Erick H. Knox PhD, PE

Principal, Chief Technical Officer

Dr. Knox is the Chief Technical Officer at Engineering Systems Inc. (ESI). Dr. Knox is a biomechanical engineer with over twenty years of experience in the field of 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.

Licenses & Certifications

- State of Illinois P.E. License No. 062-059483
- State of Arkansas P.E. License No. 17356
- State of North Carolina P.E. License No. 053972

Positions Held

Engineering Systems Inc., Aurora, Illinois

- Principal, 2010 – Present
- Chief Technical Officer, Present
- Vice-President, 2009 - 2025
- Director, Biomechanical and Safety Engineering, 2007 – 2020
- Assistant Director of Illinois Operations, 2006 – 2007
- Manager of Mechanical and 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 of Northwestern University Medical School

- Research Engineer, 1988-1996

Publications/Presentations

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, C.J. Leatt, SAE International Journal of Transportation Safety, 12(3), 2024

Investigation of Ladder Weld Fractures and More

E. E. Wright & E.H. Knox, International Materials Applications & Technologies Conference, Cleveland, OH, Sep 30-Oct 3, 2024

Erick H. Knox
Principal, Chief Technical Officer

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4215 Campus Drive
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Education

PhD, Biomedical Engineering. Northwestern University. 1996.

MS, Biomedical Engineering. Northwestern University. 1990

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

Areas of Specialization

Impact Biomechanics

Orthopedic/Clinical Biomechanics

Human Factors and ergonomics

Accident analysis and reconstruction

Injury causation and Injury mechanisms

Human motion analysis and occupant kinematics

Mechanical testing and failure analysis

Biomedical instrumentation

Importance of Standard Test Methods in Investigations of FRP Composite Ladders

G. Nagalia, A.R. Shah, E.H. Knox, P.D. Umberger, International Materials Applications & Technologies Conference, Cleveland, OH, Sep 30-Oct 3, 2024

A Methodology to Evaluate Unrestrained Torso Neck Braces for Near Vertex Impacts

C. de Jongh, A. Basson, E.H. Knox, C. Leatt, SAE International Journal of Transportation Safety, 12(3), 2024

Risk Assessment: When Have You Reached Acceptable Risk?

A.C. Mathias, W. Wong, J.C. Smolka, J.P. Mohorovic, E.H. Knox, IEEE International Symposium on Product Compliance Engineering (ISPCE), 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, E.H. Knox, XXXVth 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, J.T. Eganhouse, XXXIVth 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, M.D. Bauer, XXXIIIrd Annual International Occupational Ergonomics and Safety, Virtual Conference, 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, R.A. Brewster, XXXIst 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. Knox, D.H. Kruger, R.A. Brewster, J.A. Lueck, XXIXth Annual Occupational Ergonomics and Safety Conference, Seattle, WA, June 1-2, 2017

Ladder Safety Training

M.P. Van Bree, E.H. Knox, American Society of Home Inspectors (ASHI), Great Lake Chapter, Mount Prospect, IL, July 23, 2016

Construction Fall Accident Reconstruction and Safety Analysis

E. H. Knox, S.J. Smith, J.T. Eganhouse, The XXVIIIth 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, J.M. Petersen, The XXVIIIth Annual Occupational Ergonomics and Safety Conference, Chicago, IL, June 9-10, 2016

Methods of Accident Reconstruction: Biomechanical and Human Factors Considerations

E.H. Knox, A.C. Mathias, A.R. Rath Stern, M.P. Van Bree, D.B. Brickman, Proceedings of the ASME 2015 International Mechanical Engineering Conference and Exposition IMECE 2015, Houston, TX, November 13-19, 2015

The Angle of Inclination of Extension Ladders: Field Studies and Labeling Research

E. H. Knox, M.P. Van Bree, 2015 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, J.D. Stage, The XXVIIth 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, J.F. Grzetic, The XXVIIth Annual Occupational Ergonomics and Safety Conference, Nashville, TN, May 28-29, 2015

Ladder Safety Training

M.P. Van Bree, E.H. Knox, American Society of Home Inspectors (ASHI), 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, 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, J.A. Wilkinson, Materials Science and Technology, 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, M.P. Van Bree, 2010 International Conference on Fall Prevention and Protection, Morgantown, WV, May 18-20, 2010

Ladder Safety Training

M.P. Van Bree, E.H. Knox, OSHA Safety Day. Waubonsee Community College, Sugar Grove, IL, March 17, 2010

Stepladder Failure: Analysis of Root Cause

E.H. Knox, M.P. Van Bree, M.T. Kenner, 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, J.T. Eganhouse, Proceedings of the ASME 2009 International Mechanical Engineering Conference and Exposition, November 13-19, Lake Buena Vista, Florida, 2009

Measurement of Thermal Residual Stress Using the Strain Gauge Method

C. R. Morin, E. H. Knox, M. T. Kenner, G. J. Novak, J. T. Eganhouse, presented at the Session on “Tools and Techniques,” Failure Analysis Symposium, Materials Science & Technology (MS&T) 2007 Conference and Exhibition, ASM International, Detroit, MI, September 17, 2007

Roll-Over Shapes of Human Locomotor Systems: Effects of Walking Speed

A.H. Hansen, D.S. Childress, E.H. Knox, Clinical Biomechanics 19(4): 407- 414, 2004.

ATV Australian Analysis (Coronial Inquest) Investigative Report

Engineering Systems Inc., 2003.

Mechanical Properties of Prosthetic and Human Feet: From Shoes to Computer Alignment

A. Hansen, E.H. Knox, D.S. Childress, A.T. Sandifer, A.2nd International Conference of Advanced Prosthetics, presented by Childress in Newport Beach, California, April 18-19, 2002

Prosthetic Foot Roll-over Shapes with Implications for Alignment of Trans-tibial Prostheses

A.H. Hansen, D.S. Childress, E.H. Knox, Prosthetics and Orthotics International, Vol. 24, No. 3, 205-215, December, 2000

Rollover shapes of prosthetic feet

A.H. Hansen, D.S. Childress, E.H. Knox, 4th Annual Gait and Clinical Movement Analysis Meeting, Dallas, Texas, 1999

Foot Shape and Rehabilitation. Gait Analysis Symposium

A.H. Hansen, D.S. Childress, E.H., Honoring H. Kerr Graham at Children’s Memorial Hospital, Chicago, Illinois, September 14. (Hansen Invited Speaker),1998

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 (ISPO), Amsterdam, presented by Childress in The Netherlands, June 28-July 5, 1998

How Two-Dimensional Representations of Three-Dimensional Human Movement Can Be Misleading

S.A. Gard, D.S. Childress, E.H. Knox, Gait & Posture, 5 (2), 1997

How Shoes Alter Prosthetic Foot Mechanics

E.H. Knox, D.S. Childress, A.T. Sandifer, Biomechanics Desk Reference, 1997

How Shoes Alter Prosthetic Foot Mechanics

D.S. Childress, E.H. Knox, Annual Meeting of the American Academy of Orthotists and Prosthetists, San Francisco, 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

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, D.S. Childress Journal of Biomechanics, Vol. 29, No. 10, pp. 1387-1391, 1996

Biomechanical Characteristics of Dynamic Response Feet and Their Consideration in Walking

E.H. Knox, American Academy of Orthotists and Prosthetists Scientific Seminar, Invited Speaker, 1995

Do Shoes Influence the Forefoot Mechanics of Prosthetic Feet?

D.S. Childress, E.H. Knox, 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, 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, C.W. Heckathorne, 7th World Congress of the International Society of Prosthetics and Orthotics, Chicago, Illinois, 1992

A Preliminary Study of Dynamic Response Prosthetic Feet: Characterization of Biomechanical Properties

E.H. Knox, American Academy of Orthotists and Prosthetists Scientific Seminar, Invited Speaker, 1992

Continuing Education

- **Understanding Bloodstain Pattern Analysis** – Bevel Gardner & Associates

- **Traffic Accident Reconstruction I and Traffic Accident Reconstruction II** - Northwestern University Traffic Institute, Chicago, IL
- **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, Troy, MI
- **Accidental Injury: Biomechanics & Prevention** - University of California, San Diego School of Medicine
- **Clinical and Biomechanical Aspects of Lower Extremity Injury** - Wayne State University, Detroit, MI
- **Ergonomics: Job Analysis and Field Studies** - University of Michigan, Ann Arbor, MI
- **Forensic Analysis of Medical Records in Injury Biomechanics and Accident Reconstruction** - Society of Automotive Engineers, Troy, MI
- **Occupant and Vehicle Kinematics in Rollovers** - Society of Automotive Engineers, Fort Myers, Florida
- **Certified XL Tribometrist** - (CXLT) Excel Tribometers, LLC
- **Fall Protection – Competent Person** - Guardian Fall Protection
- **30 Hour Construction, Fall Protection, Walking Working Surfaces for General Industry Scaffolds, Stairways and Ladders** - OSHA Training Institute – University of South Florida
- **Forklift Operator Safety Training and Certification** - Atlas Companies, Aurora, IL

Professional Affiliations/Honors

American National Standards Institute (ANSI)

Involvement with ANSI A14 Committee on Ladders, which included service as:

- Chairman/Vice Chairman of the ANSI A14 Committee on Ladders
- Chairman/Member of ANSI A14 Steering Committee (current)
- Chairman of ANSI A14.2 Subcommittee on portable metal ladders (current)
- Member ANSI A14.3 Subcommittee on fixed ladders (current)
- Member ANSI A14.5 Subcommittee on portable reinforced plastic ladders (current)
- Member ANSI A14.7 Subcommittee on mobile ladder stands and mobile ladder stand platforms
- Member ANSI A14 Labeling Task Force (current)

Human Factors and Ergonomics Society

- Member

American Society of Biomechanics

- Member

American Society for Testing and Materials

- Member

American Society of Mechanical Engineers

- Member

Institute for Electrical and Electronics Engineers

- Member

Engineering in Medicine and Biology Society

- Member

Illinois (Local and State Chapter) & National Society of Professional Engineers

- Member

Alpha Eta Mu Beta (Biomedical Engineering Honor Society)

- Member

Tau Beta Pi (Engineering Honor Society)

- Member

National Institute on Disability and Rehabilitation Research

- Training Grant Fellow

Marquette University

- Biomedical Engineering Scholastic Honors