

Exponent®
Engineering & Scientific Consulting

Joe Palazzolo, M.S., SAE Fellow

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Professional Profile

Joe Palazzolo, M.S., SAE Fellow, is a senior manager in Exponent's Vehicle Engineering practice with over 30 years of experience in automotive propulsion systems, drivetrain design, and vehicle systems engineering. He advises OEMs, tier suppliers, and legal counsel on propulsion and driveline failures, product liability, standard of care, and aftermarket modifications.

Vehicle Propulsion Systems Expertise

Mr. Palazzolo brings deep, hands-on expertise across the full spectrum of vehicle propulsion and power distribution systems, including internal combustion engines (ICE), battery electric vehicle (BEV) drivetrains, hybrid electric systems (HEV/PHEV), automatic and manual transmissions, continuously variable transmissions (CVT), dual-clutch transmissions (DCT), transfer cases, all-wheel drive (AWD) and four-wheel drive (4WD) systems, driveshafts, halfshafts, axles, power transfer units (PTUs), differentials, torque management devices, brakes, bearings, gears, and castings. He advises automotive OEMs, tier-one and tier-two suppliers, off-highway equipment manufacturers, and construction equipment companies on the design, performance, and failure of these systems. His 23 years of practice as an ASE Certified Master Technician and Undercar Specialist — combined with decades of hands-on fabrication and diagnostics — give him a practical, ground-level understanding of how these systems behave in real-world service conditions that few engineering consultants can match.

Automotive Industry Standard of Care

Mr. Palazzolo advises clients on automotive industry standard of care, best practices, preventative maintenance protocols, service and repair procedures, and warranty obligations. Drawing on his background as an SAE Fellow, Master Instructor, and credentialed automotive technician, he evaluates whether vehicle systems were designed, manufactured, serviced, and maintained in accordance with applicable industry standards and OEM specifications. He assists legal teams, insurers, and manufacturers in determining whether the conduct of engineers, technicians, dealers, or fleet operators met or deviated from the accepted standard of care in the automotive industry, a critical question in product liability litigation, warranty disputes, and regulatory proceedings.

Automotive Product Liability & Intellectual Property

Mr. Palazzolo supports clients facing product liability claims, defect investigations, safety recalls, and intellectual property (IP) disputes involving automotive systems and components. He evaluates alleged design defects, manufacturing defects, and failure-to-warn claims across propulsion, drivetrain, and chassis systems. In IP matters, he provides technical analysis in patent infringement disputes, drawing on his own portfolio of 16 issued U.S. patents covering power transfer units, torque management devices,

differentials, and electric vehicle axle systems. Mr. Palazzolo has served as an expert witness in automotive product liability and IP litigation proceedings.

Automotive Design & Validation

Mr. Palazzolo assists clients with the full product development lifecycle for vehicle systems and components — from early concept inception through design verification, validation, and volume production launch. His methodology integrates failure mode and effects analysis (FMEA), design verification plan and report (DVP&R), root-cause analysis (RCA), and systems-level engineering to identify design vulnerabilities before they reach the field. He has led cross-functional engineering teams at major automotive OEMs and suppliers, managing programs that span powertrain, chassis, and electrified drivetrain systems. This experience makes him particularly effective in evaluating whether a manufacturer's design and validation process met industry expectations, a central issue in many product liability and recall matters.

Aftermarket Retrofits

Mr. Palazzolo advises clients on the engineering, safety, and liability implications of aftermarket vehicle modifications and retrofit systems, including drivetrain upgrades, axle conversions, suspension modifications, brake system changes, and electrification retrofits. He evaluates whether aftermarket components and installation practices conform to applicable standards, OEM specifications, and industry best practices — and whether deviations from those standards contributed to a vehicle failure or accident. His published works on axle design and repair, combined with his decades of hands-on fabrication experience, give him authoritative standing to assess the technical adequacy and safety of aftermarket modifications across passenger vehicles, trucks, SUVs, and off-highway equipment.

Academic Credentials & Professional Honors

Masters, Automotive Engineering, Lawrence Technological University, 1999

Bachelors, Mechanical Engineering, Cleveland State University, 1994

SAE Fellow Grade, 2013

International Automotive Media Award, 2010

SAE Forest R. McFarland Award, 2007

Academic Appointments

Guest Lecturer at Lawrence Technological University and Oakland University, Master's Programs on Powertrain Integration, 2000-2018

Prior Experience

Global Engineering Director, Dana Incorporated, 2023-2024

Director of Business Development, Dana Incorporated, 2021-2023

eDrive Director, GKN Automotive, 2018-2021

Technical Fellow, GKN Automotive, 2014-2021

Chief Engineer, GKN Automotive, 2006-2014

Systems Design Engineer, Magna Powertrain, 2002-2006

Propulsion Systems Manager, Wavecrest Labs, 2003-2005

AWD Systems Technical Fellow, Ford/Visteon, 1998-2003

Powertrain Development Engineer, Warn Industries, 1996-1998

Aftermarket and Off-road hardware support, Warn Industries, 1996-1998

Resident Engineer at Fords Arizona Proving Grounds, Carron & Company, 1995-1996

Application Engineer, Carron & Company, 1994-1995

Automotive Mechanic, Sears, Roebuck & Co., Auto Service Center

Professional Affiliations

American Society of Mechanical Engineers (ASME) Member

National Association of Fire Investigators (NAFI) Member

Society of Automotive Engineers (SAE) Fellow

SAE Master Instructor

SAE All-Wheel Drive Standards Committee – Contributing Member

Patents

US Patent 9,903,420 Shift Collar Assembly For A Power Transfer Unit, February 2018 (Engerer, Gerding, Arden, Ohsiek, Oram)

US Patent 9,003,925 Twin Electronic Torque Management Device, April 2015 (Corliss, Oram, Schmalenberg)

US Patent 8,234,955 Power Transfer Unit With Disconnecting Input Shaft, August 2012 (Bock)

US Patent 7,270,026 Differential Assembly, September 2007 (Atkinson)

US Patent 7,256,526 Integrated Stator-Axle For In-Wheel Motor Of An Electric Vehicle, August 2007 (Perkins, Peyghaleh, Benson)

US Patent 7,059,460 Hydraulic Coupling System, June 2006 (Duan, Macklem, Rahaim, Anwar, Monkaba, Perkins, Wisniewski, Kendall)

US Patent 6,830,529 Torque Transfer Assembly With Planetary Differential, December 2004 (Phelan, Perkins, Kendall)

US Patent 6,783,474 Torque Controller For Controlling Torque To Two Or More Shafts, August 2004 (Phelan)

US Patent 6,725,744 Power Train Assembly, April 2004

US Patent 6,719,660 Power Train Assembly, April 2004

US Patent 6,702,701 Oil Pump With Integral Fast Acting Valve For Controlling Planetary System Torque, March 2004 (Phelan, Kendall)

US Patent 6,688,851 Oil Pump For Controlling Planetary System Torque, February 2004 (Phelan)

US Patent 6,672,850 Torque Control Oil Pump With Low Parasitic Loss And Rapid Pressure Transient Response, January 2004 (Phelan)

US Patent 6,663,527 Planetary Gear System for Controlling Torque In A Vehicle Driveline, December 2003 (Phelan)

US Patent 6,620,069 Power Transfer Unit, September 2003

US Patent 6,605,018 Power Transfer Unit, August 2003

Publications

Palazzolo, Joe Volume 3, Part 4: Transmission and Driveline, Chapters 99 – 101:1749 - 1781. Encyclopedia of Automotive Engineering, John Wiley & Sons, Inc. 2015

Palazzolo, Joe Ford Differentials: How to Rebuild the 8.8 and 9 Inch, CarTech Books, 2013

Palazzolo, Joe High Performance Differentials, Axles, and Drivelines, CarTech Books, 2009

Palazzolo, Joe The Global 4WD-Driveline Market, 2002 – 2010, J.D. Power-LMC, 2004

Presentations

Palazzolo, Joe Drivetrain Design for Hybrid & Electric Vehicles, Society of Automotive Engineers (SAE) Virtual Drivetrain Summit 2011

Palazzolo, Joe High performance electric front axle for the Porsche 918 Spyder, Society of Automotive Engineers (SAE) All-Wheel Drive Symposium 2014.

Palazzolo, Joe Multi-mode eTransmission for the Mitsubishi Outlander, Car Training Institute (CTI) Symposium 2015.

Palazzolo, Joe Global Collaboration and Role of OEM and Suppliers in Making of Successful Electric Vehicles, IEEE Transportation and Electrification Conference (ITEC) 2015.

Palazzolo, Joe, Haeniche, Anja Innovative 2nd Generation eAxle for the new plug-in hybrid BMW 225XE, Society of Automotive Engineers (SAE) All-Wheel Drive Symposium 2016.

Palazzolo, Joe The Past and Future of Electrified Vehicle Industry, IEEE Transportation and Electrification Conference (ITEC) 2016.

Palazzolo, Joe Transmissions in Electrified Propulsion Systems, IEEE Transportation and Electrification Conference (ITEC) 2016.

Palazzolo, Joe Multi-mode Transmission a unique Hybrid Transmission Concept, Car Training Institute (CTI) Symposium 2016.

Palazzolo, Joe, Haeniche, Anja Innovative 2nd Generation eAxle for the new plug-in hybrid BMW 225XE,

Car Training Institute (CTI) Symposium 2017.

Palazzolo, Joe Impact of Electrification of Passenger Vehicles on Traditional Mechanical Design and Integration, IEEE Transportation and Electrification Conference (ITEC) 2018.

Palazzolo, Joe An Innovative Approach to a Coaxial Planetary P4 eAxle, Society of Automotive Engineers (SAE) Innovations in Mobility 2019.

Palazzolo, Joe An Innovative Approach to a Coaxial Planetary P4 eAxle, Car Training Institute (CTI) Symposium 2020.

Palazzolo, Joe Modular and Scalable Electric Rigid Beam Axles for Next Generation Trucks and SUVs, Car Training Institute (CTI) Symposium 2022.

All-Wheel Drive A Practical Manual, First edition 2009, Second edition 2016. Lead Outside Editor & Contributor

Fundamentals of Automotive Technology Principles and Practice, Jones & Bartlett Learning 2014

Project Experience

Vehicle System and Component Development:

- Upfront new concept ideation, systems interaction, market assessments, and technical feasibility reviews
- Litigation support for vehicle system and component level claims along with engineering analysis for total propulsion systems including engines, transmissions, all-wheel drive, steering/suspension, axles, brakes, and fuel and exhaust systems

Vehicle Recall and Warranty:

- Insurance – Vehicle, system, and component design and manufacturing defect identification and root-cause investigation
- Warranty claims evaluations and assessment with field data and technical documents review
- Arbitration tribunal response and dispute review to evaluate claimed defects, repairs adequacy, and manufacture or supplier responses
- Assessment of supplier manufacturing and support standards

Vehicle Product Litigation

- Internal combustion engine class action allegations
- Steering, suspension, brake, transmission, and all-wheel drive interactions and performance allegations
- Manufacturing and design issues with fuel systems

Automotive Standard of Care

- Assessment of service and repair procedures, maintenance practices, and applicable standards of care for automotive and motorcycle systems and components including brakes, wheels,

clutches, gaskets, engines, transmissions, axles, all-wheel drive systems, fasteners, batteries, trailers, exhaust systems, etc.

- Evaluations of proper equipment usage and maintenance of tools, equipment, jacks, stands, etc.

Additional Education & Training

Vehicle Level

Introduction to NVH Aspects of Hybrid and Electric Vehicles, 2016

Applied Vehicle Dynamics, 2015

Certified Vehicle Electrification Professional, 2013

Powertrain Selection for Fuel Economy and Acceleration Performance, 2008

Tier 3 Certified Driver, Ford Romeo, Continental Tire, 2005

Fundamentals of Vehicle Dynamics, 2004

Bridgestone Winter Drive School, 2003

System Level

High-Performance Brake Systems, 2010

Hybrid and Electric Vehicle Engineering Academy, 2006

LMS NVH Training, 2005

Introduction to Brake Control Systems: ABS, TCS, and ESC, 2004

Advanced 4wd and Terramechanics, 2003

Design and Process Failure Modes and Effects Analysis (FMEA), 2003

Component Level

The Essentials of Gasoline Direct Injection (GDI), Bosch, 2026

Selecting and applying the right gasket maker, Permatex online training, 2026

Selecting and applying the right threadlocker, Permatex online training, 2026

Loctite Threadlocking Training certification, 2026

Bendix Online Air Brake Training Course ABT101, 2026

The physics and design for EMC compatibility, 2017

Balancing and vibration control technology training, 2013

Bearing Design and Selection by Timken, 2012

Fundamentals of Modern Vehicle Transmissions, 2009

Engine Design Seminar, 2009

Wet Clutch and Brake Seminar, 2008

Fundamentals of Gear Design and Application, 2008

Practical Problem Solving, 2008

Fundamentals of Gear Design, 2007

Introduction to ProE Modelling I and II, 2005

Introduction to Gears, 2005

Matlab Fundamentals, 2005

EV Motor Design Analysis and Test Verification, 2005

Superflow Engine components design, testing and validation, 2003

Structured Inventive Thinking, Intro to TRIZ, 2003

Solidworks Modelling, 2003

Eight Disciplines, 1998

Tolerance Stack-Up Fundamentals, 1996

Leadership

Strategic Leadership, 2014

Situational Leadership, 2006

Team Building, 2006

Patent, Trademark, and Copyright Law, 2006

Engineering Project Management, 2005

Dale Carnegie Presentation and Public Speaking, 2002

Editorships & Editorial Review Boards

As a direct result of Mr. Palazzolo's professional work and ability to explain complex systems in laymen's terms, he was commissioned by the Society of Automotive Engineers (SAE) to create and deliver three separate professional development seminars. These seminars have been recognized and his approach has earned him the Master Instructor credential and McFarland Award. These seminars cover the broad areas of propulsion systems (transmissions, propshafts, all-wheel drive, axles, brakes), vehicle dynamics and controls. Hundreds of engineers and non-engineers have attended these courses since their inception.

Mr. Palazzolo was also commissioned by CarTech Books to author two books focusing on axle design and repair, while "ghost" authoring and illustrating multiple others.