

EXAMINING THE STANDARD OF CARE FOR EVALUATION OF EXISTING STRUCTURES

By

Keith Kesner

Kevin Coll

CVM Professional



Presentation Overview

- Need for a standard of care
- Standard of care
- Challenges in evaluation of existing structures
- Thoughts on a standard of care for existing structures

Fundamental Questions

- How much evaluation is necessary?
 - Minimum number of locations / samples
 - Capture all representative elements
 - Allow rational decisions to be made
- How much evaluation is possible?
 - Access limitations
 - Cost and client limitations
- How to ensure Standard of Care is met

Standard of Care

- Defined as “degree of care that a reasonable person should exercise”
- “The quality of work expected of a Professional Engineer”
- Use of “generally accepted standards” and for engineer’s work product to be “safe”

Standards of Care

- Generally accepted standards
 - ASTM Guides
 - ACI / ASCE Guides
 - AASHTO Bridge Inspection Manual
 - ACI 562 – Code for Repair of Existing Concrete Structures

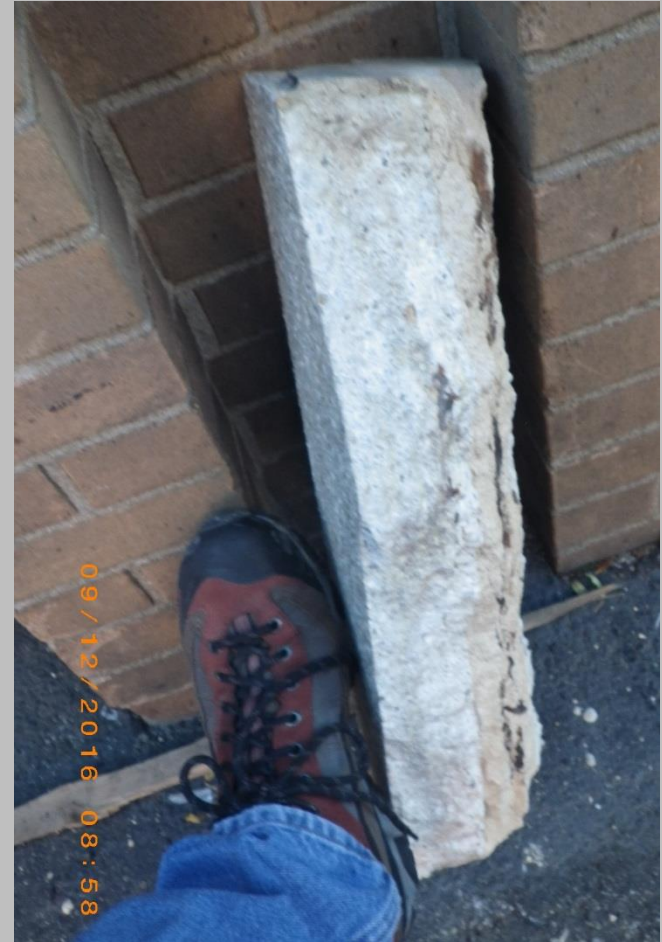
Evaluation of Existing Structures

- Existing Structures
 - Can be non-redundant



Complications

- Is a perfect survey feasible
 - Extent of damage?
 - Number of samples?
 - Redundancy of structure
 - Cost of evaluation
 - Impact of a structural failure



Evaluation of Existing Structures

- Obvious conditions
- Hidden conditions



Evaluation of Existing Structures

- Hidden damage



Bridge Evaluation

- National Bridge Inspection Standards
 - Biennial inspections
 - Tactile inspection for fracture critical elements
 - Pins
 - Truss tension members
 - Pin / hanger assemblies
 - Typical – supplement with NDT

Building Facades

- ASTM E 2270
 - Qualified professional
 - General inspection
 - Visual survey
 - More than 6 feet away
 - Detailed inspection
 - Tactile
 - Build upon general insp.



Building Facades

- Local ordinances
 - Regular intervals
 - Exposed facades
 - Report unsafe cond.
 - Watertightness
 - Maintenance requ.



ACI 562 – 6.2.1

- Performance based
- Evaluation required:
 - Evidence of distress, damage, etc.
 - Behavior inconsistent with design
 - Based upon preliminary evaluation

An ACI Standard

Code Requirements for
Assessment, Repair, and
Rehabilitation of Existing
Concrete Structures and
Commentary

Reported by ACI Committee 562

ACI 562-16

ACI 562 - Evaluation

- 6.2.3 - Where repairs are required on an element in a structure, it shall be determined if similar elements throughout the structure also require evaluation
 - Repetitive elements
 - Isolated repairs may not be acceptable

ACI 562 - Analysis

- 6.2.5 - If an analysis is required, the structural assessment shall document the requirements of 6.2.4 and (a) through (c).
 - (a) As-measured structural member section properties and dimensions.
 - (b) The presence and effect of any alterations to the structural system.
 - (c) Loads, occupancy, or usage different from the original design.

Standard of Care – Existing Structures

- Not clearly delineated
- Determined by licensed design professional
 - Project by project basis
 - Completeness over cost
- Evaluation considerations
 - Tactile and invasive surveys
 - Consider redundancy
 - Consider exposure conditions

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