

Brad James, Ph.D., P.E.
Principal Engineer and Center Director

Professional Profile

Dr. Brad James is a Principal Engineer and the Director of Exponent's Materials and Corrosion Engineering Center. He specializes in failure analysis, metallurgy, materials science, fracture, fatigue, material degradation, corrosion, life prediction, and design.

Dr. James has experience within the medical device, pipeline, chemical processing, energy, automotive, fire protection, aerospace, and electronics industries. He helps both industrial and legal clients solve complex problems, as well as interact with governmental agencies such as the FDA, NHTSA, and the NTSB. In particular, Dr. James has helped dozens of manufacturers design and validate their implants and medical devices. Dr. James has specific interest in fractography, fracture mechanics, wear, corrosion, embrittlement phenomena, microstructural development, heat treatment, material selection, and welding and joining.

Dr. James serves as a Lecturer for the Stanford University Material Science Engineering Department, where he teaches a graduate-level engineering failure analysis course. Dr. James also teaches graduate-level failure analysis and fracture mechanics courses as an Adjunct Professor for the Santa Clara University Mechanical Engineering Department. He has taught several courses for The American Society for Materials (ASM International) involving failure analysis, design, and life prediction/validation of medical devices, and has been a Visiting Lecturer at San Jose State University. Prior to joining Exponent, Dr. James was employed as a Research Engineer, Materials Performance Division, at the Babcock and Wilcox R&D Center.

Academic Credentials and Professional Honors

Ph.D., Metallurgical and Materials Engineering, (Minor in Engineering Mechanics), Colorado School of Mines, 1994
B.S., Metallurgical Engineering, University of Washington, 1988

Licenses and Certifications

Registered Professional Metallurgical Engineer, California, #MT1867

Publications

James B, Sire R. Fatigue-life assessment and validation techniques for metallic vascular implants. *Biomaterials* 2010; 31:181–186.

James B, McVeigh C, Rosenbloom S, Guyer E, Lieberman S. Ultrasonic cleaning-induced failures in medical devices. *Materials and Processes for Medical Devices*, ASM International, Minneapolis MN, August 2009, in press.

Fasching A, Kuş E, James B, Bhargava Y, Eiselstein L. The effects of heat treatment, surface condition and strain on nickel-leaching rates and corrosion performance in nitinol wires. *Materials and Processes for Medical Devices*, ASM International, Minneapolis MN, August 2009, in press.

James B, Sire R, Caligiuri R. Determination of the failure mode and the rupture pressure in a mechanically damaged pipeline. *J Fail Anal Prev* 2008; 8(3):223–230.

Eiselstein L, Sire R, James B. Review of fatigue and fracture behavior of nitinol. *ASM Symposium on Materials and Processes for Medical Devices*, ASM International, pp. 135–147, Boston, MA, November 14–16, 2005.

James B, Eiselstein L, Foulds J. Failure analysis of NiTi wires used in medical applications. *ASM International J Fail Anal Prev* 2005; 5(5):82–87; *Materials and Processes for Medical Devices*, ASM International, pp. 44–49, St. Paul, MN, August 2004.

Eiselstein L, James B. Medical device failures—Can we learn from our mistakes? *Proceedings, Materials & Processes for Medical Devices Conference*, ASM International, pp. 3–11, August 2004.

James B, Wood L, Murray S, Eiselstein L, Foulds J. Compressive damage-induced cracking in nitinol. *Proceedings, International Conference on Shape Memory and Superelastic Technologies*, ASM International, pp. 117–124, Baden Baden, Germany, October 2004.

James B, Murray S, Saint S. Fracture characterization in nitinol. *Proceedings, International Conference on Shape Memory and Superelastic Technologies*, SMST Society, pp. 321–329, May 2003.

James B, Matlock D, Krauss G. Interactive effects of phosphorus and tin on carbide evolution and fatigue properties of 5160 Steel. *38th Mechanical Working and Steel Processing Conference*, Vol. XXXIV, pp. 579–590, October 1996.

Jones D, Hoppe R, Hechmer J, James B. An experimental study on the effects of compressive stress on the fatigue crack growth of low-alloy steel. *Journal of Pressure Vessel Technology* 1994; 116:317–324.

James B. Interactive effects of phosphorus and tin on carbide evolution and fatigue and fracture properties in 5160 steel. Ph.D. Thesis, Colorado School of Mines, 1994.

Merlano N, James B, Matlock D, Krauss G. Effects of tempering and residual element content on mechanical properties of 5160H steel. Proceedings, Gilbert R. Speich Symposium, Iron and Steel Society, pp. 101–109, Montreal, Canada, October 1992.

James B, Paul L, Miglin M. Low cycle fatigue crack initiation in SA-210 A1 carbon steel boiler tubing in contaminated boiler water. Proceedings, Pressure Vessels and Piping Conference, ASME-PVP Vol. 195, pp. 13–19, Nashville, TN, June 1990.

Presentations/ Seminars

James B. Ultrasonic cleaning-induced failures in medical devices. Materials and Processes for Medical Devices, ASM International, Minneapolis MN, August 2009.

James B. Fatigue design and validation of implantable medical devices. Invited lecture, United States Food and Drug Administration (USFDA) Office of Science and Engineering Laboratories (OSEL) Science Seminar, June 2009.

James B. Medical device failures—Lessons learned. Invited lecture, Bio2Device Group, Sunnyvale, CA, March 2009.

James B. Medical device design validation and failure analysis. Materials and Processes for Medical Devices, ASM International Educational Course, 2008–present.

James B. Medical device failure analysis—Practice and pitfalls. Invited lecture, ASM International, Materials and Processes for Medical Devices Conference, Cleveland Clinic, August 2008.

James B. Medical device failure analysis. Invited lecture, San Jose State University, April 2008.

James B. Failure analysis for the medical device engineer. Materials and Processes for Medical Devices, ASM International Educational Course, 2005–2007.

James B. Fracture, fatigue and corrosion for the medical device engineer. Materials and Processes for Medical Devices, ASM International Educational Course, 2005–2007.

James B. Engineering design for medical device fracture, fatigue and corrosion performance. ASM International, Materials and Processes for Medical Devices Conference, Cleveland Clinic, October 2006.

James B. Medical device failure analysis. Invited lecture, San Jose State University, July 2006.

James B. Nitinol fatigue and fracture—Beyond the fundamentals. Invited lecture, International conference on shape memory and superelastic technologies, Monterey, CA, May 7, 2006.

James B. Compressive damage-induced cracking in nitinol. International Conference on Shape Memory and Superelastic Technologies, ASM International, Baden Baden, Germany, October 2004.

James B. Failure analysis of NiTi wires used in medical applications. Materials and Processes for Medical Devices, ASM International, St. Paul, MN, August 2004.

James B. Metallurgical failure analysis. Invited lecture, Stanford University, April, 2004.

James B. Fracture characterization in nitinol. International Conference on Shape Memory and Superelastic Technologies, SMST Society, May 2003.

James B. Interactive effects of phosphorus and tin on carbide evolution and fatigue properties of 5160 Steel. 38th Mechanical Working and Steel Processing Conference, Cleveland OH, October 1996.

James B. Effects of tempering and residual element content on mechanical properties of 5160H steel. Gilbert R. Speich Symposium, Iron and Steel Society, Montreal, Canada, October 1992.

James B. Low cycle fatigue crack initiation in SA-210 A1 carbon steel boiler tubing in contaminated boiler water. Pressure Vessels and Piping Conference, ASME, Nashville, TN, June 1990.

Reports

James B. Metallurgical examination of Kinder Morgan November 2004 Basin Road release. Exponent Failure Analysis Associates Report, September 2005.

James B. Kinder Morgan April 2005 Donner Summit release. Exponent Failure Analysis Associates Report, August 2005.

James B. Metallurgical examination of Kinder Morgan May 2005 El Paso, TX Pipeline rupture. Exponent Failure Analysis Associates Report, August 2005.

James B. Metallurgical investigation of accelerated metal loss in an aluminum de-coating kiln. Exponent Failure Analysis Associates Report, June 2005.

James B. Metallurgical examination of a fractured guide wire. Exponent Failure Analysis Associates Report, September 2003.

James B. Ammonia piping fracture. Exponent Failure Analysis Associates Report, January 2003.

James B. GTSIO 520 shaft failure. Exponent Failure Analysis Associates Report, December 2001.

James B, Murray S. Evaluation of pitting and cracking in Sonoma cutter hot water storage tank. Exponent Failure Analysis Associates Report, July 2001.

James B, Murray S. Metallurgical investigation of Tracy kickoff valve fracture. Exponent Failure Analysis Associates Report, May 2001.

James B, Moyer C. Examination of N₂O₄ storage tanks after long-term exposure testing. Exponent Failure Analysis Associates Report for US Department of the Air Force, April 2001.

James B. Examination of cracking in electric-arc furnace cradle rollers at the IPSCO Montpelier Steel Works. Exponent Failure Analysis Associates Report, February 2001.

James B. Examination of fractured main drive spline teeth at the IPSCO Montpelier Steel Works. Exponent Failure Analysis Associates Report, February 2001.

James B, Mikolajczak C, Duffner D. Evaluation of damage to cooling bed rollers at the IPSCO Montpelier Steel Works. Exponent Failure Analysis Associates, February 2001.

James B, Corlett N. Investigation of caster spring failures at the IPSCO Montpelier Steel Works. Exponent Failure Analysis Associates, February 2001.

James B, Swanger L, Loud J. Analysis of HVAC motor failures in Navistar trucks. Exponent Failure Analysis Associates Report, September 2000.

James B, Foulds J, Huet R. Investigation of the March 25, 1999 Chevron valve failure. Exponent Failure Analysis Associates Report, November 1999.

James B. Investigation of a failed generator rotor-wedge retention stud. Exponent Failure Analysis Associates Report, September 1999.

Huet R, James B. Investigation of Dutch Harbor Gantry wheel shaft failure. Failure Analysis Associates Report, February 1998.

James B. Investigation of a water heater leak at William Wilson Associates. Failure Analysis Associates Report, May 1997.

Eiselstein L, James B. Advanced silicon materials sensitization testing. Failure Analysis Associates Report, May 1997.

Huet R, James B. Investigation of Kaohsiung Harbor crane bolt and axle failures. Failure Analysis Associates Report, May 1997.

Eiselstein L, James B. Advanced silicon materials reactor vessel weld cracking. Failure Analysis Associates Report, April 1997.

James B. Metallurgical analysis to determine the cause of a ductile cast iron fire protection pipe rupture at Sun Microsystems. Failure Analysis Associates Report, February 1997.

Shyne J, James B. Yuba Trucking steering gear failure. Failure Analysis Associates Report, 1995.

Current Academic Appointments

- Lecturer, Stanford University, Materials Science and Engineering Department
- Adjunct Professor, Santa Clara University, Mechanical Engineering Department

Editorial Boards

- *Journal of Failure Analysis and Prevention*

Peer Review

- ASM Handbook, Volume 19, *Fatigue and Fracture*
- *Biomaterials*
- *Materials Engineering and Performance*

Professional Affiliations

- ASM International (member)
- International Organization on Shape Memory and Superelastic Technologies (member)
- ASTM International, Committees F04 – Medical and Surgical Materials and Devices, E08 – Fatigue and Fracture