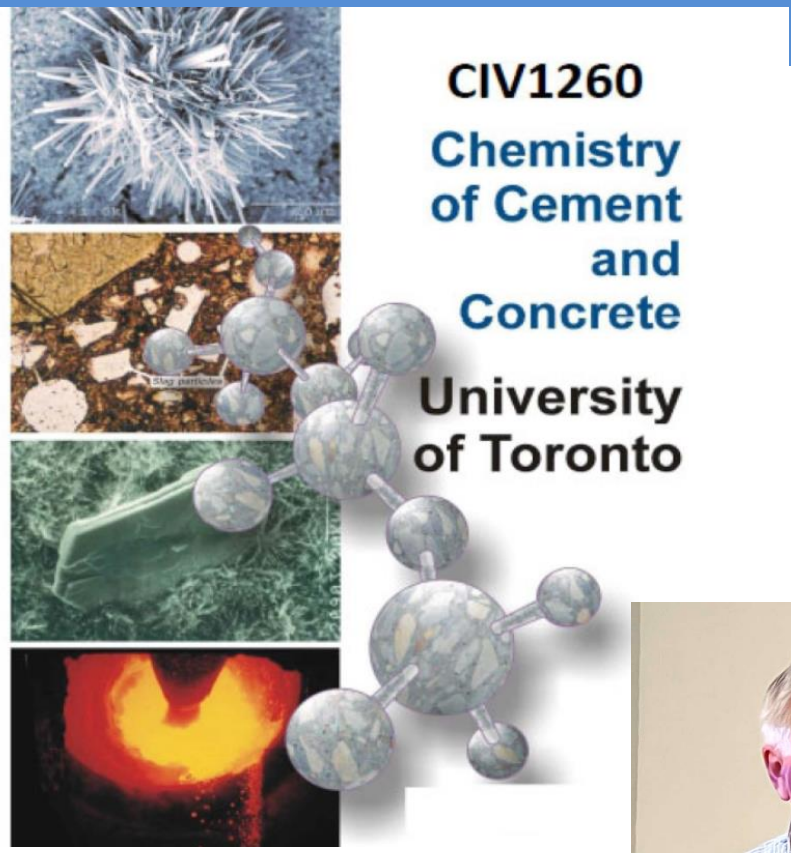
Contributions of R. D. Hooton to PCA Research and Cement Standards Development

Presented By: Michelle Wilson

Senior Director, Concrete Technology and Industry Outreach
Portland Cement Association



- Educator

- Cement Chemistry Workshop

Portland Cement Association
Education Foundation

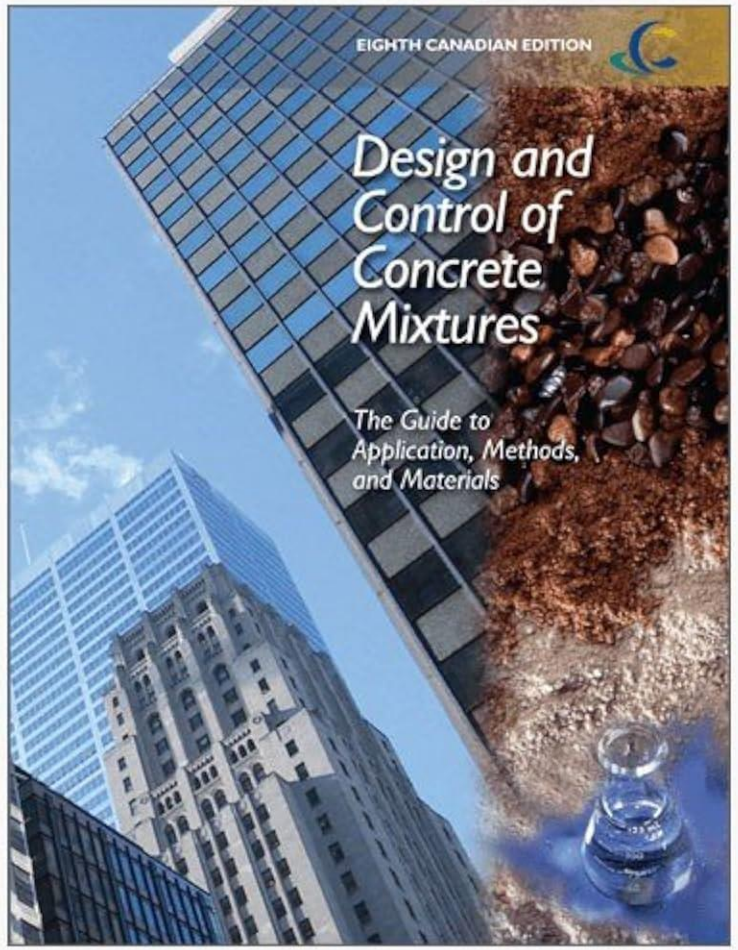
- Educator

- PCA Fellowships

- Michelle Nokken, 2001
- Ms. K. Luke, 2002
- Hoa Lam, 2002
- Michael Robbins, 2005
- Lindsay Lashley, 2007
- Mila Aleksic, 2008
- Qian Bi, 2021
- Christian Pavlidis, 2024

- Educator
- Durability Expert

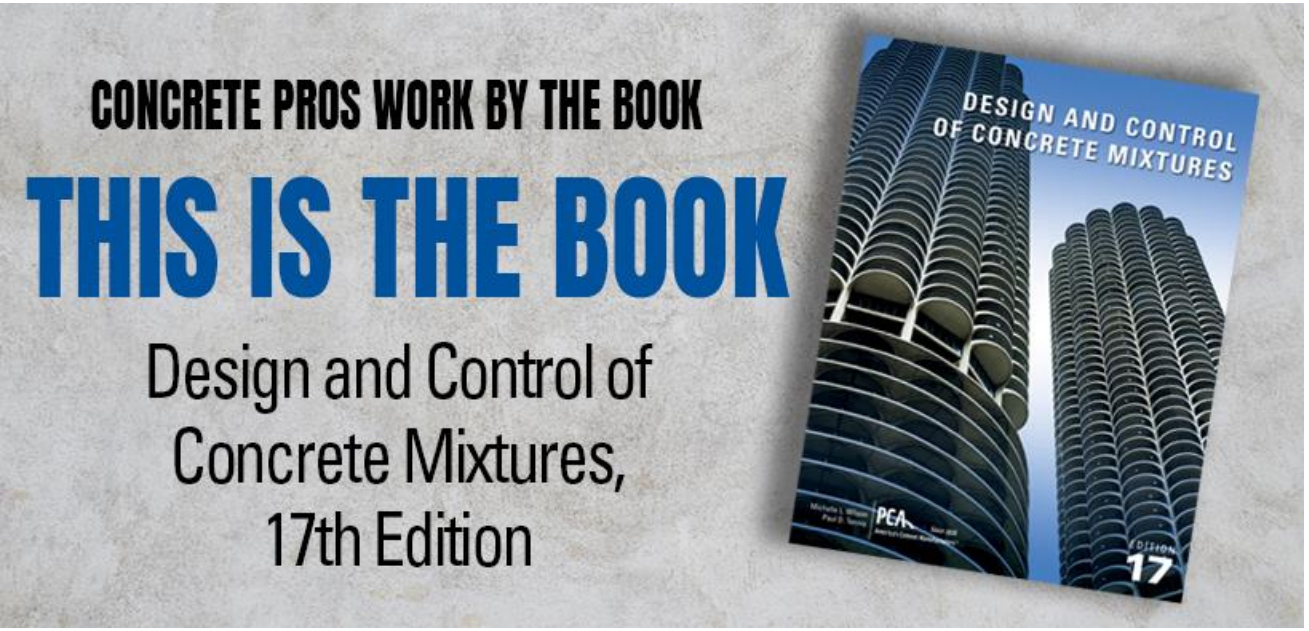
R.Douglas Hooton



- Educator
- Durability Expert
- Author

EB101 - Design And Control Of Concrete Mixtures Eighth Canadian Edition

Written by S. Kosmatka, B. Kerkhoff, R. D. Hooton, and R. J McGrath.



- Educator
- Durability Expert
- Author

*79 References in PCA's 17th Edition of Design and Control.

Discussion

- Contributions to PCA Research and Cement Standards
  - Internal Curing
  - Permeability
  - Fineness
  - Sulfate Resistance
    - Thaumasite
  - DEF
  - AAR

- Portland-Limestone Cements

PCA Cement and Concrete Research Library

Code: SN2620b	**Effects Of Internal Curing Methods On Restrained Shrinkage And Permeability** Authors: Lam, Hoa; Hooton, R. Douglas Year: 2005 Citation: Lam, Hoa and Hooton, R. Douglas, Effects Of Internal Curing Methods On Restrained Shrinkage And Permeability, Proceedings of the Fourth International Research Seminar, Gaithersburg, Maryland, Usa, June, 2005, Pages 210-228. Keywords: Concrete; Internal curing; Mortar; Permeability; Properties; Restrained shrinkage; SAP; Shrinkage reducing admixtures; SRA; Super absorbent polymers
Code: SN2861a	**Development of Early-Age Impermeability in High-Performance Concretes** Authors: Nokken, Michelle R.; Hooton, R. Douglas Year: 2003 Citation: Nokken, Michelle R. and Hooton, R. Douglas, Development of Early-Age Impermeability in High-Performance Concretes, PCI Bridge Conference and PCI/FHWA International Symposium on High Performance Concrete, Orlando, Florida, October 19-22, 2003, 17 pages. Keywords: Curing; Early age; Fellowship; High performance concrete (HPC); Permeability; Porosity; Transport properties
Code: SN3002	**Electrical Conductivity Testing** **Authors: Nokken, Michelle R.; Hooton, R. Douglas** Year: 2006 Citation: Nokken, Michelle R. and Hooton, R. Doug, Electrical Conductivity Testing, Concrete International, American Concrete International, Farmington, Michigan, October 2006, pages 58 to 63. Keywords: ACI committee 236; Concrete; Durability criteria; Conductivity; Index test; Performance based **standards; Prequalification; Quality control; Structure; Test**
Code: SN3003	**Using Pore Parameters to Estimate Permeability or Conductivity of Concrete** Authors: Nokken, Michelle R.; Hooton, R. Douglas Year: 2006 Citation: Nokken, Michelle R. and Hooton, R. Douglas, Using Pore Parameters to Estimate Permeability or Conductivity of Concrete, Materials and Structures Journal, 1 rue des Blai, F- 92220, Bagneux, FRANCE, November 2008, 16 pages. Keywords: ACI committee 236; Concrete; Durability criteria; Conductivity; Index test; Performance based standards; Prequalification; Quality control; Structure; Test

PCA Cement and Concrete Research Library

Code: SN2861b	**Discontinuous Capillary Porosity in Concrete, Does it Exist?** Authors: Nokken, Michelle R.; Hooton, R. Douglas Year: 2004 Citation: Reprinted with permission authors, Nokken, Michelle R. and Hooton, R. Douglas, Discontinuous Capillary Porosity in Concrete, Does it Exist?, Advances in Concrete through Science and Engineering, ACBM RILEM International Symposium, Northwestern University, Evanston, Illinois, March 22 to 24, 2004, 17 pages. Keywords: Curing; Early age; High performance concrete (HPC); Permeability; Porosity; Transport properties
Code: SN2869a	**Dual Effectiveness of Lithium Salt in Controlling Both Delayed Ettringite Formation and ASR in Concretes** Authors: Ekolu, Steven; Thomas, Michael D. A.; Hooton, R. Douglas Year: 2007 Citation: Ekolu, Steven; Thomas, Michael D. A., and Hooton, R. Douglas, Dual Effectiveness of Lithium Salt in Controlling Both Delayed Ettringite Formation and ASR in Concretes, Cement and Concrete Research, Vol. 37, No. 6, June 2007, pages 942 to 947. Keywords: Alkali silica reaction (ASR); Delayed ettringite formation (DEF); Fellowship; Heat treatment; Lithium
Code: SN2871	**Effect of Cement Fineness and C3S Content on Properties of Concrete, a Literature Review.** Authors: Hooton, R. Douglas; Boyd, A. J.; Bhadkamkar, D Year: 2005 Citation: PCA R&D Serial No. 2871. Keywords: Blaine fineness; Cement; C3A; C3S; Compressive strength; Concrete properties; Creep; Durability; Fineness; Heat of hydration; Porosity; Shrinkage; Sulfate resistance; Tricalcium aluminate; Tricalcium silicate (C3S)

Limestone in Portland Cement

2002 PCA R&D Serial No. 2658:

- *The Use of Limestone in Portland Cements: Effect on Thaumasite Form of Sulfate Attack*
  - by R. Doug Hooton and Michael D. A. Thomas

  - Overall, the data available supported the proposal to permit use of up to 5% limestone in portland cements (ASTM C150).

Portland Limestone Cements

2007 PCA R&D Serial No. 3053:

- *Portland-Limestone Cement: State-of-the-Art Report and Gap Analysis For CSA A 3000*
- by R. D. Hooton, M. Nokken, and M. D. A. Thomas

-St. Lawrence Cement- introducing a new class of cements with up to 15% limestone

Portland Limestone Cements

2010 PCA R&D Serial No. 3142:

- *The Durability of Concrete Produced with Portland-Limestone Cement: Canadian Studies*
- by Michael D. A. Thomas and R. Doug Hooton

Findings ensured PLC can be used in all classes of concrete- however testing to determine the long-term performance of PLC-SCM blends in sulfate exposure was ongoing during this study.

Portland Limestone Cements

2016 PCA R&D Serial No. 3285:

- *Sulfate Resistance of Mortar and Concrete Produced with Portland-Limestone Cement and Supplementary Cementing Materials*
- by R. D. Hooton and M. D. A. Thomas

The data (including Hossack's Fellowship research) show that when mitigated with appropriate levels of SCMs, there is no influence of limestone on sulfate resistance.

Portland Limestone Cements

- Sulfate Resistance of PLC
- ASTM C452 Testing

Gagatek, D.; and Hooton, R.D., "Assessing Performance of Sulfate-Resistant Portland Cements," *ACI Materials Journal*, Vol. 116, No. 6, November 2019, pages 227 to 233. https://doi.org/10.14359/51718056.

Hooton, R. D., and Emery, J. J., "Sulfate Resistance of a Canadian Slag Cement," *ACI Materials Journal*, Vol. 87, No. 6, November-December 1990, pp. 547 to 555. https://doi.org/10.14359/2501.

Work cited to include ASTM C452 for sulfate acceptance of PLC

Portland Limestone Cements

- *Development of a More Rapid Test for Assessing Sulfate Resistance of Blended Cements and Cement-SCM Mixtures*

-Christian Pavlidis, Professor Emeritus R. Douglas Hooton

- Durability Expert
- Educator
- Author
- Taste

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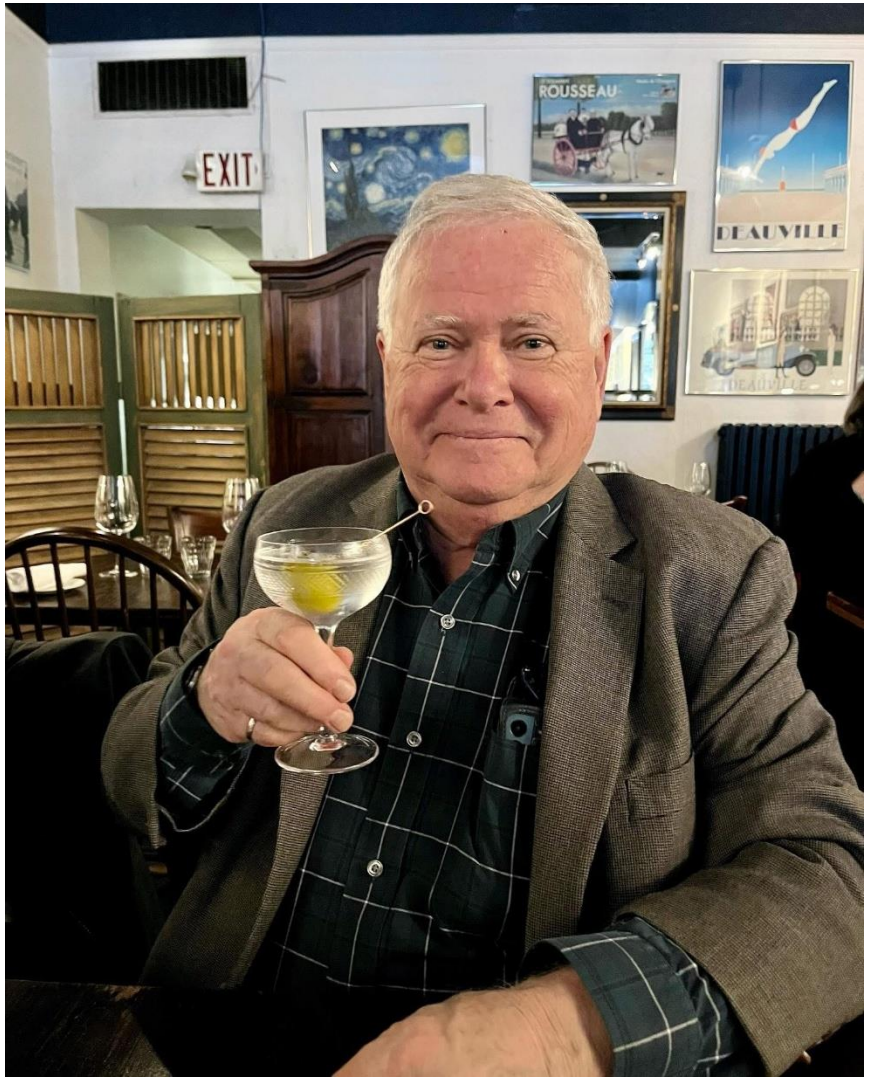
A Persuasive Man

With a Respected Viewpoint.



Thank you Doug & Cheers to You!

Further Information

Michelle L. Wilson
Senior Director,
Concrete Technology and Industry Outreach

PCA
America's Cement Manufacturers

5420 Old Orchard Road
Skokie, IL 60077

847.972.9034 (phone)
mwilson@cement.org
www.cement.org