ICRI’S NEW GUIDELINE FOR EVALUATION OF MASONRY FAÇADE STRUCTURES

BY MICHAEL TABASSI


Masonry technology has evolved slowly over the centuries from simple solid load-bearing walls to curtain wall structures with a drainable system. Over time, materials such as finely cut stone, fired clay brick, structural clay tile, concrete masonry units, glazed terra-cotta, cast stone, precast concrete, glazed concrete block, and brick have been introduced to make masonry more versatile and allow more elaborate and intricate designs.

Masonry structures are susceptible to moisture and movement. Masonry assemblies are generally not waterproof. The masonry units themselves, the
mortar, and the bond lines may allow water penetration. A solid masonry construction, in most cases, controls the moisture through sheer mass that distributes the moisture and allows dissipation before it can enter the building. A curtain wall system controls moisture with flashing, vapor barrier, and weep holes.

Movement in masonry can be caused by a myriad of factors: building frame shortening under service load due to creep and shrinkage; settlement; lateral loading; thermal movement; expansion due to moisture absorption; and corrosion of embedded anchors, angles, or structural members. Failure mechanisms can impact types and styles of masonry construction differently. A thorough evaluation, including a comprehensive knowledge of timelines, characteristics of building materials, and structures, is required to interpret the response of masonry systems to these failure mechanisms.

The new Guideline describes the tools, techniques, and processes that are used in the evaluation of masonry façade structures. It offers background into the history and evolution of masonry structure design and construction and is presented as a flow process beginning with an investigation of the history of the structure, including review of documents and interviews of building maintenance management. The environmental service conditions are reviewed to determine the climatic variables that contribute to the current state of the building masonry components. Techniques and procedures for nondestructive evaluation are described, including a detailed description of visual observations of the structure, followed by a variety of nondestructive instrument testing procedures and tools that are available to the investigator. The evaluation process includes exploratory investigation to determine the actual in-place condition of the components of the masonry façade. The Guideline describes the physical inspection process and provides a detailed description of the façade elements to be evaluated. Summarizing the evaluation and report format are discussed and suggestions for frequency of testing and the scope are provided at the conclusion of the guidelines.

The new “Guide for the Evaluation of Masonry Façade Structures” contains information on the evaluation of the entire masonry façade structure which includes:

- Introduction
- Definitions and Notation
- Safety Consideration
- Evaluation Process
- History and Background Information
  - Environment Condition
    - Exterior Climate
    - Interior Climate
    - Industrial Environments
    - Coastal Environments
- Field Investigation (Nondestructive Evaluation)
  - Visual Examination
    - Moisture Infiltration
    - Cracking
    - Spalling
    - Settlement
    - Deflection
    - Creep/Bulging/Compression/Shrinkage
    - Volume
Summary

Scope of Investigation and Frequency of Testing

This Guideline will provide necessary tools and knowledge to assess the condition of a masonry façade structure and the causes of its failures. In addition, the Guideline will provide an interpretation of the clues and patterns found during the investigation. It contains the experience and knowledge of more than 25 engineers, architects, material suppliers, and contractors experienced in the field of masonry structures. Having a personal copy of this Guideline will be a great addition to everyone’s reference library.

ICRI’s Masonry Committee is working on another Technical Guideline, “Guide for the Repair of Masonry Façade Structures,” which is scheduled for publication in 2010. This Guideline will help the reader repair the damage found during the evaluation process.

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