



Emily Brady, Ph.D., P.E., CWI

Senior Engineer | Mechanical Engineering

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Professional Profile

Dr. Brady specializes in materials verification and mechanical behavior characterization of materials in various industries, primarily in process, utilities, rail, and industrial environments. Dr. Brady utilizes both destructive and portable non-destructive evaluation equipment to perform these engineering analyses. Furthermore, she also assists clients in cases involving industrial and occupational safety, such as those involving machine guarding, lock-out/tag-out, and other safety protocols.

Process

Dr. Brady performs analysis of equipment failures and related operational procedures in the oil and gas, and chemical industries. Dr. Brady has assisted on cases involving loss of containment and design lifetime. In performing these analyses, Dr. Brady utilizes relevant regulations, codes, and standards including OSHA regulations, ASME and ANSI standards, and standards and codes issued by other professional associations. In addition, Dr. Brady relies on the design and use of destructive/non-destructive evaluation techniques in her work.

Utilities/Energy

Dr. Brady assists clients in the energy sector in performing asset integrity assessments, which frequently involves material characterization. Specific examples include characterizing pipeline materials, preparing submittals of compliance to governmental regulators, and analyzing asset availability. Dr. Brady utilizes both destructive and nondestructive evaluation techniques in addition to regulations and standards to assist clients in these matters.

Rail/Transportation

Dr. Brady performs material investigations of railcars that have experienced environmental degradation, such as corrosion and erosion. Specific examples include hopper cars with corroded interiors, and/or corrosion at structural joints. In these cases, Dr. Brady utilizes destructive and portable non-destructive evaluation techniques to determine the type and likely causes of the environmental degradation present.

Industrial Equipment and Manufacturing

Dr. Brady assists clients with cases in industrial and manufacturing environments involving machine safeguarding, including the evaluation of awareness devices, lockout/tagout procedures, and design and manufacturing processes. Some examples of machinery Dr. Brady has performed investigations on include conveyors, brake presses, rolling mills, crawler cranes, and air compressors.

Prior to joining Exponent, Dr. Brady completed her Ph.D. in Materials Science and Engineering at the University of Texas at Austin. Her doctoral work focused on the mechanical behavior and microstructure evolution in unalloyed niobium. Specifically, her work established the first mechanistic explanation with supporting microstructural data for how impurity content affects high-temperature strength in refractory metals. Dr. Brady developed and successfully implemented two new microstructural characterization techniques: one that allows HR-EBSD analysis on heavily deformed materials using open-source software, and one that segments substructure in deformed materials. During her time at UT Austin, Dr. Brady also served as mentor for the Research Experience for Teachers program where she trained high school teachers to use advanced laboratory equipment and helped develop lessons to engage high school girls in engineering. Dr. Brady has extensive experience in mechanical property testing and microstructural characterization techniques including high-temperature tensile testing, and metallography techniques. Dr. Brady also has hands-on experience with machine shop tools such as drill presses, lathes, milling machines, and shearing machines; heat treatment of steel using salt pots and box furnaces; various software applications and programming languages including SolidWorks, MATLAB, R, and Python; and the use of various regulations, codes, and standards including ASME, ANSI, ASTM, ISO, API, and DNVGL.

Academic Credentials & Professional Honors

Ph.D., Materials Science and Engineering, University of Texas, Austin, 2021

B.S., Mechanical Engineering, University of Texas, Austin, 2017

Recipient, Center for Integrated Nanotechnologies User Proposal, 2019-2020

Special Commendation for Outstanding Poster, TMS Bladesmithing Competition, 2019

Virginia and Ernest Cockrell, Jr. Fellowship, 2017-2021

Licenses and Certifications

Professional Engineer Mechanical, California, #42455

Professional Engineer Mechanical, Louisiana, #PE.0050340

Professional Engineer Mechanical, Texas, #157028

American Welding Society Certified Welding Inspector (CWI)

Prior Experience

R&D Intern, Sandia National Labs, 2016

Longhorn Maker Studio Assistant, The University of Texas at Austin, 2015-2016

AutoCAD Intern, Austin Energy, 2015

Design and Graphics Lab Assistant, 2015

Professional Affiliations

The Minerals, Metals & Materials Society (TMS)

Publications

Maragh J, Brady EAD, Kornuta J, Lopez-Oneal O, Veloo P. Determination of Destructive Strength and Chemical Composition Uncertainties for Material Property Verification. Proceedings of the 37th International Pipeline Pigging and Integrity Management Conference, Houston, TX USA. January 29-31, 2025.

Brady EAD, Gould M, Kornuta J, Switzner N, Veloo P. A Historical Review and Analysis of the Effect of Tensile Test Sample Orientation on Pipeline Yield Strength. Proceedings of the PRCI Research Exchange REX 2023, PRCI-REX2023-006

Brady EAD, Kornuta J, Anderson J, Steiner A, Veloo P. Improvements to Strain Hardening Exponent and the Implications to Failure Pressure Predictions. Proceedings of the 2022 14th International Pipeline Conference, Vol. 2. Calgary, Alberta, Canada. September 26-30, 2022.

Brady EAD, Taleff EM. The Effects of Impurity Content on Plastic Deformation and Microstructure Evolution in Niobium at Temperatures from 1473 to 1773 K. Metallurgical and Materials Transactions A 2022; 53: 3057-3072.

Brady EAD, Taleff EM. Plastic deformation and microstructure evolution in niobium at temperatures from 1473 to 1823 K. Metallurgical and Materials Transactions A 2021; 52(3): 1095-1105

Brady EAD, Taleff EM. The Effects of Impurity Content on Plastic Deformation and Microstructure Evolution in Niobium at Temperatures from 1473 to 1773 K. Metallurgical and Materials Transactions A 2022; 53: 3057-3072.

Brady EAD, Taleff EM. Plastic deformation and microstructure evolution in niobium at temperatures from 1473 to 1823 K. Metallurgical and Materials Transactions A 2021; 52(3): 1095-1105.

Presentations

Maragh J, Brady EAD, Kornuta J, Lopez-Oneal O, Veloo P. Determination of Destructive Strength and Chemical Composition Uncertainties for Material Property Verification. The 37th International Pipeline Pigging and Integrity Management Conference, Houston, TX USA. January 29-31, 2025.

Brady EAD, Kornuta J, Anderson J, Steiner A, Veloo P. Improvements to Strain Hardening Exponent and the Implications to Failure Pressure Predictions. The ASME International Pipeline Conference, Calgary, Alberta, Canada, 2022.

Brady EAD, Taleff EM. A Review of Plastic Flow and Microstructure Evolution at Elevated-temperatures in Unalloyed Niobium. Oral Presentation, The Minerals, Metals & Materials Society Annual Meeting, Virtual, 2021.

Brady EAD, Taleff EM. Static and dynamic grain growth in niobium at 1200 to 1500°C. Oral Presentation, The Minerals, Metals & Materials Society Annual Meeting, San Diego, CA, 2020.

Brady EAD, Taleff EM. Elevated-temperature tensile behavior of niobium. Oral Presentation, The Minerals, Metals & Materials Society Annual Meeting, San Antonio, TX, 2019.

Brady EAD, Taleff EM. Static and Dynamic Grain Growth in Niobium. Poster presentation, Center for Integrated Nanotechnologies Annual User Meeting, Santa Fe, NM, 2019.