

## ROBERT J. KUDDER, Ph.D., S.E., F.ASTM

Principal



### +CONTACT

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Robert Kudder is an accomplished structural engineer with 44 years of experience in structural forensics and building enclosure performance. He has specialized in investigations, peer review, testing, and repair design for nonperforming and distressed structures, and building wall systems and enclosures.

Dr. Kudder is a leading building enclosure expert in the areas of performance testing and evaluation of building walls of masonry, glass and aluminum, wood, and metal windows, and building cladding systems including stucco, EIFS, wood, and specialty panels. He has conducted numerous studies relating to functional problems with walls: causes of water leakage, structural capacity and durability, and developed instrumentation and monitoring programs to study condensation problems and effects of material properties on wall behavior. Many of these studies led to wall repair programs with particular attention to constructability and accommodation of existing tolerances.

His structural forensic knowledge and portfolio include studies involving wind and dynamic loading, vibrations, durability, and the effects of corrosion. He has performed structural investigations into the causes of collapse and the stabilization of partially collapsed structures.

He has served as expert witness providing litigation support services on numerous building envelope issues related to water leakage, condensation, and durability, as well as structural failures.

Dr. Kudder is active in several professional organizations and is a frequent industry speaker and author on building wall systems, condensation, quality assurance, and building science issues.

### ■ EDUCATION

Doctor of Philosophy in Civil Engineering  
 Northwestern University

Master of Science in Civil Engineering  
 Northwestern University

Bachelor of Engineering  
 The Cooper Union, New York

### ■ REGISTRATIONS

Licensed Structural Engineer in Illinois

Licensed Professional Engineer in Colorado and Ohio

### ■ PROFESSIONAL AFFILIATIONS

ASTM International, Fellow

Member, Committee E06.55 Performance of Exterior Walls

Member, Committee E06.51 Windows and Curtain Walls

Member, Committee E06.58 Exterior Insulation and Finish Systems

Former Chair, Committee E06.55.15 Leakage of Exterior Walls

American Society of Civil Engineers (ASCE)

Former Member, Committee on Research, Structural Division

Structural Engineers Association of Illinois (SEAOI)

The Masonry Society (TMS)

Member, Technical Committee on Architectural Practices

Former Chairman, Technical Committee on Construction Practices

The Construction Specifications Institute (CSI)

Exterior Design Institute (EDI)

Co-Founder and Charter Member

Board of Directors 1996–2000

Board Chairman 2000–2001

Instructor, EDI Seminar for Inspectors

Northwestern University, Department of Civil and

Environmental Engineering, External Advisory Board

### ■ AWARDS

ASTM International

Award of Merit, 2012

Award of Appreciation, Committee E06 on the Performance of Buildings, 2007

American Society of Civil Engineers (ASCE)

Award of Life Member Status



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### ■ PUBLICATIONS

- "Peer Review: Effective, Efficient and Educational," Proceedings of the IBEC 32nd International Convention and Trade Show, Anaheim, CA, R.J. Kudder and C.M. Ceja, March 17, 2017
- "ASTM in Our DNA, The Standards Effect on an Engineering, Architecture, Forensics Consulting Practice," *Standardization News*, January/February 2017
- "Maintaining Masonry - Moisture Remediation in Single Wythe Masonry," *SMART / Dynamics of Masonry*, Volume 2, No. 1, July 2014
- Co-Chair, Symposium on Condensation of Exterior Building Wall Systems, ASTM International, West Conshohocken, PA, October 10-11, 2010, ASTM STP 1498 Proceeding published in 2011, B.S. Kaskel and R.J. Kudder, JTE Guest Editors
- "Installation Details and Condensation Performance," RRJ *Insight* Issue No. 23, R.J. Kudder, D.K. Johnson, and S.K. Flock, August 2006
- "Importance of Condensation Control in Cold Climate Wall Assemblies," RRJ *Insight* Issue No. 23, R.J. Kudder, D.K. Johnson, and S.K. Flock, August 2006
- "Effect of Installation Details on the Condensation Performance of Window Frames," Committee on Performance and Durability of Window-Walls Interface, ASTM STP 1484, R.J. Kudder, S.K. Flock, and D.K. Johnson, ASTM International, West Conshohocken, PA, 2004
- "Controlling Condensation with Vapor Barriers and Air Barriers," *The Story Pole*, a Journal of The Masonry Institute of Michigan, January 2003
- "Ambiguities, Changes, and Contradictions in Building Wall Literature," *Performance of Exterior Building Walls*, ASTM STP 1422, R.J. Kudder, K.M. Lies, and B.A. Faith, ASTM International, West Conshohocken, PA, 2002
- "Case Study of a Humidified Computer Center," *Change Order*, a publication of the Chicago Chapter of The Construction Specifications Institute, 2002
- "*Masonry Designers' Guide*" Third Edition, publication of The Masonry Society, Contributing Author, 2001
- "EIFS and Wall Dry-Out Potential," RRJ *Insight* Issue No. 14, R.J. Kudder and K.M. Lies, June 2000
- "Case Study of a Humidified Computer Center - Diagnosing the Problem and The Repair," RRJ *Insight* Issue No. 14, June 2000
- Proceedings of ASTM International Symposium on *Water Leakage through Building Walls*, ASTM STP 1314 R.J. Kudder and J.L. Erdly, Eds., ASTM International, West Conshohocken, PA, February 1998
- "The Facts About Hose Testing," Symposium on Water Leakage through Building Walls, K.R. Hoigard and R.J. Kudder, ASTM STP 1314, R.J. Kudder and J.L. Erdly, Eds., ASTM International, West Conshohocken, PA, 1998
- "Comparison of Class PB EIFS Lamina Water Transmission Test Methods," Symposium on EIFS: Materials, Properties and Performance, R.J. Kudder and K.M. Lies, ASTM STP 1269, P.E. Nelson and R.E. Kroll, Eds., ASTM International, Philadelphia, PA, 1995
- "Collapse Recovery Strategy," RRJ *Insight* Issue No. 4, March 1995



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### ■ PUBLICATIONS *continued*

- "Communications: Making a Technical Concept Clear and Understandable," *RRJ Insight* Issue No. 3, January 1995
- "Durability and Serviceability of Polymer-based Exterior Insulation Systems," *Development, Use, and Performance of Exterior Insulation and Finish Systems*, R.J. Kudder and K.M. Lies, ASTM STP 1187, Mark F. Williams and Richard G. Lampo, Eds., ASTM International, Philadelphia, PA, 1995
- "Deliver Masonry as a Cladding System," *Aberdeen's Magazine of Masonry Construction*, August 1994
- "Condensation in Walls," *RRJ Insight* Issue No. 1, May 1994
- "Laboratory Study of Corrosion of Steel Studs and Screws Used in Masonry Walls," *Masonry: Design and Construction, Problems and Repairs*, R.J. Kudder and J.E. Slater, ASTM STP 1180, John M. Melander and Lynn R. Lauersdoff, Eds., ASTM International, Philadelphia, PA, 1993
- "Including ASTM E-514 Tests in Field Evaluations of Brick Masonry," *Masonry: Design and Construction, Problems and Repairs*, K.R. Hoigard, R.J. Kudder, and K.M. Lies, ASTM STP 1180, John M. Melander and Lynn R. Lauersdoff, Eds., ASTM International, Philadelphia, PA, 1993
- "Testing for Construction Quality Control," *Aberdeen's Magazine of Masonry Construction*, July 1992
- "The Need for an Engineering Systems Approach to Steel Stud/Brick Veneer Walls," invited discussion, *Progressive Architecture*, June 1992
- "Performance of a Modified Sealant Fillet Detail," *Science and Technology of Building Seals, Sealants, Glazing and Waterproofing: Second Volume*, K.R. Hoigard and R.J. Kudder, ASTM STP 1142, Jerome M. Klosowski, Ed., ASTM International, Philadelphia, PA, 1992
- "Diagnosing Window and Curtain Wall Leaks," *Water in Exterior Building Walls: Problems and Solutions*, R.J. Kudder and K.M. Lies, ASTM STP 1107, Thomas A. Schwartz, Ed., ASTM International, Philadelphia, PA, 1991
- "Vapor Control and Psychrometric Monitoring in Exterior Walls," *Water in Exterior Building Walls: Problems and Solutions*, ASTM STP 1107, Thomas A. Schwartz, editor, ASTM International, Philadelphia, PA, R.J. Kudder and K.R. Hoigard, submitted for publication
- "Construction Details Affecting Wall Condensation," Proceedings of BTECC Symposium on Air Filtration, Ventilation & Moisture Transfer, Fort Worth, TX, R.J. Kudder, K.M. Lies, and K.R. Hoigard, December 1986
- "Longevity Compromises of Buildings," ASCE Structures Congress, Chicago, IL, September 1985
- "Bend Tests of Grade 60 Reinforcing Bars," *Journal of the American Concrete Institute*, Title No. 80-20, R.J. Kudder and D.P. Gustafson, May-June 1983
- "Recurring Causes in Construction Failures," ASCE National Convention, New York, NY, O.C. Guedelhoefer, R.J. Kudder, and T.L. Rewerts, May 1981
- "Vibration Problems and Repair of a Football Stadium," ASCE National Convention, Miami, FL, S.G. Pinjarkar and R.J. Kudder, November 1980
- "Static and Ultimate Load Behavior of Cold-Formed Steel Joist Residential Floor Systems," Proceedings of the Fourth International Conference on Cold-Formed Structures, R.J. Kudder, P.W. Linehan, and J.F. Wiss, St. Louis, MO, June 1979
- "Dynamic and Human Response Behavior of Cold-Formed Steel-Joist Residential Floor Systems," Proceedings of the Fourth International Conference on Cold-Formed Steel Structures, Chicago, IL, P.W. Linehan, R.J. Kudder, and J.F. Wiss, June 1978



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### ■ PUBLICATIONS *continued*

- "Computer Program for Preliminary Building Safety Analysis," Proceedings of the Second Conference on Designing to Survive Severe Hazards, Illinois Institute of Technology, Chicago, IL, R.J. Kudder, N. FitzSimons, and J.R. Janney, November 1977
- "Computer Applications in Full Scale Structural Testing," Proceedings of the Specialty Conference on Computers in Structural Engineering Practice, Canadian Society of Civil Engineers, Montreal, Canada, S.G. Pinjarkar, O.C. Guedelhoefer, and R.J. Kudder, October 1977
- "Seismic Soil-Structure Interaction for Embedded Buildings," Proceedings of the Fifth World Conference of Earthquake Engineering, Rome, Italy, R.A. Parmelee and R.J. Kudder, June 1973
- "Analysis of Cables as Equivalent Two-Force Members," *Engineering Journal*, American Institute of Steel Construction, New York, NY, D.H.H. Tung and R.J. Kudder, April 1968

### ■ PRESENTATIONS

- "Window Condensation Problems: Why Now?" IIBEC Chicago Area Chapter, Annual Meeting/Program, Oak Brook, IL, January 17, 2018
- "Mitigating Window Condensation: Analysis, Simulations & Instrumentation," Building Enclosure Council-Chicago Annual Evening Chair Program, Chicago, IL, November 12, 2015
- "Thermal Bridging and Moisture Control in Building Enclosures," Association of Licensed Architects (ALA), Educational Program, Glenview, IL, K.M. Lies, S.K. Flock, and R.J. Kudder, March 31, 2015
- "Torture by PowerPoint - Four Hours of Building Technology," seminar presented at request of Seagate Inspections, Inc., Toledo, OH, February 25, 2015
- "Using ASTM E2128, Standard Guide for Evaluating Water Leakage of Buildings," Greater Detroit BEC Symposium 2014: What Would Water Do?, Livonia, MI, October 14, 2014
- "Using ASTM Standard E2128-01a, Standard Guide for Evaluating Water Leakage of Buildings," Symposium on Building Walls Subjected to Water Intrusion and Accumulation: Lessons from the Past and Recommendations for the Future, ASTM International, Indianapolis, IN, April 14, 2013
- "Dr. Seuss Does Building Science: Fundamentals of Moisture and Vapor Transport Mechanisms," Greater Detroit BEC Symposium 2011, Plymouth, MI, October 18, 2011
- "Tutorial on Fundamentals of Condensation Performance of Exterior Walls," Symposium on Condensation of Exterior Building Wall Systems, ASTM International, San Antonio, TX, October 10, 2010
- "Understanding Condensation," Chicago Masonry Expo for the International Masonry Institute, Chicago, IL, April 2003
- "Condensation in Walls," The Construction Specifications Institute, Chicago Chapter, October 22, 2002
- "Moisture Problems and Solutions - Methodology for Investigating Leakage of Exterior Walls," American Industrial Hygienist Association, Mold Seminar: A Multidisciplinary Approach, Schaumburg, IL, February 6, 2002
- "EIFS 101 - The Fundamentals," Inspect World '02, American Society of Home Inspectors, Continuing Education and Technical Sessions, New Orleans, LA, January 15, 2002



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### ■ PRESENTATIONS *continued*

- "Ambiguities, Changes, and Contradictions in Building Wall Literature," *Performance of Exterior Building Walls*, ASTM STP 1422, R.J. Kudder, K.M. Lies, and B.A. Faith, 2002
- "Building Forensics - Water Vapor and Mold," American Institute of Architects (AIA) St. Louis Chapter Continuing Education Workshop, St. Louis, MO, November 7, 2001
- "Condensation in Walls," Southern Illinois University Seminar Series and Continuing Education, R.J. Kudder and B.A. Faith, February 19, 2001
- "Flashing," Howard Schockey 2001 Annual Training Program, Winchester, VA, February 2, 2001
- "Condensation in Masonry Walls," Masonry 2000 Seminar, Masonry Institute of Michigan, Farmington Hills, MI, October 26, 2000
- "Investigative Tools and Techniques: Methodology for Investigating Leakage of Exterior Walls," The Association for Preservation Technology - Symposium for Preserving the Recent Past 2, Philadelphia, PA, October 9, 2000
- "Exterior Insulation and Finish Systems (EIFS) - What It Is and How It Works," ABA Forum on the Construction Industry - More Sticks and Bricks, October 9, 1999 in Seattle, WA and October 14, 1999 in Philadelphia, PA
- Quality Assurance Testing and Education - Session 5, panel member, ASTM International EIFS Workshop, Seattle, Washington, April 18, 1999
- Cladding Technology Seminar, Chicago Architecture Foundation, Docent Continuing Education Seminar, Chicago, IL, R.J. Kudder, I.R. Chin, and D. Rupert, 1996
- "EIFS Is Here To Stay," Brick Institute of America Region 9 Annual Meeting, Pine Mountain, GA, November 6, 1995
- "EIFS Is Here To Stay," Southwestern Brick Institute Annual Meeting, Montgomery, TX, October 20, 1995
- "Comparison of Class PB EIFS Lamina Water Transmission Test Methods," Symposium on EIFS: Materials, Properties and Performance, R.J. Kudder and K.M. Lies, ASTM STP 1269, P.E. Nelson and R.E. Kroll, Eds., ASTM International, Philadelphia, PA 1995
- "Condensation in Exterior Walls," panel discussion for AIA Chicago Chapter, Technical Committee, Chicago, IL, R.J. Kudder, R. Berg, H. Krogstad, and J. Horvath, October 27, 1994
- "Masonry Testing for a Q.C. Program," The Masonry Society Annual Meeting, Atlanta, GA, February 21, 1994
- "Diagnosing Curtainwall Leaks," The Construction Specifications Institute Continuing Education Program, Birmingham, AL, R.J. Kudder and M.A. Rodriguez, February 21, 1994
- "Understanding Tolerances," AIA Chicago Technical Roundtable, Chicago, IL, R.J. Kudder and R.W. Johnson, December 16, 1993
- "Laboratory Study of Corrosion of Steel Studs and Screws Used in Masonry Walls," *Masonry: Design and Construction, Problems and Repairs*, R.J. Kudder and J.E. Slater, ASTM STP 1180, John M. Melander and Lynn R. Lauersdoff, Eds., ASTM International, Philadelphia, PA, 1993
- "Laboratory and Field Testing for Quality Control," The Masonry Society Annual Meeting, Orlando, FL, February 8, 1992



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"Performance of a Modified Sealant Fillet Detail," *Science and Technology of Building Seals, Sealants, Glazing and Waterproofing: Second Volume*, K.R. Hoigard and R.J. Kudder, ASTM STP 1142, Jerome M. Klosowski, Ed., ASTM International, Philadelphia, PA, 1992

"The Roles and Perspectives of the Parties to Construction," ABA Seminar on Construction Litigation, Chicago, IL, O.C. Guedelhofer and R.J. Kudder, October 26, 1991

"Specifying Curtain Walls," The Construction Specifications Institute National Convention, San Diego, CA, June 29, 1991

"The Importance of Tolerance in Facade Design and Construction," Joint CCCSI/ACI Meeting, Chicago, IL, R.J. Kudder and R.W. Johnson, January 22, 1991

"Diagnosing Window and Curtain Wall Leaks," *Water in Exterior Building Walls: Problems and Solutions*, R.J. Kudder and K.M. Lies, ASTM STP 1107, Thomas A. Schwartz, editor, ASTM International, Philadelphia, PA, 1991

"Vapor Control and Psychrometric Monitoring in Exterior Walls," *Water in Exterior Building Walls: Problems and Solutions*, ASTM STP 1107, Thomas A. Schwartz, editor, ASTM International, Philadelphia, PA, R.J. Kudder and K.R. Hoigard, submitted for publication

Session Chairman, Condition Assessment of Existing Structures, Structures Congress, Structures Division, American Society of Civil Engineers, Baltimore, MD, 1990

"Specifying Windows and Curtain Walls," The Construction Specifications Institute, Northern Illinois Chapter, September 12, 1989

"Failure Analysis of Masonry," Graduate Seminar Series, Illinois Institute of Technology Department of Civil Engineering, Chicago, IL, October 23, 1987

Session Chairman, Research on Performance of Buildings by Monitoring Behavior, Structures Congress, Structures Division, American Society of Civil Engineering, Orlando, FL, 1987

"Masonry Failures," The Construction Specifications Institute, Chicago Chapter, Chicago, IL, April 28, 1987

"Construction Details Affecting Wall Condensation," BTECC Symposium on Air Filtration, Ventilation & Moisture Transfer, Fort Worth, TX, R.J. Kudder, K.M. Lies, and K.R. Hoigard, December 1986

"Diagnosing Curtain Wall Leaks and Moisture Problems," The Construction Specifications Institute, Northern Illinois Chapter, Technical Session, October 7, 1986

"Longevity Compromises of Buildings," ASCE Structures Congress, Chicago, IL, September 1985

"Structural Engineering Concerns," Sarabond: A Seminar for Concerned Building Owners, Sponsored by Gage Behunin, Denver, CO, July 17, 1985

"Recurring Causes of Construction Failures," ASCE National Convention, New York, NY, O.C. Guedelhofer, R.J. Kudder, and T.L. Rewerts, May 1981

"Static and Ultimate Load Behavior of Cold-Formed Steel Joist Residential Floor Systems," Fourth International Conference on Cold-Formed Structures, St. Louis, MO, R.J. Kudder, P.W. Linehan, and J.F. Wiss, June 1979

"Computer Program for Preliminary Building Safety Analysis," Second Conference on Designing to Survive Severe Hazards, Illinois Institute of Technology, Chicago, IL, R.J. Kudder, N. FitzSimons, and J.R. Janney, November 1977