

Exponent®
Engineering & Scientific Consulting

Matt Edwards, Ph.D., P.E., P.Eng., EUR ING

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Professional Profile

Dr. Edwards applies his mechanical and acoustical engineering expertise to help clients solve complex multidisciplinary problems across a broad range of industries. He is proficient in the analysis of mechanical components and software: deconstructing large sets of data to classify system behavior and identify sources of failure. He has applied his expertise in mechanical failure analysis and noise & vibration control to a variety of consumer, commercial, and industrial products including earth moving equipment, gas generators, rotating machinery, air conditioners, trolleys, and other indoor rolling items.

Dr. Edwards has experience performing acoustic and vibration tests in accordance with national and international standards to evaluate equipment and help clients achieve compliance and meet regulatory requirements. He has applied his expertise to investigate electromagnetic locks, food processing equipment, train power systems, pressure cookers, blenders, conveyor belts, and emissions control systems. He has applied his expertise in noise and vibration control to earth moving equipment, generators, auxiliary power units, rotating machinery, high-speed vehicles, HVAC systems, and paper machine winders. He also possesses knowledge in the characterization and simulation of acoustic materials such as porous foams, fibrous insulation, woven materials, and perforated plates.

Prior to joining Exponent, Dr. Edwards spent many years living and working internationally in France and the Netherlands; encountering a variety of engineering challenges and learning to navigate complex regulatory environments. He has a deep understanding of and appreciation for different cultures, business practices, and ways of approaching problem-solving, allowing him to communicate effectively with people from diverse cultural backgrounds. Dr. Edwards is a certified Professional Engineer (PE) and European Engineer (EUR ING), allowing him to offer clients a unique perspective and approach to engineering solutions.

Academic Credentials & Professional Honors

Ph.D., Acoustics, National Institute of Applied Sci of Lyon, 2020

M.S., Mechanical Engineering, Georgia Institute of Technology, 2015

B.S., Mechanical Engineering, Georgia Institute of Technology, 2013

Licenses and Certifications

European Engineer (EUR ING), , #00037454

Professional Engineer Mechanical, California, #42169

Professional Engineer Mechanical, Georgia, #PE052132

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Professional Engineer, Manitoba, #52119

Professional Engineer Mechanical, North Carolina, #057977

Professional Engineer, Ontario, #100695603

Professional Engineer, Quebec, #6077988

PADI Advanced Open Water Scuba Certification

PADI Certified Enriched Air Diver

Certified Vibration Analyst (CVA), Category II per ISO 18436-2

Academic Appointments

Lab supervisor, acoustics, ENTPE, 2021

Prior Experience

Research engineer, Matelys Research Lab, 2017-2023

Senior associate engineer, Caterpillar Inc, 2015-2017

Professional Affiliations

Institute of Noise Control Engineering

American Society of Mechanical Engineers

American Society for Testing and Materials: ASTM Committee E33 on Building and Environmental Acoustics

French-American Chamber of Commerce: Atlanta Chapter

Languages

French (France)

Publications

M. Edwards, R. Gonzalez Diaz, N. Dallaji, L. Jaouen, F. Chevillotte, and N. Totaro, “Preliminary rolling noise measurements toward the design of a standard rolling noise device,” Building Acoustics, p. 1351010X2110192, May 2021.

M. Edwards, F. Chevillotte, F.-X. Bécot, L. Jaouen, and N. Totaro, “Development of a Prediction Model for Indoor Rolling Noise,” Journal of Sound and Vibration, p. 116199, May 2021.

M. Edwards, F. Chevillotte, F.-X. Bécot, L. Jaouen, and N. Totaro, “Polynomial relations for cylindrical wheel stiffness characterization for use in a rolling noise prediction model,” Acta Acust., vol. 4, no. 2, p. 4, 2020.

Presentations

M. Edwards, W. Locke, J. Travis, and A. Cardi, “Development of a characterization method for high-speed vehicle-induced vibrations in the built environment,” presented at NOISE-CON 2024, New Orleans, LA, USA, June 2024.

M. Edwards, R. Gonzalez Diaz, and N. Dallaji, “We Have a Standard Tapping Machine: What About a Standard Rolling Machine?,” presented at Forum Acusticum, Lyon, France, Dec. 2020, pp. 2681–2688.

M. Edwards, F. Chevillotte, F.-X. Bécot, L. Jaouen, and N. Totaro, “Development of an Improved Prediction Model for Indoor Rolling Noise,” presented at Forum Acusticum, Lyon, France, Dec. 2020, pp. 3271–3278.

M. Edwards, F. Chevillotte, F.-X. Bécot, L. Jaouen, and N. Totaro, “Parametric Study of the Estimation of Indoor Trolley Wheel Stiffness for Use in a Rolling Noise Prediction Model,” presented at ICA 2019, Aachen, Germany, 2019, pp. 514–519.

M. Edwards, F. Chevillotte, L. Jaouen, F.-X. Bécot, and N. Totaro, “Rolling Noise Modeling in Buildings,” presented Internoise 2018, Chicago, IL USA, Aug. 2018.

M. Edwards, K. Cunefare, and E. Ryherd, “Mapping of Automotive Vehicle Command Functions to a Subset of Pushbutton Sounds,” presented at NOISE-CON 2014, Grand Rapids, MI USA, Jun. 2014.

Project Experience

Consumer Products

Performed acoustic testing on various consumer products, including fans, air purifiers, rolling suitcases, children’s toys, and office chairs.

Investigated the failure of kitchen blenders due to vibro-acoustic excitation of the blender blades.

Performed a user study for medical wearable technology.

Evaluated national and international standards for the measurement and classification of hearing protection devices (HPDs).

Performed experimental testing to evaluate the performance of magnets used in shoe levitation stands.

Performed experimental testing to measure the torque required to open a pressure cooker as a function of internal cooker pressure.

Commercial Products & Applications

Conducted an environmental noise study at an outdoor recreational facility to assess community noise complaints.

Investigated the failure of various electromagnetic locks, including overhead door locks, push to exit buttons, and their associated control systems and software.

Performed acoustic testing and modeling on various commercial products, including rolling trolleys, flooring materials, ceiling components, and HVAC systems.

Performed acoustic characterization and modeling for porous materials in various automotive, aerospace, and building construction applications, including porous foams, fibrous insulation, woven materials, and perforated plates.

Designed, built, and executed a custom experimental procedure to measure the dynamic force imparted on a table when sat upon by various human test participants.

Evaluated ground vibrations from racecars in an urban environment to assess the potential for building damage.

Construction & Industrial Applications

Performed extensive acoustic and vibration testing on construction equipment and heavy machinery, including articulating trucks, excavators, skid steers, compact track loaders, track loaders, wheel loaders, wheel tractor-scrapers, dozers, motor graders, diesel generators, and isolated diesel engines.

Designed and tested hydraulic resonators for reducing fluid noise in earth moving machinery.

Analyzed and redeveloped sounds packages for earth moving machinery to optimize acoustic & thermal performance with durability, manufacturing, and cost.

Performed extensive vibration and performance analysis on a paper mill winder.

Evaluated defect claims associated with the design, construction, and operation of a rock crushing machine.

Performed technical analyses related to patent and trade secret litigation for a cold milling machine.

Analyzed the alleged design deficiencies of a conveyor belt system for transferring bulk material.

Evaluated defect claims associated with the design, construction, and operation of shrink wrap tunnels.

Reviewed and assessed the engineering justification for elements of the emission control strategy — including dosing of urea, modulation of exhaust gas recirculation rates and fuel injection timing in response to ambient/driving conditions, and soot/sulfur regeneration strategies — on various locomotive and on-highway diesel engines.

Investigated the failure of various components of auxiliary power units (APUs) used on trains for a national railway company related to an international arbitration dispute.

Peer Reviews

Applied Acoustics

ASME Journal of Vibration and Acoustics