Herbert Wertheim College of Engineering
UNIVERSITY of FLORIDA

Florida Building Inspection Laws

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Engineering School of Sustainable Infrastructure and Environment
University of Florida

KU Structural Engineering Conference
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POWERING THE NEW ENGINEER TO TRANSFORM THE FUTURE

Presentation Outline

- Background
  - 40-year building inspection programs in South Florida
  - Development of new statewide regulation for milestone inspections
- Study Objectives
- Approach and Methodology
- Results and Limitations
- Recommendations
- Implementation of Florida's 'Condo Safety Act'
- ASCE 11-28: New standard for the condition assessment of existing buildings

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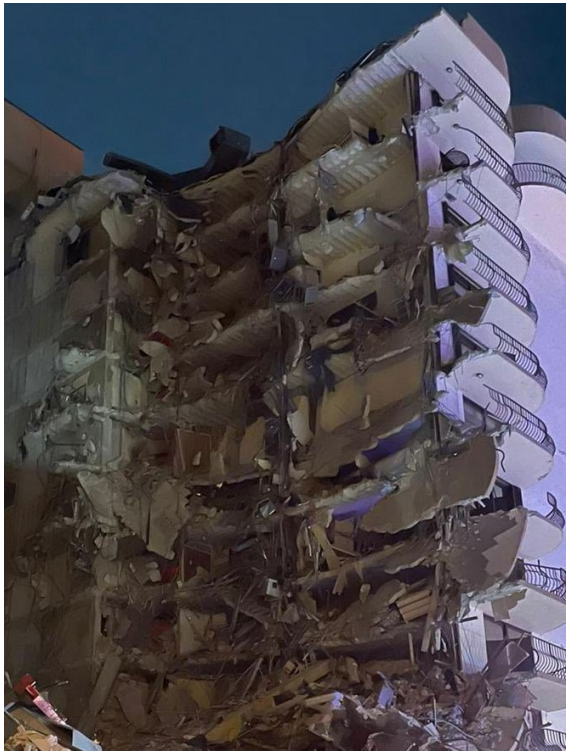
Background

- The partial Champlain Tower South collapse almost immediately led to call for review of building inspection programs in place in South Florida and the consideration of a statewide inspection mandate

- Florida Building Commission requested a study on existing 40-year inspection programs
  - Implementation
  - Outcomes
  - Recommendations



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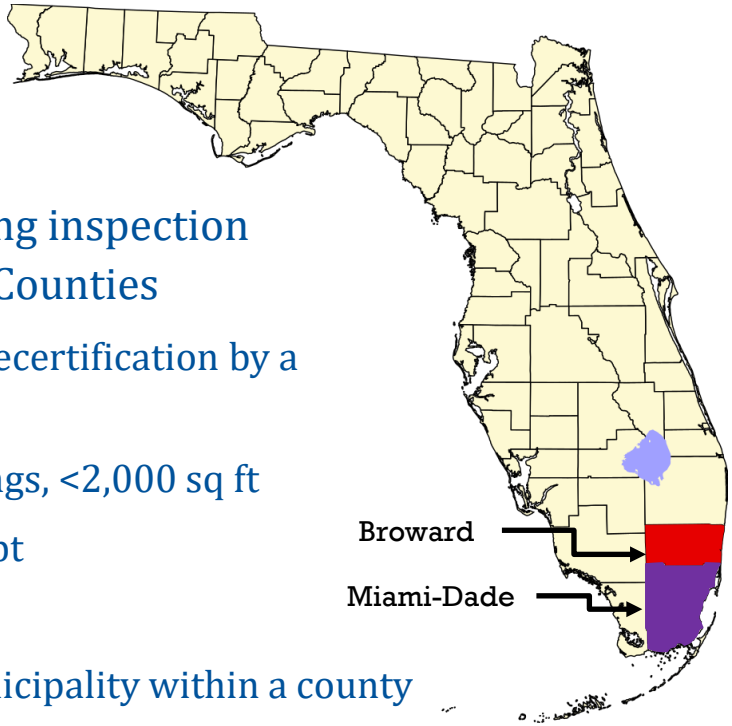
Background



At the initiation of study in 2021, only age-based building inspection programs in Florida were in Miami-Dade and Broward Counties

- Buildings older than 40 years are subject to inspection/recertification by a licensed engineer or registered architect every ten years
- Miami-Dade program in place since 1976, exempt buildings, <2,000 sq ft
- Broward program in place since 2011, <3,500 sq ft exempt
- Single-family homes, duplexes, minor buildings exempt
- Common inspection forms (checklists) used by each municipality within a county
- Each municipality responsible for notifications, tracking, and enforcement
  - Miami-Dade: 34 jurisdictions
  - Broward: 32 jurisdictions

Component or System	Elements and Conditions Assessed
Overall structure condition	General alignment, portions showing distress, surface condition, cracks, extent of deterioration, previous repairs, nature of present loading conditions
Masonry bearing wall	Masonry units, reinforced tie beams and columns, lintels, other bond beams, finishes (exterior and interior), cracks, spalling, reinforcement corrosion
Roof system	Type, supported equipment, drains, condition
Floor system	Type, condition
Steel framing system	Description, paint condition, corrosion, concrete/fireproofing condition, elevator sheave beams and machine floor beam condition
Concrete framing system	Description, general condition, cracking, reinforcement corrosion
Windows	Type, anchorage type and condition, sealant condition (exterior and interior), general condition
Wood framing	Type/description, metal fittings and condition, joints condition, drainage issues, ventilation
Exterior finishes (Broward)	Stucco, veneer, soffits, ceiling, other; condition

Background

- New statewide Florida milestone inspection legislation (Senate Bill 154) in response to Champlain Tower South collapse
  - Introduced and passed in 2022, law in 2023
- Scope of legislation
  - Condominiums and cooperatives with three or more stories
  - Starting at 30 years
    - Initially proposed buildings within 3 miles of the coast to start at 25 years
  - Every 10 years thereafter
  - Two-phase inspection process:
    - Phase 1: an initial visual inspection
    - Phase 2: if signs of "substantial structural deterioration" are identified, a more in-depth structural assessment that may include destructive testing

Project Objectives

- Year 1 (2021 – 2022)
  - Conduct a preliminary assessment of the 40-year inspection programs in Miami-Dade and Broward Counties
  - Catalog types of reported structural damage and deficiencies
  - Provide a broad account of inspection and reporting practices
  - Survey building officials in the rest of the state for input on inspection programs
  - Provide recommendations for improved inspections, reporting, and data management
- Year 2 (2022 –2023)
  - Expand sample size for inspection report collection and analysis
  - Evaluate inspection reports to assess the number of buildings that will likely require a phase 2 milestone inspection
  - Collect feedback on proposed from experienced existing building inspectors
- Year 3 (2024)
  - Consult on development of electronic inspection form
  - Develop educational materials on inspection legislation

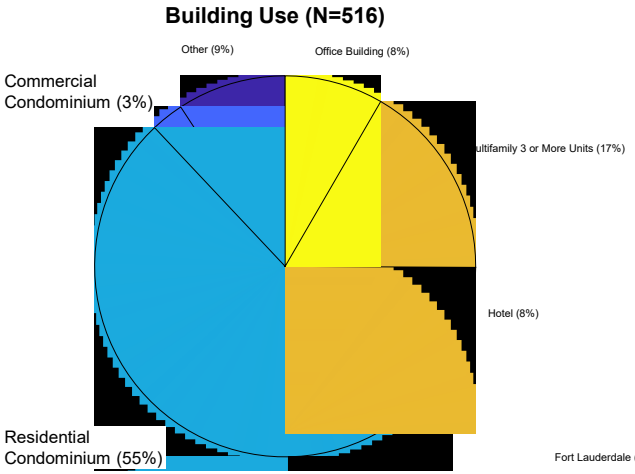
Inspection Report Acquisition

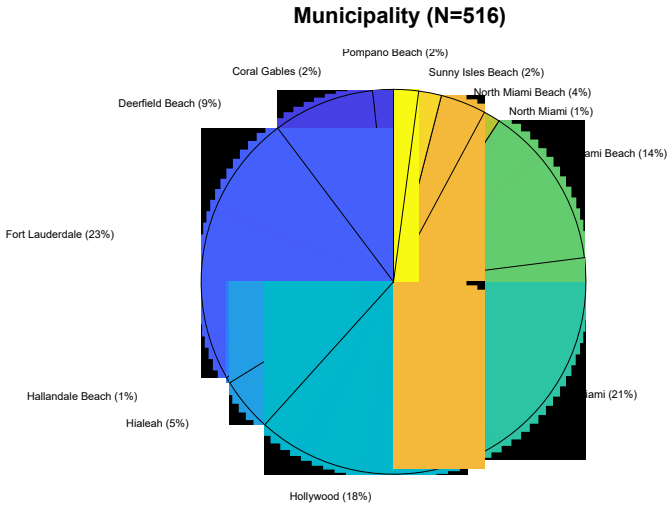
- Obtain a representative set of inspection reports from jurisdictions in each county
- Extract and classify the data to report on the reported conditions of buildings considering: use, structural type, age, distance to coast

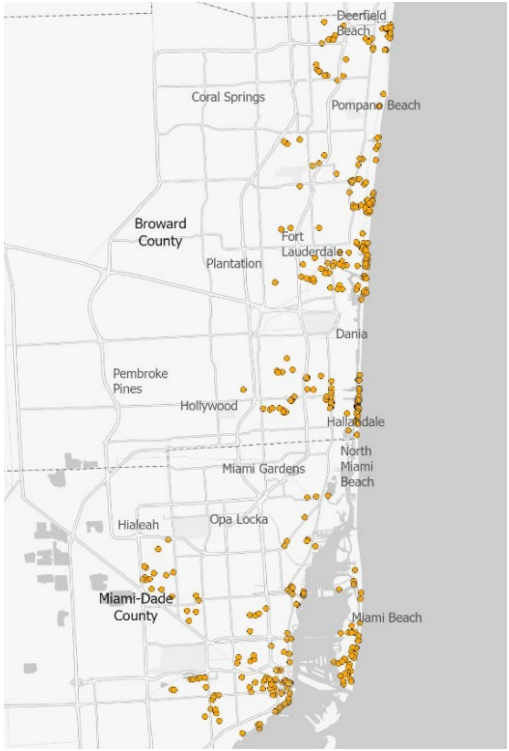
	Broward	Miami-Dade	Total
Total non-exempt properties in study municipalities (approx.)	4,490	9,493	13,983
Number of addresses requested	297	385	682
Number of addresses received	230	291	521
Percent of requested addresses received	77%	76%	76%
Percent of total non-exempt addresses received	5.1%	3.1%	3.7%

- Some addresses had more than one report furnished
- Before repair reports received:
  - Total reports: 573
  - Total unique addresses with structural reports: 516

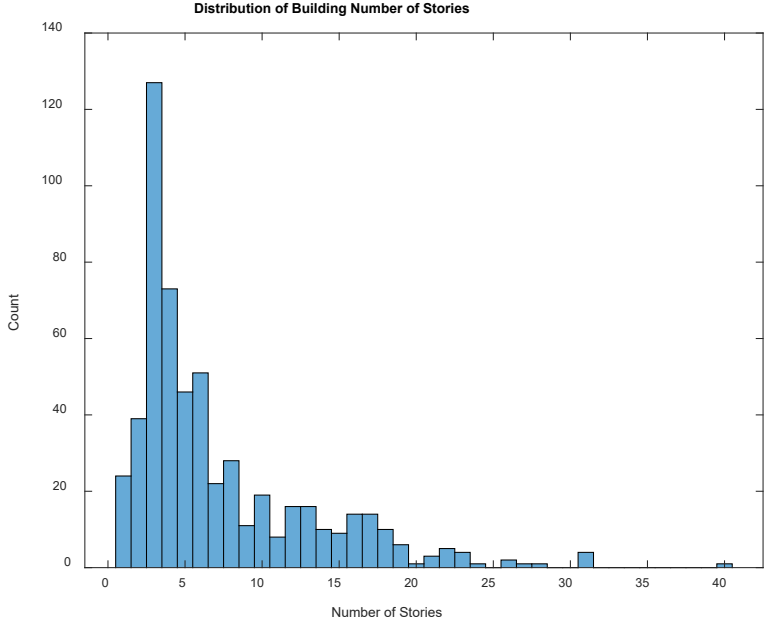
Dataset Statistics

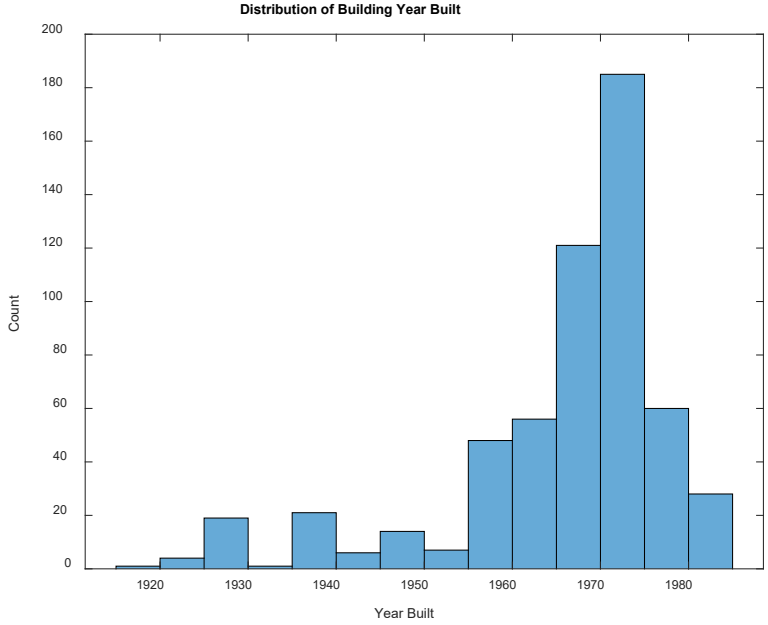






Dataset Statistics

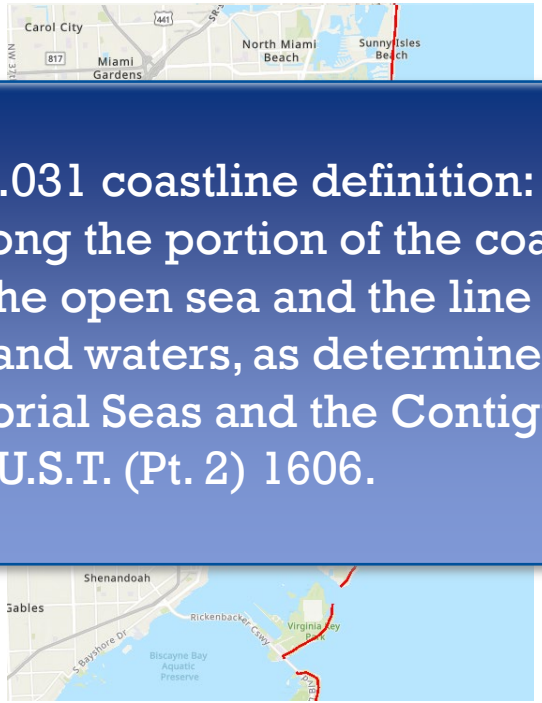




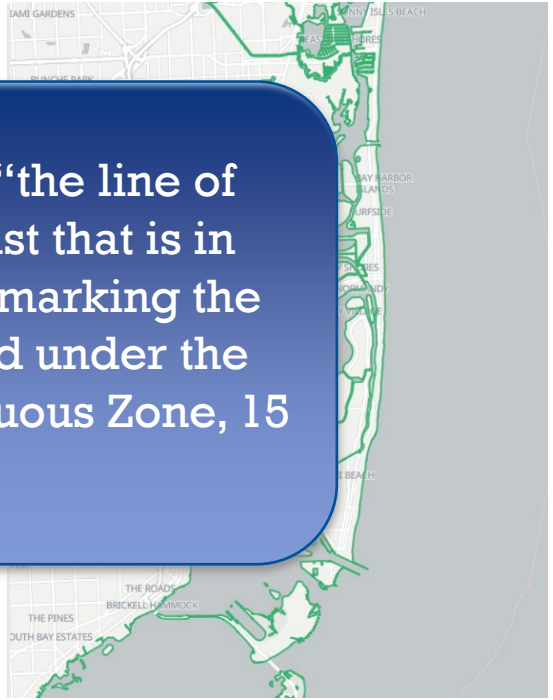
Definition of Coast

- Year 1 study: FDEP Coastal Constructi
  - Simple guideli
  - Not a g to asse
- Year 2 st Updated
  - Based sources: aerial photography
  - Better representation of saltwater exposure

Florida Statute 376.031 coastline definition: "the line of mean low water along the portion of the coast that is in direct contact with the open sea and the line marking the seaward limit of inland waters, as determined under the Convention on Territorial Seas and the Contiguous Zone, 15 U.S.T. (Pt. 2) 1606.



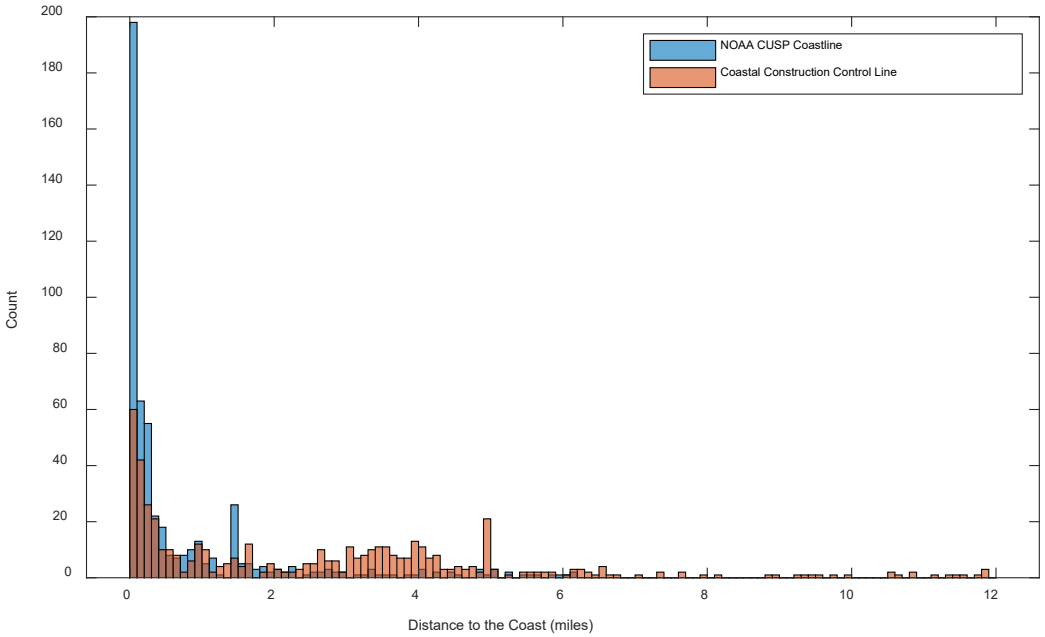
FDEP CCCL

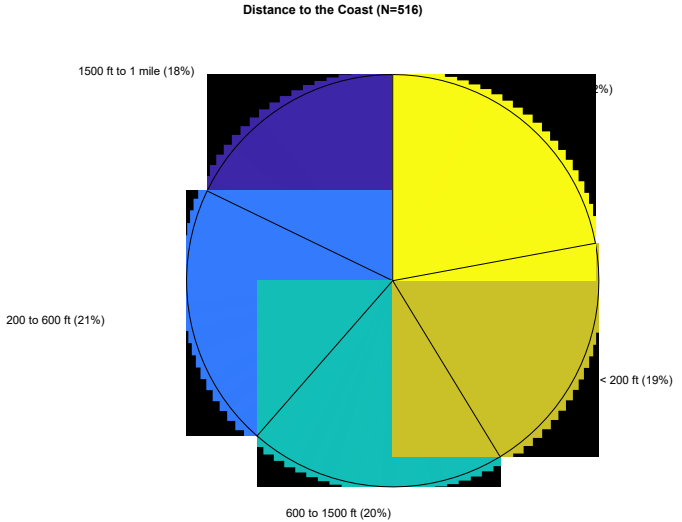


NOAA CUSP (7/2022)

Definition of Coast

Addresses divided such that ~20% of the dataset is in each distance to CUSP bin





< 200 ft
200 – 600 ft
600 – 1,500 ft
1,500 ft – 1 mile
> 1 mile

Data Extraction and Classification

- Variation in completion of reports despites standard inspection forms in each county
- Ensuring consistent extraction of data for aggregation
  - Comprehensive data collection spreadsheet
    - Property Appraiser Data
    - Inspection Program Information
    - Inspection Reporting Data
  - Dropdown menus for standard value assignment
    - Common component/item descriptions
    - Presence of component/defect
    - Condition of component (good, fair, poor, N/A)
  - Notes recorded to capture all non-standard data

(8) Concrete Framing System			
8.a Description	Concrete pile foundations, CBS walls, columns, beams, tie-beams,tie-columns, window header beam, stairs, landing, walkways, floor slabs	Composite floor slabs with steel beams, structural concrete flat slabs. Reinforced concrete columns beams and shear walls	Concrete
8.b Cracking			
8.b.1 Not significant	Significant	Significant	Not Significant
8.b.2 Location and description	Wide cracking noted; see repair list attached	Previously repaired and sealed fine to medium temperature cracks were observed	No Data Reported
8.c General Condition	Poor	Fair	Fair
8.d. Rebar corrosion			
8.d.1, 8.d.3., 8.d.4. Rebar corrosion	Significant - Structural repairs required	None Visible	No Data Reported
8.d.2 Location and description of members affected and type cracking	Columns, beams, balcony, stairs, slab	N/A	Minor column spalls
8.e Samples chipped out in spall areas			
8.e.1 No	No Samples Taken	No Samples Taken	No Data Reported
8.e.2 Yes, describe color, texture, aggregate, general quality	N/A	N/A	No Data Reported
ADDITIONAL NOTES:		Office tower is in good condition. Parking levels need ongoing maintenance type repairs	

Cell legend:	Form Section Header	Fixed responses	No data required or provided	Free response

Data Classification

- Lack of standardized condition rating definitions
  - Similar defects classified differently by different inspectors
  - Requirements for repairs varied for similar defects
- Data extraction process sought to standardize inspection report results by grouping similar ratings with fixed rating
  - No adjustment for inconsistencies in the assignment of the ratings

Translation of inspector condition assessment responses

Standardized Value	Example Responses
Good	Overall good, good where visible, no noticeable damage, functional, adequate, satisfactory
Fair	Fair to good, good/fair, good w/exceptions
Poor	Fair to poor, needs repair
None	None visible, not significant, none noted, none observed, none evident, none noticed, not apparent
No Data Reported	"X" or check provided instead of condition rating

Repair Rating

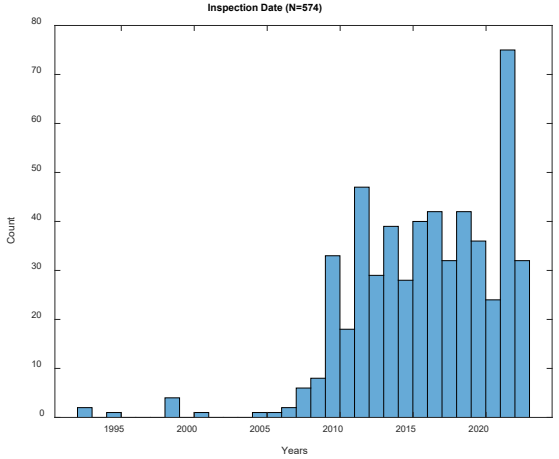
- Developed to record the severity of deterioration and required repairs
  - Captures the worst case reported
  - Does not provide indication of extent/localization of deterioration

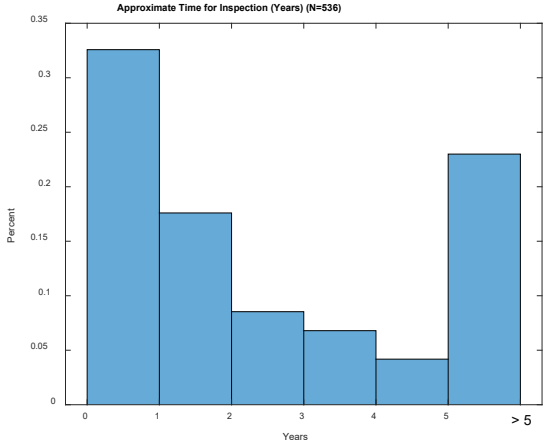
Repair Rating	Rating definition
3	Noted deterioration in likely structural elements for which repairs required by inspector
2	Maintenance repairs required to mitigate future deterioration
1	No repairs required; maintenance suggested in some cases

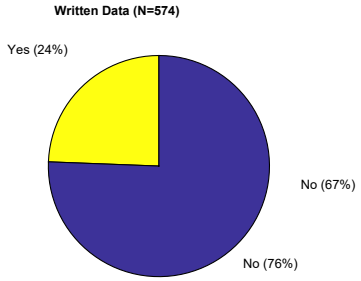
Analysis Results

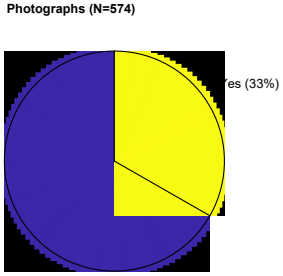
Implementation of Inspection Programs

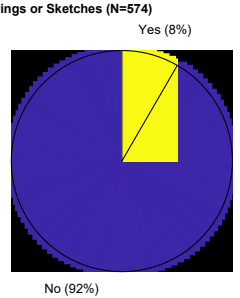
- 86% of reports completed by a P.E. (6% with Special Inspector designation)
- Almost 23% of reports were five or more years overdue
- 10% of reports did not substantially follow inspection form
- Only 4% of reports used any method other than visual observation





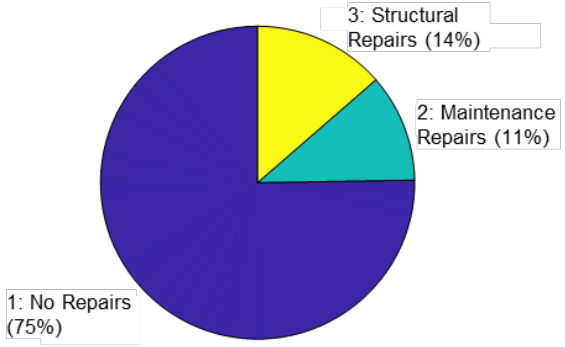




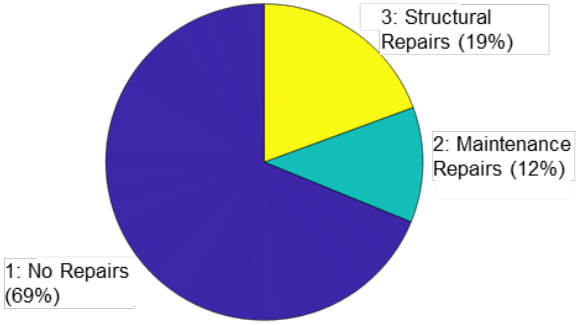


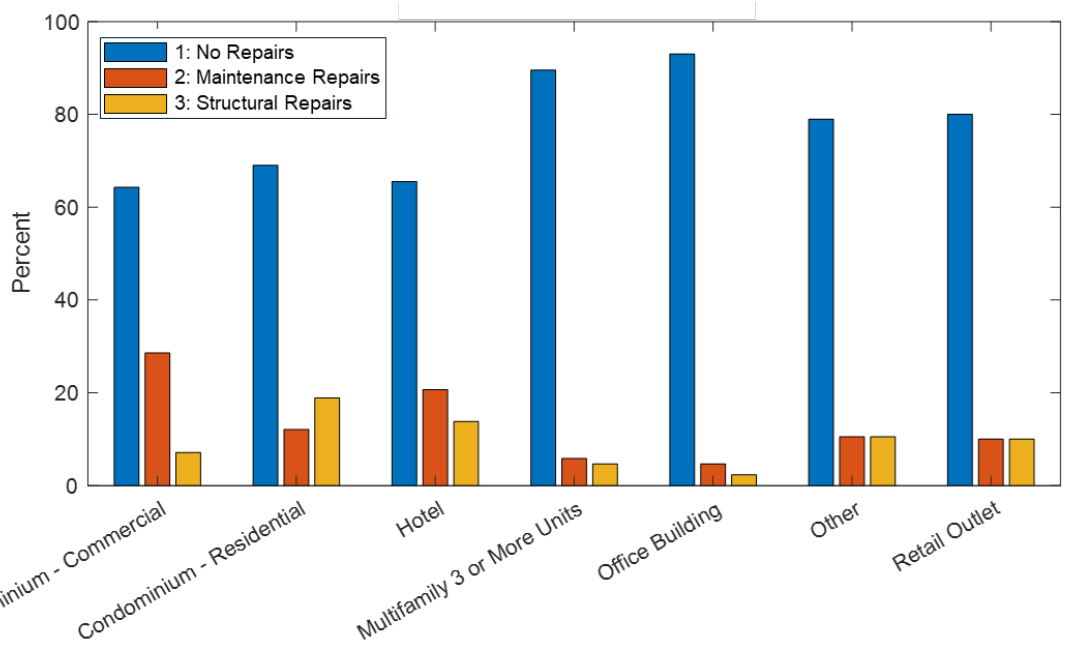
Repair Ratings

Repair rating for all buildings (n=501)

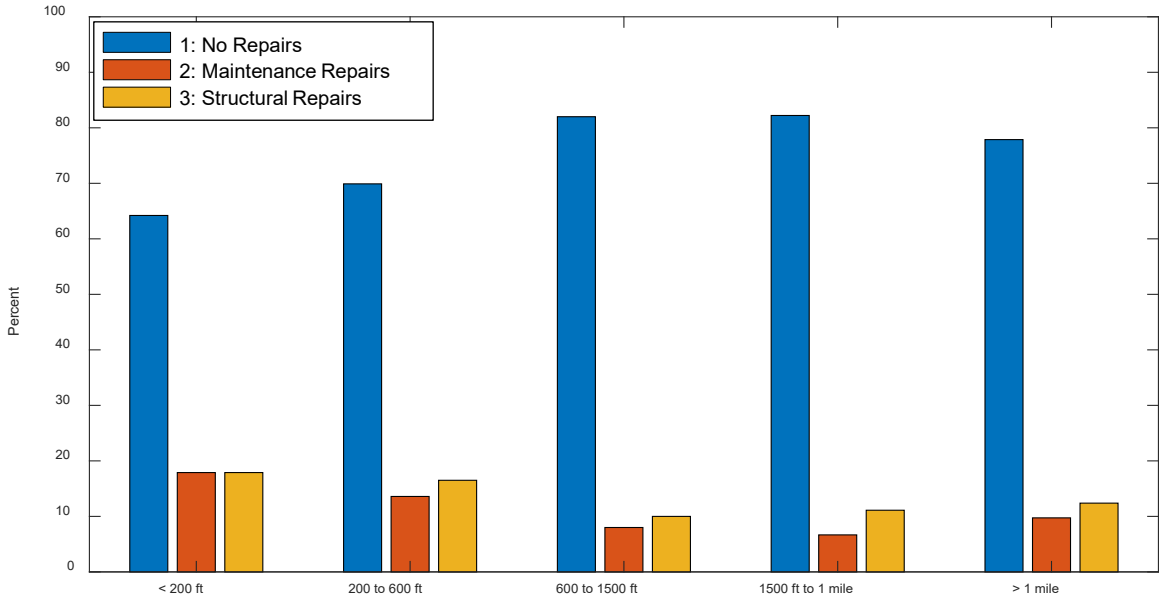


Repair rating for residential condominiums (n=263)





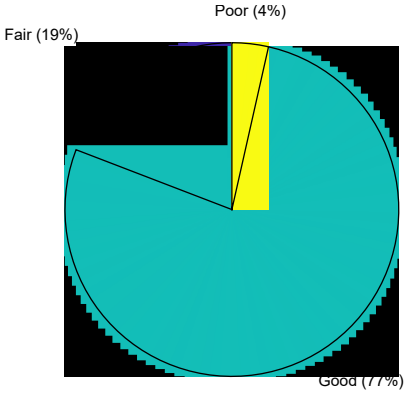
Effects of Coastal Proximity



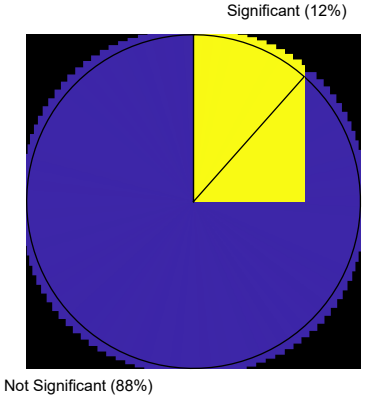
Repair rating vs. distance to the NOAA CUSP coastline definition (n = 501)

Concrete Condition

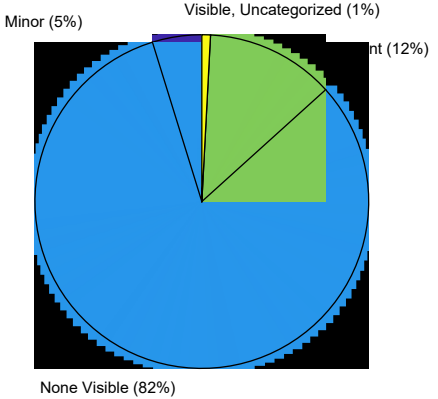
General condition (n = 454)



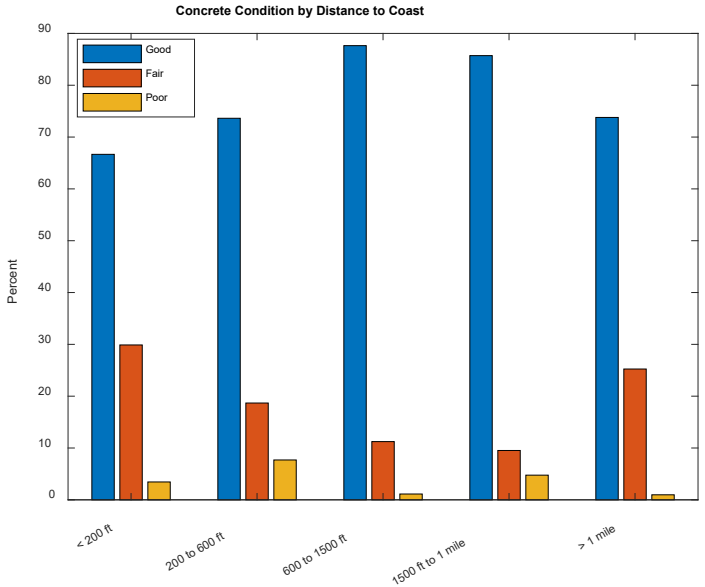
Cracking significance (n = 468)

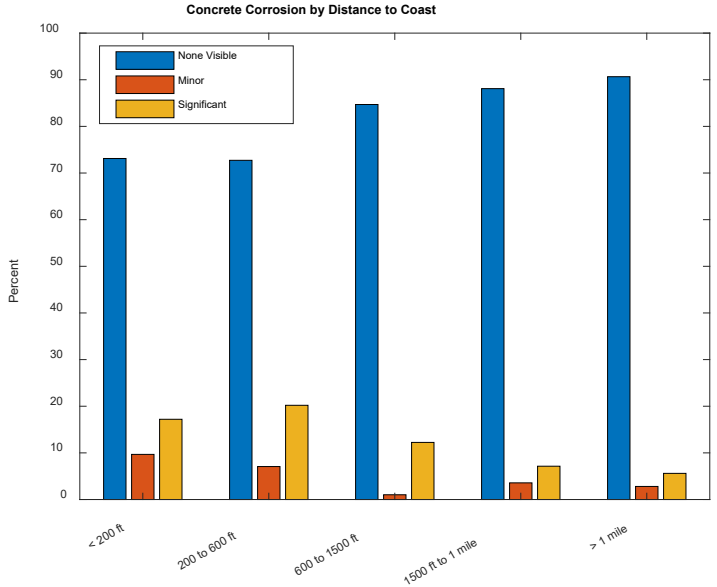


Reinforcement corrosion significance (n = 481)



Concrete Condition vs. Coastal Proximity



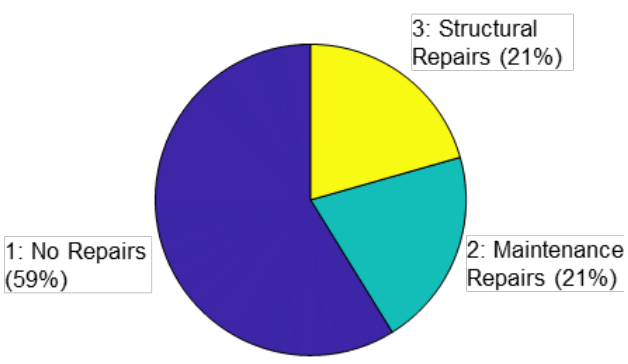


- Concrete condition improves with distance from the coast up to 1,500 ft from coast

- Observed concrete corrosion decreases with distance from the coast
- Results consistent with previous studies observing chloride content in concrete samples placed at various distances from the coast

Analysis Results: 40 and 50-year Comparison

- 33 addresses had both reports provided
- Enabled direct comparison of conditions between inspections
- Overall reduction in required repairs 10 years later
- Maintenance repairs more than halved



Repair rating assigned to the same buildings at the 40-year inspection (left) and the 50-year inspection (right) (n = 33)

Inspection Report Analysis Conclusions

- Approximately ¼ of inspections require some type of repairs, with 14% indicating signs of deterioration in structural elements
- Between 19 and 31% of condominiums three or more stories are likely to require a phase 2 inspection under new milestone inspection law
- The definition of the coastline requires careful consideration, and guidance must be provided to building departments if coastline is considered
- The distance to the coast is directly correlated to the rate of observed corrosion as well as the rate and severity of required repairs, with an increase for buildings less than 600 ft from the coast
- Buildings have lower rates of required maintenance ten years after inspections and repairs are required at the 40-year mark

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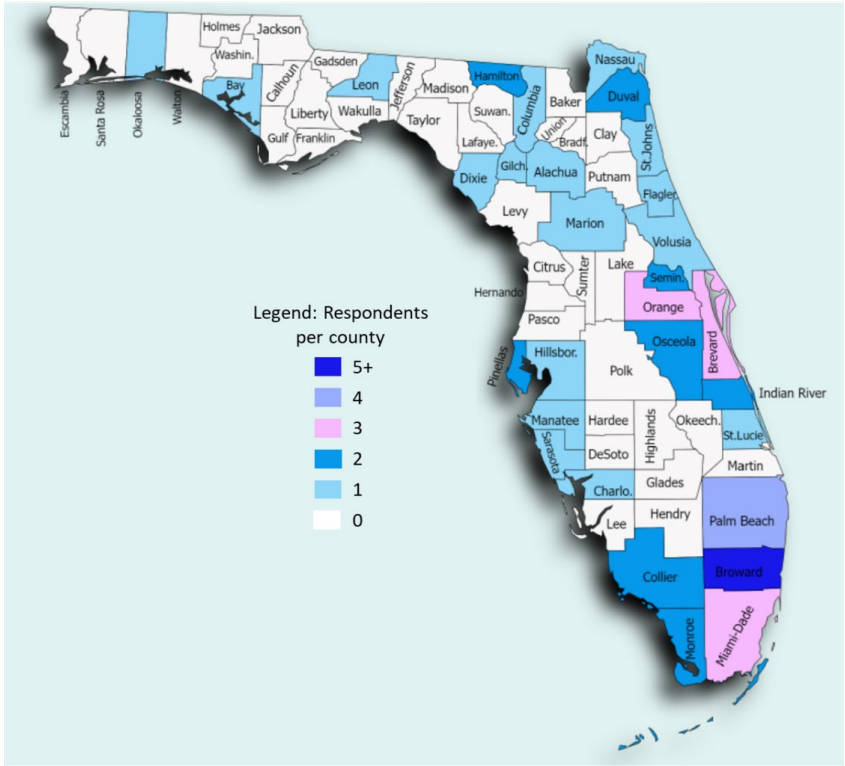
Mandatory Milestone Inspection Law

Florida Statute 553.899

POWERING THE NEW ENGINEER TO TRANSFORM THE FUTURE

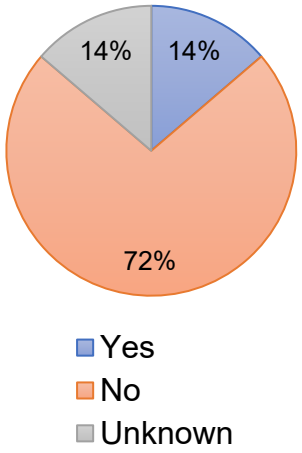
Pre-legislation Statewide Survey

- Building Official survey conducted in anticipation of statewide milestone inspection requirements
- To report on:
  - Planning or interest in adoption of similar program
  - Problems observed in buildings 40 years +
  - Perceived challenges to implementing programs
- Approach:
  - Developed a brief electronic survey for other Florida building jurisdictions
  - Surveys distributed via BOAF email list October/November 2021
  - 70 responses



Pre-legislation Statewide Survey

Is your jurisdiction experiencing problems/issues with buildings 40 years or older? (n = 51)



Observed Building Issues:

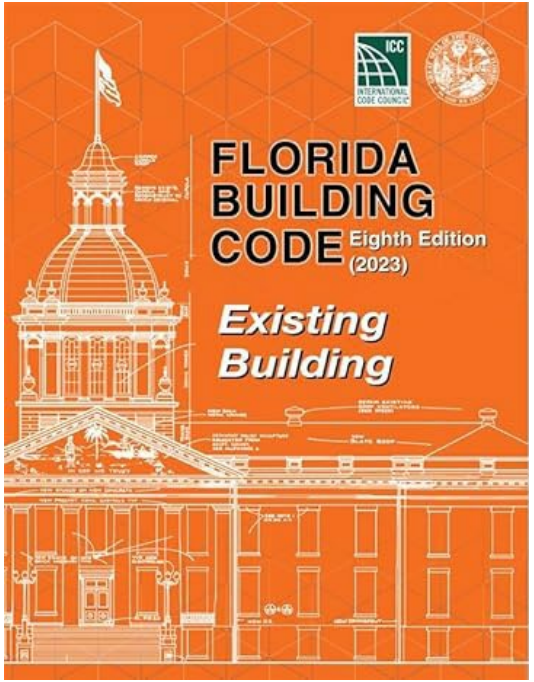
- Wood framed buildings: water penetration and termites
- Concrete: spalling, cracks, balcony/walkway slab deterioration, rebar/post-tensioning corrosion, delamination, exposed rebar
- Foundations: settlement
- Fenestrations: water infiltration, improper sealing
- Roofs: leaks, system deterioration

Inspection Program Concerns:

- Cost
- Personnel requirements
- Program enforcement
- Burden on building departments
- Thorough investigation may require destructive testing

Mandatory Milestone Inspection Legislation

- Florida Condo Safety Act:
  - Florida Legislature passed Florida Statute 553.899 in May 2022
  - Florida Building Commission to establish a building safety program within the Florida Building Code
- Florida Building Commission established a working group to implement legislation:
  - Created Chapter 18: Minimum Requirements for the Mandatory Milestone Inspection
  - Supplement to the 8th Ed. (2023) Florida Building Code, Existing Building
  - Created common forms to be used during milestone inspections



Mandatory Milestone Inspections Scope

- Buildings subject to inspections:
  - Condominium or cooperative form of ownership
  - Three or more stories in height
  - Exempt: Single-family, two-family, three-family, or four-family dwellings with three or fewer habitable stories above ground
- Requires a structural inspection of a building, including the primary structural members and primary structural system conducted by either a licensed architect or engineer
- Local enforcement agency must provide written notice to owner
- Phase 1 inspection must be completed within 180 days of the building's owner(s) receiving notice
- If Phase 2 inspection is required, the report must be submitted within 180 days of submitting the Phase 1 inspection report

Milestone Inspection Phases

Phase 1

- Visual examination of the building's habitable and non-habitable areas, including major
- Inspector must prepare and submit an inspection report
- Building official must be notified if unpermitted work is discovered in the structural components

Phase 2

- Necessary if signs of *substantial structural* identified during Phase 1
- The extent of the inspection depends on assessing areas of structural distress to confirm the building's structural soundness and safety for its intended use

Substantial Structural Deterioration [s.553.899(2)(b), FS]

- Refers to a condition negatively affecting a building's structural condition and integrity
- Excludes surface imperfections like cracks, distortion, sagging, deflections, misalignment, and signs of leakage

Milestone Inspection Scope

Background considerations:

- Identification of structural system
- Code baseline
- Loading conditions
- Violations or unpermitted activities
- Previous repairs
- Previous reports

Inspection of:


- Foundation


- Masonry bearing walls


- Floor and roof systems


- Steel framing systems


- Concrete framing systems


- Windows and doors


- Wood framing


- Building facade

Survey: Inspector Feedback on Legislation

- Objective:
  - Obtain experienced inspector feedback on the milestone structural inspection requirements outlined in the new legislation for review by the Florida Building Commission
- Approach:
  - Developed set of questions for inspector phone interviews
  - Identified experienced inspectors
  - Conducted 15 phone interviews 20-60+ minutes (according to IRB plan)
  - Aggregated and summarized responses

Survey: Inspector Feedback on Legislation

- All interviewees are engineers with 15-30+ yeas of experience (some S.I.s), familiar with legislation
- Generally positive opinions on legislation
  - Provides a good starting point as written
  - Refinement will be required as program is implemented, and data is collected
- Inspection requirements
  - Expand scope beyond condos and consider lower rise structures
  - Original 3-mile demarcation for coastal vs. inland structures raised questions
  - Age of inspection initiation and interval found acceptable
- Two-phase inspection procedure
  - Phase 1 definition reasonable for most – leaves room for engineering judgement
  - More detailed language requested by some for Phase 2 inspection triggering and guidelines

Survey: Inspector Feedback on Legislation

- "Substantial structural deterioration"
  - Mostly acceptable, though "deterioration" may not be consistent with compromised structural safety
  - Consider use of "deficiency"
- Enforcement
  - Building departments will require more resources to ensure they are proactive with enforcement and follow-up
  - Many request consistent forms in all jurisdictions
- Inspector qualifications
  - Most do not feel architects have adequate qualifications, especially if design for shoring and repair is required

Inspection Reporting Recommendations

- Create standard electronic inspection form and submission system
- Standardize response options
- Standardize condition assessment ratings:
  - Good, Fair, Poor, Not visible or accessible, Not applicable
  - Clearly define for each defect type or structural component
- Integrate with database for tracking and reporting
  - Reduce paperwork burden
  - Automate generation of notifications and send earlier in the year
  - Automate report screening and quality control
  - Limit acceptance and approval of reports that do not comply with form requirements

Inspection Reporting Recommendations

- Create standard electronic inspection form ~~and submission system~~
- Standardize response options ✓
- Standardize condition assessment ratings:
  - Good, Fair, Poor, Not visible or accessible, Not applicable ✓
  - Clearly define for each defect type or structural component ✗
- Integrate with database for tracking and reporting ✗
  - ~~Reduce paperwork burden~~
  - Automate generation of notifications and send earlier in the year ✗
  - Automate report screening and quality control ✗
  - Limit acceptance and approval of reports that do not comply with form requirements ✓

Phase 1 Inspection Report Form

MILESTONE INSPECTION REPORT FORMS - STRUCTURAL BSIP INSPECTION FORM

Form EB18 – 2024

MILESTONE INSPECTION REPORT FORM PHASE 1

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Phase 1 Inspection Report Form

	Section
	Inspector Information, Dates, Findings, Signature and Seal
1	Description of Structure
2	Present Condition of Structure
3	Inspections
4	Supporting Data Attached
5	Foundation
6	Masonry Bearing Wall
7	Floor and Roof System
8	Steel Framing System
9	Concrete Framing System

Inspection & Background Information

Description & Condition Assessment of Systems

	Section
10	Windows, Storefronts, Curtainwalls, and Exterior Doors
11	Wood Framing
12	Building Façade
13	Special/Unusual Features
14	Deterioration
15	Unsafe Conditions
16	Safe Occupancy Determinations
17	Summary of Findings
18	Review of Existing Documents/Permits
19	Definition of Terms

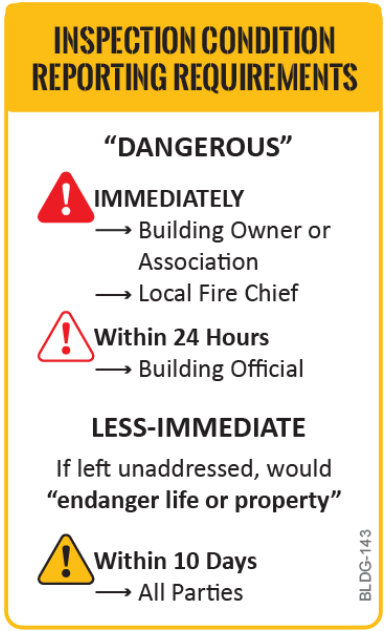
Condition Rating Definitions

Report Form Section 19

- **Good**: No *substantial structural deterioration* and no *dangerous condition* observed
- **Fair**: Indication of *substantial structural deterioration* was observed, and no *dangerous conditions* were observed
- **Poor**: Actual *substantial structural deterioration* observed, and no *dangerous condition* observed
- **Significant**: Any observation that is an indication of a *dangerous condition* or actual *dangerous condition*

Dangerous: FBC 2023 Definition

- Any building, structure, or portion thereof that meets any of the conditions described below shall be deemed dangerous:
  - The building or structure has collapsed, has partially collapsed, has moved off its foundation, or lacks the necessary support of the ground
  - There exists a significant risk of collapse, detachment, or dislodgment of any portion, member, appurtenance, or ornamentation of the building or structure under permanent, routine, or frequent loads; under actual loads already in effect; or under wind, rain, flood, or other environmental loads when such loads are imminent



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Overall Findings

Phase 1 Summary of Findings

17. SUMMARY OF FINDINGS — Reset Section 17

The below Condition(s) were noted within this Phase 1 Inspection.	Phase 2 Inspection Required:
☐ Indication of Dangerous Condition Observed	○ Yes ○ No
☐ Actual Dangerous Condition Observed	○ Yes ○ No
☐ Indication of Substantial Structural Deterioration Observed	○ Yes ○ No
☐ Actual Substantial Structural Deterioration Observed	○ Yes ○ No
☐ Indication of Need for Maintenance	○ Yes ○ No
☐ Indication of Need for Repair	○ Yes ○ No
☐ Indication of Need for Replacement	○ Yes ○ No
☐ Inaccessible Condition of Structural Component	○ Yes ○ No

Phase 2 Inspection Report Form

9. SAFE OCCUPANCY DETERMINATION Reset Page 6

a. Based on the results of the inspection, does the building or any portion of the building need to be vacated, secured, or access limited? If so, what portions of the building need to be vacated and how quickly do those portions need to be vacated, secured, or access limited?

◯ Yes ◯ No

10. SUMMARY OF FINDINGS

The below Condition(s) were noted within this Phase 2 Inspection.

☐ The Building has Substantial Structural Deterioration or is considered dangerous, Corrective Action is Required.

☐ A Need for Maintenance was Observed, but Does Not Meet the Standard of Substantial Structural Deterioration at This Time. The Building Passes the Milestone Inspection Program.

☐ There Are No Signs of Substantial Structural Deterioration. The Building Passes the Milestone Inspection Program.

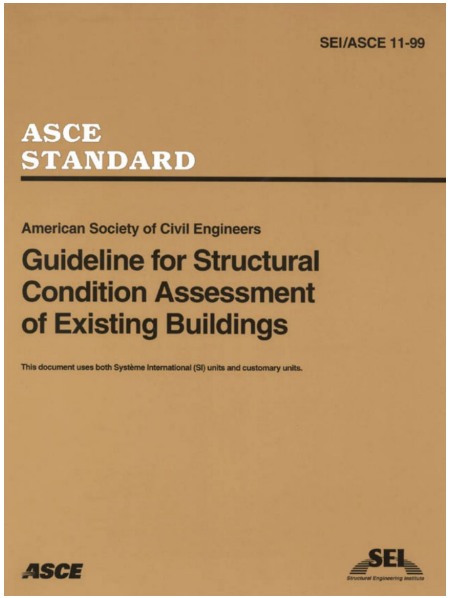
☐ Corrective Action is required. Upon completion of corrective work file an Ammended Phase 1 Inspection Report and resubmit.

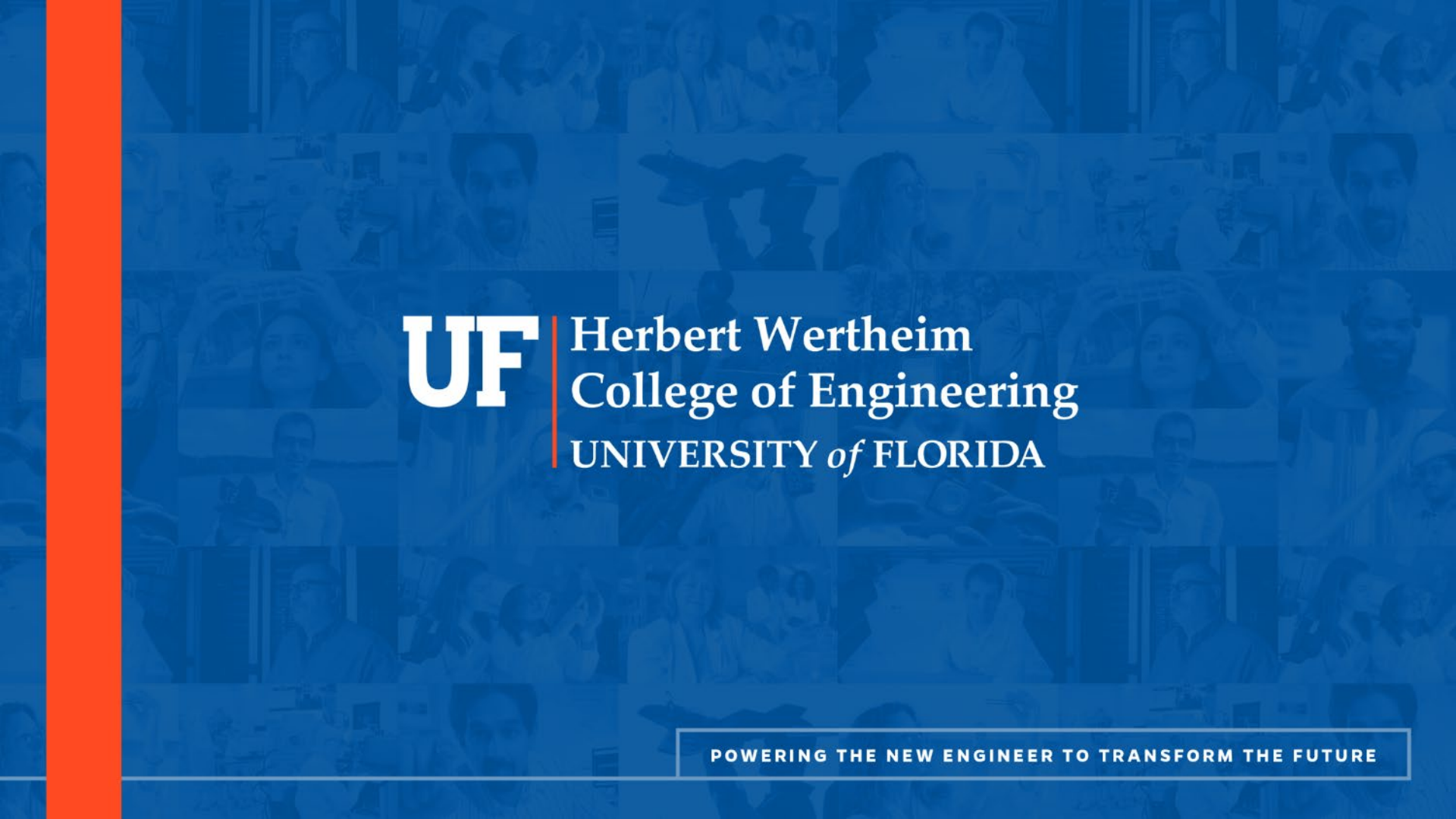
**Upon completion of the corrective action the Design Professional in charge of the Milestone Inspection must submit an amended Phase 1 Milestone Inspection Report per Chapter 18 of the Florida Building Code - Existing Buildings.*

Add Attachments

ASCE 11

- History
  - ASCE 11-99: Guideline for the Condition Assessment of Existing Buildings
  - MOP No. 158: 11-99 content moved to Manual of Practice in 2024
  - 2024: Standard Committee formed to develop Minimum Requirements for the Condition Assessment of Existing Buildings
- Gap: No standard procedure for assessments
- Purpose
  - Consensus based standardized procedures for the condition assessment of existing buildings
  - Intended to be adopted into the International Existing Building Code
- Benefits
  - Consistency in building assessments
  - Definition of the limitations of the building assessment
  - Consensus expectations of existing building performance relative to their intended purpose
- Status (March. 2025)
  - Roster with representation from practice, academia, building officials, code officials, industry organizations (77 members)
  - Generating first draft for first round of ballots later this year

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