 2018
- **Pedestrian/Bicycle Crash Investigation**–Level I, University of North Florida, 2018
- **Human Factors in Traffic Crash Reconstruction**, University of North Florida, 2017
- **Vehicle Dynamics for Passenger Cars and Light Trucks**, SAE, 2017

- **Fundamentals of Heavy Truck Dynamics**, SAE, 2017
- **Reconstruction and Analysis of Rollover Crashes of Light Vehicles**, SAE, 2016
- **Reconstruction and Analysis of Motorcycle Crashes**, SAE, 2016
- **Crash Data Retrieval (CDR)–Data Analyst**, Northwestern University, 2016
- **Vehicle Crash Reconstruction Methods**, SAE, 2015
- **Crash Data Retrieval (CDR)–Technician Level 1**, Collision Safety Institute, 2014
- **Accessing and Interpreting Heavy Vehicle Event Data Recorders**, SAE, 2014
- **Commercial Vehicle Air Brake Systems Training**, Bendix Spicer Foundation Brake LLC, 2013
- **Traffic Accident Investigation 7**–Commercial Vehicle, Michigan State University, 2012
- **Hands-On Vehicle Fire/Arson Investigation**, Public Agency Training Council, 2011
- **Fire Investigation and Product Liability Litigation**, University of Wisconsin, 2008
- **Fire/Arson Investigation**, IVY Tech Community College, 2007
- **Vehicle Frontal Crash Occupant Safety and CAE**, SAE, 2007
- **Modern Investigation Techniques**, IAAI, Ohio Chapter, 2007
- **Commercial Vehicle Braking Systems**, SAE, 2005
- **Design FMEA Participant Workshop**, Eastern Michigan University, 2005
- **Mechanics of Heavy-Duty Truck Systems**, University of Michigan, 2004
- **Traffic Accident Reconstruction**, Northwestern University, 2003
- **CVSA Inspection Familiarization**, Commercial Vehicle Safety Alliance, 2002
- **Heavy Vehicle Rollover TOPTEC**: Prevention, Analysis and Reconstruction, SAE, 2000
- **Injuries, Anatomy, Biomechanics & Federal Regulation**, SAE, 2000

## Patents:

- Hybrid Electric Vehicle Battery Box and Supports, U.S. Patent 6,547,020
- Seat Belt Anchor and Method of Installation in a Mobile Vehicle, U.S. Patent 6,158,774

## Professional Affiliations/Honors

- **SAE International (SAE)**
- **National Society of Professional Engineers (NSPE)**
- **Pi Tau Sigma** (International Mechanical Engineering Honor Society)

## Project Experience

Vehicle Crash Investigation, Analysis, and Reconstruction

- Analyzed light vehicle event data and police scene photographs and measurements to reconstruct a fatal crash in which an SUV struck the side of a tractor-trailer as it passed through a rural intersection. Provided rebuttal to the police reconstruction and determined alternative actions that would have allowed the SUV driver to pass behind the tractor-trailer after it had passed through the intersection.
- Analyzed police scene photographs and measurements, vehicle photographs, Google Earth images, and other available evidence to reconstruct a fatal crash in which an SUV accelerated rapidly from a side street into the path of an oncoming heavily laden dump truck and was struck by the dump truck.

- Analyzed dash camera video and vehicle photographs to reconstruct a collision between a tractor-trailer and a car in which the car's occupants alleged serious injuries after the tractor-trailer partially changed lanes and contacted the side of the car. Provided rebuttal to the opposing recontructionist's opinions. Analyzed available event data from a substantially similar crash in a NHTSA crash database to show that the subject crash was relatively benign with little chance of injuring the car's occupants as alleged.
- Analyzed heavy vehicle event data, crash site inspection data, and vehicle characteristics to determine the rollover threshold speed for the subject loaded tractor-trailer at the crash location and concluded that the subject rollover was solely due to excessive speed in a curve and not due to "load shift" as Plaintiff alleged.
- Analyzed an ejected motorcyclist's "throw" distance from impact to rest, light vehicle event data, and police scene photographs and measurements to reconstruct a fatal crash in which two motorcyclists struck a car as it was turning left from a side street onto a larger thoroughfare where the motorcyclists were traveling. Provided rebuttal to the surviving motorcyclist's testimony that they had been traveling near the posted speed limit when the crash occurred.

## Commercial Vehicle Cab Structure and Crashworthiness

- Provided opinions and testimony regarding the design, development, and testing of a heavy truck OEM's tractor cab that was involved in a fatal post-collision rollover crash. Provided opinions and testimony regarding the development and effectiveness of SAE Recommended Practice J2422 and ECE Regulation Number 29. Provided rebuttal to the opposing crashworthiness experts' opinions and testimony regarding the subject cab design, their ad hoc cab strength testing, and their proposed alternative design. Prepared to testify regarding significant differences between heavy truck and light vehicle rollover dynamics and how that influences respective crashworthiness test protocols.
- Provided opinions and testimony regarding the design, development, and testing of a heavy truck OEM's truck cab involved in a fatal offset frontal crash with underride into the rear of another heavy truck. Provided opinions and testimony regarding the development and effectiveness of SAE Recommended Practice J2420 and ECE Regulation Number 29 and how they compare to light vehicle crashworthiness standards. Provided rebuttal to the opposing crashworthiness experts' opinions and testimony regarding the subject cab design and their proposed alternative design.

## Compliance with Federal Motor Vehicle Safety Standards and Federal Motor Carrier Safety Regulations

- Reviewed the available FMVSS compliance documentation for a specialty heavy truck manufacturer and advised them on record keeping and testing to demonstrate compliance with applicable FMVSSs and industry standards, including those pertaining to vehicle lighting, pneumatic braking, seat and seat belt anchorage strength, cab strength, steps and handholds, etc.
- Provided opinions regarding the hiring, qualifications, and monitoring of a commercial motor vehicle driver in accordance with 49 CFR Parts 383 and 391.
- Provided opinions regarding the responsibility of a commercial motor vehicle driver to inspect his vehicle and cargo before, during, and after driving and to ensure the cargo is properly secured in accordance with 49 CFR Parts 392, 393, and 396.