THE INGENIEUR

Revisit to Guidelines on Periodical Inspection of Buildings

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The question of what is the expected life span of a building has attracted different views from different experts. For Reinforced Concrete buildings, it generally depends on the quality of materials used and the standard of maintenance. The New Zealand Building Code requires the structural elements of a building, with only normal maintenance, to satisfy the performance requirement of the Code: 'for the lesser of the specified intended life span of a building to be not less than 50 years'.

It is common for owners, especially new owners, to undertake renovation and make alterations incorporating additional loads, without taking into consideration the structural integrity of the building. The findings in the cases of the collapse of Hotel New World, Singapore in 1986 and Sampoong Department Store, Korea in 1995, pointed to major changes in the usage of the buildings with additional loads added. These are just examples of the misuse of buildings that have resulted in weakened structures.

Subsequent to the Highland Tower collapse in Malaysia in 1993, the Street, Drainage and Building Act (Act 133) was amended in 1994 to introduce a provision for the periodical inspection of buildings of more than five storeys every ten years.

The Ministry of Housing and Local Government in December 1996 produced detailed 'Guidelines on the Periodical Inspection of Buildings' to streamline the manner in which such inspections should be carried out and included a standard set of forms for submission purposes.

However, there are still owners of high rise buildings who are not aware of their obligations to perform the periodical inspection of their building or appreciate the importance of such directives.

The question of failure to perform the periodical inspection of a Penang office building on Jalan Macalister by the owner was raised during the Penang State Government Commission of Enquiry when the 200 ton fin wall fell from the top of the 21-storey building, hitting a passing car on June 13, 2013.

With the increasing stock of high rise buildings accumulated over the last 30 years, it may be worthwhile to revisit the guidelines to remind the owners of buildings of their legal and social obligations to comply with the Street, Drainage and Building Act to perform the periodical inspections of buildings of more than five stories every ten years.

GENERAL GUIDELINES ON PERIODICAL INSPECTION OF BUILDINGS

The requirements for mandatory periodical inspection of buildings are stipulated under Section 85A of the Street, Drainage and Building Act (Amendment) 1994, Act A903.

The parties involved in the inspection process are:

- The local authority whose responsibility it is to ensure that the inspections are carried out according to the requirements of the Act;
- The building owner who is responsible for the appointment of an engineer to carry out the inspections; and
- The engineer who is appointed to inspect the building.

BUILDING TO BE INSPECTED

The requirement for inspection as provided under the Act shall apply to all buildings exceeding five storeys. Any storey of a building which is at a level lower than the ground storey shall be deemed to be a storey.

The owners under this provision include:

a) The Joint Management Body or Management Corporation having control of the building; or
b) The person receiving any rent or charge for the maintenance of the common property of the subdivided building.

NOTICE TO OWNER TO CARRY OUT INSPECTION

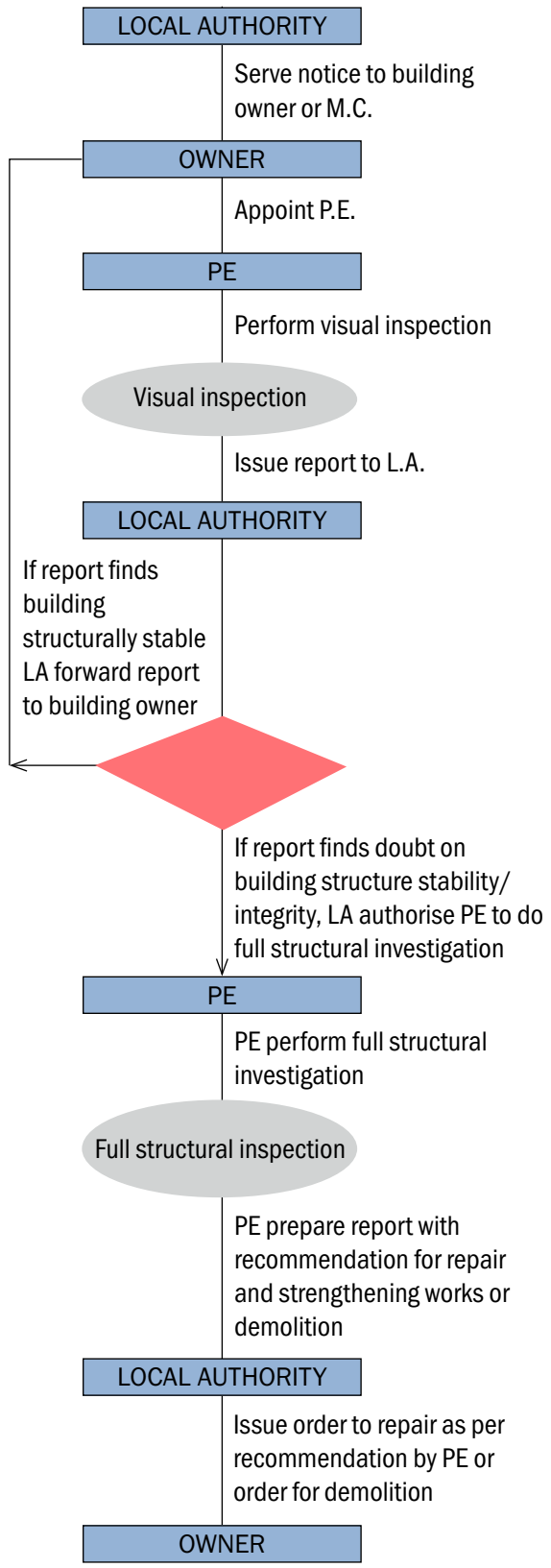
The local authority shall by notice in writing serve on the owner of a building that it is required that the building is inspected every ten years from the date of issuance of CFO or CCC of the building. If the owner fails to perform the inspection after the notice is issued, the local authority may appoint an engineer to perform the inspection and recover the expenses from the owner.

INDEPENDENCE OF AN ENGINEER

An engineer shall not be appointed by the local authority or owner of a building for the purpose of carrying out an inspection of a building under Section 85A if the engineer has any professional or financial interest in the building, for example:-

a. he has been responsible for the design or construction of the building or any part thereof;
b. he or any nominee of his is a member, officer or employee of a company or other body which has a professional or financial interest in the building or any part thereof;
c. he is partner or is in the employment of a person who has a professional or financial interest in the building or any part thereof;
d. he holds any interest in the building or any part thereof;
e. a person shall be treated as having a professional interest in the building event if he has interest only as a trustee for the benefit of some other person; and
f. in the case of married people living together, the interest of one spouse shall, if known to the other be deemed to be also an interest of the other.

PROCESS FLOWCHART OF PERIODICAL INSPECTION OF BUILDING



THE MANNER OF INSPECTION OF A BUILDING UNDER THE ACT

The inspection of a building may consist of one or both or the following:

- Visual inspection, or
- Full structural investigation.

VISUAL INSPECTION

Conducting a visual inspection includes:

- A visual inspection of the building, including a visual survey of the condition of the building, its structural elements and any addition or alteration to the building and its structural elements;
- A visual inspection of the surrounding areas including the slopes and drainage system and any alteration to the slope retaining structures;
- The preparation and submission to the local authority of a report of the result of the visual inspection;
- If, having regard to the results of the visual inspection, the engineer reasonably suspects or is of the opinion that there are defects, deformations or deterioration in the building and its structural elements that will or are likely to endanger or reduce the structural stability or integrity of any part of the building, he shall inform the local authority of the need to carry out a full structural investigation, including investigation in respect of its structural elements; and
- Details and guidelines on Visual Inspection and the Submission of the report are in the sidebar.

FULL STRUCTURAL INVESTIGATION

The local authority may after considering the report of the engineer, authorise the engineer to carry out a full structural investigation which shall include the following:

a) taking all reasonable steps in obtaining information relating to the design, construction, maintenance and history of the building;
b) with reasonable diligence checking the structural plans of the building and the calculation therein if the plans are not available and reconstructing such structural plans where the local authority so requires, with a view to the determining of any inadequacy in the structural elements of the building;
c) carrying out or causing to be carried out tests on the structural elements of the building with reasonable care so as not to damage any part thereof;
d) carrying out tests on the materials used in the construction of the building; and
e) carrying out tests on such parts of the building as the engineer considers necessary.

The engineer shall then prepare and submit to the local authority a report of the results of the full structural investigation carried out together with his recommendations.

REPORT OF THE RESULT OF AN INSPECTION

A report of the result of an inspection of a building shall comprise:

a. a detailed description of the visual inspection and any full structural investigation of the building conducted by the engineer;
b. an analysis of observations and tests conducted in the course of any full structural investigation of the building; and
c. recommendations by the engineer as to any remedial works as are necessary to ensure the structural stability or integrity of the building.

The local authority may, if after evaluating the inspection report, accept it in full, reject it, accept part of it or obtain a second opinion on it.

The local authority shall thereafter:-

a. issue an order to the owner of the building to take the appropriate measures to rectify or remedy any defect, deformation or deterioration as recommended by the engineer within such period as the local authority may specify; or
b. may issue, in place of an inquiry under section 83, of the Act 133, closure or

Details on Visual Inspection and the Submission of the report

Objective:

The emphasis of the inspection is not on the architectural aspects, but on the structural elements of the buildings and the surrounding area 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.

Visual Inspection

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

a. the condition of the structure 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 on the structure of the building
   - to identify any misuse, abuse and change of the 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 effects on the structure

d. Other conditions that may affect the safety of the occupants
   - 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 have a stability effect on the building should be checked against the overall stability and functionality. Earth retaining structures and soil stabilisation within the building lot boundary should be inspected against possible failure.

Extent of Inspection

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

b. However, in a building where the loading is light, where the usage is 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 detects signs of structural defects and possible deterioration, he should consider inspection of the structure in full.

c. 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.

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

e. All parts of the building with special and critical structural elements shall be inspected fully.

f. All drain components shall be inspected fully.

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

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

The scope and standard of visual inspection

a. In general, a report on the results of a visual inspection of a building shall comprise:
   i. A detailed record and description of the visual inspection.
   ii. 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.
   iii. Recommendation by the engineer on such remedial actions or full structural investigation to ensure the structural stability and integrity of the building.

b. 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.

a demolition order to the owner of the building if the local authority is satisfied that the structure cannot be restored to a safe condition for the occupants or the surroundings.

IMPLEMENTATION OF REPAIR WORK

a. Major repair and strengthening work, where necessary, shall be treated as building works. Examples include the replacement of corroded reinforcement bars, reconstruction of the main water tank and underpinning works are considered as major works. As such, all relevant applications for approval of plans, permits to carry out building works and supervision of building works shall apply.
b. Minor repairs can be treated as routine maintenance and will not require plan submissions or permit applications.

CONCLUSION

As the nation approaches the target date of a developed nation status by 2020, the big building stock that has been accumulated should be maintained in a safe and stable condition. While the Street, Drainage and Building Act provides for local authority to issue a notice to owners of buildings of more than five storeys to inspect their buildings every five years, it should be the onus of these owners to inspect the buildings irrespective of such notices. ■

REFERENCE

Guidelines on Periodical Inspection of Buildings issued by Jabatan Kerjaan Tempatan, KPKT. Street, Drainage and Building Act 1974 (Amendment 1994), Act A903