



Exponent[®]
Engineering & Scientific Consulting

Elif Erkal, Ph.D.

Manager | Construction Consulting
Oakland
eerkal@exponent.com

Professional Profile

Dr. Erkal focuses on helping her clients diagnose their project management systems and develop integration plans to improve their effectiveness. She specializes in translating both well-established and state-of-the-art project management systems into practice through multi-disciplinary collaborations and research to help her clients' changing needs. She has extensive hands-on experience in developing and communicating innovations through industry engagements. In graduate research, she specialized in assessing, and developing safety management systems for improved safety performance. Dr. Erkal's experience with expert-oriented research is utilized by many industry teams to find effective solutions to challenging problems through consensus building, focus groups, interviews, and brainstorming sessions. She has led professional teams in efforts of research, development and implementation for organizational change and project management success.

Dr. Erkal's proficiency extends to developing Power BI dashboards tailored specifically for safety metrics, thereby empowering organizations with insightful visualization tools to monitor and enhance safety performance effectively. Her expertise in this domain also involves crafting new corporate safety metrics, aligning them with industry best practices, and facilitating seamless reporting mechanisms for stakeholders. Furthermore, Dr. Erkal actively engages in the development of corporate governance procedures and standards, ensuring organizational compliance and fostering a culture of accountability. Her adeptness in public communication shines through her contributions to high-profile projects, where she adeptly translates intricate technical jargon into digestible content for diverse audiences, thereby facilitating transparent and effective communication channels. Additionally, Dr. Erkal's proficiency in documenting data models enhances corporate communication and augments decision-making processes, laying a robust foundation for organizational growth and success.

Dr. Erkal supported the integration of cutting-edge project management ideas from generation to design and to implementation. Her work in organizational learning in construction organizations, contract negotiations, knowledge management and data collection frameworks, functional team networks, and machine learning systems for predictive decision-making solutions proved impactful for the implementing organizations and is recognized through peer-reviewed research. Dr. Erkal has worked in various types of projects such as infrastructure, onshore oil and gas facilities, utilities and service, nuclear, residential and commercial buildings.

Dr. Erkal's field experience includes acting as the contract manager in large infrastructure projects providing contract administration and implementation support, preparing claims, and assessing project controls (operations, cost, quality, safety, schedule) in pre- and post-completion processes.

Academic Credentials & Professional Honors

Ph.D., Civil Engineering, University of Colorado, Boulder, 2022

M.Sc., Architecture Eng. and Construction Management, Carnegie Mellon University, 2019

B.Sc., Civil Engineering, Istanbul Technical University, Turkey, 2014

Outstanding Graduate Researcher Award, Construction Safety Research Alliance, 2021

Academic Appointments

Graduate research assistant, Civil Engineering, University of Colorado Boulder, 2019-2022.

Graduate teaching assistant, Civil Engineering, University of Colorado Boulder, 2019.

Adjunct faculty, Architecture Engineering and Construction Management Program, Carnegie Mellon University, 2018.

Research assistant, Architecture Department, Carnegie Mellon University, 2017.

Prior Experience

Project lead, Construction Safety Research Alliance, 2019-2022.

Researcher graduate student, Capital Projects, Los Alamos National Laboratory, 2019.

Project estimator and claims engineer, Kiska Construction, 2017.

Contracts manager, Yenigun Construction Co., 2015-2017.

Civil engineer/Structural designer, Arti Architecture Engineering Consulting, 2014-2015.

Professional Affiliations

American Society of Civil Engineers (ASCE)

Construction Safety Research Alliance (CSRA)

Construction Management Association of America (CMAA)

Languages

Turkish

Publications

Published/Reviewed:

Hua, Ze & Oguz Erkal, E.D. (2024). Exploring the Landscape: Environmental, Social, and Governance (ESG) in the Construction industry, Construction Research Congress 2024 (86-95). American Society of Civil Engineers.

Hallowell, M. & Oguz Erkal, E. (2024). Severity-Based Lagging Indicator: An Alternative Measure of Safety Performance. Professional Safety Journal, 69 (04), 20-27.

Oguz Erkal, E., Hallowell, M., & Bhandari, S. (2024). Predictive Modeling for Serious Injury and Fatality Exposure. *Journal of Construction Engr. & Management*, 150(3), 04023169.

Oguz Erkal, E.D. & Hallowell, M.R. (2023). Moving beyond TRIR: Measuring and monitoring safety performance with high-energy control assessments. *Professional Safety*, 68(5), 26-35.

Oguz Erkal ED, Hallowell MR, Bhandari S (2023). Formal evaluation of construction safety performance metrics and a case for a balanced approach. *Journal of Safety Research*, 85, 380-390.

Oguz Erkal, E. (2022). Predicting Serious Injury and Fatality Exposure in Construction Industry. Ph.D. Dissertation, University of Colorado Boulder, 2022.

Oguz Erkal, E., & Molenaar, K. (2022). Precontract Negotiations in Design-Build Projects. *Construction Research Congress 2022* (pp. 1-10). American Society of Civil Engineers.

Oguz Erkal, E., Hallowell, M., & Bhandari, S. (2021). Practical assessment of potential predictors of serious injuries and fatalities in construction. *Journal of Construction Engineering and Management*, 147(10): 04021129.

Oguz Erkal, E., & Molenaar, K. (2020). Organizational Learning in Public Construction Organizations: A Case Study. *Construction Research Congress 2021* (pp. 408 - 417). American Society of Civil Engineers.

Hallowell, M.R., Oguz Erkal, E.D., Sherratt F., Court, M., Davis, M. and MacLean, B. (2023). An opportunity to put our metrics where our mouth is. Accepted in *Professional Safety Journal*.

Presentations

Oguz Erkal, E. How do we measure what matters?, Avetta Leadership Roundtable, Dallas, TX, 2024.

Oguz Erkal, E. Future of Safety Performance Measurement: High Energy Control Assessments. EEI Spring Occupational Safety & Health Committee Conference, Edison Electric Institute, Baltimore, MD, 2024.

Oguz Erkal, E. Invalidity of TRIR, Precursors and prevention of SIF, HECA and Organizational metrics that matter, TC Energy Executive Kickoff, Alberta, Canada, 2024.

Hua, K & Oguz Erkal, E. Exploring the Landscape: Environmental, Social, and Governance (ESG) in the Construction industry. *Construction Research Congress*, Les Moines, Iowa, 2024.

Oguz Erkal, E. Predictive Safety Systems and High Energy Control Assessments (HECA) Poster Session, Exponent Operations Committee, Menlo Park, CA, 2024.

Oguz Erkal, E. High Energy Control Assessments (HECA) Community of Practice Presentation, Construction Safety Research Alliance Speaker Series, 2024.

Oguz Erkal, E. Energy Wheel and Safety Classification and Learning Series, Lower Colorado River Authority, Austin, TX, 2024.

Oguz Erkal, E. Future of Safety Measurement, PG&E Contractor Safety Summit, Oakland, CA, 2023.

Hallowell M. & Oguz Erkal, E. HECA Showcase, Annual Safety Summit, Construction Safety Research Alliance, Boulder, CO, 2023.

Guest Lecture: Fall Lecture on Safety measurement, PUBH5134 – Advanced Safety Management, Occupational Health and Safety Management II, Cape Breton University, Canada, 2023.

Oguz Erkal, E. Performance Metrics & Predictive Analytics for SIF Prevention, Safety IQ Webinar, 2023.

Oguz Erkal, E. Measuring Safety Performance: The Benchmarking Problem, Exelon Executive Roundtable, 2023.

Oguz Erkal, E. Predictive Analytics to Prevent Serious Injuries and Fatalities, Construction Management Association of America Annual Conference, Washington, DC, 2023.

Hua, Keats, Oguz Erkal, E. & Bomba, S. Corporate Sustainability in Construction, Construction Management Association of America Annual Conference, Washington, DC, 2023.

Oguz Erkal, E. Making Predictions to Prevent SIFs: Performance Metrics, AI and More. National Safety Council Safety Congress and Expo, New Orleans, LA, 2023.

Oguz Erkal, E. Safety Measurement and Performance – HECA. Transmission, Distribution, Metering and Mutual Assistance Conference, Edison Electric Institute, Orlando, FL, 2023.

Oguz Erkal, E. Future of Safety Metrics. Western Energy Institute, Safety Strategy and Policy Track, Los Angeles, CA, 2023.

Oguz Erkal, E. ESG & Safety in Utilities: Change is Coming. EEI Fall Occupational Safety & Health Committee Conference, Edison Electric Institute, Atlanta, GA, 2023.

Oguz Erkal, E. Safety Performance Metrics and Predictive Analytics. EPRI SS&R conference, Electric Power Research Institute (EPRI), New Orleans, LA, 2023.

Oguz Erkal, E. Next Generation Safety Metrics and Performance Measurement, Utility Analytics Institute, 2023.

Oguz Erkal, E. & Flener, D. Measuring Safety Performance: Surpassing TRIR & Alternative Metrics, Avetta Leadership Roundtable, Houston, TX, 2023.

Oguz Erkal, E. Setting Industry Standards for Leading Indicators, INGAA Foundation Leading Safety Indicators Workshop, Houston, TX, 2023.

Oguz Erkal, E. Future of Safety Performance Measurement: High Energy Control Assessments and Next Generation Leading Indicators. EEI Spring Occupational Safety & Health Committee Conference, Edison Electric Institute, New Orleans, LA, 2023.

Oguz Erkal, E. & Edison Electric Institute. Future of Safety Metrics Research, OSHA Executive Committee Meeting and CEO Engagement, Edison Electric Institute Annual Meeting, Austin, 2023.

Oguz Erkal, E. Measuring Safety Performance: Surpassing TRIR, Better Workplace Conference, The Conference Board of Canada, 2023.

Oguz Erkal, E. Leveraging AI to create a Safer Workplace Environment Webinar, EHS Today, 2023.

Oguz Erkal, E. Predictive Analytics for Safety. Wolfcreek Group Safety Summit, Houston, TX, 2022.

Oguz Erkal, E. Predictive Analytics for Safety. Human Performance Workshop Series, Electric Power Research Institute (EPRI), Chicago, IL, 2022.

Oguz Erkal, E. High Energy and Controls Assessments. Webinar presentation, Community of Practice, Construction Safety Research Alliance, University of Colorado Boulder, 2022.

Oguz Erkal, E. Predictive analytics project final report. Presentation, Safety Summit, Construction Safety Research Alliance, Boulder, CO, 2022.

Oguz Erkal, E. Predictive Analytics for Safety. EEI Fall Occupational Safety & Health Committee Conference, Edison Electric Institute, Spokane, WA, 2022.

Oguz Erkal, E. Alternatives to TRIR. Webinar presentation, Community of Practice, Construction Safety Research Alliance, University of Colorado Boulder, 2022.

Oguz Erkal, E. Predictive analytics in serious injury and fatality prevention. Lecture presentation, Project Leadership Institute, Stanford University, Boulder, CO, 2022.

Oguz Erkal, E. Measuring safety performance. Presentation, Future of EHS – Work to Zero Summit & Expo, National Safety Council, Louisville, KY, 2022.

Oguz Erkal, E. Precontract Negotiations in Design-Build Projects. Construction Research Congress, Washington D.C., 2022.

Oguz Erkal, E. Predictive analytics in construction. Presentation, Associated General Contractors (AGC), Denver, CO, 2022.

Oguz Erkal, E. Predictive analytics project progress report. Presentation, Safety Summit, Construction Safety Research Alliance, Boulder, CO, 2021.

Oguz Erkal, E. Automation in Construction. Guest lecture, University of Colorado Boulder, Boulder, CO 2021.

Oguz Erkal, E. Predictive analytics project initial report. Virtual presentation, Safety Summit, Construction Safety Research Alliance, Boulder, CO, 2020.

Oguz Erkal, E, Molenaar, K. Organizational Learning in Public Construction Organizations: A Case Study. Construction Research Congress, Phoenix, AZ, 2020.

Oguz Erkal, E, Anaya L. Organizational learning project. Poster presentation, Los Alamos National Laboratory, Los Alamos, NM, 2019.

Project Experience

Research and Development

Managed research teams of construction safety professionals to develop a predictive safety performance dashboard. Conducted expert opinion research, including consensus building methods (Delphi, focus groups, interviews, brainstorming, etc.) and implemented bias reduction techniques.

Contributed to academic knowledge about serious injury and fatality prevention by generating a comprehensive catalogue of validated predictors of incidents and developed a new safety performance metric to reduce the shortcomings of incident rates.

Designed and reported on a machine learning pipeline to predict serious injury and fatality exposure. Managed on-site data collection and interdisciplinary data science collaborations. Created training modules, surveys, and videos for industry engagement.

Engaged with executive leadership teams to diagnose organizational learning opportunities and barriers in large infrastructure organizations. Used network analysis methods to evaluate potential improvements

in knowledge management and organizational communication systems. Conducted root cause analysis to assess causes of the challenges.

Designed and managed Social Network Analysis project on architectural design collaborations and learning. Collected on-site survey and observation data to identify the teamwork functionalities of architects during design processes.

Utilities

Created resources to ensure good communication of performance metrics through Power BI dashboards and data documentation strategies.

Managed a team to resolve problematic project orders to ensure good documentation and assurance in project management systems.

Drafted and reviewed project documentation, data logs, procedures, standards and high profile public communications related to project progress, operations, and strategy.

Performed as a program manager for major work categories within utility sector maintenance work. Ensured project communications, process efficiency and coordination. Supported documentation and data collection for order closeouts.

Analyzed program management procedures and trackers to develop tools for process efficiency and consistency within organization to enable better communication, training, and management.

Acted as the technical advisor of a major utility contractor community in researching and developing safety performance measurement systems. Designed and managed data collection, analysis, and final reporting for community implementation.

Heavy Civil Construction & Infrastructure

Prepared bid packages for medium/large scale construction projects and participated in industry outreach for subcontractors. Formulated subcontractor breakdowns and contracts for estimated projects to support risk management and cost control.

Assisted in the generation of work breakdown structures for construction projects. Managed and monitored Primavera project schedule generation, updating, and communication.

Ensured that operations, safety, planning, and quality staff operate in accordance with project specific procedures, instructions, project schedules and budgets per the civil and earthwork contracts of a \$6B onshore oil and gas construction project. Monitored and managed contractual processes concerning the changes to the value and scope of work. Supported the official internal and external communications between project stakeholders.

Facilitated data and archival collection in preparation of contract claims and changes. Participated and advised during the settlement of contracts and claims through negotiations.

Performed 3D modeling and structural design using AutoCAD, SAP, Revit, and BIM for various new construction and restoration projects.

Developed cost and risk-loaded work schedules using Monte Carlo simulation techniques on Primavera Risk Analysis to quantify contingency budgets and foresee potential delays. Prepared executive reports for project management and controls to consider in making alternative risk-benefit decisions between competing project priorities.

Research Grants

Construction Safety Research Alliance Fellowship Award

Los Alamos National Laboratory Safety SPOT Award

Interdisciplinary Ethics Tech Competition 3rd rank Award

Peer Reviews

Journal of Construction Management

Safety Science

Automation in Construction

Practice Periodical on Structural Design and Construction