

Exponent®
Engineering & Scientific Consulting

Bill Davies, Ph.D., P.E., CFEI

Managing Engineer | Thermal Sciences
Philadelphia
+1-215-594-8876 | wdavies@exponent.com

Professional Profile

Dr. Davies is a licensed mechanical engineer providing expert consulting in fluid and thermal systems. He has expertise with liquid and gas pipelines, heat exchangers, HVAC systems, oil and gas equipment, consumer products, and power generation systems.

Dr. Davies investigates industrial incidents and product failures, including fires, explosions, floods, water losses, burn injuries, and equipment failures. His project experience includes piping, valves, pumps, compressors, heat exchangers, drilling equipment, residential and commercial HVAC systems, geothermal systems, generators, natural gas distribution systems, and power plant equipment. His technical expertise covers phenomena such as water hammer, flow-induced vibration, multi-phase flow, and condensation shock.

Dr. Davies offers failure investigation and root cause analysis, evaluation and optimization of manufacturing and mechanical systems, design reviews and verifications, process troubleshooting, and development of customized testing programs to ensure system safety, performance, and regulatory compliance. Dr. Davies has testified in litigation matters in state and federal court.

Prior to joining Exponent, Dr. Davies conducted research at the University of Illinois's Air Conditioning and Refrigeration Center (ACRC). He designed and built experimental facilities for power plant condensers and two-phase flow that characterized heat transfer, pressure drop and two-phase void fraction. Early in his career, he was a Field Engineer for Schlumberger Wireline, where he led crews on both land and offshore rigs to acquire subsurface data in conventional and unconventional resources. He designed and led data-acquisition operations using seismic, downhole acoustic, pressure-testing, coring, and other well-testing equipment. He was certified and led operations with radiation and explosives for international clients.

Dr. Davies' additional experience includes analysis of carbon monoxide poisoning, automotive radiators, boilers, geothermal systems, plate heat exchangers, control valves, ammonia heat exchangers, carbon injection wells, and kitchen appliances, including blenders. Dr. Davies has also performed customized pressure and wind tunnel testing.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, University of Illinois, Urbana-Champaign, 2019

M.S., Mechanical Engineering, University of Illinois, Urbana-Champaign, 2016

B.A., Physics, Bates College, 2008

TechnipFMC Educational Fund Fellowship, 2017

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David Hinde Award, 2017

IBM Thomas J. Watson Memorial Scholarship, 2004-2008

Licenses and Certifications

Professional Engineer Mechanical, California, #40299

Professional Engineer, Delaware, #33256

Professional Engineer, Pennsylvania, #PE095026

40-Hour Hazardous Waste Operation and Emergency Response Certification (HAZWOPER)

Prior Experience

General Field Engineer (Wireline), Schlumberger, 2009-2013

Professional Affiliations

ASTM International (Metrology subcommittee member E11.50)

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

-TC 6.2 Subcommittee on District Energy

-TC 6.8 Subcommittee on Geothermal Heat Pump and Energy Recovery Applications

-TC 6.9 Subcommittee on Thermal Storage

National Association of Fire Investigators (NAFI)

Society of Petroleum Engineers (SPE)

Languages

Spanish

Publications

Davies WA III, Wolf MI, Barry M, O'Hern SC, Morse TL. The effect of valve closure time on water hammer. ASME 2021 International Mechanical Engineering Congress and Exposition, November 2021. Paper No. 71153.

Davies WA III, Hrnjak P. Heat transfer and flow regimes during counter-flow steam condensation in flattened-tube air-cooled condensers. International Journal of Heat and Mass Transfer 2020; 147:118930.

Davies WA III, Hrnjak P. A correlation for heat transfer coefficient during stratified steam condensation in large flattened tubes with variable inclination and wall temperature. International Journal of Heat and Mass Transfer 2020; 146:118666.

Davies WA III, Hrnjak P.Local heat transfer coefficient during stratified flow in large, flattened-tube steam

condensers with non-uniform heat flux and wall temperature. International Journal of Heat and Mass Transfer 2020; 146:118854.

Davies WA III, Hrnjak P. Effects of airflow profile and condensation pressure on performance of air-cooled condensers. Heat Transfer Engineering 2019; 1-13.

Davies WA III, Hrnjak P. Heat transfer in a large, inclined, flattened-tube steam condenser. Heat Transfer Engineering 2019; 41.

Noori Rahim Abadi SMA, Davies WA III, Hrnjak P, Meyer JP. Numerical study of steam condensation inside a long inclined flattened channel. Int. J. Heat Mass Transfer 2019; 134:450-467.

Davies WA III, Hrnjak P. Thermo-hydraulic model for steam condensation in a large, inclined, flattened-tube air-cooled condenser. Applied Thermal Engineering 2019; 149:745-756.

Davies WA III, Kang Y, Hrnjak P, Jacobi AM. Effect of inclination on heat transfer and flow regimes in large flattened-tube steam condensers. Applied Thermal Engineering 2019; 148:999-1006.

Davies WA III, Kang Y, Hrnjak P, Jacobi AM. Heat transfer and flow regimes in large flattened-tube steam condensers. Applied Thermal Engineering 2019; 148:722-733.

Davies WA III, Kang Y, Hrnjak P, Jacobi AM. Method for evaluating the effect of inclination on the performance of large flattened-tube steam condensers with visualization of flow regimes. Applied Thermal Engineering 2018; 138:934-941.

Kang Y, Davies WA III, Hrnja, P, Jacobi AM. Effect of inclination on pressure drop and flow regimes in large flattened-tube steam condensers. Applied Thermal Engineering 2017; 123:498-513.

Presentations

Davies WA III. Carbon injection well design and consideration of failure modes. Guest Lecture. LSU PETE 401: Well Design – Completion, November 10, 2025.

Davies WA III, Owens Z, Hur IY, Ajdari A, Nirankari Z, Datta D, Vytiniotis A, Levine M. Vibrational assessment of injection well tubing. SPE, AAPG, SEG: Carbon Capture, Utilization, and Storage, March 2024.

Davies WA III. Performance comparison between co-current and counter-flow ACC tubes. Air Cooled Condenser Users Group Conference, October 12-14, 2021.

Davies WA III, Wikramanayake E, Wolf M, Hudgins A. Transient effects of injecting green hydrogen into natural gas pipelines. AIChE 10th International Congress on Sustainability Science & Engineering (ICOSSE2021), September 13-15, 2021.

Morse TL, Wolf MI, Davies WA III. Residential fuel gas explosions. Oakland County Association of Arson and Fire Investigators, Inc., OCAAFII Quarterly Training, November 2020.

Davies WA III, Hrnjak P. Pressure drop in large flattened-tube steam condensers. Paper presented at the 25th IIR International Congress of Refrigeration, Montreal, Canada, Aug 2019.

Davies WA III, Hrnjak P. Steam condensation heat transfer coefficient in large, flattened-tube steam condensers. Paper presented at the 25th IIR International Congress of Refrigeration, Montreal, Canada, Aug 2019.

Davies WA III, Hrnjak P. Thermo-hydraulic model for steam condensation in a large, inclined, flattened-tube air-cooled condenser. Paper presented at Refrigeration and Air Conditioning Conference, Purdue,

Indiana, Jul 2018.

Davies WA III, Hrnjak P. Effects of airflow direction, air velocity profile, and condensation pressure on the performance of air-cooled condensers. Paper presented at Refrigeration and Air Conditioning Conference, Purdue, Indiana, Jul 2018.

Davies WA III, Kang Y, Hrnjak P, Jacobi AM. Effect of inclination on heat transfer in large flattened-tube steam condensers. Paper presented at ASME 2017 International Mechanical Engineering Congress and Exposition, Tampa, Florida, Nov 2017.

Davies WA III. Effect of California's carbon cap-and-trade policy on home design. Poster presented at the Institute for Sustainability, Energy, and Environment Congress, Urbana, Illinois, Sep 2017.

Davies WA III, Hrnjak P, Jacobi AM. Advanced air-cooled condensers with vortex-generator arrays between fins. Presented at NSF-EPRI Power Plant Dry Cooling Science and Technology Innovation Program Annual Review Meeting, Palo Alto, California, May 2017.

Davies WA III, Kang Y, Hrnjak P, Jacobi AM. Heat transfer and visualization in large flattened-tube condensers with variable inclination. Paper presented at Refrigeration and Air Conditioning Conference, Purdue, Indiana, Jul 2016.

Peer Reviews

Energy

Applied Thermal Engineering

International Journal of Heat and Mass Transfer

13th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics

Chemical Engineering and Processing