The City of Boynton Beach
DEVELOPMENT DEPARTMENT
BUILDING DIVISON
100 East Ocean Avenue Boynton Beach, Florida 33425-0310
www.boynton-beach.org

Inspection Guidelines for Structural Recertification

Basic Guidelines of Structural Inspection

The fundamental purpose of the required inspection(s) and report(s) is to confirm in reasonable fashion that the building or structure under consideration is safe for continued use under the present occupancy. As implied by the title of this document, this is a recommended procedure, and under no circumstances are these minimum recommendations intended to supplant proper professional judgment.

Such inspection shall be for the purpose of determining the general structural condition of the building or structure to the extent reasonably possible of any part, material or assembly of a building or structure which affects the safety of such building or structure and/or which supports any dead or designed live load, and the general condition of its electrical systems pursuant to the Building Code.

In general, unless there is obvious overloading, or significant deterioration of important structure elements there is little need to verify the original design. It is obvious that this has been “time tested’ if still offering satisfactory performance. Rather, it is of importance that the effects of time with respect to deterioration of the original construction materials be evaluated. It will rarely be possible to visually examine all concealed construction, nor should such be generally necessary. However, a sufficient number of typical structure members should be examined to permit reasonable conclusions to be drawn.

Visual Examination will, in most cases, be considered adequate when executed systematically. The visual examination must be conducted throughout all habitable and non-habitable areas of the building, as deemed necessary by the inspecting professional to establish compliance. Surface imperfections such as cracks, distortion, sagging, excessive deflections, significant misalignment, signs of leakage, and peeling of finishes should be viewed critically as indications of possible difficulty.

Testing Procedures and quantitative analysis will not generally be required for five (5) structural members or systems except for such cases where visual examination has revealed such need, or where apparent loading conditions may be critical.

Manual Procedures such as chipping small areas of concrete and surface finishes for closer examinations are encouraged in preference to sampling and/or testing where visual examination alone is deemed insufficient. Generally, unfinished areas of buildings such as utility spaces, maintenance areas, stairwells and elevator shafts should be utilized for such purposes. In some cases, to be held to a minimum, ceilings or other construction finishes may have to be opened for selective examination of critical structural elements. In that event, such locations should be carefully located to be least disruptive most easily repaired, and held to a minimum. In an event, a sufficient number of structural members must be examined to afford reasonable assurance that such are representative of the total structure.

Evaluating an existing structure for the effect of time, must take into account two, basic considerations; movement of structural components with respect to each other, and deterioration of materials.

With respect to the former, volume change considerations, principally from ambient temperature changes, and possible long-time deflections, are likely to be most significant. Foundation movements will frequently be of importance, usually settlement, although upward movement due to expansive soils actually may occur. However, it is infrequent in this

area. Older buildings on spread footings may exhibit continual, even recent settlements if founded on deep unconsolidated fine grained or cohesive soils or from subterraneous losses or movements from several possible causes.

With very little qualification, such as rather rare chemically reactive conditions, deterioration of building materials can only occur in the presence of moisture, largely to metals and their natural tendency to return to the oxide state in the corrosive process.

In this marine climate, highly aggressive conditions exist year round. For most of the year, outside relative humidity may frequently be about 90 or 95%, while within air-conditioned buildings, relative humidity will normally be about 35 to 60%. Under these conditions moisture vapor pressures ranging from about 1/3 to 1/2 pounds per square inch will exist much of the time. Moisture vapor will migrate to lower pressure areas. Common building materials such as stucco, masonry and even concrete, are permeable even with these slight pressures. Since most of our local construction does not use vapor barriers, condensation will take place within the enclosed walls of the building. As a result, deterioration is most likely adjacent to exterior walls, or wherever else moisture or direct leakage has been permitted to penetrate the building shell.

Structural deterioration

Structure deterioration will always require repair. The type of repair, however, will depend on the importance of the member in the structural system and degree of deterioration. Cosmetic type repairs may suffice in certain non-sensitive members such as tie beams and columns, provided that the remaining sound material is sufficient for the required function. For members carrying assigned gravity or other loads, cosmetic type repairs will only be permitted if it can be demonstrated by rational analysis that the remaining material, if protected from further deterioration can still perform its assigned function at acceptable stress levels. Failing that, adequate repairs or reinforcement will be considered mandatory.

Foundation

If all of the supporting subterranean materials were completely uniform beneath a structure, with no significant variations in grain size, density, moisture content or other mechanical properties; and if dead load pressures were completely uniform, settlements would probably be uniform and of little practical consequence. In the real world, however, neither is likely. Significant deviations from either of these two idealisms are likely to result in unequal vertical movements.

Monolithic masonry, generally incapable of accepting such movements will crack. Such cracks are most likely to occur at corners, and large openings. Since, in most cases, differential shears are involved, cracks will typically be diagonal.

Small movements, in themselves, are most likely to be structurally important only if long term leakage through fine cracks may have resulted in deterioration. In the event of large movements, continuous structural elements such as floor and roof systems must be evaluated for possible fracture or loss of bearing.

Pile foundations are, in general, less likely to exhibit such difficulties. Where such does occur, special investigation will be required.

Roofing system

Sloping roofs, usually having clay or cement tiles, are of concern in the event that the covered membrane may have deteriorated, or that the tiles may have become loose. Large deflections, if merely resulting from deteriorated rafters or joists will be of greater importance. Valley Flashing, and Base Flashing at roof penetration will also be matters of concern.

Flat roofs with built up membrane roofs will be similarly critical with respect to deflection considerations. Additionally, since the will generally be approaching expected life limits at the age when building recertification is required, careful examination is important. Blisters, wrinkling, alligatoring, and loss of gravel are usually signs of difficulty. Punctures or

loss of adhesion of base flashing, coupled with loose counterflashing will also signify possible problems. Wind blown gravel, if excessive, and the possibility of other debris, may result in pounding, which if permitted, may become critical.

Masonry Bearing Walls

Random cracking, or if discernible, definitive patterns of cracking, will of course, be of interest. Bulging, sagging, or other signs of misalignment may also indicate related problems in other structural elements. Masonry walls where commonly constructed of either concrete masonry remits or scored clay tile, may have been constructed with either reinforced concrete columns tie beams, or lintels.

Steel bar joists are, of course, sensitive to corrosion. Most critical locations will be web member welds, especially near supports, where shear stresses are high possible failure may be sudden, and without warning. Cold formed steel joists, usually of relatively light gage steel, are likely to be critically sensitive to corrosion, and are highly dependent upon at least normal lateral support to carry designed loads. Bridging and the floor or roof system itself, if in good condition, will serve the purpose.

Wood joists and rafters are most often in difficult from “dry rot”, or the presence of termites. The former (a misnomer) is most often prevalent in the presence of sustained moisture or lack of adequate ventilation. A member may usually be deemed in acceptable condition if a sharp pointed tool will penetrate no more than about one eight of an inch under moderate hand pressure. Sagging floors will most often indicate problem areas. Gypsum roof decks will usually perform satisfactorily except in the presence of moisture. Disintegration of the material and the foam-board may result from sustained leakage. Anchorage of the supporting bulb tees against uplift may also be of importance, with significant deterioration. Floor and roof systems of case in place concrete with self centering reinforcing, such as paper backed mesh and rib-lath, may be critical with respect to corrosion of the unprotected reinforcing. Loss of uplift anchorage on roof decks will also be important if significant deterioration has taken place, in the event that dead loads are otherwise inadequate for that purpose.

Steel Framing System

Corrosion, obviously enough, will be the determining factor in the deterioration of structural steel. Most likely suspect areas will be fasteners, welds, and the interface area where bearings are embedded in masonry. Column bases may often be suspect in areas where flooding has been experienced, especially if salt water has been involved.

Thin cracks usually indicate only minor corrosion, requiring minor patching. Extensive spalling may indicate a much more serious condition requiring further investigation.

Of most probable importance will be the vertical and horizontal cracks where masonry units abut tie columns, or other frame elements such as floor slabs. Of interest here is the observation that although the raw materials of which these masonry materials are made may have much the same mechanical properties as the reinforced concrete framing, their actual behavior in the structure, however, is likely to differ with respect to volume change resulting from moisture content, and variations in ambient thermal conditions.

Moisture vapor penetration, sometimes abetted by salt laden aggregate and corroding rebars, will usually be the most common cause of deterioration. Tie columns are rarely structurally sensitive, and a fair amount of deterioration may be tolerated before structural impairment becomes important. Usually, if rebar loss is such that the remaining steel area is still about 0.0075 of the concrete area, structural repair will not be necessary. Cosmetic type repair involving cleaning, and patching to effectively seal the member, may often suffice. A similar approach may not be unreasonable for tie beams, provided they are not also serving as lintels. In that event, a rudimentary analysis of load capability using the remaining actual rebar area, may be required.

Floor and Roof Systems

Cast in place reinforced concrete slabs and/or beams and joists may often show problem due to corroding rebars resulting from cracks or merely inadequate protecting cover of concrete. Patching procedures will usually suffice where such damage has not been extensive. Where corrosion and spalling has been extensive in structurally critical areas, competent analysis with respect to remaining structural capacity, relative to actual supported loads, will be necessary. Type and extent or repair will be dependent upon the results of such investigation.

Precast members may present similar deterioration conditions. End support conditions may be important. Adequacy of bearing, indications of end shear problems, and restraint conditions are important, and should be evaluated in at least a few typical locations.

Concrete Framing Systems

Concrete deterioration will, in most cases similarly to related to rebar corrosion possibly abetted by the presence of salt-water aggregate or excessively permeable concrete. In this respect, honeycomb areas may contribute adversely to the rate of deterioration. Columns are frequently most suspect. Extensive honeycomb is most prevalent at the base of columns, where fresh concrete was permitted to segregate, dropping into form boxes. This type of problem has been known to be compounded in areas where flooding has occurred, especially involving salt water.

In spall areas, chipping away a few small loose samples of concrete may be very revealing. Especially, since loose material will have to be removed even for cosmetic type repairs, anyway. Fairly reliable quantitative conclusions may be drawn with respect to the quality of the concrete. Even though our cement and local aggregate are essentially derived from the same sources, cement will have a characteristically dark grayish brown color in contrast to the almost white aggregate. A typically white, almost alabaster like coloration will usually indicate reasonably good overall strength. The original gradation of aggregate can be seen through a magnifying glass. Depending upon the structural importance of the specific location, this type of examination may obviate the need for further testing if a value of 2000 psi to 2500 psi is sufficient for required strength, in the event that visual inspection indicates good quality for the factors mentioned.

Windows

Window condition is of considerable importance with respect to two considerations. Continued leakage may have resulted in other adjacent damage and deteriorating anchorage may result in loss of the entire unit in the event of severe wind storms short of hurricane velocity. Perimeter sealant, glazing, seals, and latches should be examined with a view toward deterioration of materials and anchorage of units for inward as well as outward (section) pressures, most importantly in high buildings.

Wood Framing

Older wood framed structures, especially of the industrial type, are of concern in that long term deflections may have opened important joints, even in the absence of deterioration. Corrosion of ferrous fasteners will in most cases be obvious enough. Dry rot must be considered suspect in all sealed areas where ventilation has been inhibited, and at bearings and at fasteners. Here too, penetration with a pointed tool greater than about one eight inch with moderate hand pressure, will indicate the possibility of further difficulty.

Building Facade

Appurtenances on an exterior wall of a threshold building are elements including, but not limited to, any cladding material, precast appliques, exterior fixtures, ladders to rooftops, flagpoles, signs, railings, copings, guard- rails, curtain walls, balcony and terrace enclosures, including greenhouses or solariums, window guards, window air conditioners, flower boxes, satellite dishes, antennae, cell phone towers, and any equipment attached to or protruding from the façade that is mechanically and/or adhesive attached.

Loading

It is of importance to note that even in the absence of any observable deterioration, loading conditions must be viewed with caution. Recognizing that there will generally be no need to verify the original design, since it will have already been “time tested”, this premise has validity only if loading patterns and conditions remain unchanged. Any material change in type and/or magnitude or loading in older buildings should be viewed as sufficient jurisdiction to examine load carrying capability of the affected structural system.

Life Safety Systems/ Florida Fire Prevention Code

Florida Statute and the scope of this document does not allow for testing of built in fire protection systems such as fire alarms and fire sprinkler systems by anyone other than properly licensed fire system contractors. These systems are required to be inspected, tested and maintained on a frequency determined by the licensing authority and as directed within the Florida Fire Prevention Code, or by local jurisdiction amendments. The compliance for ITM of these systems is under the scope and authority of the local fire official. This inspection/survey shall include a visual verification that systems have been maintained by evidence of proper documentation on site and will serve as a good check and balance that the complete building life safety system has been maintained. The inspection may also document the visual presence of emergency lighting, exit lighting and egress pathway illumination. If any concerns are presented from these observations the report shall be submitted to the local building official who shall consult with the local fire official for remedial action.

Historical Documents, Permitting, Repairs and Reports

An attempt shall be made to investigate the existence of documents with the historical records online available on the Building Department webpage to assist with the overall inspection of the building. Understanding the structural system, building components, and intended design may guide the design professional to investigate certain critical areas of the structure.

Violations through Community Standards should be investigated. Cases on file may lead to issues pre-existing with the building, especially any unsafe structure determinations. Depending on the nature of the violation, Building Safety Inspections may be affected.

Unpermitted activities may also affect the outcome of a Building Safety Inspection, especially with unpermitted additions to the building. The Building Safety Inspection of a building is conducted on the entire structure including the original construction and any subsequent permitted addition. Unpermitted additions found by the Building Safety Inspection process present an unsafe situation and shall be identified in the report, even if found to be properly built. Like a repair process identified by the report, legalizing an unpermitted addition would be a prerequisite to the completion of a successful Building Safety Inspection report. Examples of unpermitted work that may affect Building Safety Inspections include, but are not limited to, additions, alterations, balcony enclosures, etc.

Repairs identified in the recertification report will most likely require permits. Once the initial report is completed it should be immediately submitted to the local jurisdiction for processing, do not proceed to conduct repairs without permits. Some repairs, like changing a bulb in an exit sign, may not require a permit but most other work will require permits. Proceeding without obtaining repair permits may lead to a violation of the code. Additionally, repairs being conducted under a permit will afford additional time to comply with a complete recertification report.

1. INSPECTION COVERPAGE

Inspection Firm or Individual Name: _____

Address: _____

Phone Number: _____ Email Address: _____

Architect/Engineer Performing Inspection Name: _____

License Number: _____

I am qualified to practice in the discipline in which I am hereby signing.

Signature _____ Date _____

Inspection Commenced Date: _____ Inspection Completion Date: _____

Phase 1 Inspection - Complete all sections

◯ No Repairs Required **OR** ◯ Phase 2 Required [Can Only Choose One]

◯ Building Safe **OR** ◯ Building Unsafe [Can Only Choose One]

Phase 2 Inspection - **Complete all sections, provide pictures and supporting documents**

◯ Repairs required as outlined in attached inspection report

OR

◯ Immediate repairs needed, restricted use [Can Only Choose One]

◯ Building Safe **OR** ◯ Building Unsafe [Can Only Choose One]

Seal

Signature _____ Date _____

To the best of my knowledge and ability, this report represents an accurate appraisal of the present condition of the building based upon careful evaluation of observed conditions, to the extent reasonably possible.

2. BUILDING OWNER INFORMATION

Building/Structure address: _____

Legal Description: _____

PCN or Folio # _____

Owner's Name*: _____

Owner's mailing address*: _____

Owner's Phone number and Email: _____ Email: _____

***Building Owner.** Means the fee simple title holder of the land on which a building subject to Building Recertification Inspection is situated or, in the case of condominium or cooperative type of ownership, shall mean the person or entity responsible for the structure and common systems of a building subject to Building Recertification Inspection.

3. BUILDING INFORMATION

Building Occupancy Classification: _____ Present Use _____

Construction Type: _____Number of Stories: _____ Square Footage: _____

CO Issue or Reasonable Age of Building Date: _____ Resource: _____

General Description of building (overall description, structural systems, special features): _____

_____

_____

Additional Comments or Observations: _____

_____

_____

The purpose of the required inspection and report is to confirm with reasonable fashion that the building or structure and all habitable and non-habitable areas, as deemed necessary by the inspecting professional to establish the electrical service systems, are safe for continued use under present occupancy. This is a recommended procedure, and under no circumstances are these minimum recommendations intended to supplant proper professional judgement.

4. PRESENT CONDITION OF BUILDING OR STRUCTURE Provide Additional Sheets as Required

a. General Alignment: Note: Good, Fair, Poor - Explain if significant

1. Bulging: _____
2. Settlement: _____
3. Deflections: _____
4. Expansion: _____
5. Contraction: _____

b. Portions showing stress Note: Good, Fair, Poor - Explain if significant

1. Beams: _____
2. Columns: _____
3. Structural Walls: _____
4. Floors: _____
5. Roof: _____
6. Other: _____

c. Surface Conditions - Describe General Conditions of Finishes:

1. Cracking: _____
2. Spalding: _____
3. Peeling: _____
4. Signs of Moisture Penetration or Stains: _____

_____

d. Cracks – Note location in significant members. Identify crack size as HAIRLINE if barely discernible; FINE if less than 1 mm in width; MEDIUM if between 1- and 2-mm width; WIDE if over 2 mm:

_____

_____

_____

_____

e. General extent of deterioration – cracking or spalling of concrete or masonry, oxidation of metals; rot or borer attack in wood:

_____

_____

_____

f. Previous Patching or Repairs:

_____

_____

_____

g. Nature of present loading indicate residential, commercial, other, estimate magnitude:

_____

_____

5. INSPECTION **Provide Additional Sheets as Required**

1. Date of Inspection commencement: _____

2. Date of Inspection Completion: _____

3. Name and Qualifications of Individual Submitting Report: _____

_____

4. Description of laboratory or other formal testing, if required, rather than manual or visual procedures

_____

_____

5. Structural repair required? No ◯ Yes ◯

b. Structural Repair Required (describe and Indicate Acceptance):

_____

_____

_____

_____

_____

SUPPORTING DATA

1. ☐ Sheet Written Data
2. ☐ Color Photographs
3. ☐ Drawings and or Sketches
4. ☐ Test Reports

I. Foundation

Provide Additional Sheets as Required - Provide Color Photos with Report

Foundation: Note: Good, Fair, Poor - Explain if significant

a. Describe building foundation: _____

_____

_____

_____

b. Is wood in contact or near soil? No ○ Yes ○

c. Signs of differential Settlement? No ○ Yes ○

d. Describe any cracks or separation in the walls, columns, or beams that signal differential settlement:

_____

_____

_____

e. Is water draining away from the foundation? No ○ Yes ○

f. Is there additional sub-soil investigation required? No ○ Yes ○

If yes, explain: _____

_____

_____

II. Masonry Bearing Wall:

Provide Additional Sheets as Required - Provide Color Photos with Report

Masonry Bearing Wall: Note: Good, Fair, Poor - Explain if significant

1. Concrete masonry units: _____

_____

2. Clay tile or terra cotta units: _____

_____

3. Reinforced concrete tie columns: _____

_____

4. Reinforced concrete tie beams: _____

_____

5. Lintels: _____

_____

6. Other type bond beams: _____

_____

7. Masonry Finishes – Exterior:

a. Stucco: _____

b. Veneer: _____

c. Paint only: _____

e. Other (describe): _____

8. Masonry Finishes – Interior:

a. Vapor Barrier: _____

b. Furring and Plaster: _____

c. Paneling: _____

d. Paint only: _____

e. Other (describe): _____

9. Cracks:

a. Location - note beams, columns, other: _____

_____

_____

_____

b. Description: _____

_____

_____

10. Spalling:

a. Location - note beams, columns, other: _____

_____

b. Description: _____

_____

11. Rebar corrosion - check appropriate line

a. None visible: _____

_____

b. Minor – patching will suffice: _____

_____

c. Significant-but patching will suffice: _____

_____

d. Significant-structural repairs required: _____

_____

12. Samples Chipped out for examination in spall areas: _____

_____

a. No ◯ Yes ◯

b. **If Yes** – Describe color, texture, aggregate, general quality, other observations:

_____

_____

_____

_____

III. Roof and Floor Systems: **Provide Additional Sheets as Required - Provide Color Photos with Report**

1. **Roof System: Note: Good, Fair, Poor - Explain if significant**

a. Describe type of framing system (flat, slope, type roofing, type roof deck, condition):

_____

_____

_____

b. Note water tanks, cooling towers, air conditioning equipment, signs, other heavy equipment and condition of supports: _____

_____

_____

_____

c. Note types of drains and scuppers and condition: _____

_____

_____

2. **Roof system(s): Note: Good, Fair, Poor - Explain if significant**

a. Describe (type of system framing, material, condition):

_____

_____

_____

b. Equipment and conditions of support: _____

_____

_____

c. All improved Balconies - indicate location, framing system, material, and condition:

_____

_____

_____

3. Inspection - note exposed areas available for inspection, and where it was found necessary to open ceilings, etc. for inspection of typical framing members:

_____

_____

_____

_____

_____

IV. Steel Framing Systems: **Provide Additional Sheets as Required - Provide Color Photos with Report**

Steel Framing Systems: Note: Good, Fair, Poor - Explain if significant

1. Description: _____

_____

2. Exposed Steel - describe condition of paint & degree of corrosion:

_____

_____

_____

3. Concrete or other fireproofing - note any cracking or spalling, and note where any covering was removed for inspection:

_____

_____

_____

4. Elevator sheaves beams & connections, and machine floor beams - note Condition:

_____

_____

_____

_____

_____

V. Concrete Framing Systems: **Provide Additional Sheets as Required - Provide Color Photos with Report**

Concrete Framing Systems: Note: Good, Fair, Poor - Explain if significant

1. Full description of structural system: _____

_____

_____

2. Cracking:

a. Not significant: _____

b. Location and description of members affected and type cracking:

_____

_____

_____

3. General condition: _____

_____

_____

4. Rebar corrosion – Check Appropriate Line:

a. None visible: _____

b. Minor: _____

_____

c. Significant - structural repairs required (describe):

_____

_____

_____

5. Samples chipped out in spall areas:

a. No: ___ Yes: ___ If yes describe below

Describe color, texture, aggregate, general quality:

_____

_____

_____

_____

_____

VI. Windows

Provide Additional Sheets as Required - Provide Color Photos with Report

Windows: Note: Good, Fair, Poor - Explain if significant

1. Type (Wood, steel, aluminum, jalousie, single hung, double hung, casement, awning,

pivoted, fixed, other): _____

_____

2. Anchorage - type & condition of fasteners and latches: _____

_____

3. Sealants - type & condition of perimeter sealants & at mullions: _____

_____

4. Interior seals - type & condition at operable vents: _____

5. General condition: _____

_____

_____

VII. Wood Framing: **Provide Additional Sheets as Required - Provide Color Photos with Report**

Wood Framing: Note: Good, Fair, Poor - Explain if significant

1. Describe floor system: _____

_____

_____

2. Note condition connector or stress: _____

_____

_____

3. Note rotting or termite damage: _____

_____

_____

4. Note alignment problems: _____

_____

5. Note bearing deficiencies: _____

_____

_____

_____

6. Note any significant damage that might affect safety and stability of building structure:

_____

_____

_____

VIII. Building Facade Inspection (Threshold Building)

Provide Additional Sheets as Required - Provide Color Photos with Report

Building Facade Inspection (Threshold Building): Note: Good, Fair, Poor - Explain if significant

1. Identify and describe the exterior walls and appurtenances on all sides of the building (cladding type, corbels, precast appliques, etc.):

_____

_____

_____

2. Identify attachment type of each appurtenance type (Mechanically attached or adhered):

_____

_____

3. Indicate the condition of each appurtenance (Distress, settlement, splitting, bulging, cracking, loosening of metal anchors and supports, water entry, movement of lintel or shelf angles, or other defects:

_____

_____

If the inspecting Engineer or Architect finds that there are conditions in the building or structure causing an actual or immediate danger of the failure or collapse of a building or structure, or there is a health, windstorm or fire hazard, such Engineer or Architect shall report such conditions to the Building Official within twenty-four (24) hours of the time of discovery