



**PHILIP J. DAUM, P.E.**  
**PRINCIPAL**

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Mr. Daum is a Principal at Engineering Systems Inc. (ESI) who specializes in mechanical engineering, research, development, and experimental testing. He has conducted complex, multidisciplinary research and accident investigations pertaining to freight and transit railroads, cargo and portable tanks, transportation equipment systems and components, and hazardous materials. His evaluations include the areas of reliability, durability, crashworthiness, security performance and regulatory compliance. His 39 years of industrial experience includes design of railroad rolling stock, truck/bogies, brakes, draft systems, valves, pressure relief devices, safety equipment, and operating components/systems. He is also experienced in technology evaluations, intellectual property analysis, equipment qualification, health monitoring, and maintenance.

**Areas of Specialization**

Freight and transit cars	Pressure relief devices
Hazardous materials transportation	Valves and fittings
Transportation security	Railroad wheels, axles and bearings
Transportation accident investigations	Castings and machined components
Railroad safety appliances	Railroad draft systems
Braking systems	Railroad rolling stock
FELA	Cargo and portable tanks
Accident reconstruction	Failure Analysis

**Education**

B.S., Mechanical Engineering, University of Illinois at Urbana-Champaign, 1981  
A.S., Engineering, Moraine Valley Community College, Palos Hills, IL, 1978  
Cooperative Work-Education Program  
David W. Taylor Naval Ship R. & D. Center, Bethesda, MD, 1979–1980  
Continental Can Corporation, Chicago, IL, 1978

**Licensed Professional Engineer**

State of Illinois..... License No. 062-045260  
State of California..... License No. M-37660 - Retired Professional Engineer

*Dec 2025*

## **Professional Affiliations**

### **Transportation Research Board (TRB)**

Committee for Review of the Federal Railroad Administration's (FRA's) Research and Development (R&D) Program, 2019 – 2020

Committee on the Review of Department of Transportation Testing of Electronically Controlled Pneumatic (ECP) Brakes, Transportation Research Board, National Academies of Sciences, Engineering, and Medicine, 2016 – 2017

Contributed at briefings for Department of Transportation and U.S. Congressional Staff, February and October 2017

Member, Committee on Transportation of Hazardous Materials (AT040), 2006 – 2015

Associate Member, Railroad Operational Safety Committee, 2007 – 2020

TRB Human Factors Conference: Safety Culture Measurement, January 2016

Peer Reviewer, U.S. Department of Transportation, Federal Railroad Administration (DOT-FRA) Research Review, Hosted by TRB, 2009, 2011, & 2012

Peer Reviewer, TRB Technical Papers, 2009 & 2010

Human Factors Implementation – Workshop, January 2009

Transportation of Renewable Fuels: Risk and Preparedness in a Changing World, Co-organizer, January 2009

Rail Hazmat Safety and Security: Research, Modeling, and Testing, Co-chairman, January 2008

Proactive Risk Management Safety Approaches for Managing Human Factors Caused Accidents in the Railroad Industry – Workshop, January 2007

Workshop for the U.S. Government Accounting Office (GAO) evaluation of security measures for hazmat transportation by rail, Invited tank car subject matter expert, June 2002

### **National Transportation Safety Board (NTSB)**

Invited member of various ad hoc investigative teams, including crude-by-rail derailment investigations

Coordinated a meeting between the National Transportation Safety Board (NTSB) and the RSI-AAR Tank Car Safety Project (Safety Project) oversight committee that led to a Memorandum of Understanding whereby NTSB invited the Safety Project to become a Party to certain future NTSB rail accident investigations, with ESI participating on behalf of the Safety Project, January 2014

### **Transportation Safety Board of Canada (TSB)**

Invited subject matter expert for crude-by-rail derailment investigations, including Lac-Mégantic

### **Advanced Tank Car Collaborative Research Program (ATCCRP)**

Coordinated the development and implementation of the initial 5-year research and development plan

Technical Advisor, 2010 – 2012

Program Director, 2009 – 2010

**Next Generation Railroad Tank Car Project (NGRTC)**

Lead Contractor – Design & Construction, 2007 – 2008

Member, External Advisory Panel, 2006 – 2007

**Society of Automotive Engineers (SAE International)**

Member, 2014 – Present

**American Society of Mechanical Engineers (ASME)**

Rail Transportation Division (RTD) Assistant Technical Program Chair, 2010

Member of Rail Transportation Division (RTD), 2006 – Present

Peer Reviewer, ASME-RTD Technical papers, 2008 – 2010

Member of the Section XII Committee on Continuing Qualification Requirements for  
Transportation Containers, 1999 – 2001

**Chicago Railroad Superintendents Association (CRSA)**

Member, 2007 – 2019

**American Short Line & Regional Railroad Association (ASLRRA)**

Member, 2007 – Present

**American Railway Engineering and Maintenance-of-Way Association (AREMA)**

Member, 2006 – Present

**Association of American Railroads (AAR) Tank Car Committee (TCC)**

Member of Executive Committee, 1998 – 2006

Chairman of the Material & Design (M/GD&E) Working Group, 1999 – 2001

Chairman of the Tank Car Qualification Guidelines Task Force, December 2000. Coordinated  
an industry-wide workshop which resolved significant issues with new federal  
maintenance planning rules

Liaison to the AAR Hazardous Material Working Group, 1999

**AAR's Hazardous Material Critical Action Team**

Contributed to the development of the hazmat portion of the AAR's National Security  
Management Plan

Charter member – tank car design subject matter expert, October 2001 – 2004

**Railway Supply Institute (RSI) Engineering & Technical Subcommittee**

Member, 1995 – 2006

Chairman, 2001 – 2002

### **Chlorine Institute (CI)**

Hydrochloric Acid Rubber Lining Condition Monitoring Task Group,

Ex-officio member, 2008 – 2014

Chairman, 2006 – 2008

Chairman, Tank Car Subcommittee, 2004 – 2006; Vice-Chairman, 2000 – 2004

Member, 1998 – 2008

Invited speaker at special session on future chlorine tank car specifications, Atlanta, GA, 2005

### **Side Bearing Testing Consortium**

Chairman, 2003 – 2005

### **American Association of Railroad Superintendents (AARS)**

Member, 2006 – 2008

### **American Petroleum Institute (API) Railroad Transportation Committee**

Member, 2001 – 2006

## **Positions Held**

### **Engineering Systems Inc., Aurora, IL**

Principal, August 2014 – Present

Director of Rail 2018 – 2022

Senior Managing Consultant, 2010 – July 2014

Senior Consultant, 2006 – 2010

### **Union Tank Car Company, East Chicago, Indiana**

Director of Engineering, 1998 – 2006

Chief Product Engineer, 1991 – 1998

Product Engineer, 1987 – 1991

Project Engineer, 1984 – 1987

### **General Electric Railcar Services Corporation, Chicago, Illinois (Originally North American Car Corporation)**

Mechanical Engineer, 1981 – 1984

## **Continued Education**

University of Illinois RailTEC William Hay Railroad Engineering Seminars, 2006 – Present

Metra Mental Health Awareness Symposium, Suicide Prevention and Railroad Safety, October 2019

FARO Focus 3D Scanner, Certified Technician

FARO Technologies, June 2015

**Traffic Crash Reconstruction**

Northwestern University Center for Public Safety, Ann Arbor, MI, January 2015

**Vehicle Crash Reconstruction Methods**

Society of Automotive Engineers, Troy, MI, December 2014

**U.S. Department of Homeland Security**

Transportation Security Administration (DHS-TSA) SECRET Clearance, 2012 – 2020

Union Pacific Derailment Investigation Course, October 2011

NTSB Accident Investigation Orientation for Rail Professionals, July 2011

Department of Homeland Security (DHS) Toxic Inhalation Hazard (TIH) release and dispersion tests;  
Dugway, UT, Invited Guest 2010

ASME Joint Rail Conferences, Annual Technical Conferences, 2006 – 2010

ASME Rail Transportation Division (RTD) Fall Technical Conferences, 2006 – 2010

ASSE Hazard Recognition for the Field Employee, February 2010

FMCSA National Truck and Bus Crash Picture Webinar, February 2011

University of Illinois Railroad Environmental Conference, 2006, 2007, 2008, 2009

BNSF Derailment Analysis and Prevention Workshop, May 2007

40 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training for Initial  
Site Workers (29CFR 1910.120), 2006

**Derailment Investigation and Prevention Seminar**

Sponsored by the American Association of Railroad Superintendents, November 2006

**Powered Industrial Truck Operator Safety Training**

Certified 2012 - Present

**Patents**

Combination Bottom Outlet Saddle and Sump, U.S. Patent No. 4,892,042, issued 1990, Canadian  
Registration No. 1,310,542, issued 1992

**Technical Presentations**

Tank Car Damage Assessment Guidelines, Security and Emergency Response Training Center  
(SERTC) Teach-Back Session, January 2022

Tank Car Damage Assessment Guidelines, Union Pacific Railroad Hazardous Materials Department,  
October 2021

Toxic Tort Litigation Issues, Benjamin R. Slater III, Esq., Robert A. Wells, and Philip J. Daum, NARTC, La Jolla, CA, 2017

Lessons from the Field — Risk Assessment, RSA Rail Forum, RSA Rotterdam and London Offices, September 2015

Crude by Rail Safety, Chicago Railroad Superintendent Association, October 2014

Visual Data: 3-Dimensional Laser Scanning, Global Level Crossing Symposium, Champaign, IL August 2014

Scene Preservation for Future Safety, American Short Line and Regional Railroad Association, Annual Meeting, Mechanical breakout Session, San Diego, CA, April 2014

Scene Freeze-Frame in 3-D, AREMA Student Chapter, University of Illinois, Champaign, IL, January 2014

RSI-AAR Tank Car Safety Project, Lac-Mégantic, Quebec, Investigation, Factual Information Meeting at Transportation Safety Board of Canada's Engineering Laboratory, Ottawa, Ontario, December 2013

Damage Assessment Task Force, Norfolk Southern Damage Assessment Class, Charlotte, NC, November 2013

Scene Freeze-Frame in 3-D, Association of American Railroads General Claims Conference, Palm Beach, FL, October 2013

"Advanced Tank Car Collaborative Research Program," Chlorine Institute meetings, Charlotte, NC, October 2009 and New Orleans, LA, March 2010

"Rubber Lining Condition Monitoring Test Results," Chlorine Institute Hydrochloric Acid Forum, New Orleans, LA, March 2010 and Nashville, TN, September 2010

"The Initial Forensic Investigation," American Short Line and Regional Railroad Association (ASLRRA) Liability Seminar, Boston, MA, July 2009

"Preventing Release – Improved Puncture Resistance of Hazardous Materials Tank Cars," University of Illinois Railroad Environmental Conference, November 2008

"Hydrochloric Acid Rubber Failure Analysis," Chlorine Institute Fall Meeting, Broomfield, CO, September 2008

"Hydrochloric Acid Rubber Lining Condition Monitoring," Presentation at the Chlorine Institute Hydrochloric Acid Forum, Houston, TX, March 2007

"Tank Car Journal Bearing Investigation," Presentation at the Chlorine Institute Tank Car Forum, Houston, TX, March 2007

"Chlorine Tank Car," Chlorine Institute's Fall Meeting, Atlanta, GA, September 2005

“Tank Car and Fittings Design,” Training course and tour of production facilities for Class 1 Railroad  
Emergency Response Teams

Union Pacific Railroad Company, 2005 (two sessions)

BNSF, 2003

CSX Transportation, 2000, 2001

Norfolk Southern Corporation, 2004

AAR Transportation Technology Center Inc. (TTCI) Hazmat Instructors, 1999

## Technical Publications

“Assessment Best Practices - Tank Car Damage,” Contributors: Hazardous Materials Committee of the  
Association of American Railroads (HMC-AAR), May 2021

TRANSCAER 2020 “*Seconds Count*” Video Series, “*Rapid Scene Size-Up (Tank Cars)*,” Invited  
subject-matter-expert co-author, CHEMTREC®, TRANSCAER®, American Chemistry Council,  
January – December 2020

“Review of the Federal Railroad Administration’s Research and Development Program, Transportation  
Research Board Special Report 334,” a Consensus Study Report of the National Academies of  
Sciences, Engineering, and Medicine, December 2020

“A Review of the Department of Transportation’s Testing and Analysis Results for Electronically  
Controlled Pneumatic Brakes: Letter Report (Phase 2),” Contributors: Committee on the Review  
of the Department of Transportation Testing of Electronically Controlled Pneumatic (ECP)  
Brakes; Policy Studies; Studies and Special Programs Division; Transportation Research Board;  
National Academies of Sciences, Engineering, and Medicine, October 5, 2017,  
<http://www.trb.org/main/blurbs/176644.aspx>

“A Review of the Department of Transportation Plan for Analyzing and Testing Electronically Controlled  
Pneumatic Brakes,” Contributors: Committee on the Review of Department of Transportation  
Testing of Electronically Controlled Pneumatic (ECP) Brakes; Policy Studies; Transportation  
Research Board; National Academies of Sciences, Engineering, and Medicine, February 17,  
2017, <http://www.trb.org/Main/Blurbs/175476.aspx>

“Energy Transportation Safety on the Rails: Historical Perspectives on Applied and Cooperative  
Research,” article in TR News 298, June-July-August 2015,  
<http://www.trb.org/Main/Blurbs/173066.aspx>

"Feasibility Study for Highway Hazardous Materials Bulk Package Accident Performance Data Collection," HMCRP Report 10: Transportation Research Board of the National Academies, Washington, D.C., 2013, [www.trb.org/HMCRP/Blurbs/168492.aspx](http://www.trb.org/HMCRP/Blurbs/168492.aspx)