GUIDELINES ON VISUAL INSPECTION AND THE SUBMISSION OF THE REPORT.

1. INTRODUCTION

1.1 The guidelines are only a general guidance on the scope of the visual inspection as well as the content of the report to be submitted to the local authority. It is only for consistency in approach and reporting. The engineer should therefore exercise his own professional judgement and diligence in the conduct of the inspection and reporting of his findings appropriate to the particular building inspected.

2. OBJECTIVE OF VISUAL INSPECTION

2.1 The emphasis of the inspection is not of the architectural aspects, but of the structural elements of the buildings and the surrounding so that any misuse, abuse, defect, sign of structural distress, deformation and deterioration can be identified. The owner will get the professional advice from the engineer so as to initiate further structural investigation or to take appropriate remedial action.

3. VISUAL INSPECTION

3.1 The engineer is expected to carry out, with reasonable diligence, a visual inspection of:

a the condition of the structural of the building

- to identify the type of structural defects
- to identify any sign of structural distress and deformation
- to identify any sign of material deterioration

b. the loading of the structure of the building

- to identify any misuse, abuse and change of use which can result in overloading

c. any addition or alteration affecting the structure of the building

- to identify any addition or alteration which can result in overloading or adverse effect on the structure.

d. Other conditions that may affect the safety of the occupant.

- to assess the state and condition of the water tank
- to assess the stability of the surrounding areas. The condition of slopes and drainages within the same catchment area which has stability effect on the building should be checked against overall stability and function ability. Earth retaining structures and soil stabilisation within the building lot boundary should be inspected against possible failure.

4. EXTEND OF INPECTION

4.1 Due to difficulty of access and other practical problem, it is sometimes not possible to inspect 100% of all areas in a building. The engineer should therefore identify critical areas of the structure and pay special attention to them.

4.2 However, in a building where the loading is light, the usage fairly uniform and where it is unlikely to subject to overloading, a reasonable sampling of a certain percentage of inspection may well suffice. However if the engineer detects the possibility of abuse or overloading and detect signs of structural defects and possible deterioration, he should consider inspection of the structure in full.

4.3 In a building where loading is high, the usage varied and where it is subject to likely abuse and overloading, the engineer should carry out inspection of all units or parts of the building.

4.4 All exposed common areas in any building shall be inspected fully.

4.5 All parts of a building with special and critical structural elements.

4.6 All drain components shall be inspected fully.

4.7 All slopes should be inspected for sign of lateral movement and instability if there are any changes in the condition of the slopes.

4.8 All retaining structures should be checked against stability, alteration of loading pattern and possibility of weakening of the toe due to other construction activities

5 THE SCOPE AND STANDARD OF VISUAL INSPECTION

5.1 In general, a report on the results of a visual inspection of a building shall comprise:

a. a detail record and description of the visual inspection

b. assessment of the observations in regard to the condition of the structure of the building, the loading on the structure of the building, and any addition or alteration affecting the structure of the building. The seriousness of any structural problems detected should be assessed.

c. recommendation by the engineer on such remedial actions or full structural investigation to ensure the structural stability and integrity of the building.

5.2 A report should therefore reflect that the engineer has in fact carried out inspection in a professional manner with reasonable diligence expected of him as a professional engineer.

APPENDIX B

THE MAIN CONTENTS OF A VISUAL INSPECTION REPORT

1.1 Contents Page

1.2 Scope of the Inspection

1.3 General Information on the Building

- Name and address of the building
- Location plan showing the location of the building
- Sketch site plan showing the number of blocks of buildings at the site indicating clearly the block inspected
- Number of storeys and units in each block of building
- Description of main usage of building, indicating approximately the percentage of areas for each usage
- Date of completion
- Maintenance history of the building
- Name of original architect, professional engineer and builder

1.4 Structural System of the Building

- Description of the structural forms, systems and materials used in the difference parts of the building
- Description of the soil condition and the foundation system, if known
- Identification of the key structural elements and the critical areas for special investigation

1.5 Conditions of the Surrounding Areas

- Description of the condition of the drainage system of the surrounding areas
- Description of the condition of the slope protection system

1.6 Extend of Inspection

- Extend of inspection carried out, indicating clearly the number of units and percentage of areas inspected as well as the areas not inspected and the reasons for not inspecting them.

- Indicate clearly the conditions of the drains and the slope protection system of the surrounding areas inspected as well as the areas not inspected and the reasons for not inspecting them.

- Limitation of access for inspection

1.7 Dairy of the Survey

- Record of observation indicating clearly the locations, the extend and seriousness of any observations in respect of loading conditions, addition/alteration and sign of structural defects, distress, deformation.

- Record of observations of the drains, indicating clearly the cracks, infiltration, adequacy of capacity, blockages and the condition of the concrete surface.

- Record of observation of the slope protection system, indicating clearly any tilt or lateral movement, cracks of the walls, tension cracks of the soils, sink holes, condition of ground anchors and minor slip.

1.8 Survey of Loadings on the Building Structure

- Records and comments on the observations on the loading conditions, indicating the usage at difference parts of the building and identifying any misuse, abuse or change of use.

- State whether the existing usage and loading condition is compatible with the intended purpose of the structure

- State whether any misuse, abuse or change of use has given rise to excessive loading which can adversely affect the building structure

1.9 **Survey of Addition/Alteration to the Building Structure and the Surroundings**.

- State whether any addition and alterations have given rise to excessive loading or other adverse effects on the building structure

- State whether any addition and alterations have given rise to excessive loading or other adverse effects on the slope protection system

1.10 Survey of Signs of Structural Defects, Damages, Distress, Deformation or Deterioration.

- Records of observations of any signs of structural defects, damages, distress, deformation or deterioration.

- Comments on the extend, possible causes and assess the seriousness of these problems identified

- Report whether the identified problems are:

    - defects of no structural significance,

    - defects requiring monitoring and remedial action, or

    - suspected defects of structural significance requiring full structural investigation and immediate action

- recommendations on any monitoring or remedial actions necessary to ensure the structural stability and integrity of the building or for a further full structural investigation.

1.11 **Other Surveys or Checks Carried Out**

- Report and comment on any previous rectification carried out on the building structure

- Report and comment on any construction work on adjacent site which may affect the building under inspection

- Report and comment on any other surveys or checks carried out on the conditions of the water tanks

- Report and comment on any other surveys or checks carried out by the engineer

1.12 **Conclusions**

- Conclusion on the structural condition shall include conclusions on loading, additions and alteration, structural defects, damage, distress, deformation, deterioration, overall structural integrity and stability

- Conclusion on the condition of the surrounding areas shall include:

  i) conclusions on the flow capacity, structural integrity and extend of maintenance of the drains and;

  ii) loading, additions and alteration, structural defects, damage, distress, deformation, deterioration, overall structural integrity and stability of the slope protection system

1.13 **Recommendations**

- Recommendation for follow-up actions shall include, measures on restriction of loading; action on additions/alterations affecting the building structure and slope protection system; monitoring; repair; strengthening and the need for a full structural investigation where necessary

1.14 **Sketches, Plans and Photographs**

- Sketches, plans and photographs are useful to give an idea of the building under inspection

- They can clearly illustrate the structural system of the building, the usage, loading, addition/alterations in various parts of the building, as well as record all major problems and show the condition of key structural elements.

- They can clearly illustrate the drainage system of the areas, addition/alterations in various parts of the surrounding areas, as well as record all major problems and show the condition of slope protection system

- All sketches, plans and photographs should have proper title, explanations, legend and cross-reference to the main report. They can be attached as appendices as the need be.

1.15 **Engineer's Endorsement and Standard Certification**

- The report shall be sign and endorsed by the engineer appointed to carry out the inspection

- The engineer shall submit standard certification form 3

APPENDIX C

GUIDELINES ON THE SUBMISSION OF FULL STRUCTURAL INVESTIGATION REPORT

The guidelines listed below contain a standard list of check items to be carried out by the engineer in full structural investigation. It is by no means exhaustive; the engineer should therefore exercise his own professional judgement and diligence in the conduct of the investigation and may include further details to support his findings.

1. General Information on the Building

- Name and address of the building
- Location plan showing the location of the building
- Sketch site plan showing the number of blocks of buildings at the site indicating clearly the block inspected
- Number of storeys and units in each block of building
- Description of main usage of building, indicating approximately the percentage of areas for each usage
- Date of completion
- Maintenance history of the building
- Name of original architect, professional engineer and builder

2. Source of Information on Design, Construction and Maintenance

2.1 Calculations and as-built drawings – The report shall indicate the source and provide a listing of the original calculations and drawings available for checking purpose. The engineer shall ensure that only appropriate drawings are used in the structural appraisal.

2.2 Soil investigation report, including records on the foundation system used.

2.3 Any construction records

2.4 Routine maintenance information, including previous visual inspection report

3. Design Check or Reconstruction of Structural Plans

3.1 Where structural plans and calculations are not available:

Reconstruct the structural plans, where possible, including tests done and structural appraisal.

a. Conduct the necessary survey, investigations and test to ascertain type, sizes and reinforcement detail of key structural elements, including foundation system

b. Prepare a set of drawings showing structural layouts and details for each floor including member sizes and reinforcement details of key elements

3.2 Where structural plans and calculations are available:

a. Summary of report stating the conclusion and overall evaluation of the design

b. Evaluation and detailed comments on the design evaluations and comments on the design based on the following criteria:

i. Codes of Practice adopted in the design

ii. Design Loading (including wind load if applicable)

iii. Standard & Specification of materials

iv. Structural design concept and identification of key structural elements

- To evaluate the structural design concept and whether any simplified design process takes into account the actual behaviour of the structural system

- Identification and classification of key structural elements.

v. Structural analysis of all key structural elements, including foundation system

- To evaluate designers' analysis and design of key structural elements and compare with own independent calculations.

vi. Stability of structural frame

- Stability under various load combinations including wind and other dynamic loads in relation to height/width ratio

vii. Structural detailing

- to be consistent with design concept

- in accordance with recommendation in codes of practice

viii. Other design aspect

- Design aspect which are peculiar to the building and essential to structural integrity

- Stability of the slope protection works under current condition

4. Tests Carried Out

4.1 Laboratory and in situ tests

- Laboratory tests on mechanical and chemical properties of materials
- In-situ testing by non-destructive methods.
- test for presence of deteriorated or deleterious materials
- description of test methods and their limitations
- Interpretation of test results

4.2 Loading Test

- Load testing of the relevant parts or the whole of the structure if deemed necessary by the engineer
- description of test procedure and its limitation
- interpretation of load test results

5. Survey of the Condition and Assessment of the Load Carrying Capacity of the Existing Structure

5.1 Identification of areas of existing potential defects and structural deficiencies. Ascertain the extend, nature, causes and seriousness of these defects and deficiencies

5.2 Survey of dimensions of existing structural elements and survey of type, size and number of steel reinforcement. Comparison with as built drawings is to be made.

5.3 Assessment of actual loading and load carrying capacity of the existing structure

- Assessment of actual loads and their distribution
- Assessment of in-situ strength of materials
- Assessment of the effect due to deterioration and damage
- Assessment of the load carrying capacity of the structure

6. Recommendation for Remedial Works

6.1 When remedial work is required subsequently to the full structural investigation, the engineer shall recommend the appropriate remedial measure, including suitable strengthening, rectification, modification and/or replacement measures.

6.2 The engineer shall make conclusion on his inspection and recommend any monitoring, repairs, limitation on usage and loadings etc.

7. Sketches, Plans and Photographs

7.1 In general, the report should be accompanied by sketches, plans and photos to illustrate the findings of the investigation

8. Engineers' Endorsement and Standard Certification

- The report shall be sign and endorsed by the engineer appointed to carry out the inspection
- The engineer shall submit standard certification form 4

APPENDIX D

GUIDELINES ON THE SUBMISSION OF DESIGN AND SPECIFICATIONS ON REMEDIAL WORKS

This is a guideline for the submission of the design and specifications on remedial work to the local authority. However, it should include, if deemed necessary, additional consideration and comments depending on the actual building condition.

1. Recommendation in the Inspection Report submitted

2. Methods of Remedial Works

Identify the types of remedial work necessary and indicate on the drawings where such repairs are to be carried out.

3. Analysis of methods of Remedial Works

a method statement of remedial work

b Materials to be used – to include catalogues where appropriate

c recommendations from specialist contractors

d analysis and design of the strengthening and replacement work

e any defects on existing structure requiring further analysis

4 Assessment of Remedial Works carried out

a recommendation on test on materials

b recommendation on quality control of remedial work

c materials to be used – to include catalogues where appropriate

d recommendations on tests to determine the effectiveness of remedial works

APPENDIX E

GUIDELINES ON THE SUBMISSION OF REPORT AFTER COMPLETION OF REMEDIAL WORKS

This is a guideline for the submission of the report after the completion of the remedial work to the local authority.

1. **Diary of Remedial Works**

2. **Type and Location of Remedial Works**

   - to indicate on drawings and sketches the locations and type of remedial works carried out at these locations

3. **Methods of Remedial Works.**

   a. To comment on any deviations in the extend of remedial work
   b. To comment on any changes in the methods used
   c. To comment on any changes in the material used

4. **Assessment of Remedial Works carried out**

   a. Reports of tests on materials carried out during the work
   b. Reports on tests on completed structure
   c. Reports of any other test

5. **Engineer's Endorsement and Standard Certification**

   - The report shall be sign and endorsed by the engineer appointed to carry out the investigation

   - The engineer shall submit standard certification form 5

Appendix F

FORM 1

Ref No. :

Date :

Address of
Local Authority

The Owner/Management Corporation

_____

_____

_____

_____

NOTICE OF PERIODICAL INSPECTION OF BUILDING
[SECTION 27(B) BUILDING ORDINANCE 1994]

BUILDING NAME : _____

BUILDING ADDRESS : _____

1. Under Section 27(B) of the Building Ordinance 1994, it is mandatory for buildings to be inspected at regular intervals by Professional Engineers to detect any deterioration or defects in the buildings and the surrounding areas.

2. The Ordinance requires you to appoint an Engineer within 60 days of the date of this notice and to notify us such appointment within 14 days thereof. This shall also be accompanied by a confirmation signed by the Engineer of his appointment to inspect the building and the surrounding areas. For your convenience, Form 2 is attached for your completion and return by _____

LOCAL AUTHORITY

Appendix G

FORM 2

PARTICULARS OF PROFESSIONAL ENGINEER

Address of
Local Authority

1.	Particular of the building to be inspected: Notification Serial No. : _____ *Lot/Plot : _____ Address/Road : _____ Description of Building : _____ Name of Building (if applicable) : _____ Name of Original Developer/Owner : _____ Name of Architect : _____ Name of Professional Engineer : _____ Name of Original Contractor : _____	
2.	I wish to inform you that I have appointed the following Professional Engineer to carry out an inspection of the above building as required Building Ordinance 1994 (Section 27B). Name of Engineer : PE Registration No. : Name and Address of Professional Firm :	
	Name & Signature of Owner/Management Corporation	Address of Owner/Management Corporation
	Date:	Tel:
3.	I _____ (Professional Engineer) hereby: a. Confirm that I have been appointed by _____ (owner/management corporation) to carry out an inspection of the above building and the surrounding, and b. Declare that I have no professional or financial interest in the above building.	
	Stamp & Signature of Professional Engineer	Address of Professional Firm
	Date	Tel

*Delete where not applicable

Appendix H

FORM 3

VISUAL INSPECTION CERTIFICATION
BUILDING ORDINANCE 1994 (SECTION 27B)

Address of
Local Authority

BUILDING NAME : _____

BUILDING ADDRESS : _____

1. As required under Section 27B of the Building Ordinance 1994, I, _____ (Professional Engineer) have carried out a visual inspection of the above building and the surrounding areas from _____ to _____ (date).

2. I heerby certify that:

   *(a) no sign of defects of structural significance were observed

   *(b) defects requiring monitoring but not structural investigation and remedial action (if any) were visible to me in the building and the surrounding areas during my inspection

   *(c) that signs of possible defects of structural significance are detected in the building and the slope protection system during my inspection. A full and immediate investigation to ascertain their effects on the structure is necessary.

3. I submit herewith my report on the visual inspection of the above building and the surrounding areas, duly prepared and signed as required under the Ordinance.

_____

(PE Stamps & Signature)

cc

Building Owner/Management Corporation

*Delete whichever is not applicable

Appendix J

FORM 4

STRUCTURAL INSPECTION CERTIFICATION
BUILDING ORDINANCE 1994 (SECTION 27B)

Address of
Local Authority

BUILDING NAME : _____

BUILDING ADDRESS : _____

1. As required under Section 27B of the Building Ordinance 1994, I, _____ (Professional Engineer) have carried out a visual inspection of the above building and the surrounding areas from _____ to _____ (date).

*2. I hereby certify that the sign of possible defects as identified earlier in the visual inspection reported dated _____ were of no structural significance.

In arriving at my conclusion, I confirm that:

*a I have checked the structural plans and calculations relating to the above building and the slope protection system and I am satisfied that there are no inadequacies in the key structural elements.

*b I have reconstructed the structural plans and I am satisfied that no inadequacies in the key structural elements as would be reasonably discoverable by such structural appraisal were present.

*3 I hereby notify that the investigation has confirmed that there are defects of structural significance.

In arriving at my conclusion, I confirm that:

*c I have checked the structural plans and calculations relating to the above building and the slope protection system

*d I have reconstructed the structural plans where possible and carried out a structural appraisal

The report as attached has been submitted to the owner/management corporation of the building and he has been advised to rectify the defects immediately.

I submit my report on the full structural investigation as well as my own analysis and design calculations relating to the above building and the slope protection system, including recommendation for remedial works (if any)

_____

(PE Stamps & Signature)

cc

Building Owner/Management Corporation

*Delete whichever is not applicable

Appendix K

Form 5

COMPLETION OF REMEDIAL WORK CERTIFICATION

Address of
Local Authority

BUILDING NAME : _____

BUILDING ADDRESS : _____

1. I _____ (Professional Engineer) have supervised work and carried out on the above building and surrounding areas as set out in the attached report.

2. I hereby certify that defects as identified in the report dated _____ have been fully and satisfactorily remedied at the date of my inspection on _____

_____

(PE Stamps & Signature)

cc

Building Owner/Management Corporation