Assessment of Inspection Reporting and Building Conditions in South Florida (Miami-Dade and Broward Counties) – Phase II

Interim Report

February 28, 2023

Florida Department of Business and Professional Regulation
Florida Building Commission

and

Engineering School of Sustainable Infrastructure and Environment (ESSIE)
University of Florida (UF)

Executive Summary

This project is a continuation of a study carried out between October 2021 and June 2022 to evaluate the results of existing building inspection practices in place in Broward and Miami-Dade Counties. The previous study collected and analyzed over 250 40-year building safety and recertification inspection reports in both counties to provide a comprehensive analysis of reported building conditions and inspection procedures. This current study seeks to increase the number of total inspection reports analyzed to enhance the statistical significance of reported results. In response to Senate Bill 4-D, this study also seeks to evaluate all collected inspection reports to determine whether they would require Phase 2 inspections as outlined in the milestone inspection legislation. In addition, this project includes tasks to solicit inspector feedback on the new legislation and to evaluate available inspection technologies for their ability to enhance current building inspection practices.

A set of interview questions was developed and administered via phone interview to 15 experienced existing building inspectors, all of whom are licensed engineers (P.E.s). The interviews sought to determine the professional opinions of the interviewees on Senate Bill 4-D so they could be considered by the Florida Building Commission in the development of their required response to the legislation. Questions spanned topics including the definition of buildings included in the milestone inspection requirements, the building age of first inspection, the impact of distance to the coast, and inspector qualification requirements. The respondents have a favorable view of the legislation as originally written and see the benefit of providing building owners with the information needed to maintain the safety of their buildings. However, there is recognition of the challenges associated with implementing the program on such a large scale, including a lack of qualified inspectors, inadequate resources for building department enforcement, and the potential for inconsistent reporting requirements across hundreds of jurisdictions.

In addition to the reports acquired in the first phase of this research, this study has requested an additional 295 inspection reports, adding the cities of Aventura, South Miami, North Miami, and North Miami Beach to the dataset. To date, 31% of requested reports have been received. Data extraction and analysis will begin soon on the new inspection reports and will be carried out according to the methods established in the first phase of this research.

A repair rating scheme was developed to analyze the nature and extent of the repairs required by the 40-year inspections. The ratings provide a distinction between repairs required for maintenance, repairs required for signs of substantial structural deterioration, and repairs required for noted substantial structural deterioration. These ratings can be used to infer if, according to the condition and required repairs noted in the inspection report, a building would likely require a Phase 2 inspection according to the milestone inspection legislation. Inspection reports acquired and analyzed in the first phase study were revisited and assigned a repair rating. The results indicate that approximately 12% of buildings would require a Phase 2 inspection under the new legislation. This analysis will be applied to all inspection reports acquired in both phases of this research and additional results will be provided in the final report.

1 Introduction and Background

The 2021 collapse of the Champlain Towers South in Surfside, Florida highlighted the need for a broad assessment of building inspection and maintenance practices in the State of Florida. A critical first step toward this assessment is to gain a clear understanding of the reported condition of existing structures through investigation of available building inspection reports in Miami-Dade and Broward Counties. In October of 2021, this research team (UF ESSIE) began work on a research project to achieve this objective. The scope of the project included the identification and collection of over 250 inspection reports from ten municipalities in these two counties. Analysis and reporting on this inspection data was completed in June 2022.

In May 2022, new state legislation (Senate Bill 4-D) was passed mandating "milestone" structural inspections for condominiums and co-ops that are three or more stories. The legislation defines two phases of the structural inspection: an initial visual inspection (Phase 1) and, if signs of "substantial structural deterioration" are identified, a second, more in-depth structural assessment that may include destructive testing (Phase 2). This project will review and analyze inspection reports from Miami-Dade and Broward Counties to evaluate how many inspection results would have warranted a Phase 2 inspection. The legislation calls on the Florida Building Commission to review the milestone inspection requirements and make recommendations by December 31, 2022, if any, to the Legislature to ensure inspections are sufficient to determine the structural integrity of a building.

1.1 Project Objectives and Scope

The objectives of this Phase II project are to increase the sample size of inspection reports analyzed and ensure that relevant inspection reporting documentation is obtained, while leveraging the strategies for acquiring, recording, and analyzing inspection report data established in the first project. These data, combined with the data collected in the first phase of the project, will provide the foundation for a comprehensive assessment of current building structural inspection practices that can be used to develop recommendations for inspection practices to enhance the safety of Florida's building inventory.

This project will review and analyze inspection reports from Miami-Dade and Broward Counties (from both phases of this research project) to evaluate whether the inspection results would have warranted a Phase 2 inspection according to Senate Bill 4-D. This project will also seek feedback on the legislation from experienced existing building inspectors through a formal interview process for consideration by FBC in the formulation of their required feedback to the legislature.

The scope of work for this project consists of four tasks and accompanying deliverables:

- Task 1: Engineer and/or Architects Feedback on SB 4-D
- Task 2: Building Inspection Report Acquisition
- Task 3: Data Aggregation and Analysis
- Task 4: Inspection Technology Landscape Assessment

As of this interim report, Task 1 is complete, Tasks 2 and 3 are partially complete, and Task 4 has been initiated. The project is on track to be completed on time by June 30, 2023. Details on the progress for each task are provided below.

1.2 Building Inspection Programs

The 40-year building inspection programs in Miami-Dade and Broward Counties are similar; however, they vary in their histories and current implementation. In Miami-Dade County, the 40-year Building Recertification code has been in place since 1976 while the Broward County 40-year Building Safety Inspection Program was initiated in 2006 and fully phased in by 2011. Both codes exempt minor buildings, single-family residences, and duplexes. In Miami-Dade County buildings less than 2,000 sq. ft. are exempt while in Broward County buildings less than 3,500 sq. ft. are exempt. In both counties, inspections are required every ten years following the first 40-year inspection. Both counties require inspectors to be either a Professional Engineer or Registered Architect licensed in the State of Florida.

The Boards of Rules and Appeals in each county issue the guidelines and inspection forms for the programs. In Broward County there are 32 jurisdictions – 31 municipalities and unincorporated Broward County. Each year, the Broward County Board of Rules and Appeals (BORA) staff generates a list of properties that are due for their 40-year or 10-year anniversary inspection. The list is distributed to each jurisdiction in June, who then have the responsibility to notify building owners and follow up on the inspection process. In contrast, the 34 jurisdictions in Miami-Dade County (33 municipalities and Unincorporated Miami-Dade) are responsible for generating their own list of properties due for recertification each year and administering the program. Inspection reports and recertification outcomes are maintained by the individual jurisdictions; neither county has historically collected nor maintained records at the county level associated with the inspection programs.

The milestone inspections mandated by Senate Bill 4-D are required for all condominiums and co-ops that are three or more stories in the State. Inspections are to be carried out by a registered architect or licensed engineer. For buildings within three miles of the coast, the inspections must start when the building reaches 25 years of age, while inland inspections are to start at 30 years. In both cases, structural inspections are to occur every 10 years thereafter. The inspection process is divided into two phases, with the first phase providing an initial visual inspection of the structure. If signs of substantial structural deterioration are noted in the Phase 1 inspection, a building will require a Phase 2 inspection. The purpose of the Phase 2 inspection is to fully assess areas of structural distress to confirm the building is either structurally sound or to recommend repairs to restore the structural integrity of the building.

2 Task 1: Engineer and/or Architects Feedback on SB 4-D

2.1 Task 1 Objectives

The objective of Task 1 of this study was to obtain engineer and/or architect feedback on the milestone structural inspection requirements outlined in the new legislation for review by the Florida Building Commission in developing their required legislative response recommendations. After careful review of the legislation, a set of questions were developed for use in inspector phone interviews. In total, 15 interviews were conducted with engineers with direct experience in inspection of aged building.

2.2 Task 1 Approach

Most of the interview candidates were identified from the data collected by the research team as part of the review of inspection reports in Phase I of the project. These data include information from over 300 reports from 40-year building safety inspections carried out in Miami-Dade and Broward Counties from 1977 to 2021, including the name of the engineer or architect who carried out the inspection. From the initial list of approximately 160 inspectors, a subset was selected based on the number of inspections for which they were responsible in the dataset and the date of the most recent inspection they conducted in the dataset. The goal was to find experienced inspectors who are likely to still be conducting inspections. Some additional interview candidates were identified through the research team's professional network, or suggested by another interviewee. All interviews were carried out according to the plan approved by the University of Florida Institutional Review Board (IRB #202201688).

Candidates were informed of the purpose and scope of the interview and were guaranteed anonymity with respect to the reporting of their opinions. Of the 32 inspectors contacted with a request for a phone interview, 15 responded and agreed to be interviewed. While several architects were contacted for interview, none responded. As a result, all interviewees are licensed professional engineers (P.E.s), with four having the additional certification of a Special Inspector (S.I.).

2.2.1 Interview Questions

A set of interview questions was developed based on the content of the legislation and distributed to all candidates who agreed to be interviewed (see Appendix A). The first questions were to establish the relevant inspection experience of the engineers and to determine their level of familiarity with the legislation. Subsequent questions were written to solicit feedback on the definitions and processes outlined in the portion of the legislation specifically associated with the structural milestone inspections (Section 3. Section 553.899). A summary of the legislation was also provided (Appendix B). During each call, which lasted approximately 30-40 minutes, interviewees were prompted to answer most questions and to share any other opinions or experiences relevant to the content and language of the legislation; not all questions were addressed if other topics took precedence during the discussion.

2.3 Feedback Summary

Due to the conversational nature of the interviews and the resulting qualitative feedback that was received, the results are presented in an aggregated summary.

2.3.1 Interviewee Experience and Familiarity with Legislation

The interviewees are all engineers with 15 to over 30 years of experience in building inspection and assessment, with some also having a structural design background. All but one have direct experience with the 40-year inspection programs in either or both Miami-Dade and Broward Counties. One engineer was part of the Surfside Working Group and two had input on recently developed guidelines for structural inspection in the City of Boca Raton. Most of the engineers have some level of familiarity with Senate Bill 4-D, with a few already conducting reserve study or milestone inspections associated with the new law.

2.3.2 Non-exempt Buildings

The legislation requires milestone inspections for all condominiums and cooperatives that are three or more stories. The inspections are to be initiated when the building reaches 25 years of age if it is within three miles of the coast (defined in Florida Statute s. 376.031) or 30 years inland. The interval for subsequent inspections is 10 years, regardless of their proximity to the coast.

The interviewees were asked their opinion on these definitions. The responses are summarized as follows:

- Building use: most say that the requirement for inspections should not be limited to condos and cooperatives; buildings of any use, especially dwellings, should be assessed for safety.
- Building stories: some indicate that lower-rise buildings can also have safety issues that milestone inspections could address (e.g., falling debris from spalling). One respondent thinks that the legislation should be for buildings over three stories to be consistent with the definition of a threshold building in Florida.
- Distance from the coast for earlier initial inspection:
    - Most express an understanding for a differentiation between buildings with saltwater exposure and those inland.
    - Some state that the most important distinction for inspections is the identification of buildings directly exposed to saltwater, especially the exposed portions (balconies, parking garages, pool decks, etc.); such buildings, or portions of buildings, that are directly on the coast or intercoastal waterway may warrant even earlier and more frequent inspections.
    - Some question the scientific reasoning for the three-mile demarcation, while others reason that a line must be drawn so three miles is reasonable. A few suggest that the line may shift in response to additional data that is collected throughout implementation of the inspection legislation.
    - Regardless of what the line is, a few of the respondents see a need for GIS specialists to be involved in creating maps that can be used by the various jurisdictions for identifying coastal buildings; jurisdictions do not have the resources to create these maps.
- Age of initial milestone inspection: Most feel that the ages of initiation are reasonable. A few suggest that earlier initial inspections promote less-costly maintenance rather than waiting for more concerning and costly issues to develop, with 10-20 years being the appropriate age of initial for buildings in the coastal zone. Another respondent thinks that 40 years is reasonable for a consistent statewide requirement.
- Inspection interval: most feel that 10 years is a reasonable time between inspections. A few indicated that shorter intervals may be better and would align better with other maintenance activities, such as painting, to streamline exterior building access.

Several of the respondents expressed that while they would favor different definitions of buildings and timelines for inspections, they also think that the definitions outlined in the legislation are a reasonable starting point. They anticipate that changes and additions to the buildings that are inspected and their inspections timelines, may shift over time.

2.3.3 Substantial Structural Deterioration

Substantial structural deterioration is defined in the legislation as "substantial structural distress that negatively affects a building's general structural condition and integrity. The term does not include surface imperfections such as cracks, distortion, sagging, deflections, misalignment, signs of leakage, or peeling of finishes unless the licensed engineer or architect performing the phase one or phase two inspection determines that such surface imperfections are a sign of substantial structural deterioration." The interviewees were asked their opinion of this definition and how the term is used to differentiate between stages of the inspection process.

Most of the interviewees find the definition to be reasonable and that it is broad enough to allow the inspector to use their engineering judgement in assessing the structural condition. One engineer feels that the word "deterioration" should be replaced with "deficiency" to indicate that the structure no longer meets the code-described ability to carry load. They feel the term "deterioration" implies something that has occurred to the building over time, while some sources of structural concern may be inadequate in the initial design or construction or changes to the building use during its life. In addition, they state that significant deterioration may occur without compromising the load carrying capacity of the structural members due to the high factor of safety present in design codes. As a result, it is asserted that the definition of substantial structural deterioration or deficiency should be made relative to specific definitions of what constitutes a safe structure and cannot be determined without careful analysis of the current structural capacity and demand.

Some of the respondents have concern regarding the first part of the definition provided in the legislation, stating that surface imperfections, with common reference to spalling, are often an indication of structural deterioration or deficiency. Furthermore, such defects are often precursors to issues that may ultimately result in structural compromise. While this concern is somewhat alleviated in the second part of the definition, where the engineer may use their judgement to assess what constitutes a sign of structural deterioration, a few feel that the wording is unnecessarily circular or vague.

2.3.4 Two-phase Inspections

The milestone inspection process is divided into two phases such that an in-depth, possibly more intrusive, and likely more costly inspection is only required after a qualitative visual inspection reveals signs of substantial structural deterioration. Most of the interviewees are in favor of the two-phase inspection process, with many indicating that it reflects how 40-year building safety inspections are already carried out: the engineers conduct an initial walk-through to determine if additional in-depth inspection and testing is required. A few respondents are concerned that breaking the inspection up into two phases may insert an unnecessary delay during the inspection process and even prolong the implementation of time-critical shoring or repairs. One interviewee feels that coastal buildings should automatically require a Phase 2 inspection due to the mechanisms and timelines of their deterioration.

The interviewees that are working on reserve study inspections question the relationship between the milestone inspections and the required reserve study inspections. Specific questions include whether a single inspection can fulfill both requirements and whether they can or should be

conducted by different engineers (with possibly very different assessments). They also note that reserve study inspections do investigate roofing, windows, and waterproofing; which could be beneficial to include in the milestone inspections.

2.3.5 Phase 1 Inspections

A Phase 1 inspection is defined as a visual inspection of the habitable and non-inhabitable areas of the building that is intended to provide a qualitative assessment of the structural conditions of the building. The definition of a Phase 1 inspection is reasonable to most of the interviewees. Several interviewees believe that visual inspection conducted by an experienced inspector is adequate to evaluate if there are signs of substantial structural deterioration but not necessarily to determine cause or extent. Some feel that additional inspection techniques, such as hammer/tap tests may be useful during this inspection phase for assessing the level of structural deterioration. One inspector expressed that a visual inspection could still require the removal of finishes as needed, which is not addressed in the legislation.

A common discussion point in many of the interviews was whether the intent of the legislation is to promote maintenance that will ultimately improve structural performance or whether it is to simply identify structural conditions that have already reached a critical level of concern. If the promotion of structural preservation through timely maintenance is desired, then some feel that a Phase 1 inspection should include assessment of components such as windows, waterproofing, and sealing.

2.3.6 Phase 2 Inspections

A Phase 2 inspection is a more in-depth inspection of the structure that may involve destructive or nondestructive testing and may be as extensive or limited as necessary to fully assess areas of structural distress. The purpose of the Phase 2 inspection is either confirm that the building is structurally sound and safe for its intended use or to recommend a program for fully assessing and repairing distressed and damaged portions of the building. The inspector is encouraged to select testing locations that are the least disruptive, when possible.

A Phase 2 inspection is triggered if the inspector determines that there are signs of substantial structural deterioration under visual inspection (Phase 1). Some interviewees expressed the opinion that, due to liability concerns, many inspectors will call for a Phase 2 inspection if there is even the possibility of structural deterioration, regardless of whether their assessment can determine if it has reached the level of “substantial”.

There was a lot of discussion on whether a Phase 2 inspection should be required when what may be deemed to be superficial defects, such as spalling or compromised seals, are observed. These defects can be indicative of, or quickly lead to, structural issues even if they do not yet rise to the level of substantial structural deterioration. Several interviewees would like more latitude for the inspector to specify the need for a Phase 2 inspection. Some respondents question whether they can specify the need for minor repairs upon completion of the Phase 1 inspection as preventative measures without having to trigger a Phase 2 inspection.

Most interviewees find the description of the Phase 2 inspection to be adequate and reasonable. Some request more detailed language, such as the requirement to inspect “all exterior surfaces”

or to specifically address foundation assessment. One respondent feels that the legislation should address whether an engineer can "fail" the building if unpermitted work is found during the inspection. Several interviewees feel that more specific language provides them backing when they find themselves in the position to convince condominium association boards of the necessity of certain evaluation methods.

There are mixed opinions on what, if any, destructive or non-destructive testing methods are appropriate for structural assessment. A few think that visual techniques can often provide all the necessary information, while most had one or two testing methods they favor for assessment. Methods commonly used by those interviewed include

- Hammer/tap/sounding – concrete assessment
- Chipping out spalls – spall assessment, corrosion identification and assessment
- Ground penetrating radar (GPR) – rebar location and assessment
- X-Ray – rebar location and assessment
- Core samples – as-built assessment (e.g., cover thickness), chloride content testing, mix assessment
- Thermal imaging/IR cameras – moisture detection
- Geotechnical assessments

A few respondents have concern that larger engineering firms with more resources may have access to expensive testing equipment and may be more likely to recommend testing that requires it, while smaller firms may not be able to compete.

Almost all the interviewees cite gaining adequate access as the primary challenge to carrying out a Phase 2 inspection. Obtaining unit owner approval for removal of finishes can be a challenge and condo boards do not always provide timely access to necessary inspection locations. A few respondents mentioned the challenges of obtaining original building plans.

2.3.7 Inspection Reporting

Many strongly request that consistent inspection forms be adopted in all jurisdictions. There is concern about the challenges that would be presented with a lack of consistency in reporting requirements. Most are in favor of the requirement for condo boards to provide the inspection report to all unit owners; while a few suggest redacting contact information of the engineers so that all correspondence is carried out through the board.

2.3.8 Timelines and Enforcement

Several of the interviewees express concern regarding the timeline for the initial round of inspections to take place (before the end of 2024). They cite the large number of buildings that will need to be inspected versus the small number of experienced inspectors in the state. This capacity concern is further exacerbated by building departments that may not be adequately staffed to implement the new inspection program and process the inspection reports and subsequent repair permits.

The requirement for repairs to be started within a year of a Phase 2 inspection seems long to some interviewees; six months may be more reasonable with extensions requested as needed. If

the repairs are more minor in nature, or to address maintenance concerns, then a year may be reasonable; however, if substantial structural deterioration is observed, repairs should start sooner, if not immediately in some cases. While more timely repairs can be specified by the engineer, a shorter timeline enforced by building departments would provide additional motivation to the owners. Another interviewee does not think that the repair process will move quickly given timelines for creating repair drawings, pulling permits, and competitive bidding as required by condominium laws. Extensions may be filed if the process takes longer than expected.

Several interviewees stressed the importance of role of the building departments in enforcing timelines for inspections and following up on inspections to ensure that owners are meeting the requirements of the legislation and that inspection and repairs are occur in a timely manner. One respondent suggested that building departments should go to each site to verify repairs and sign off that they have been completed.

Several interviewees expressed concern for inevitable cases when condo boards and building owners do not have adequate funds to perform required repairs.

2.3.9 Inspector Qualifications

Most interviewees do not feel that architects have the appropriate training to carry out milestone structural inspections, especially Phase 2 inspections that may require in-depth structural analysis and design of repairs. In addition, several think that engineers should have a specific background in structural engineering to qualify as milestone inspectors. Almost all support a minimum required level of experience to qualify inspectors to carry out the inspections. This experience could be defined in number of years or number of buildings inspected. There is little support for the requirement of a Special Inspector (S.I.) certification to conduct milestone inspections; it is not relevant experience for this type of inspection and would potentially narrow an already small pool of potential inspectors.

2.4 Task 1 Summary

All interviewees have a generally positive opinion of legislation mandating a statewide building inspection program and see the benefit of providing building owners the information needed to maintain the safety of their buildings. Overall, many see the legislation, as it is currently written, as a good starting point and see the opportunity for this program to collect data on building performance that may ultimately provide more information on the most appropriate inspection onset and interval and how the proximity to the coast impacts structural deterioration. There is also recognition of the challenges associated with implementing the program on such a large scale, including a lack of qualified inspectors, inadequate resources for building department enforcement, and the potential for inconsistent reporting requirements across hundreds of jurisdictions.

Many of the interviewees appreciate that the general language in the legislation allows inspectors to apply their judgement in assessing structural condition, determining when a Phase 2 inspection is required, and specifying repairs. Some feel that additional specificity would promote more consistent inspection outcomes and offer the engineer some support in cases where condo boards are resistant to more in-depth evaluation and repairs.

3 Task 2: Building Inspection Report Acquisition

3.1 Task 2 Objective

The objective of Task 2 is to determine the quantity and types of inspection reports required to ensure statistical significance of the final analysis results and to request inspection reports from municipalities in Miami-Dade and Broward Counties accordingly.

3.2 Task 2 Progress

To identify the property addresses that would be requested to supplement the data acquired in the Phase I project, the research team first had to determine the number of non-exempt buildings present within each municipality within Miami-Dade and Broward Counties. These numbers provide information on the full dataset (total number of non-exempt addresses, building use, year built, and number of stories) from which to select a representative and statistically meaningful sample size.

The starting dataset from Miami-Dade County was in the form of an Excel spreadsheet with property appraiser information for all properties in the county, both exempt and non-exempt, and in which each individual unit within a condominium was listed as a separate property. A program was developed to automatically consolidate condominiums and remove non-exempt addresses. Data for individual condominium units were collapsed into a single address and folio number per building. Buildings without condominiums and an area below the threshold or with non-applicable building uses were removed from the dataset. The data provided by Broward County BORA was in the form of several Excel spreadsheets (one corresponding to each year of the program since inception in 2006) with a list of non-exempt addresses due for inspection in the respective year. In the first phase of this project, addresses with inspection due dates prior to 2018 were provided; in this phase of the research, the addresses due for inspection between 2018 and 2022 were also provided. Data cleaning for Broward County addresses required consolidation of all individual spreadsheets and removal of any remaining non-exempt properties.

The goal in this phase of the project was to obtain a total of 5% of identified non-exempt addresses in each of the municipalities selected for this study, inclusive of the Phase I project and the current Phase II project. As a result, the research team identified the number of additional addresses required to reach the 5% goal. Some municipalities from which reports were requested in the Phase I project were not targeted (revisited) in the second round of requests due to a low response rate or simply not having adequate building inventory to warrant additional reports. A few additional municipalities were added to achieve a more representative total sample.

The requested inspection reports by municipality are summarized in Table 1, which includes the total number of non-exempt buildings and the number of reports requested and received in Phases I and II of this study. In contrast to Phase I, all municipalities are now requiring payment for records requests, which is being furnished by the project budget. To date, most requests have been made to the respective municipalities. Almost one-third of the requested or soon-to-be requested reports have been received and the research team is currently waiting for the remainder of the requests to be fulfilled.

Table 1. Inspection report summary.

		Total Non-exempt	Phase 1		Phase 2		Total	
			Requested	Received	Requested	Received	Requested	Received (to date)
		Totals	341	261	302	96	643	329
County	**Municipality**							
Broward	**Deerfield Beach**	408	13	11	29	28	35	39
	Fort Lauderdale	2121	46	35	69	0	115	35
	Hallandale Beach	-	13	3	0	0	13	3
	Hollywood	1961	24	18	81*	0	105	18
	Pompano Beach	-	20	11	0	0	20	11
Miami-Dade	**Coral Gables**	241	18	13	0	0	18	13
	Miami	2254	121	102	0	0	121	102
	Miami Beach	1506	35	33	51	43	86	76
	Aventura	222	0	0	12*	0	12	0
	South Miami	255	0	0	10	0	10	0
	North Miami	516	0	0	20	0	20	0
	North Miami Beach	486	0	0	30	25	30	25
	Hialeah	3771	34	25	0	0	34	25
	Sunny Isles Beach	242	17	10	0	0	17	10

*Note: to be requested in early March.

4 Task 3: Data Aggregation and Analysis

4.1 Task 3 Objective

The objective of Task 3 is to extract relevant information from the additional inspection reports requested and received during Task 2 and to analyze the extracted data according to the analysis procedures established in the first phase of the research project. Following the passage of Senate Bill 4-D, the research team added additional inspection report analysis to evaluate the severity of the deterioration and extent of required repairs for each recorded building inspection report. The Phase I project reported the severity of some component defects; however, the overall requirement for repair was reported simply as “yes” or “no”. The purpose of this additional analysis is to use the building inspection reports to determine the extent of the deterioration present at the time of inspection based on the information provided within. The analysis was

used to infer if a building would require a Phase 2 inspection according to the language in the current legislation based on the information provided in the inspection report.

4.2 Task 3 Progress

4.2.1 Repair Rating

A repair rating was developed to categorize the extent of deterioration and required repairs provided in each of the inspection reports analyzed in this study, as shown in Table 2. Ratings of 1 and 2 would not likely require a Phase 2 inspection according to the language of Senate Bill 4-D. Ratings of 4 and 5 would likely require a Phase 2 inspection, with 4 indicating signs of substantial structural deterioration, and 5 indicating defects rising to the level of substantial structural deterioration. A rating of 3 indicates that maintenance repairs were required and that there may be signs of deterioration that would lead to substantial structural deterioration if maintenance is deferred. Depending on the inspector, a rating of 3 could potentially lead to the call for a Phase 2 inspection.

Table 2. Repair rating scheme.

Rating	**1**	**2**	**3**	**4**	**5**
Brief description	No Repairs Required	Maintenance Suggested	Maintenance Required	Signs of Substantial Structural Deterioration	Substantial Structural Deterioration
Detailed Description	No signs of Surface Imperfections. No notable imperfections or conditions. No repairs required.	Some Surface Imperfections that were **not** likely to lead to Substantial Structural Deterioration. Repairs were not required, but repairs **may** be suggested for maintenance.	Surface Imperfections that lead to Substantial Structural Deterioration. Repairs were required for maintenance.	Surface Imperfections that **are** a sign of Substantial Structural Deterioration. Repairs were required.	Substantial Structural Deterioration was found and reported. Repairs were required.
Phase 2?	No	No	Possibly	Yes	Yes
Examples		Doors and windows maintenance, sealing, minor stucco cracking, minor concrete cracking, minor masonry cracking, waterproofing issues	Spalling, concrete cracking, delamination, roofing/reroofing	Spalling, significant concrete or masonry cracking, rebar corrosion, concrete repair	Section loss, significant spalling or cracking, immediate repairs, concrete repair

At the time of this interim report, almost all the inspection reports acquired in Phase I of this project have been re-evaluated to assign a rating (except for the City of Fort Lauderdale), with

the results shown in Figure 1. The results are further summarized in Figure 2 to indicate the percentage of inspection reports that would likely lead to Phase 2 inspections according to Senate Bill 4-D based on the data provided.

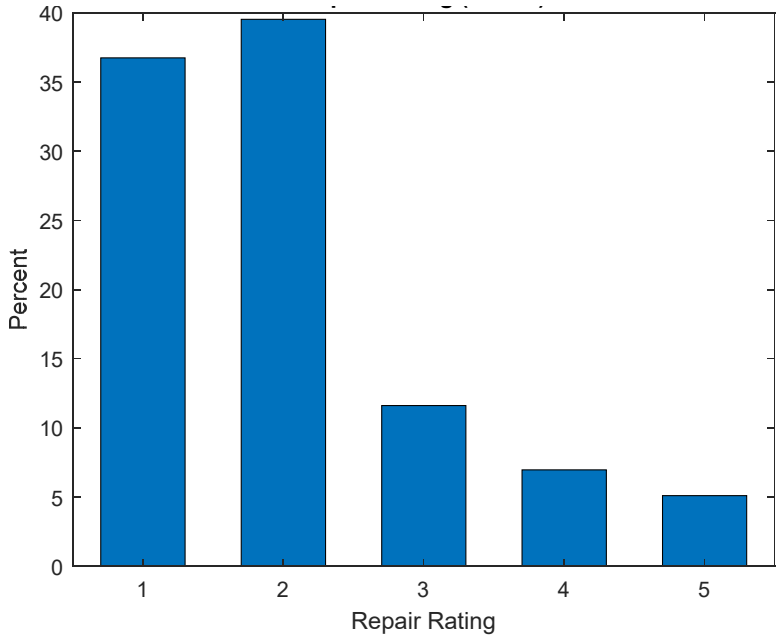

Figure 1. Repair ratings assigned to inspection reports acquired in Phase I of this project, excluding Fort Lauderdale (N=215).

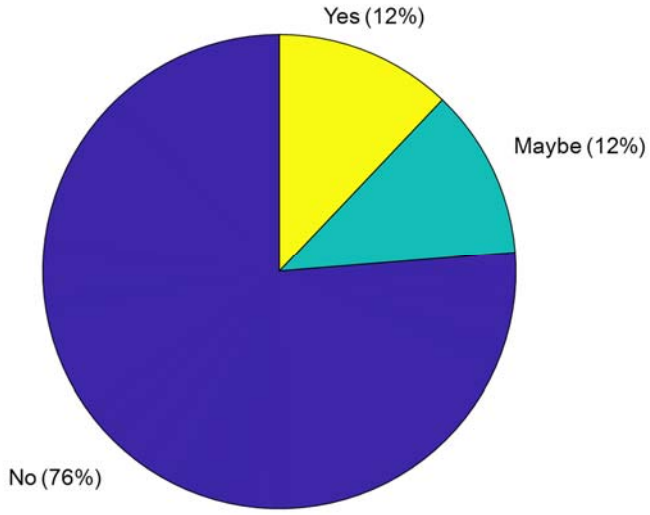

Figure 2. Percentage of reports that would require a Phase 2 inspection (N=215).

4.2.2 Phase II Data Analysis

As more inspection reports are received from the second round of requests made in Task 2, analysis of the reports will be carried out with the analysis code developed in MATLAB for the Phase I project. The analysis will be expanded (compared to Phase I) to include the repair rating assignment and analysis.

5 Task 4: Inspection Technology Landscape Assessment

5.1 Task 4 Objective

The objective of Task 4 is to objectively assess and report on destructive and nondestructive structural assessment technologies that are currently available and effective for providing structural condition assessment.

5.2 Task 4 Progress

Based on the research team experience and the results of the interviews carried out in Task 1, an initial list of current and emerging technologies used to evaluate structural conditions on buildings in Florida and has been compiled as follows:

- Acoustic emission
- Stress wave methods (including ultrasonics and sounding techniques)
- Ground Penetrating Radar (GPR)
- Thermography
- Fiber optic sensors
- Imagery
- Doppler vibrometer
- AR/VR guided inspection
- Vibration sensors/modal analysis (accelerometers)
- Integrated sensors
- X-ray inspection
- Core sampling of concrete
- In-situ strength testing methods
- Corrosion detection and monitoring techniques
- Analysis of ingress and transport properties
- Analysis of carbonation

In addition, a list of metrics by which each technology will be quantified has been determined as follows:

- Standardization
- Guidance Provided by Industry Consensus
- Damage Type/Target Material
- Contact/Noncontact
- Automated/Manual
- Localized/Global Damage Assessment
- Assessment Reliability
- Assessment Frequency
- Cost
- Technology Maturity/Years in Use
- Certification/Operator Training/Experience Requirements
- Interpretation Training/Experience Requirements
- New Construction/ Existing Structure (NC/E)
- Relevant Guidance

As this task proceeds, additional technologies will be added as they are identified. The technologies and assessment categories will be used to build a comprehensive matrix for their evaluation, which will be accompanied by a detailed narrative description of each assessment technology.

Appendix A: Interview Question Pool (Task 1)

- Have you been involved in 40-year building safety inspections (in either Miami-Dade or Broward Counties) in the past and, if so, approximately how many buildings have you inspected for building safety inspection programs?
- What is your level of familiarity with Florida Senate Bill 4-D?
- Are the definitions for non-exempt buildings reasonable?
- Describe the inspection methods that are required to adequately assess the structural condition of the building, to determine the presence of substantial structural deterioration, to determine if a building is structurally sound, and to determine appropriate repair and maintenance measures to restore the structural safety of a building.
- Do you think that the definition of "substantial structural deterioration" in the legislation is clear and reasonable? If not, what changes would you suggest?
- Is the description of the phase one inspection in the legislation clear? Are the requirements for the phase one inspection clear? Are there any changes you would suggest to the description?
- Are the conditions that trigger a phase two description clearly outlined? If not, what clarifications would you suggest?
- Is the description of the phase two inspection in the legislation reasonable and clear? Are the requirements for the phase two inspection reasonable and clear? Are there any changes that you would suggest to the description?
- What assessment methods (destructive or nondestructive) could be used in a phase two inspection and under what circumstances?
- What challenges do you see to carrying out the phase two inspection as outlined in the legislation?
- What consideration or challenges do you anticipate regarding the preparation and public distribution of the full inspection report and the inspection summary as outlined in the legislation?
- Does the legislation provide adequate and clear guidelines related to enforcement of milestone inspections?
- What inspector qualifications should be required to carry out milestone inspections?
- What is your overall opinion of the legislation as currently written? What changes or additions would you suggest?

Appendix B: Senate Bill 4-D Summary Sent to Interviewees for Task 1

The full text of legislation (See Section 3, Section 553.899 F.S. – Mandatory structural inspections for condominiums and cooperative buildings)

Definitions:

- Milestone inspection:
  - Structural inspection of a building, including load-bearing walls and the primary structural members and primary structural systems by licensed architect or engineer authorized to practice in Florida.
  - The purpose is to attest to the life safety and adequacy of the structural components of the building and, to the extent reasonably possible, determine the general structural condition of the building as it affects the safety of such building, including a determination of any necessary maintenance, repair, or replacement of any structural component of the building.
- Substantial structural deterioration:
  - Substantial structural distress that negatively affects a building's general structural condition or integrity.
  - Does not include surface imperfections such as cracks, distortion, sagging, deflections, misalignments, signs of leakage, or peeling of finishes unless the licensed engineering or architect determines that such surface imperfections are a sign of substantial structural deterioration.
- Phase one inspection:
  - Visual examination of habitable and non-habitable areas of a building, including the major structural components of a building.
  - Intended to provide a qualitative assessment of the structural conditions of the building.
  - If no signs of substantial structural deterioration are found to any building components under visual examination, a phase two of the inspection is not required.
  - Inspection report shall be prepared and submitted pursuant to subsection (8).
- Phase two inspection:
  - Required if any substantial structural deterioration is identified during phase one.
  - May involve destructive or nondestructive testing at the inspector's direction.
  - May be as extensive or as limited as necessary to fully assess areas of structural distress in order to confirm that the building is structurally sound and safe for its intended use and to recommend a program for fully assessing and repairing distressed and damaged portions of the building.
  - When determining testing locations, the inspector must give preference to locations that are the least disruptive and most easily repairable while still being representative of the structure.
  - Inspection report shall be prepared and submitted pursuant to subsection (8).

Inspection Reports

- Report requirements (subsection 8):
    - Report and summary to be submitted to the condominium/cooperative association and to local jurisdiction building official
    - Seal and signature
    - Manner and type of inspection
    - Identification of any substantial structural deterioration within a reasonable professional probability based on the scope of inspection, describing the extent of such deterioration
    - Identification of any recommended repairs for noted deterioration
    - State whether unsafe or dangerous conditions, defined in Florida Building Code, were observed
    - Recommend any remedial or preventative repair for any items that are damaged but not substantial structural deterioration
    - Identify and describe any items requiring further inspection
- Condominium/Cooperative association must distribute inspection summary to each unit owner and must post a copy of summary in conspicuous place. A copy of full inspection report must be published on the association's website.

Enforcement and Scheduling

- Initial milestone inspection must occur by December 31 in the year required (25 for buildings within three miles of the coast or 30 years for buildings more than three miles from the coast, from the certificate of occupancy), and every 10 years thereafter.
- Condominium and cooperative associations are responsible for arranging the milestone inspection and for all costs associated with the inspection.
- For buildings with certificates of occupancy issued on or before July 1, 1992, the building's initial milestone inspection must be performed by December 31, 2024.
- The local enforcement agency must provide written notice to the association that an inspection is required.
- The association must complete the phase one milestone inspection (determined by submission of the report by the engineer or architect) within 180 days from receiving notice that the inspection is due.
- Local enforcement agency prescribes timelines and penalties with respect to inspection requirements.
- A board of county commissioners may adopt an ordinance requiring that a condominium or cooperative association schedule or commence repairs for substantial structural deterioration within a specified timeframe after the local enforcement agency receives a phase two inspection.
- Such repairs must be commenced within 365 days after receiving such report.
- If an association fails to submit proof to the local enforcement agency that repairs have been scheduled or have commenced for substantial structural deterioration identified in a phase two inspection report within the required timeframe, the local enforcement agency must review and determine if the building is unsafe for human occupancy.