

RICHARD P. GOLDBERG AIA, CSI, NCARB

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Expertise

Richard P. Goldberg, AIA, CSI, NCARB is an Architect and President of Professional Consultants International, LLC- Connecticut, and PROCON Consulting Architects, Inc.-Florida, both building design and construction consulting companies. Mr. Goldberg is a technical and forensic architect, responsible for managing and providing technical consultations to architects, contractors, building owners, product manufacturers, insurers, accountants and attorneys.

He specializes in exterior building envelope systems, with sub-specialties in concrete, ceramic tile, natural & engineered stone, brick & concrete masonry, terrazzo, glass and waterproofing material applications. Mr. Goldberg is involved in all phases of a building project, from research and design development, to construction monitoring, forensic investigations and litigation support.

Experience

Mr. Goldberg has 37 years of architectural and construction industry experience. An Architect by training, Mr. Goldberg was in general private practice of architecture as a licensed architect prior to specialization as a technical and forensic architect.

Prior to forming PROCON (Professional Consultants International) in 1999, Mr. Goldberg served as the Director of the Technical Service Division of Laticrete International, a manufacturer of products for the concrete, ceramic tile and stone industries from 1990-1999. Mr. Goldberg was a principal of Goldberg & Associates Architects from 1986-1990, and a project architect at several architectural firms in the Hartford, CT area from 1979-1986.

Education, Licenses, Certifications & Awards

Mr. Goldberg received his Bachelor of Architecture (1979) professional degree and Bachelor of Science in Building Sciences (1977) degree from Rensselaer Polytechnic Institute in Troy, NY. Mr. Goldberg has continued professional education at Harvard University Graduate School of Design, Massachusetts Institute of Technology in Cambridge, MA, and attends numerous certified continuing education seminars on an annual basis as required by state Architectural licensing regulations.

Mr. Goldberg holds National Council of Architectural Registration Boards (NCARB) certification, and is a registered Architect in the U.S. in multiple states, including Connecticut, New York, New

Jersey and Florida. He is a professional member of the American Institute of Architects (AIA) and the Construction Specifications Institute (CSI), and served as the President for the Hartford, CT/USA chapter of CSI in 2005. Mr. Goldberg is a National Tile Contractor's Association (NTCA) Recognized Industry Consultant, and received the prestigious NTCA Ring of Honor Lifetime Achievement Award in 2014.

Trade Organization Appointments, Publications & Speaking Engagements

Mr. Goldberg is the author of numerous technical articles and books published worldwide. His most recent book is titled *Direct Adhered Ceramic Tile Stone & Thin Brick Facades*. This book is considered the authoritative text on this emerging exterior building envelope technology.

Trade association appointments include the Tile Council of North America (TCNA) technical handbook committee, the Technical Committee of the National Tile Contractors Association (NTCA) and various ANSI & ASTM Standards Committees, including ANSI A108 Standard Specification for Installation of Ceramic Tile, ANSI A137 Series Standard Specification for the Manufacture of Ceramic Tile, and the International Standards Organization ISO Technical Advisory Group TAG 189.

Mr. Goldberg is a frequent speaker at global technical conferences and trade shows such as Construction Specifications Institute, American Institute of Architects, International Masonry Institute, Brick Research Center Forum, Building Enclosure Council, COVERINGS / International Tile & Stone Exposition, USA, QUALICER, Spain and CERSAIE, Italy.

Technical Books & Publications

"Direct Adhered Ceramic Tile, Stone & Thin Brick Facades" 1999 (edited & re-issued 2010) 200 page compilation of technical articles

SECTION 1 INTRODUCTION

- 1.1 Preface
- 1.2 Why Use The Direct Adhered Method?
- 1.3 Brief History of Ceramic Tile, Stone and Thin Brick Facades
- 1.4 Summary - Content of Manual
- 1.5 Historical Case Study

SECTION 2 EXTERIOR WALL CONCEPTS

- 2.1 Function of Exterior Walls
- 2.2 Types of Exterior Wall Structures
 - Bearing Wall Non-bearing Wall
 - Curtain Wall
- 2.3 Types of Exterior Wall Construction
 - Barrier Wall Cavity Wall
 - Pressure-equalized Rainscreen Wall
 - Future Technology - Dynamic Buffer Zone
- 2.4 References

SECTION 3 TYPES of DIRECT ADHERED WALL CONSTRUCTION

- 3.1 Concrete Masonry Unit Substrate
 - Barrier Wall

- Cavity and Pressure-Equalized Wall Inner Cavity
- Concrete Masonry
- Inner Cavity Light Gauge Steel Framing
- 3.2 Clay Masonry Unit Substrate
- 3.3 Light Gauge Steel Framing
 - Cement Backer Unit Substrate
 - Lath and Cement Plaster Substrate Corrugated
 - Steel Substrate
- 3.4 Reinforced Cast-in-place Concrete Substrate
- 3.5 Pre-fabricated Panels
- 3.6 Pre-cast Concrete
 - Positive Cast
 - Negative Cast
 - Glass Fiber Reinforced Concrete (GFRC) Panels
- 3.7 Architectural Details
- 3.8 Case Study - Saskatoon City Hospital - Precast Concrete and Ceramic Tile

SECTION 4 STRUCTURAL AND ARCHITECTURAL CONSIDERATIONS

- 4.1 Structural Considerations - Types of Structural Movement
 - Live and Dead Loads Thermal
 - Movement Moisture Expansion Drying
 - Shrinkage Elastic Deformation Creep
 - Differential Settlement
- 4.2 Architectural Considerations - Components of the Exterior Wall Assembly
 - Windows and Window Maintenance Systems
 - Thermal Control - Insulation
 - Moisture Control - Waterproofing and Flashing
 - Movement Joints
 - Fire Resistance and Containment
 - Acoustical Control Roofing and Parapet
 - Walls
- 4.3 References

SECTION 5 SUBSTRATES

- 5.1 Criteria for Substrates
- 5.2 Types of Substrates
- 5.3 Substrate Preparation - Design and Construction Requirements
- 5.4 Substrate Preparation - Cleaning Equipment and Procedures
- 5.5 References

SECTION 6 SELECTION OF EXTERNAL CLADDING MATERIAL

- 6.1 Criteria for Selection of Ceramic Tile, Natural Stone and Thin Brick
- 6.2 Ceramic Tile
- 6.3 Natural Stone and Agglomerates
- 6.4 Thin Brick Masonry
- 6.5 Cladding Selection - Moisture Sensitivity, Color, Temperature
- 6.6 References

SECTION 7 INSTALLATION MATERIALS AND METHODS - ADHESION GROUTING OF CERAMIC

TILE, STONE AND THIN BRICK

7.1 Adhesive Performance and Selection Criteria

7.2 Types of Adhesives

7.3 Methods of Adhesive - Cladding Installation

7.4 Cladding Installation Equipment and Procedures

7.5 Grout and Sealant Joint Materials and Methods of Installation 7.6 Post-installation Cleaning

7.7 References

SECTION 8 INDUSTRY STANDARDS, BUILDING REGULATIONS AND SPECIFICATIONS

8.1 Background

8.2 Building Codes and Regulations

8.3 Industry Standards

8.4 Guideline Specifications

SECTION 9 QUALITY ASSURANCE, TESTING, INSPECTION MAINTENANCE PROCEDURES

9.1 Quality Assurance Procedures

9.2 Preventative and Corrective Maintenance

9.3 Protection and Sealing

9.4 Non-destructive Testing

Visual Inspection

Computer Modeling (Finite Element Analysis FEA)

Tap (Acoustic Impact) Testing

Infrared Imaging (Thermographic Scanning)

Ultrasonic Pulse Velocity and Echo Testing

Moisture Content Testing

Salt Contamination Testing

9.5 Destructive Testing

Tensile Pull Strength Testing

Core Drilling Shear Bond Testing

9.6 Types, Causes and Remediation of Defects

Staining and Weathering

Fluid Migration Efflorescence

Cracking

Delamination and Adhesive Bond Failure

Movement Joint and Grout Failure

9.7 Case Study - Computer Modeling of Ceramic Tile Cladding

Finite Element Analysis

Select Trade Conference Papers & Speaking Engagements

Annual Continuing Education Conference Presenter at following:

International Tile & Stone Exposition / Coverings Trade 1992-2016

Qualicer World Congress on Ceramic Tile Quality, Spain 1994-2012

Coverings Trade Show 2016 - Chicago

Keynote Breakfast presentation – Industry Recognized Consultant

Building Enclosure Council 2014 -Chicago

“Ventilated Rainscreen Facades”

International Masonry Institute Education Conferences 2014 –Chicago, Hartford

“Ventilated Rainscreen Facades”

International Masonry Institute Contractor's College – Total Solutions Plus Conference 2014

"Ventilated Rainscreen Facades"

International Masonry Institute Education Conference 2013 - Connecticut

"Code & Standards Update for the Ceramic Tile & Stone Design & Construction"

Construction Executive Conference– Charlotte, NC October 2009

"Moisture In Building Materials"

Technical Seminar - Hartford, CT April 2009

International Masonry Institute

"Design & Detailing w/ Stone, Ceramic & Glass Tile"

Keynote Speaker -Clemson University, SC

54th Annual Brick Industry Forum October 2008

"New Technologies for Exterior Thin Brick Cladding"

Education Conference 2006

"Direct Adhered Exterior Marble Cladding"

NTCA Educational Conference – 2007

"Hydraulic Cement Mortars – What Are They...Really"

NTCA Total Solutions Education Conference 2005

"Coordination of Concrete & Tile Trades"

Education Conference 2005

"Introduction to the LEED Green Building Rating System"

Coverings Trade Show Orlando, FL 2004

"Management of Construction Claims – Strategies for Flooring Contractors"

Coverings Trade Show Orlando, FL 2004

"Retainage – Rights & Remedies for Building Construction Contractors"

International Masonry Institute Education Conference 2004

"Types of Ceramic Tile"

CSI Hartford, CT Education Conference 2003

"CSI MasterFormat 2004"

NTCA Education Conference 2003

"Engineered Wood Construction – Considerations for Ceramic Tile Floor Assemblies"

AIA/CES Continuing Education Conference, Hong Kong, PRC 2002

"Resin Agglomerate Tile – A Sustainable Building Material"

Qualicer World Congress on Ceramic Tile Quality, Spain 2002

Invited Keynote Speaker -"Ceramic Tile Facades at the Vanguard of Architecture"

SAFECO Insurance Education Conference 2001

"Design / Build Project Delivery– New Challenges for the Surety"

Engineered Wood Construction

NTCA Education Conference 2001

AIA/CES Education Conference 2001

"The Effect of Concrete Vapor Transmission on Ceramic Tile Installations"

AIA / CES Education Conference Saudi Arabia 2000

"Architectural Detailing of Ceramic Tile Facades"

AIA / CES Education Conference 2000

"Ceramic Tile & Stone Plazas & Roof Decks"

AIA / CES Education Conference 2000

Education Conference 2000

"International Building Code Update"

AIA / CES Education Conference 2000

"Installation of Tile in Swimming Pools"

AIA / CES Education Conference 1999

"Types of Ceramic Tile"

Select Technical Articles

"Ventilated Porcelain Stone Rainscreen Exterior Wall Systems" Series of three articles NTCA Tile Letter Magazine April 2016

"Installation of Ceramic Tile in Swimming Pools & Water Features"

NTCA Tile Letter Magazine April 2009

"Lippage of Natural Stone Tile Installations"

NTCA Tile Letter Magazine October 2008

"Selection & Maintenance of Natural Stone Flooring"

Retail Construction Magazine / Tile Letter Magazine July 2008 & March 2009

"Assessing Metal Trim Durability"

NTCA Tile Letter Magazine June 2008

"Can Moisture Vapor Emissions be Harmful to Ceramic Tile Installations ?"

NTCA Tile Letter Magazine January 2008

"New Development in Tile-Clad Exterior Building Facades"

NTCA Tile Letter Magazine 2007

"Guidelines for Tile Installation
in Engineered Wood Framing Assemblies"

NTCA Tile Letter Magazine 2003

"The Effect of Water Treatment on Ceramic Tile Finishes in
Swimming Pools & Water Features"

NTCA Tile Letter Magazine 2002

"Tile Floor Profiling – Can we Level the Playing Field"

NTCA Tile Letter Magazine 2002

"Deflection – Are Current Standards for Ceramic Tile Floors Realistic ?"

NTCA Tile Letter Magazine 2001

"Concrete Substrates – Not All Concrete is Created Equal"

NTCA Tile Letter Magazine 1999

"Efflorescence"

"Architectural Detailing of Direct Adhered Ceramic Tile Facades"

NTCA Tile Letter 1997