GENERAL CONSIDERATIONS

SCOPE OF STRUCTURAL INSPECTION

The fundamental purpose of the required inspection and report is to confirm in reasonable fashion that the building or structure under consideration is safe for continued use under 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 structural 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 degradation 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 structural 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 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 any event, a sufficient number of structural members must be examined to afford reasonable assurances that such are representative of the total structure.

Evaluating an existing structure for the effects 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 possibly long time deflections, are likely to be most significant. Foundation move-

ments will frequently be of importance, usually settlement, although upward movement due to expansive soils actually may occur, although infrequently in this area. Older buildings on spread footings may exhibit continual, even recent settlements if founded on deep unconsolidated fine grained or cohesive coils, or from subterraneous losses or movements from several possible causes.

With very little qualifications, such as rather rare chemically reactive conditions deterioration of building materials can only occur in the presence of moisture, largely related 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 building, relative humidity will normally be about 55 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 to 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 will always require repair. The type of repair, however, will depend upon 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.

Written reports shall be required attesting to each required inspection. Each such report shall note the location of the structure, description of the type of construction, and general magnitude of the structure, the existence of drawings and location thereof, history of the structure to the extent reasonably known, and a description of the type and manner of the inspection, noting problem areas and recommended repairs, if required to maintain structural integrity.

Evaluation: Each report shall include a statement to the effect that the building or structure is structurally safe, unsafe, safe with qualifications, or has been made safe. It is suggested that each report also include the following information indicating the actual scope of the report and limits of liability. This paragraph may be used:

> *"As a routine matter, in order to avoid possible misunderstanding, nothing in this report should guarantee for any portion of the structure. 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.*

Foundations:

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, structures are generally incapable of accepting such movements, 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, contiguous 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.

Roofs

Sloping roofs, usually having clay or cement tiles, are of concern in the event that the covered membrane may have deflections, if merely resulting from deteriorated rafters or joists will be of greater import. 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 they 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 usual signs of difficulty. Punctures or loss of adhesion of base flashings, coupled with loose counter-flashing will also signify possibility of other debris, may result in ponding, 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 units, or scored clay tile, may have been constructed with either reinforced concrete columns and tie beams, or lintels.

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 ~~are~~ is still about 0.0075% of the concrete area, structural repair will not be necessary. Cosmetic type repair involving cleaning, and parching 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 problems 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 of repair will be dependent upon the results of such investigation.

Pre-cast members may present similar deterioration conditions. End support conditions may also 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.

Steel bar joists are, or course, sensitive to corrosion. Most critical locations will be web member welds, especially near supports, where shear stresses are high and 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 nominal 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 difficulty 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 eighth 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 form-board may result from sustained leakage. Anchorage of the supporting bulb tees against uplift may also be of importance.

Floor and roof systems of cast 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. Concrete fireproofing will, if it exists, be the best clue indicating the condition of the steel.

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

Concrete Framing Systems

Concrete deterioration will, in most cases, similarly be 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. Depending upon the structural importance of the specific location, this type of examination may obviate the need for further testing if a value of 200 psi to 2500 psi is sufficient for required strengths, 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 even short of hurricane velocity. Perimeter sealants, glazing, seals, and latches should be examined with a view toward deterioration of materials and anchorage of units for inward as well as outward (suction) pressure, 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 eighth inch with moderate hand pressure will indicate the possibility of further difficulty.

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 justification to examine load carrying capability of the effected structural system.

Scope of Electrical Inspection

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 compliance are safe for continued use under present occupancy. As mentioned before, this is a recommendation procedure, and under no circumstances are these minimum recommendations intended to supplant proper professional judgment.

Electric Service

A description of the type of service supplying the building or structure must be provided, stating the size of amperage, if three (3) phase or single (1) phase, and if the system is protected by fuses or breakers. Proper grounding of the service should also be in good standing. The meter and electric rooms should have sufficient clearance for equipment and for the serviceman to perform both work and inspections. Gutters and electrical panels should all be in good condition throughout the entire building or structure.

Branch Circuits

Branch circuits in the building must all be identified and an evaluation of the conductors must be performed. There should also exist proper grounding for equipment used in the building, such as an emergency generator, or elevator motor.

Conduit Raceways

All types of wiring methods present in the building must be detailed and individually inspected. The evaluation of each type of conduit and cable, if applicable, must be done individually. The conduits in the building should be free from erosion, and checked for considerable dents in the conduits that may be prone to cause a short. The conductors and cables in these conduits should be chafe free and their currents not over the rated amount.

Emergency Lighting

Exit sign lights and emergency lighting, along with a functional fire alarm system must all be in good working condition.

MINIMUM INSPECTION PROCEDURAL GUIDELINES FOR BUILDING STRUCTURAL RECERTIFICATION

1. **Description of Structure:**

   a. Name of title _____

   b. Street address _____

   c. Legal description _____

   _____

   _____

   d. Owner's name _____

   e. Owner's mailing address _____

   f. Building Official Folio Number _____

   g. Building Code Occupancy Classification _____

   h. Present use _____

   i. General description, type of construction, size, number of stories, and special features.

   _____

   _____

   _____

   j. Additions to original structure _____

2. **Present Condition of Structure:**

   a. General alignment (note good, fair, poor, explain if significant)

      1. Bulging _____

      2. Settlement _____

      3. Defections _____

      4. Expansion _____

      5. Contraction _____

b. Portions showing distress (note, beams, columns, structural walls, floors, roofs, other)

_____

_____

c. Surface conditions - describe general conditions of finishes, noting cracking, spalling, peeling, signs of moisture penetration & 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 in 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 stimate magnitude.

_____

3. **Inspections:**

a. Date of notice of required inspection _____
b. Date(s) of actual inspection _____
c. Name and qualification of individual submitting inspection report:

_____

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

_____

e. Structural repair - note appropriate line:

1. None required _____
2. Required (describe and indicate acceptance) _____

4. **Supporting data:**

a. _____ sheets written data

b. _____ photographs

c. _____ drawings or sketches

1

5. **Masonry Bearing Walls - indicate good, fair, poor on appropriate lines:**

a. Concrete masonry units _____

b. Clay tile or terra cotta units _____

c. Reinforced concrete tie columns _____

d. Reinforced concrete tie beams _____

e. Lintels _____

f. Other type bond beams _____

g. Masonry finishes - exterior:

1. Stucco _____

2. Veneer _____

3. Paint only _____

4. Other (describe) _____

h. **Masonry finishes - interior:**

1. Vapor barrier _____

2. Furring and plaster _____

3. Paneling _____

4. Paint only _____

5. Other (describe) _____

i. **Cracks:**

1. Location - note beams, columns, other _____

2. Description _____

_____

j. **Spalling:**

1. Location - note beams, columns, other _____

2. Description _____

_____

k. **Rebar corrosion - check appropriate line:**

1. None visible _____

2. Minor - patching will suffice _____

3. Significant - but patching will suffice _____

4. Significant - structural repairs required
(describe) _____

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l. **Samples chipped out for examination in spall areas:**

1. No _____

2. Yes - describe color texture, aggregate, general quality _____

_____

6. **Floor and Roof Systems:**

a. **Roof:**

1. Describe (flat, slope, type roofing, type roof deck, condition)

_____

_____

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

_____

_____

3. Note types of drains and scuppers and condition:

_____

b. **Floor system(s):**

1. Describe (type of system framing, material, spans, condition)

_____

_____

_____

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

_____

_____

_____

7. **Steel Framing Systems:**

a. Description _____

_____

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

_____

_____

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

_____

d. Elevator sheaves beams & connections, and machine floor beams - note condition: _____

_____

8. **Concrete Framing Systems:**

a. Full description of structural system _____

_____

b. **Cracking:**

1. Not significant _____
2. Location and description of members affected and type cracking _____

c. General condition: _____

_____

d. Rebar corrosion - check appropriate line:

1. None visible _____
2. Location and description of members affected and type cracking _____
3. Significant but patching will suffice _____
4. Significant - structural repairs required (describe) _____

_____

e. **Samples chipped out in spall areas:**

1. No. _____
2. Yes describe color, texture, aggregate, general quality:

_____

_____

9. **Windows:**

a. Type (Wood, steel, aluminum, jalousie, single hung, double hung, casement, awning, pivoted, fixed, other)

b. Anchorage - type & condition of fasteners and latches:

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

d. Interior seals - type & condition at operable vents:

e. General condition:

10. **Wood Framing:**

a. Type - fully describe if mill construction, light construction, major spans, trusses:
b. Note metal fittings i.e., angles, plates, bolts, split pintles, pintles, other, and note condition:
c. Joints - note if well fitted and still closed:

d. Drainage - note accumulations of moisture:
e. Ventilation - note any concealed spaces not ventilated:
f. Note any concealed spaces opened for inspection:

CERTIFICATION OF COMPLIANCE WITH PARKING LOT ILLUMINATION STANDARDS IN CHAPTER 8C OF THE CODE OF MIAMI-DADE COUNTY

Date:_____

Re: Case No:

Property Address: _____ **Bldg. No:** _____

Building Description: _____

The undersigned states the following:

1. I am a Florida registered professional engineer or architect with an active license.

2. On _____, 20____, I measured the level of illumination in the parking Lot(s) serving the above referenced building.

3. The level of illumination provided in the parking lot(s) meets the minimum standards for the occupancy classification of the building as established in Section 8c-3 of the Code of Miami-Dade County

_____
Signature and Seal
Of Architect or Engineer

_____
(Print Name)

MINIMUM INSPECTION PROCEDURAL GUIDELINES FOR BUILDING ELECTRICAL RECERTIFICATION

INSPECTION COMMENCED

Date: _____

INSPECTION COMPLETED

Date _____

INSPECTION MADE BY:

SIGNATURE _____

PRINT NAME: _____

TITLE: _____

ADDRESS: _____

_____

1. **DESCRIPTION OF STRUCTURE:**

   a. NAME OF TITLE _____

   b. STREET ADDRESS _____

   c. LEGAL DESCRIPTION _____

   d. OWNERS NAME _____

   e. OWNER'S MAILING ADDRESS _____

   f. FOLIO NUMBER OF BUILDING: _____

   g. BUILDING CODE OCCUPANCY CLASSIFICATION: _____

   h. PRESENT USE: _____

   i. GENERAL DESCRIPTION, TYPE OF CONSTRUCTION, SIZE, NUMBER OF STORIES, AND SPECIAL FEATURES. ALSO ADDITIONAL COMMENT.

   _____

MINIMUM GUIDELINES AND INFORMATION FOR RECERTIFICATION OF ELECTRICAL SYSTEMS OF FORTY (40) YEARS STRUCTURES

1. **ELECTRIC SERVICE:**
   1. SIZE, AMPERAGE: ( ): FUSES ( ): BREAKER ( )
   2. PHASE: 30 ( ): 10 ( ):
   3. CONDITION: GOOD ( ) FAIR ( ): NEEDS REPAIR ( )
   4. COMMENTS: _____

2. **METER AND ELECTRIC ROOMS:**
   1. CLEARANCES: GOOD ( ): FAIR ( ): REQUIRES CORRECTION ( )
   2. COMMENTS: _____

3. **GUTTERS:**
   1. LOCATION: GOOD ( ): REQUIRES REPAIR ( )

      _____

      _____

   2. _____ GOOD ( ): REQUIRES REPAIR ( )

      _____

   3. COMMENTS: _____

4. **ELECTRICAL PANELS:**

   LOCATION GOOD ( ): NEEDS REPAIR ( )

   1. PANEL # ( ): _____

      GOOD ( ): NEEDS REPAIR ( )

   2. PANEL # ( ): _____

      GOOD ( ): NEEDS REPAIR ( )

   3. PANEL # ( ): _____

      GOOD ( ): NEEDS REPAIR ( )

   4. PANEL # ( ): _____

      GOOD ( ): NEEDS REPAIR ( )

   5. PANEL # ( ): _____

      GOOD ( ): NEEDS REPAIR ( )

   6. COMMENTS: _____

      _____

      _____

5. BRANCH CIRCUITS:
   1. IDENTIFIED: YES ( ): MUST BE IDENTIFIED ( )
   2. CONDUCTORS: GOOD ( ): DETERIORATED ( ): MUST BE REPLACED ( )
   3. COMMENTS: _____

      _____

6. **GROUNDING OF SERVICE** : GOOD ( ): REPAIRS REQUIRED ( )

   COMMENTS: _____

7. **GROUNDING OF EQUIPMENT:** GOOD ( ): REPAIRS REQUIRED ( )

COMMENTS: _____

8. **CONDUIT RACEWAYS: CONDITION:** GOOD ( ): REPAIRS REQUIRED ( )

COMMENTS: _____

9. **CONDUCTOR AND CABLES: CONDITION:** GOOD ( ): REPAIRS REQUIRED ( )
COMMENTS: _____

10. **TYPES OF WIRING METHODS: CONDITION:**

CONDUIT RACEWAYS: RIGID: GOOD ( ): REPAIRS REQUIRED ( )

CONDUIT PVC: GOOD ( ): REPAIRS REQUIRED ( )

NM CABLE: GOOD ( ): REPAIRS REQUIRED ( )

BX CABLE: GOOD ( ): REPAIRS REQUIRED ( )

11. **CONDUCTORS: CONDITION:** GOOD ( ): REPAIRS REQUIRED ( )

COMMENTS: _____

12. **EMERGENCY LIGHTING:** GOOD ( ): REPAIRS REQUIRED ( )

COMMENTS: _____

13. **BLDG. EGRESS ILLUMINATION:** GOOD ( ): REPAIRS REQUIRED ( )

COMMENTS: _____

14. **FIRE ALARM SYSTEM:** GOOD ( ): REPAIRS REQUIRED ( )

COMMENTS: _____

15. **SMOKE DETECTORS:** GOOD ( ): REPAIRS REQUIRED ( )

COMMENTS: _____

16. **EXIT LIGHTS:** GOOD ( ): REPAIRS REQUIRED ( )

COMMENTS: _____

17. **EMERGENCY GENERATOR:** GOOD ( ): REPAIRS REQUIRED ( )

COMMENTS: _____

18. **WIRING IN OPEN OR UNDER COVER PARKING GARAGE AREAS:** GOOD ( ): REQUIRE ADDITIONAL ILLUMINATION ( )

COMMENTS: _____

_____

19. **OPEN OR UNDERCOVER PARKING GARAGE AREAS AND EGRESS ILLUMINATION:** GOOD ( ): ILLUMINATION REQUIRE ADDITIONAL ( )

COMMENTS: _____

20. **SWIMMING POOL WIRING:** GOOD ( ): REPAIRS REQUIRED ( )

COMMENTS: _____

21. **WIRING TO MECHANICAL EQUIPMENT:** GOOD ( ): REPAIRS REQUIRED ( )

COMMENTS: _____

22. **GENERAL ADDITIONAL COMMENTS:**

_____

_____

_____