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ERICK H. KNOX, Ph.D., P.E.
PRINCIPAL
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Dr. Knox is Director of Biomechanical and Safety Engineering 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.

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

Education

Ph.D., Biomedical Engineering, Northwestern University, 1996
M.S., Biomedical Engineering, Northwestern University, 1990
B.S., Engineering, Biomedical Engineering Department, Marquette University, 1987

Licensed Professional Engineer (P.E.)

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

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

Society of Automotive Engineers

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

Positions Held

Engineering Systems Inc., Aurora, Illinois

Principal, 2010 – Present

Vice President, 2009 – Present

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

Continued 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

OSHA Training Institute – University of South Florida
30 Hour Construction
Fall Protection
Walking Working Surfaces for General
Industry Scaffolds
Stairways and Ladders

Forklift Operator Safety Training and Certification
Atlas Companies, Aurora, IL.

Publications/Presentations

"Toward a Test-Based Methodology to Evaluate Unrestrained Torso Neck Braces Using the Hybrid III ATD and MATD Neck," de Jongh, C.U., Basson, A.H., **Knox, E.H.**, Leatt, C.J. SAE International Journal of Transportation Safety, 12(3), 2024.

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

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

"A Methodology to Evaluate Unrestrained Torso Neck Braces for Near Vertex Impacts," de Jongh, C., Basson, A., **Knox, E.H.**, Leatt, C. SAE International Journal of Transportation Safety, 12(3), 2024.

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

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

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

- "Concrete Buggy Operator Presence Control 3-Dimensional Convergency of Accident Reconstruction Technology," Brickman, D.B., **Knox, E.H.**, Eganhouse, J.T., Kruger, D.H., Brewster, R.A., Lueck, T.C., Bauer, M.D. XXXIIIrd Annual International Occupational Ergonomics and Safety, Virtual Conference, September 16-17, 2021.
- "Residential Elevator Child Entrapment Virtual Reality Accident Reconstruction," Brickman, D.B., **Knox, E.H.**, Mathias, A.C., Rewerts, L.E., Lueck, J.K., Brewster, R.A. XXXIst Annual International Occupational Ergonomics and Safety Conference, New Orleans, LA., June 12-13, 2019.
- "Tanker Truck Loading Platform Fall Protection Accident Reconstruction Analysis," Brickman, D.B., **Knox, E.H.**, Kruger, D.H., Brewster, R.A., Lueck, J.A. XXIXth Annual Occupational Ergonomics and Safety Conference, Seattle, WA, June 1-2, 2017.
- "Ladder Safety Training," Van Bree, M.P., **Knox, E.H.**, American Society of Home Inspectors (ASHI), Great Lake Chapter, Mount Prospect, IL, July 23, 2016.
- "Construction Fall Accident Reconstruction and Safety Analysis," **Knox, E.H.**, Smith, S.J., Eganhouse, J.T. The XXVIIIth Annual International Occupational Ergonomics and Safety Conference, Chicago, IL, June 9-10, 2016.
- "Beach Rental Elevator Child Entrapment Safety Analysis," Brickman, D.B., Bajzek, T.J., **Knox, E.H.**, Fox, C.A., Lueck J.K., Petersen J.M., The XXVIIIth Annual Occupational Ergonomics and Safety Conference, Chicago, IL, June 9-10, 2016.
- "Methods of Accident Reconstruction: Biomechanical and Human Factors Considerations," **Knox, E.H.**, Mathias, A.C., Rath Stern, A.R., Van Bree, M.P., Brickman, D.B., Proceedings of the ASME 2015 International Mechanical Engineering Conference and Exposition IMECE2015, Houston, TX, November 13-19, 2015.
- "The Angle of Inclination of Extension Ladders: Field Studies and Labeling Research," **Knox, E.H.**, Van Bree, M.P., 2015 Human Factors and Ergonomics Society International Meeting, Los Angeles, CA, October 26-30, 2015.
- "Commercial Hand Fed Chipper Winch Line Accident Reconstruction Analysis," Brickman, D.B., **Knox, E.H.**, Fox, C.A., Stage, J.D., The XXVIIth Annual Occupational Ergonomics and Safety Conference, Nashville, TN, May 28-29, 2015.
- "Dresser Tipover Child Accident Reconstruction Case Study." Brickman, D.B., **Knox, E.H.**, Grzetic, J.F., The XXVIIth Annual Occupational Ergonomics and Safety Conference, Nashville, TN, May 28-29, 2015.
- "Ladder Safety Training," Van Bree, M.P., **Knox, E.H.**, 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," Kenner, M.T., Stevenson, M.E., **Knox, E.H.**, Van Bree, M.P., Wilkinson, J.A., 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," Stevenson, M.E., **Knox, E.H.**, Van Bree M.P., Kenner, M.T., Wilkinson, J.A., 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," **Knox, E.H.**, Van Bree M.P., 2010 International Conference on Fall Prevention and Protection, Morgantown, WV, May 18-20, 2010.
- "Ladder Safety Training," Van Bree M.P., **Knox E.H.** OSHA Safety Day. Waubensee Community College, Sugar Grove, IL, March 17, 2010.
- "Stepladder Failure: Analysis of Root Cause," **Knox E.H.**, Van Bree M.P., Kenner M.T., Wilkinson J.A., 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," Van Bree M.P., **Knox E.H.**, Smith K.M., Eganhouse J.T., 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." Clinical Biomechanics 19(4): 407- 414., Hansen, A.H., Childress, D.S. and **Knox, E.H.**, 2004.
- "ATV Australian Analysis (Coronial Inquest) Investigative Report.," Engineering Systems Inc., 2003.
- "Mechanical Properties of Prosthetic and Human Feet: From Shoes to Computer Alignment." 2nd International Conference of Advanced Prosthetics, presented by Childress in Newport Beach, California, April 18-19. Hansen, A., **Knox, E.**, Childress, D., Sandifer, A., 2002.
- "Prosthetic Foot Roll-over Shapes with Implications for Alignment of Trans-tibial Prostheses," Hansen, A.H., Childress, D.S., **Knox, E.H.**, Prosthetics and Orthotics International, Vol. 24, No. 3, 205-215, December, 2000.
- "Rollover shapes of prosthetic feet," Hansen, A.H., Childress, D.S., **Knox, E.H.**, 4th Annual Gait and Clinical Movement Analysis Meeting, Dallas, Texas, 1999.
- "Foot Shape and Rehabilitation. Gait Analysis Symposium," Honoring H. Kerr Graham at Children's Memorial Hospital, Chicago, Illinois, September 14. (Hansen Invited Speaker), Hansen, A.H., Childress, D.S., **Knox, E.H.**, 1998.
- "Mechanical Properties of Artificial Feet: Some Practical Interpretations," 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., Childress, D. Hansen, A., **Knox, E.**, Miller, L., 1998.
- "How Two-Dimensional Representations of Three-Dimensional Human Movement Can Be Misleading," Gard, S.A. Childress, D.S., **Knox, E.H.**, Gait & Posture, 5 (2), 1997.
- "How Shoes Alter Prosthetic Foot Mechanics," **Knox, E. H.**, Childress, D. S. & Sandifer, A. T., Biomechanics Desk Reference, 1997.
- "How Shoes Alter Prosthetic Foot Mechanics." Childress, D.S. & **Knox, E.H.**, 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," 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," Gard, S.A., **Knox, E.H.** & Childress, D.S., Journal of Biomechanics, Vol. 29, No. 10, pp. 1387-1391, 1996.
- "Biomechanical Characteristics of Dynamic Response Feet and Their Consideration in Walking," American Academy of Orthotists and Prosthetists Scientific Seminar, Invited Speaker, 1995.
- "Do Shoes Influence the Forefoot Mechanics of Prosthetic Feet?" Childress, D. S., **Knox, E. H.** & Sandifer, A. T., 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," Childress, D. S., Sandifer, A. T. & **Knox, E. H.**, 9th Scientific Meeting of the Japanese Society of Prosthetics and Orthotics, Kobe, Japan, 1993.

"Slip Detection and Automatic Grasping for a Prosthetic Prehensor," **Knox, E. H.**, Childress, D. S. & Heckathorne, C. W., 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," American Academy of Orthotists and Prosthetists Scientific Seminar, Invited Speaker, 1992.