Erick H. Knox

PhD, PE

Principal, CTO

Dr. Knox is Director of Biomechanical and Safety Engineering at Engineering Systems Inc. (ESI). Dr. Knox is a biomechanical engineer with over 20 years' experience in biomechanics.

He specializes in biomechanical analysis, determination of injury causation and mechanisms, ergonomics and human factors analysis, accident investigation and reconstruction, mechanical testing and failure analysis, human motion analysis including occupant kinematics, and biomedical devices.

Education

PhD, Biomedical Engineering. Northwestern University. 1996

MS, Biomedical Engineering. Northwestern University. 1990

BS, Engineering, Biomedical Engineering Department. Marquette University. 1987

Licenses & Certifications

- State of Arkansas P.E. License 17356
- State of Illinois P.E. License 062-059483
- State of North Carolina P.E. License 053972
- OSHA 30-Hour Construction
- Certified XL Tribometrist – (CXLT) Excel Tribometers, LLC.
- Competent Person Guardian Fall Protection
- OSHA Fall Protection
- OSHA Walking Working Surfaces for General
- OSHA Industry Scaffolds
- OSHA Stairways and Ladders
- Forklift Operator Safety Training and Certification

Positions Held

Engineering Systems Inc., Aurora, Illinois

- CTO, 2025 – Present

Contact Information

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ESi Aurora

4215 Campus Drive
Aurora, IL 60504

Areas of Specialization

- Impact Biomechanics
- Orthopedic & Clinical Biomechanics
- Human Factors & Ergonomics
- Accident Analysis & Reconstruction
- Injury Causation & Injury Mechanisms
- Human Motion Analysis & Occupant Kinematics
- Mechanical Testing & Failure Analysis
- Biomedical Instrumentation

- Principal, 2010 – Present
- Vice President, 2009 – Present
- Director, Biomechanical and Safety Engineering, 2007–2020
- Assistant Director of Illinois Operations, 2006–2007
- Manager, Mechanical & Biomechanical Engineering, 2004–2006
- Manager of Biomechanical Engineering, 2003–2004
- Senior Staff Consultant, 1998–2003
- Staff Engineer, 1996–1998
- Engineering Research Associate, 1988–1991

Rehabilitation Engineering Research Center and Prosthetics Research Laboratory, Northwestern University Medical School, Chicago, Illinois

- Research Engineer, 1988–1996

Continuing Education

- **Understanding Bloodstain Pattern Analysis** – Bevel Gardner & Associates
- **Traffic Accident Reconstruction I and Traffic Accident Reconstruction II** – Northwestern University Traffic Institute
- **Strain Gage Technology Course** – Vishay Measurements Group, Inc.
- **Injuries, Anatomy, Biomechanics and Federal Regulation** – Society of Automotive Engineers
- **Current issues in Using Crash Injury Data** – Society of Automotive Engineers
- **Accidental Injury: Biomechanics & Prevention** – San Diego School of Medicine
- **Clinical and Biomechanical Aspects of Lower Extremity Injury** – Wayne State University
- **Ergonomics: Job Analysis and Field Studies** – University of Michigan
- **Forensic Analysis of Medical Records in Injury Biomechanics and Accident** – Reconstruction Society of Automotive Engineers
- **Occupant and Vehicle Kinematics in Rollovers** – Society of Automotive Engineers

Professional Affiliations/Honors

American National Standards Institute

- Chairman/Vice Chairman, ANSI A14 Committee on Ladders – Present
- Chairman/Member, ANSI A14 Steering Committee – Present

- Member, ANSI A14.1 Subcommittee on Portable Wood Ladders – Present
- Chairman, ANSI A14.2 Subcommittee on Portable Metal Ladders – Present
- Chairman, ANSI A14.3 Subcommittee on Fixed Ladders – Present
- Member, ANSI A14.5 Subcommittee on Portable Reinforced Plastic Ladders – Present
- Member, ANSI A14.7 Subcommittee on Mobile Ladder Stands and Mobile Ladder Stand Platforms – Present
- Member, ANSI A14 Labeling Task Force – Present

Human Factors and Ergonomics Society

- Member – Present

American Society of Biomechanics

- Member – Present

American Society for Testing and Materials

- Member – Present

American Society of Mechanical Engineers

- Member – Present

Institute for Electrical and Electronics Engineers

- Member – Present

Engineering in Medicine and Biology Society

- Member – Present

Society of Automotive Engineers

- Member – Present

Engineering Society of Illinois

- Member – Present

National Society of Professional Engineers

- Member – Present

Alpha Eta Mu Beta, Biomedical Engineering Honor Society

- Member – Present

Tau Beta Pi, Engineering Honor Society

- Member – Present

National Institute on Disability and Rehabilitation Research

- Training Grant Fellow

Marquette University

- Biomedical Engineering Scholastic Honors

Publications

“Novel Accident Reconstruction Methodologies: A Collaborative Human Factors Approach,” C.P. Eckersley, D.B. Brickman, **E.H. Knox**, and L.E. Rewerts, Special Issue: Proceedings of the 69th HFES International Annual Meeting, October 2025.

“Forensic Analysis of a Walker-Related Fall: Balancing Design, Safety, and Intrinsic Risk Factors,” D.M. Fortenbaugh, **E.H. Knox**, and S.J. Smith, Proceedings of the XXXVII Annual International Occupational Ergonomics and Safety Conference, July 2025.

“Accident Reconstruction of a Ladder Slide-Out: Integrating Human Factors, Design, and Safety,” D.M. Fortenbaugh, **E.H. Knox**, and D.H. Kruger, Proceedings of the XXXVII Annual International Occupational Ergonomics and Safety Conference, July 2025.

“Classification of Wood Chipper Accident Types: Influence of Bottom Bump Bar,” D.B. Brickman, **E.H. Knox**, A.C. Mathias, C.P. Eckersley, and L.E. Rewerts, Proceedings of the XXXVII Annual International Occupational Ergonomics and Safety Conference, July 2025.

“Toward a Test-Based Methodology to Evaluate Unrestrained Torso Neck Braces Using the Hybrid III ATD and MATD Neck,” C.U. de Jongh, A.H. Basson, **E.H. Knox**, and C.J. Leatt, SAE International Journal of Transportation Safety, Vol. 12, No. 3, 2024.

"A Methodology to Evaluate Unrestrained Torso Neck Braces for Near Vertex Impacts," C. de Jongh, A. Basson, **E.H. Knox**, and C. Leatt, SAE International Journal of Transportation Safety, Vol. 12, No. 3, 2024.

“Methods of Accident Reconstruction: Biomechanical and Human Factors Considerations,” **E.H. Knox**, A.C. Mathias, A.R. Rath Stern, M.P. Van Bree, and D.B. Brickman, Proceedings of the ASME 2015 International Mechanical Engineering Conference and Exposition, Houston, TX, November 13–19, 2015.

“Roll-Over Shapes of Human Locomotor Systems: Effects of Walking Speed,” A.H. Hansen, D.S. Childress, and **E.H. Knox**, Clinical Biomechanics, Vol. 19, No. 4, pp. 407–414, 2004.

“ATV Australian Analysis (Coronial Inquest) Investigative Report,” **E.H. Knox**, Engineering Systems Inc., 2003.

“Prosthetic Foot Roll-Over Shapes with Implications for Alignment of Trans-Tibial Prostheses,” A.H. Hansen, D.S. Childress, and **E.H. Knox**, Prosthetics and Orthotics International, Vol. 24, No. 3, pp. 205–215, December 2000.

“Foot Shape and Rehabilitation,” A.H. Hansen, D.S. Childress, and **E.H. Knox**, Gait Analysis Symposium, Chicago, IL, September 14, 1998.

"How Two-Dimensional Representations of Three-Dimensional Human Movement Can Be Misleading," S.A. Gard, D.S. Childress, and E.H. Knox, Gait & Posture, Vol. 5, No. 2, 1997.

"How Shoes Alter Prosthetic Foot Mechanics," **E.H. Knox**, D.S. Childress, and A.T. Sandifer, Biomechanics Desk Reference, 1997.

"Two-Dimensional Representation of Three-Dimensional Pelvic Motion During Human Walking: An Example of How Projections Can Be Misleading," S.A. Gard, **E.H. Knox**, and D.S. Childress, Journal of Biomechanics, Vol. 29, No. 10, pp. 1387–1391, 1996.

Presentations

"Investigation of Ladder Weld Fractures and More," E.E. Wright and **E.H. Knox**, International Materials Applications & Technologies Conference, Cleveland, OH, September 30–October 3, 2024.

"Importance of Standard Test Methods in Investigations of FRP Composite Ladders," G. Nagalia, A.R. Shah, **E.H. Knox**, and P.D. Umberger, International Materials Applications & Technologies Conference, Cleveland, OH, September 30–October 3, 2024.

"Risk Assessment: When Have You Reached Acceptable Risk?" A.C. Mathias, W. Wong, J.C. Smolka, J.P. Mohorovic, and **E.H. Knox**, IEEE International Symposium on Product Compliance Engineering, Chicago, IL, April 30–May 2, 2024.

"Residential Bunk Bed Child Entrapment Hazard Safety Test Methods," D.B. Brickman, J.P. Mohorovic, A.C. Mathias, and **E.H. Knox**, XXXV Annual International Occupational Ergonomics and Safety Virtual Conference, October 9–10, 2023.

"Ergonomic Safety Analysis of Tilting a Concrete Grinding Machine," W. Wong, S.F. Uchneat, D.B. Brickman, **E.H. Knox**, and J.T. Eganhouse, XXXIV Annual International Occupational Ergonomics and Safety Conference, September 15–16, 2022.

"Concrete Buggy Operator Presence Control 3-Dimensional Convergency of Accident Reconstruction Technology," D.B. Brickman, **E.H. Knox**, J.T. Eganhouse, D.H. Kruger, R.A. Brewster, T.C. Lueck, and M.D. Bauer, XXXIII Annual International Occupational Ergonomics and Safety, Virtual, September 16–17, 2021.

"Residential Elevator Child Entrapment Virtual Reality Accident Reconstruction," D.B. Brickman, **E.H. Knox**, A.C. Mathias, L.E. Rewerts, J.K. Lueck, and R.A. Brewster, XXXI Annual International Occupational Ergonomics and Safety Conference, New Orleans, LA, June 12–13, 2019.

"Tanker Truck Loading Platform Fall Protection Accident Reconstruction Analysis," D.B. Brickman, **E.H. Kno**x, D.H. Kruger, R.A. Brewster, and J.A. Lueck, XXIX Annual Occupational Ergonomics and Safety Conference, Seattle, WA, June 1–2, 2017.

"Ladder Safety Training," M.P. Van Bree and **E.H. Knox**, American Society of Home Inspectors Great Lake Chapter, Mount Prospect, IL, July 23, 2016.

"Construction Fall Accident Reconstruction and Safety Analysis," **E.H. Knox**, S.J. Smith, and J.T. Eganhouse, XXVIII Annual International Occupational Ergonomics and Safety Conference, Chicago, IL, June 9–10, 2016.

“Beach Rental Elevator Child Entrapment Safety Analysis,” D.B. Brickman, T.J. Bajzek, **E.H. Knox**, C.A. Fox, J.K. Lueck, and J.M. Petersen, XXVIII Annual Occupational Ergonomics and Safety Conference, Chicago, IL, June 9–10, 2016.

“The Angle of Inclination of Extension Ladders: Field Studies and Labeling Research,” **E.H. Knox** and M.P. Van Bree, Human Factors and Ergonomics Society International Meeting, Los Angeles, CA, October 26–30, 2015.

“Commercial Hand-Fed Chipper Winch Line Accident Reconstruction Analysis,” D.B. Brickman, **E.H. Knox**, C.A. Fox, and J.D. Stage, XXVII Annual Occupational Ergonomics and Safety Conference, Nashville, TN, May 28–29, 2015.

“Dresser Tipover Child Accident Reconstruction Case Study,” D.B. Brickman, **E.H. Knox**, and J.F. Grzetic, XXVII Annual Occupational Ergonomics and Safety Conference, Nashville, TN, May 28–29, 2015.

“Ladder Safety Training,” M.P. Van Bree and **E.H. Knox**, American Society of Home Inspectors, Northern Illinois Chapter Meeting, Villa Park, IL, August 8, 2012.

“Step Ladder Failure Analysis: A Comparison of Analytical Methods,” M.T. Kenner, M.E. Stevenson, **E.H. Knox**, M.P. Van Bree, and J.A. Wilkinson, Proceedings of the ASME 2011 International Mechanical Engineering Congress & Exposition, Denver, CO, November 11–17, 2011.

“Tool and Techniques for Analyzing Structural Damage Patterns in Ladders,” M.E. Stevenson, **E.H. Knox**, M.P. Van Bree, M.T. Kenner, and J.A. Wilkinson, ASM International Annual Meeting, Houston, TX, October 17, 2010.

“Field Studies and Labeling Research on the Angle of Inclination of Non-Self-Supporting Ladders,” **E.H. Knox** and M.P. Van Bree, International Conference on Fall Prevention and Protection, Morgantown, WV, May 18–20, 2010.

“Ladder Safety Training,” M.P. Van Bree and **E.H. Knox**, OSHA Safety Day, Sugar Grove, IL, March 17, 2010.

“Stepladder Failure: Analysis of Root Cause,” **E.H. Knox**, M.P. Van Bree, M.T. Kenner, and J.A. Wilkinson, Proceedings of the ASME 2009 International Mechanical Engineering Conference and Exposition, Lake Buena Vista, FL, November 13–19, 2009.

“Stepladder Spreader Bar Structural Integrity and The Impact on Accidents,” M.P. Van Bree, **E.H. Knox**, K.M. Smith, and J.T. Eganhouse, Proceedings of the ASME 2009 International Mechanical Engineering Conference and Exposition, Lake Buena Vista, FL, November 13–19, 2009.

“Measurement of Thermal Residual Stress Using the Strain Gauge Method,” C.R. Morin, **E.H. Knox**, M.T. Kenner, G.J. Novak, and J.T. Eganhouse, Failure Analysis Symposium, ASM International Materials Science & Technology Conference and Exhibition, Detroit, MI, September 17, 2007.

“Mechanical Properties of Prosthetic and Human Feet: From Shoes to Computer Alignment,” A. Hansen, **E.H. Knox**, D. Childress, and A. Sandifer, 2nd International Conference of Advanced Prosthetics, Newport Beach, CA, April 18–19, 2002.

“Rollover Shapes of Prosthetic Feet,” A.H. Hansen, D.S. Childress, and **E.H. Knox**, 4th Annual Gait and Clinical Movement Analysis Meeting, Dallas, TX, 1999.

“Mechanical Properties of Artificial Feet: Some Practical Interpretations,” D. Childress, A. Hansen, **E.H. Knox**, L. Miller, Proceedings of the 9th World Congress of the International Society for Prosthetics and Orthotics, Amsterdam, The Netherlands, June 28–July 5, 1998.

“How Shoes Alter Prosthetic Foot Mechanics,” D.S. Childress and **E.H. Knox**, Annual Meeting of the American Academy of Orthotists and Prosthetists, San Francisco, CA, 1997.

“Measurement and Analysis of the Biomechanical Properties of Prosthetic Feet and the Influence of Shoes,” **E.H. Knox**, Marquette University Biomedical Engineering Seminar Series, March 1997.

“Biomechanical Characteristics of Dynamic Response Feet and Their Consideration in Walking,” **E.H. Knox**, American Academy of Orthotists and Prosthetists Scientific Seminar, 1995.

“Do Shoes Influence the Forefoot Mechanics of Prosthetic Feet?” D.S. Childress, **E.H. Knox**, and A.T. Sandifer, 8th World Congress of the International Society of Prosthetics and Orthotics, Melbourne, Australia, 1995.

“The Influence of Shoes on the Forefoot Mechanics of Prosthetic Feet,” D.S. Childress, A.T. Sandifer, and **E.H. Knox**, 9th Scientific Meeting of the Japanese Society of Prosthetics and Orthotics, Kobe, Japan, 1993.

“Slip Detection and Automatic Grasping for a Prosthetic Prehensor,” **E.H. Knox**, D.S. Childress, and C.W. Heckathorne, 7th World Congress of the International Society of Prosthetics and Orthotics, Chicago, IL, 1992.

“A Preliminary Study of Dynamic Response Prosthetic Feet: Characterization of Biomechanical Properties,” **E.H. Knox**, American Academy of Orthotists and Prosthetists Scientific Seminar, 1992.