

Code of Practice for

The Mandatory **BUILDING** Inspection Scheme *and* The Mandatory **WINDOW** Inspection Scheme 2012



Code of Practice
for
Mandatory Building Inspection Scheme
and
Mandatory Window Inspection Scheme

Buildings Department

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FOREWORD

To arrest the long-standing problem of building neglect and to ensure building safety in the long run, the Mandatory Building Inspection Scheme (MBIS) and the Mandatory Window Inspection Scheme (MWIS) are introduced under the Buildings Ordinance (BO), Cap 123.

Under the MBIS, building owners are required to appoint a Registered Inspector (RI) to carry out inspection and a Registered Contractor (RC) to carry out any necessary rectification and repair works for their buildings under the supervision of an RI upon receipt of a notice served by the Building Authority (BA) under section 30B of the BO. Under the MWIS, building owners are required to appoint a Qualified Person (QP) to carry out inspection and an RC to carry out any necessary repair works for the windows in their buildings under the supervision of a QP upon receipt of a notice served by the BA under section 30C of the BO. The window repair works may be carried out by the QP appointed for the window inspection provided that the QP is also an RC eligible to carry out window repair works.

This Code of Practice (the Code) specifies the technical standards and procedural requirements for the RI and QP to carry out inspection of buildings and windows and for the RC to carry out the necessary repair works under the MBIS and MWIS. It also provides guidance on how the requirements of the BO and the related regulations are considered to be complied with.

The Code will be kept under regular review. The Buildings Department welcomes suggestions for improving the Code.

Abbreviations

The abbreviations used in the Code shall have the following meanings:

AP	Authorized person
BA	Building Authority
BD	Buildings Department
BO	Buildings Ordinance, Cap. 123
CCTV	Closed circuit television
B(I&R)R	Building (Inspection & Repair) Regulation, Cap. 123P
B(MW)R	Building (Minor Works) Regulation, Cap. 123N
FSP	Factor of Structural Performance
FS(B)O	Fire Safety (Buildings) Ordinance, Cap. 572
FS(CP)O	Fire Safety (Commercial Premises) Ordinance, Cap. 502
FS Works	Fire safety improvement works required under FS(B)O or FS(CP)O
MBIS	Mandatory Building Inspection Scheme
MWCS	Minor Works Control System
MWIS	Mandatory Window Inspection Scheme
OP	Occupation Permit
PNAP	Practice Notes for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers
PNBI	Practice Notes for Mandatory Building and Window Inspection Schemes
PNRC	Practice Notes for Registered Contractors
QP	Qualified Person
RC	Registered Contractor
RGBC	Registered General Building Contractor
RGE	Registered Geotechnical Engineer
RI	Registered Inspector
RMWC	Registered Minor Works Contractor
RSC	Registered Specialist Contractor
RSE	Registered Structural Engineer
UBW	Unauthorised Building Works
WCS	Worst Credible Strength

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PART I MANDATORY BUILDING INSPECTION SCHEME

1. INTRODUCTION

This part of the Code applies to the inspection and repair of a building carried out under the MBIS, in pursuance of a notice served by the BA under section 30B of the BO. It specifies the technical and procedural requirements for the carrying out of building inspection, examination or assessment, rectification and repair works under the MBIS.

This part also provides for the scope and requirements of inspection, rectification and repair works as well as the acceptance criteria for quality control. The supervision requirements to be met by the RI and the RC are set out for ensuring consistency of quality and standards.

Mandatory inspection under the MBIS is required for all common parts¹ (except the areas within individual private premises), external walls² (whether or not the external walls are common parts), projections as prescribed in the B(I&R)R and signboards³ erected on a building. For single-ownership buildings without registration of Deed of Mutual Covenant in the Land Registry, the inspection carried out under the MBIS should cover the external walls, projections as prescribed in the B(I&R)R, signboards and those parts that are not for the exclusive use, occupation or enjoyment of the owner or occupier of any premises.

Upon completion of the inspection, prescribed repair is required to be carried out to make good all the deficiencies and defects identified in the inspection. It is envisaged that the majority of the building repair works under the MBIS are minor works⁴ which are subject to the control of the MWCS. Therefore, if the repair works to be carried out under the MBIS are minor works under the B(MW)R, the works shall be commenced according to the simplified requirements as stipulated in the BO and the B(MW)R. For repair works which are not minor works nor exempted

¹ 'Common parts' has the meaning given in section 2 of the Building Management Ordinance (Cap. 344).

² 'External wall' means the whole, or any part, of an outer wall of a building even though adjoining a wall of another building and includes a party wall.

³ 'Signboards' has the meaning as defined under section 2 of the Buildings Ordinance (Cap 123).

⁴ 'Minor works' are those building works designated as minor works in the B(MW)R.

building works, the BA's prior approval of plans and consent to the commencement of works under the BO are required. In connection with the above, the submission of relevant documents and specified forms required under the MWCS or the full approval and consent system, as the case may be, should also be made in addition to that required under the MBIS.

The procedural requirements for inspection, rectification and repair for the MBIS are given in Appendix I.

2. DUTIES OF REGISTERED INSPECTOR AND REGISTERED CONTRACTOR

2.1 Registered Inspector

The person appointed to carry out the building inspection or supervision of building repair works under the MBIS shall be a person whose name is for the time-being on the inspectors' register kept by the BA, under section 3(3B) of the BO (the 'RI').

According to section 27 of the B(MW)R, the RI shall assume the role of an AP in respect of the prescribed repair or any associated demolition works that are Class I minor works.

The duties of and the procedures required of the RIs under the MBIS are stipulated in the BO and the subsidiary regulations including the B(I&R)R. In this connection, the RIs should observe, amongst others, the followings:

Main Duties:

- (a) Carry out the building inspection personally. However, there may be cases where the RI has established the nature and cause of defects and he may be assisted by his representatives in ascertaining the extent of defects (see section 3.3.2(B) below). The RI shall be personally responsible for the identification of the extent of such defects;
- (b) Provide proper supervision of the necessary rectification and repair works; and where an AP has been appointed to provide supervision of the works, coordinate for compliance with the BO and the B(I&R)R with regard to the requirements of the MBIS;
- (c) Ensure the repair materials to be used comply with the provisions of the BO and are not defective;
- (d) Ensure the repair materials to be used have been mixed, prepared, applied, used, erected, constructed, placed or fixed in the manner

required for such materials under the BO;

- (e) Ensure the building for which he is appointed to supervise the repair is safe or has been rendered safe;
- (f) Notify the BA of any case of emergency in relation to building safety revealed during the course of building inspection or supervision of building repair works;
- (g) Notify the BA of any building works that have been or are being carried out in contravention of the provision of the BO in the common parts of the building; on the exterior other than the common parts of the building, such as external wall, roof or podium, yard or slope adjoining the building; or on the street on which the building fronts or abuts, which are identified during the course of building inspection; and
- (h) Comply generally with the BO

Main Procedural Requirements:

- (a) Notification to the BA of his appointment as RI in the specified form (Form MBI 1) within 7 days after the date of appointment;
- (b) Notification to the BA of his nomination of another RI to temporarily act in his stead to supervise the prescribed repair in the specified form (Form MBI 2) within 7 days after the date of the nomination;
- (c) Notification to the BA in writing of the cessation of his nomination of another RI to temporarily act in his stead within 7 days after the date of cessation;
- (d) Notification to the BA in writing of his cessation to act as RI within 7 days after the date on which the RI has ceased to act;
- (e) Notification to the BA in writing of the intended appointment of a representative to perform any duty in supervising a prescribed repair on his behalf not less than 7 days before making the appointment;

- (f) Notification to the BA in writing of the intention to conduct a detailed investigation and submit to the BA a proposal of the detailed investigation for endorsement;
- (g) Submission of an Inspection Report and a certificate in the specified form (Form MBI 3 or MBI 3a) to the BA. These documents should also be delivered to the person for whom the prescribed inspection is carried out within 7 days after completion of the prescribed inspection. If a different RI is appointed for the supervision of the repair works, the documents shall be provided to the RI for supervision within 2 months after the date of submission to the BA or before the commencement of the prescribed repair, whichever is the earlier;
- (h) Submission of a revised proposal of the prescribed repair to the BA within 7 days after certain matter is revealed or circumstance arises, during the course of the prescribed repair, in response to which the RI considers it necessary to revise the proposal. The revised proposal should also be delivered on the same day to the person for whom the prescribed repair is carried out;
- (i) Delivery of the documents in (g) before commencement of the repair works and any revised remedial proposal on the same day on which the revised proposal is submitted to the BA by the RI appointed for supervision of repair works to the RC;
- (j) Submission of Completion Report and a certificate in the specified form (Form MBI 4) within 14 days after completion of building repair to the BA by the RI for supervision of repair works. These documents should also be delivered on the same day to the person for whom the prescribed repair is carried out;
- (k) In case the RI who supervises the repair works is not the same person as for the building inspection, the submission of a certificate by the previous RI in the specified form (Form MBI 5) certifying that the RI who carried out the building inspection is not a partner, director, or authorized signatory of the registered contractor appointed to carry out the prescribed repair; and

- (l) Where the building repair works are designated minor works or involving works that require the prior approval of plans and consent to commencement of works by the BA under the BO, apart from the above procedural requirements under the MBIS, the procedural requirements under the MWCS or the full approval and consent system, as the case may be, should also be complied with as appropriate.

The specified forms for MBIS are listed in Appendix X.

2.2 Registered Contractor

The contractor appointed to carry out the necessary rectification and repair works under the MBIS shall be a contractor whose name is for the time-being on the register of general building contractors or register of minor works contractors (the 'RC') who are qualified to carry out the rectification and repair works kept by the BA under the BO.

The RMWC are qualified to carry out minor works belonging to the class, type and item for which they are registered.

Without prejudice to other provisions of the BO, the RC appointed to carry out rectification and repair works must ensure that the part of the building for which he is appointed has been rendered safe.

3 INSPECTION AND ASSESSMENT

3.1 Scope

When a building is selected to be a target building under the MBIS, mandatory building inspection required to be carried out shall cover the common parts (except for areas within individual private premises), external walls (whether or not the external walls are common parts), projections as prescribed in the B(I&R)R, signboards erected on a building and building works that are within or projecting outside the building envelope or the lot boundary. For the avoidance of doubt, inspection of the common parts shall cover inspection of common drains in the non-common parts of a building.

Under the MBIS, the inspection shall cover the following building elements:

- (a) External elements and other physical elements;
- (b) Structural elements;
- (c) Fire safety elements;
- (d) Drainage system; and
- (e) UBW.

There are other building elements and services that do not fall within the scope of the MBIS. These elements and services include foundations, buried or embedded elements such as pile caps and ground beams, freestanding earth retaining structures, slopes and buried water services in slopes, lifts, escalators, fire services installations, electric wiring, ventilation and air conditioning systems, and gas and water supplies installations.

The RI shall determine the critical defects or deficiencies that pose an obvious danger to the safety of the occupants or the public. The RI shall notify the BA immediately and alert the occupants and owners of any case

of emergency in relation to building safety revealed during the course of building inspection and supervision of building repair works.

3.2 Pre-inspection Preparation

The RI shall retrieve from the BD, the owners or other sources the approved plans, the plans and details of minor works commenced or carried out under the simplified requirements, plans and documents submitted to the BA under section 39C of the BO so as to gain a clear understanding of the overall building design and construction including subsequent alteration and addition. The RI shall exercise professional judgment to identify any unusual construction and areas of concern.

The RI shall review all available information to determine the design standards and codes of practice that were in force when the building was constructed and alteration and addition works that had been carried out, and the standard achieved after completion of the upgrading works arising from the implementation of the FS(CP)O and the FS(B)O.

If the approved plans are not available, the RI shall determine the appropriate standards and codes of practice with reference to the date of issue of the OP or other relevant documents. It is not necessary for the RI to obtain prior agreement from the BA with regard to the standards and codes of practice that he adopts for inspection and repair.

The RI shall review if the subject building is under the purview of the FS(CP)O or FS(B)O. Where applicable, the RI should also check if any Directions have previously been served by the BD on the building owners concerned and the status of the FS Works.

After reviewing all the available information, the RI shall formulate an appropriate method statement for the inspection of the building. Reference may be made to Appendix II for pre-inspection preparation.

3.3 External Elements and Other Physical Elements

3.3.1 Scope

The scope of inspection of the external elements includes non-structural external walls, non-structural walls of lightwell, fence walls, external finishes, fixtures, installations and appendages to the external walls. These shall include the following:

- (a) External finishes such as tiling, rendering and cladding;
- (b) Fins, grilles, and metal louvers;
- (c) Protective barriers, railings, parapets and balustrades at external walls or at the edges of roofs;
- (d) Fencings and associated fixings;
- (e) Curtain wall and associated openable windows;
- (f) Appendages including metal supporting frames, awnings, planters, supporting structures for building services installations (such as air-conditioning units, cooling towers and chimneys etc.) and the associated pipes and ducts, eaves, mouldings, projections, architectural features, drying racks, signboards, television-screen type signboards, window canopies and similar features fixed or attached to and projected from the external façade of the building; and
- (g) Any other similar external structures which are building or building works other than slope, earth-retaining structure or UBW.

The scope of inspection of external elements shall include skylight in common parts, whereas windows on external walls are subject to the MWIS.

Other physical elements in the buildings shall include but not limited to the following:

- (a) Finishes, stone cladding and false ceiling in common corridors and lobbies; and
- (b) Manually or electrically operated metal gates erected at fence walls or entrance of buildings.

For UBW in the common parts of the building; on the exterior other than the common parts of the building, such as external wall, roof or podium, yard or slope adjoining the building, or on the street on which the building fronts or abuts, reference shall be made to section 3.7 below.

3.3.2 Inspection Requirements

(A) General

External elements and other physical elements shall be inspected visually and/or by other non-destructive methods such as hammer-tapping, infrared thermography or other feasible means, where appropriate, from ground level and other available vantage points and openings.

Where the RI intends to adopt any special inspection technologies, he may engage suitable agency to assist him in ascertaining the extent of the defects. However, the RI shall be personally satisfied with and responsible for the inspection findings. Where an external wall of a building adjoins a wall of another building, the RI shall inspect the exposed parts of the external wall that are not within private premises for any signs of defect.

The RI shall keep daily inspection records, in which details including the time and date of inspections, locations and items or parts of buildings that have been inspected etc. should be recorded. These daily inspection records shall be submitted to the BD upon completion of the inspection.

(B) External Finishes

The following defects, and any other defects that the RI considers having safety concern, shall be identified:

- (a) Loose or missing tiles and rendering;
- (b) Cracks;
- (c) Bulging, bowing, separation, delamination;
- (d) Corrosion of metallic parts embedded in external finishes; and
- (e) Spalling.

Generally, the RI shall carry out the inspection personally. The RI shall inspect external finishes on all elevations of the building and identify all defects as far as practicable. There may be cases where the RI has established the nature and cause of defects, which may be of large scale, the RI may engage suitable personnel, of qualification and experience no less than those required of the representative providing supervision to building repair works as specified in section 6.4 below, as his representatives to assist him in ascertaining the extent of the defects, where necessary. However, the RI shall be personally responsible for the identification of the extent of defects. The personal particulars including the qualifications and experience of and the areas of defects identified by the engaged personnel shall be recorded and submitted to the BD upon completion of the inspection.

(C) Cladding

The following defects, and any other defects that the RI considers having safety concern, shall be identified:

- (a) Displacement of cladding panels;
- (b) Cracked or loose cladding panels;
- (c) Defective sealing joints;
- (d) Stains; and
- (e) Corrosion of fixing anchors or metal frames.

Inspection of fixing anchors and concealed metal frames is not required unless obvious defects or signs of corrosion are identified from external inspection.

(D) Fins, Grilles and Metal Louvers

The following defects, and any other defects that the RI considers having safety concern, shall be identified:

- (a) Dilapidation;
- (b) Corrosion of metallic parts; and
- (c) Loose or defective fixings.

(E) Protective Barriers, Railings, Parapets and Balustrades

The following defects, and any other defects that the RI considers having safety concern, shall be identified:

- (a) Cracked, loose, broken or missing glass panels;
- (b) Corroded or loose fixings;
- (c) Loose or defective railings; and
- (d) Defective sealants.

(F) Fencing and Associated Fixings

The following defects, and any other defects that the RI considers having safety concern, shall be identified:

- (a) Dilapidation;
- (b) Corrosion; and

- (c) Loose or defective fixings.

(G) Curtain Wall and Associated Openable Windows

The following defects, and any other defects that the RI considers having safety concern, shall be identified:

- (a) Cracked, loose, broken or missing glass panes;
- (b) Corroded or loose fixings;
- (c) Defective sealants;
- (d) Defective fire stop;
- (e) Defective locking devices and bar hinges; and
- (f) Signs of water leakage behind curtain wall.

The curtain wall shall be inspected from the internal areas of common parts and private premises if obvious defects are found on the corresponding external surfaces.

(H) Appendages

The following defects, and any other defects that the RI considers having safety concern, shall be identified:

- (a) Dilapidation;
- (b) Corrosion; and
- (c) Loose or defective fixings.

(I) Manually or Electrically Operated Metal Gates

The following defects, and any other defects that the RI considers having safety concern, shall be identified:

- (a) Defective or missing hinges;
- (b) Defective track, guide rail, stopper and safety device to prevent gate from sliding off the rail; and
- (c) Corrosion of supporting structural steel posts and fixings.

3.3.3 Follow-up Action

The RI shall assess the conditions of the elements inspected and make recommendations on the follow-up action based on the inspection findings and professional judgment. This includes providing proposals for the repair works in the Inspection Report, and any urgent action if necessary. Where defects extend from the common parts or external walls to individual private premises, the RI shall make all efforts to ascertain the extent of the defects. The RI shall record details of such defects in the Inspection Report for the BD's attention.

If emergency in relation to building safety is revealed during the building inspection, the RI shall notify the BA and alert the owners and occupants immediately.

Detailed investigation is not normally required for defective external elements and other physical elements resulting from causes such as normal wear and tear. In such cases, removal and reinstatement may be an effective and reliable repair method.

3.4 Structural Elements

3.4.1 Scope

The scope of inspection shall include structural elements on the external walls and in the common parts of the main building and all other ancillary building structures within the lot boundary such as elevated driveways, bridging structures, clubhouses, guard houses, swimming pools including filtration plant rooms etc.

The inspection shall include the following structural elements:

- (a) Columns;
- (b) Walls;
- (c) Beams;
- (d) Slabs;
- (e) Staircases;
- (f) Cantilevered projecting structures;
- (g) Transfer structures;
- (h) Water tanks and suspended manholes;
- (i) Protective barriers, railing, parapets and balustrades;
- (j) Screen walls and basement walls;
- (k) Hanging structures;
- (l) Exposed pile caps; and
- (m) Other special type of structural elements, which are exposed, in the building under inspection.

3.4.2 Inspection Requirements

(A) General

Structural elements shall be inspected visually and/or by other non-destructive methods such as hammer-tapping, cover meter survey, crack width measurement or other feasible means, where appropriate, from ground level and other available vantage points and openings.

For cantilevered slab canopy projecting over street, inspection by opening up the concrete cover at suitable locations at the root of the canopy immediately adjoining the parent structure should be conducted to assess the degree of corrosion of the existing main reinforcement. The RI shall exercise his professional judgment to select sufficient opening up locations with at least 2 numbers for each discrete canopy of a building under inspection or 1 number for every 10m along the length of the canopy, whichever is the greater.

The RI shall keep daily inspection records, in which details including the time and date of inspections, locations and items or parts of buildings that have been inspected etc. should be recorded. These daily inspection records shall be submitted to the BD upon completion of the inspection.

The following defects or phenomena, and any other defects that the RI considers having safety concern, shall be identified:

- (a) Dampness;
- (b) Rust stains or corrosion of reinforcement;
- (c) Cracks or signs of distress;
- (d) Spalling;
- (e) Delamination;
- (f) Exposed reinforcement;
- (g) Voids and honeycombing;
- (h) Deformation or displacement; and
- (i) Abnormal separation of the building from adjoining buildings.

(B) Cantilevered Projecting Structures

Cantilevered projecting structures such as canopies and balconies posing

higher risk must be inspected. Such structures may be concealed by shopfront extensions, false ceiling etc. The RI shall make all efforts to remove sufficient portion of the covering temporarily to enable inspection of 100% of the concealed pure cantilevered slab type structures and at least 30% of the concealed beam-slab type cantilevered structures to be carried out.

If the RI is not certain about the structural condition and safety level of the cantilevered projecting structures (e.g. after the opening up inspection of the cantilevered slab canopy, serious corrosion of steel reinforcement is noted), detailed investigation may be considered.

For cantilevered slab canopy, apart from the items in paragraph (A) above, the RI shall look out for any water ponding, defective drains, signs of water seepage, existence of UBW erected on and/or attached to the soffit of the canopy.

(C) Transfer Structures

Transfer plates and transfer beams are critical elements for structural stability. These elements may be concealed by covering panels such as false ceiling. The RI shall make all efforts to remove sufficient portion of the covering temporarily to enable inspection of at least 30% of the concealed elements to be carried out.

If the RI is not certain about the structural condition and safety level of the elements, detailed investigation may be considered.

(D) Other Concealed Elements

For concealed elements other than cantilevered projecting structures, transfer plates and transfer beams, the RI shall exercise professional judgment to expose sufficient structural elements for a representative assessment.

3.4.3 Follow-up Action

The RI shall assess the conditions of the elements inspected and make

recommendations on the follow-up action based on the inspection findings and professional judgment. This includes providing proposals for the repair works in the Inspection Report, and any urgent action if necessary. Where defects extend from the common parts or external walls to individual private premises, the RI shall make all efforts to ascertain the extent of the defects. The RI shall record details of such defects in the Inspection Report for the BD's attention.

If emergency in relation to building safety is revealed during the building inspection, the RI shall notify the BA and alert the owners and occupants immediately.

The RI shall consider the circumstances described in section 4.3 below to determine if a detailed investigation is required.

3.5 Fire Safety Elements

3.5.1 Scope

The scope of inspection of the fire safety elements includes all fire safety provisions in the common parts and external walls of a building. These shall include the following:

- (a) Means of escape;
- (b) Means of access for fire fighting and rescue; and
- (c) Fire resisting construction.

3.5.2 Inspection Requirements

(A) General

The RI shall inspect the fire safety provisions to ascertain whether they comply with the legislations, standards and codes of practice at the time the building was constructed and the alteration and addition works that had been carried out, or if FS Works have been completed in accordance with the fire safety directions issued under the FS(CP)O or FS(B)O, the standard

of such completed works.

For buildings that are subject to fire safety directions but the upgrading works have not yet been completed, the RI should highlight this in the Inspection Report.

The RI shall keep daily inspection records, in which details including the time and date of inspections, locations and items or parts of buildings that have been inspected etc. should be recorded. These daily inspection records shall be submitted to the BD upon completion of the inspection.

(B) Means of Escape

The following defects or deficiencies, and any other defects or deficiencies that the RI considers having fire safety concern, shall be identified:

- (a) Defective or missing exit signs;
- (b) Inadequate lighting;
- (c) Defective balustrades and handrails in staircases and escape routes;
- (d) Door swing obstructing means of escape;
- (e) Blocked or obstructed means of escape; and
- (f) Defective treads.

(C) Means of Access for Fire Fighting and Rescue

The following defects or deficiencies, and any other defects or deficiencies that the RI considers are having fire safety concern, shall be identified:

- (a) Blocked means of access to building, particularly along rear lane;
- (b) Blocked or obstructed means of access within building such as access to the fireman's lift lobby on G/F;

- (c) Dilapidated emergency vehicular access; and
- (d) Defects in the integrity of the fireman's lift lobby.

(D) Fire Resisting Construction

The following defects or deficiencies, and any other defects or deficiencies that the RI considers having fire safety concern, shall be identified:

- (a) Defective or dilapidated materials resulting in inadequate fire resisting construction;
- (b) Ventilation ducts or other building services passing through compartment walls or floors breaching the requirements of fire resisting construction;
- (c) Broken hinges or glass panels in fire doors;
- (d) Defective or non-provision of self-closing mechanism in fire doors;
- (e) Broken or dilapidated fire doors or fire resisting glazing;
- (f) Inadequate fire resistance of fire door or glazing;
- (g) Non-emergency services such as electric wires, cables and meters in the escape staircases and lobbies, without adequate fire protection;
- (h) Damaged staircase enclosure such as walls, windows and doors including those for the protected lobby;
- (i) Obstruction to fire dampers or fire shutters for compartmentation; and
- (j) Defective or blocked staircase top vents.

(E) Unauthorised Alterations and Additions

The following unauthorised alterations and additions and any other unauthorised alterations and additions that the RI considers are having fire

safety concern shall be identified and reported to the BA:

- (a) Doors, gates or roller shutters obstructing escape routes;
- (b) Unprotected openings at enclosure walls of exit routes or compartment walls, floors and ceilings;
- (c) Structures on refuge floors;
- (d) Door openings from cocklofts to exit staircases in single-staircase buildings;
- (e) Alteration to escape routes, protected lobbies or fire resisting construction resulting in deficiencies in fire safety;
- (f) Structures on main or flat roofs resulting in inadequate means of escape;
- (g) Structures on main or flat roofs resulting in deficiency in fire resisting construction such as inadequate fire separation between the structures concerned and the main or flat roof designated as a refuge floor;
- (h) Change in provision of fireman's lift or lobby of the fire fighting and rescue stairway; and
- (i) Removal of fire doors, fire shutters or other fire resisting construction.

(F) Unsuitable Change in Use

Change in use for which the whole or part of the building is unsuitable by reason of its construction in terms of fire safety and structural safety shall be identified and reported to the BA. Examples of such unsuitable change in use include:

- (a) Change in use for storage of hazardous materials; and
- (b) Change in use resulting in exceeding the approved capacity in terms of means of escape and/or imposed load of a room or storey.

3.5.3 Follow-up Action

The RI shall assess the conditions and make recommendations on the follow-up action based on the inspection findings and professional judgment. This includes providing proposals for the rectification and repair works in the Inspection Report, and any urgent action if necessary.

Where defective entrance door of individual private premises is found to have adverse effects on the fire safety of a building or the door is of inadequate fire resistance, the RI shall record details of such defects and deficiencies in the Inspection Report for BD's attention.

If emergency in relation to building safety is revealed during the building inspection, the RI shall notify the BA and alert the owners and occupants immediately.

Detailed investigation is not normally required. However, where there is uncertainty in the fire resistance capability of the fire resisting construction, in-depth investigation or opening up may be required.

3.6 Drainage System

3.6.1 Scope

The scope of inspection of the drainage system shall include the following:

- (a) Drainage system located at the external walls of the building;
- (b) Drainage system in the common parts;
- (c) Drainage system laid within the common pipe ducts;
- (d) Underground and above-ground common drainage system; and

- (e) Any other common drainage system for the building under inspection that may, if defective, choked or misconnected, affect the sanitary or hygienic condition of the building.

3.6.2 Inspection Requirements

(A) General

All parts of the drainage system specified in section 3.6.1 above shall be inspected visually or by any other means that the RI considers suitable in the circumstances of the building under inspection.

For concealed drain pipes laid within common vertical pipe ducts located inside individual private premises, inspection may be made by gaining access from the individual private premises at least every 3 floors and at pipe duct outlet to assess the overall condition of the pipes and sign of seepage.

As an alternative, the RI may adopt other feasible inspection methods such as CCTV survey to avoid gaining access from individual private premises. However, the overall condition of the pipes shall be assessed.

The RI shall keep daily inspection records, in which details including the time and date of inspections, locations and items or parts of buildings that have been inspected etc. should be recorded. These daily inspection records shall be submitted to the BD upon completion of the inspection.

The following defects or deficiencies, and any other defects or deficiencies that the RI considers as affecting the sanitary condition of the building under inspection or affecting public health, shall be identified:

- (a) Corrosion, leakage, deformation, displacement, damage and blockage of drain pipes and traps including underground drains;
- (b) Corrosion, loosening or breaking of metal brackets;
- (c) Damage or blockage of manhole/septic tank;

- (d) Broken and blockage of surface channel, gullies and catch pits;
- (e) Missing drain pipes or grating at the top of ventilating pipes; and
- (f) Deterioration or missing of mica flap in the fresh air inlet.

(B) Unauthorised Alterations and Additions

The following unauthorised alterations and additions, and any other unauthorised alterations and additions to the drainage system that the RI considers may adversely affect the drainage system shall be identified and reported to the BA:

- (a) Misconnection of foul or waste water to the surface water drainage system or discharge of foul or waste water to external parts of the building or open areas;
- (b) Drainage alteration and addition resulting in discharge of untreated trade effluent, including hot water, into the drainage system or to external parts of the building or open areas; and
- (c) Mis-connection of surface water to foul water system.

3.6.3 Follow-up Action

The RI shall assess the conditions of the drainage system and shall provide an account of the defects, deficiencies, misconnections and any unauthorised alterations and additions identified that constitute a threat to the safety and health of the occupants or the public.

If emergency constituting health hazard is revealed during the building inspection, the RI shall notify the BA and alert the owners and occupants immediately.

When blockages or defects in underground drains are observed in private streets or lanes accessible to the public resulting in health hazard or danger to the public, the RI shall arrange with the owners to take remedial action

urgently. If urgent remedial action cannot be taken, the RI shall report to the BD immediately.

The RI shall consider the circumstances described in section 4.4 below to determine if a detailed investigation is required.

The RI shall provide appropriate proposals for the rectification and repair works in the Inspection Report, based on the inspection findings, including any detailed investigation and professional judgement.

3.7 Unauthorised Building Works

3.7.1 Scope

The UBW to be identified shall cover those in the common parts of the building including those external ground, open space, gardens, playgrounds, private streets and access roads etc; on the exterior other than the common parts of the building such as external wall, roof, podium, the yard or slope adjoining the building; or on the street on which the building fronts or abuts.

The scope of identification of UBW shall include the following:

- (a) Structures in the common parts and on roof top, flat roof, yard, lane or street;
- (b) Projections and signboards erected on the exterior of the building;
- (c) Alterations or additions affecting fire safety (see section 3.5.2(E) above);
- (d) Alterations and additions of structural elements;
- (e) Alterations and additions of drainage system (see section 3.6.2(B) above);
- (f) Alterations of external walls or parapets;

- (g) Removal or alteration of provisions for barrier free access for people with disability; and
- (h) Alterations or additions to balconies, canopies or other approved projections of the building.

The RI shall look for signs of suspected subdivision of flats such as presence of many flat door openings, door bells, electricity meters or drain pipe connections during the course of inspection. Observation of such signs shall be recorded in the Inspection Report for submission to the BA.

The RI shall keep daily inspection records, in which details including the time and date of inspections, locations and items or parts of buildings that have been inspected etc. should be recorded. These daily inspection records shall be submitted to the BD upon completion of the inspection.

3.7.2 Inspection Requirements

(A) General

The RI shall conduct visual inspection to identify and record all UBW as far as practicable.

The RI shall make all efforts to identify UBW such as carrying out inspection at high level and vantage points.

(B) UBW under Construction or Constituting Obvious Hazard or Imminent Danger

The RI shall make an assessment of the UBW to determine whether the UBW constitute an obvious hazard or imminent danger to the occupants or the public. The RI shall report to the BA immediately if any of the following are observed:

- (a) UBW are constituting obvious hazard or imminent danger to life or property;

- (b) Parent structure is overloaded and shows serious signs of distress;
- (c) UBW are constituting serious environmental nuisance or health hazard;
and
- (d) UBW are under construction.

(C) UBW Validated under Section 39C of the BO

The RI shall identify and inspect the UBW (i.e. supporting structures on slab or supporting frames projecting from the external wall for air-conditioning units, drying racks and window canopies) that have been validated under section 39C of the BO. Defects including but not limited to the following shall be identified:

- (a) Dilapidation;
- (b) Corrosion; and
- (c) Loose or defective fixings.

3.7.3 Follow-up Action

The RI shall record all UBW in the Inspection Report for submission to the BA.

The RI shall indicate clearly in the Inspection Report if any UBW would obstruct the carrying out of any inspection and subsequent repair works.

The RI shall assess the safety of the UBW inspected under section 3.7.2(C) above and make recommendations on the follow-up action based on the inspection findings and professional judgment. This includes providing proposals in the Inspection Report for the repair or rectification and any urgent action if necessary.

If emergency in relation to building safety is revealed during the building inspection, the RI shall notify the BA and alert the owners and occupants immediately.

4. DETAILED INVESTIGATION

4.1 Scope

The RI shall consider conducting a detailed investigation where there are serious defects, not arising from normal deterioration, constituting structural instability or serious health hazard, or where the extent or cause of the defects cannot be ascertained in the inspection.

The RI shall exercise professional judgment to determine whether a detailed investigation is required to be conducted for the inspected items stated in the Code.

Detailed investigation may be required for determining the seriousness of defects or deficiencies in structural elements, or ascertaining the integrity of drainage systems or the fire resistance capability of fire resisting construction.

The RI may engage suitable specialist to conduct tests for the detailed investigation. If considered necessary, the RI may also seek input from a specialist of appropriate professional discipline for the detailed investigation. However, the RI shall supervise the specialist and exercise his professional judgment and be personally responsible for the application of the findings of the detailed investigation when formulating appropriate repair proposals to render the building safe.

4.2 Notification to the Building Authority

When the RI intends to conduct a detailed investigation, he shall submit notification of his intention and a detailed investigation proposal to the BA in accordance with the B(I&R)R and the relevant PNBI issued by the BA from time to time, prior to the commencement of the detailed investigation.

A detailed investigation proposal shall include the following information:

- (a) Purpose of conducting a detailed investigation;

- (b) Proposed scope, methods, particulars of the detailed investigation;
- (c) Justification for the proposed methods; and
- (d) Summary of all building defects subject to the detailed investigation accompanied by annotated photos and marked up plans.

Detailed investigation shall not be conducted until the corresponding investigation proposal has been endorsed by the BA. In case the BA has refused the proposal, the RI may still arrange for the detailed investigation provided that the person for whom the prescribed inspection is carried out has been duly informed of the BA's refusal and he decides nevertheless to proceed with the detailed investigation proposed by the RI.

4.3 Structural Elements

4.3.1 Structural Defects

The RI should consider conducting a detailed investigation for the following types of defects:

- (a) Serious flexural cracks on sides and soffit of beams or slabs;
- (b) Diagonal cracks at or near supports of a beam;
- (c) Helical cracks on beam faces;
- (d) Cracks at tension zone of cantilevered structures;
- (e) Cracking or crushing of columns;
- (f) Tensile cracks at hanging structures;
- (g) Serious structural cracks other than the types mentioned above;
- (h) Excessive deformation of structural members;

- (i) Global movement of the building;
- (j) Extensive spalling or serious corrosion of reinforcement and structural steel; or
- (k) Serious corrosion of the main steel reinforcements at the root of cantilevered slab canopies after the opening up inspection.

4.3.2 Investigation Methods

Apart from visual inspection, depending on the situation, various destructive and non-destructive tests may be adopted for detailed investigation.

The condition of concrete may be assessed by hammer-tapping, carbonation test, test on chloride and cement content, coring, rebound hammer test, crack survey or other feasible means.

The condition of reinforcement may be assessed by covermeter survey, measurement of section loss, electrochemical (half-cell) potential measurement or other feasible means.

4.3.3 Structural Assessment

Based on the detailed investigation results, the RI shall conduct assessment to ascertain the safety level of the structural element concerned and propose the necessary follow-up actions.

The RI may conduct the assessment based on the standards and codes of practice prevailing at the time the building was constructed or when any alteration and addition works were carried out.

The RI may also evaluate the safety level of a structural element by determining its FSP. The FSP of a structural member is defined as the ratio of the limit state resistance of the structural member and the factored load effects. The limit state resistance and factored load effects shall be determined with reference to recognized standards taking into consideration the requirements of loadings, materials and partial safety factors given in Appendix III.

4.3.4 Follow-up Action

Where the safety level of structural elements is determined by evaluation of the FSP in accordance with section 4.3.3 above, and the limit state resistance of the structural element is found to be less than the factored load effects, the RI shall report to the BA immediately and carry out emergency remedial works.

4.4 Drainage System

4.4.1 General

Detailed investigation may be required under the following circumstances:

- (a) Identification of misconnection of drain pipes;
- (b) Detection of defective underground drains;
- (c) Detection of source of leakage;
- (d) Detection of defective concealed pipes including those within pipe ducts; or
- (e) Detection of corroded or loosen metal brackets within pipe ducts.

4.4.2 Investigation Methods

The RI shall consider the most appropriate type and extent of the detailed investigation. The following investigation methods or other feasible means may be adopted:

- (a) CCTV survey;
- (b) Smoke or water test.

4.4.3 Follow-up Action

Where blockages or defects in the underground drains are detected in private streets or lanes accessible to the public and such blockages or defects cause health hazard or danger to the public, the RI shall make arrangement with the owners to take remedial action urgently. If urgent remedial action cannot be taken, the RI shall report to the BA immediately.

5. RECTIFICATION AND REPAIR

5.1 Scope

This section provides the technical standards for commonly used methods of repair and proof tests. The RI should exercise professional judgment in adopting the most appropriate repair methods based on the findings of the inspection provided that appropriate proof tests are carried out to ensure the standard and quality of the repair works. The RI shall ensure that the repair works are carried out to meet the standards stipulated in the BO and regulations.

Upon completion of the inspection, assessment and detailed investigation, if applicable, the RI shall formulate the appropriate rectification and repair proposals for making good all deficiencies and defects.

The RI shall ensure that the performance of the rectification and repair works shall not be inferior to that required by the legislations, standards and codes of practice prevailing at the time when the building was constructed and alteration and addition works that had been carried out, or if FS Works have been completed in accordance with Directions issued under the FS(CP)O or FS(B)O, the standard of such completed works. Reference should also be made to the relevant PNAP and PNBI issued by the BA from time to time as well as the Technical Guidelines on Minor Works Control System.

The rectification and repair works to be carried out shall be in accordance with the latest plans approved by the BA, plans submitted to the BA for the commencement or carrying out of minor works under the simplified requirements, and where applicable, the completed FS Works under the FS(CP)O or FS(B)O.

For rectification or repair works that are minor works or exempted building works⁵, the prior approval and consent from the BA is not required.

⁵ 'Exempted building works' means the building works that may be carried out without prior approval and consent from the BA and without the appointment of AP/RSE/RGE and RC, by virtue of sections 41(3), 41(3B) or 41(3C) of the BO

For other types of rectification or repair works, BA's approval of plans and consent to the commencement of works is required prior to the commencement of the works. For the purpose of carrying out such works, the RI shall advise the owners to engage an AP, and an RSE and RGE, where applicable as well as an RGBC or RSC, as the case may be, as prescribed in the BO and regulations. The AP, RSE, RGE and RC engaged shall take up their respective responsibilities under the provisions of the BO for such rectification or repair works; and the RI is still responsible for coordinating the compliance with the BO and the B(I&R)R with regard to the requirements of the MBIS. However, under the provision of section 27 of the B(MW)R, the RI shall assume the role of an AP in respect of the prescribed repair or any associated demolition works that are Class I minor works.

The rectification and repair works to be carried out shall make the building safe until the next cycle of inspection. However, some components may require regular maintenance to ensure the repair can last until the next inspection cycle. These components shall be highlighted in the Inspection Report and the owners shall be informed accordingly.

5.2 Selection Criteria for Repair Methods

In determining the repair methods, the RI shall consider the following aspects:

- (a) Intended use and design life of the structure or building components;
- (b) Severity of exposure;
- (c) Condition of the existing structure or building components;
- (d) Causes of defect;
- (e) Impact of repair proposal to the occupants and the public;
- (f) Effects of repair works on the building and the environment;

- (g) Required performance and durability of the repair works;
- (h) Compatibility of repair materials and method of application with the substrate and the parent structure; and
- (i) Any other aspects which are relevant to the safety and health standards of the building under repair.

5.3 External Elements and Other Physical Elements

5.3.1 Rendering and Tiling

In general, removal and reinstatement is the most effective and reliable repair technique for rendering and tiling. Appendix IV provides the technical standards of commonly used repair method and proof test.

5.3.2 Cladding

All defects shall be repaired taking into account the storey drift, water ingress, aging of sealant and corrosion of fixings.

The methods of repair may include:

- (a) Insertion of new fixings;
- (b) Panel replacement or repair; and
- (c) Re-cladding by a new material.

The renewed cladding panels shall be of non-combustible materials, of such thickness, strength and durability not inferior to those of the original design. Any new metal dowels and fixings securing the cladding shall be suitable, permanent and adequately protected from corrosion.

5.3.3 Fins, Grilles and Metal Louvers

Defective fins, grilles and metal louvers should be repaired or renewed. The renewed installation shall be durable and securely fixed. Any anchor

bolts used should be suitable, permanent and adequately protected from corrosion.

5.3.4 Curtain Wall

All defective components of the curtain wall shall be replaced. The standard of any curtain wall repair shall not be inferior to the original design standard including the use of materials.

The RI shall submit certificates/reports of the materials proposed for replacement such as glass panes, structural sealant or fire stop demonstrating adequacy and suitability of the proposed materials to the BA.

5.3.5 External Appendages

Removal and reinstatement may be an effective rectification method for defective external appendages of which the removal and erection is minor works.

The renewed installation shall be of adequate strength, stiffness and durability for the intended use. It shall be securely fixed to the structural elements by suitable and permanent anchor bolts which are adequately protected from corrosion.

5.3.6 Other Physical Elements

For repair of finishes in the common corridors and lobbies, reference may be made to section 5.3.1 above wherever applicable. Defective false ceiling in the common corridors and lobbies shall be removed and/or replaced.

For repair of protective barriers, railings, parapets, balustrades, fencing and associated fixings, all defective components shall be replaced. The standard of any corresponding repair shall not be inferior to the original design standard including the use of materials.

For manually or electrically operated metal gates, defective components

such as hinges shall be replaced. For repair of corroded supporting structural steel posts and fixings of metal gates, reference shall be made to section 5.4.2 below.

5.3.7 Regular Maintenance

Some components of the elements inspected such as rivets, screws, fixing bolts, locking devices and hinges may require regular maintenance and replacement for maintaining safety until the next cycle of inspection. The RI shall highlight such components in the Inspection Report and advise the owners of the need for regular maintenance and replacement as necessary of such components.

5.4 Structural Elements

In determining the most suitable repair methods, the RI shall consider the following aspects:

- (a) Effects on the structure during and after repair works;
- (b) Means for ensuring load-carrying capacity during and after repair works; and
- (c) Any other aspects which are relevant to the structural safety standards of the building under repair.

5.4.1 Reinforced Concrete

Appendix V provides the technical standards of some repair methods and proof tests commonly used for reinforced concrete elements. The RI shall ensure that the repair works are carried out to meet the standards stipulated in the BO and regulations.

5.4.2 Structural Steel

(A) Corrosion of Structural Steelworks

The corroded loose parts on structural steelworks shall be removed completely by suitable techniques such as machine brushing, grinding or grit blasting. The grades of preparation of steel surfaces shall be in accordance with recognized national standards. The cleaned steel surface shall be protected by a suitable paint system with adequate coat thickness appropriate to the exposure conditions.

Where the load-carrying capacity of a structural element is significantly impaired by corrosion, the RI should consider removal and replacement of the element. The renewed element shall be of such material grade and size not inferior to the original design. Where welded connections are required for the renewed structural steel elements, the RI shall conduct or direct non-destructive testing of welds such as magnetic particle inspection or ultrasonic examination to be carried out.

It is important to subdue the source of corrosion attack in order to ensure the effectiveness of the repair works and prolong the life of a structure.

The RI shall include the mill certificates in the Completion Report where new structural steel elements are used. If the replacement of structural steel is substantial, the RI should exercise professional judgment and conduct appropriate tests where necessary.

(B) Corrosion of Bolts

Corroded friction grip bolts, black bolts, rivets etc. shall be replaced and adequately protected from corrosion. All newly installed bolts shall be securely tightened and checked by torque meter. The use of new bolts shall be of such material grade and size not inferior to the original design.

(C) Fire Protection

Any damage of the fire protection material on the structural steelworks shall be reinstated to a fire resistance standard not inferior to the original design. For the application of fire resisting material, the RI shall ensure the compatibility of the fire resisting material, primer and the steel substrate. The application of the fire resisting material shall be in accordance with the manufacturer's specifications.

5.4.3 Masonry and Brickworks

For masonry structures containing soluble sulphate salts and exposed to wet environment, sulphate attack may occur causing the bedding mortar to expand.

Where defects caused by sulphate attack are observed, the source of dampness shall be stopped. Where the damage is localized, the affected section should be raked and repaired using sulphate resisting cement mortar. Where the masonry structure is badly damaged, the RI may consider partial rebuild.

5.4.4 Regular Maintenance

Protective treatment to structural steel members and connections, such as metal coating and painting may require regular maintenance and reinstatement for maintaining safety until the next cycle of inspection. The RI shall highlight such items in the Inspection Report and advise the owners of the need for regular maintenance and reinstatement of such items.

5.5 Fire Safety Elements

Defects, damages or dilapidations of the approved fire safety provisions shall be repaired or rectified by reinstating to a standard not inferior to the original approved design, and in the case which upgrading works required under the FS(CP)O or FS(B)O have been completed, to such upgraded standards.

5.5.1 Means of Escape

For means of escape, the RI should consider the following rectification and repair methods and any other methods suitable and necessary in the circumstances of the building under repair:

- (a) Defective or missing exit signs shall be replaced or reinstated;

- (b) Inadequate lighting shall be rectified;
- (c) Defective balustrades, handrails and treads shall be repaired;
- (d) Door swing obstructing means of escape shall be rectified;
- (e) Obstruction to means of escape shall be removed; and
- (f) Non-complying locking devices shall be rectified.

5.5.2 Means of Access for Fire Fighting and Rescue

For means of access for fire fighting and rescue, the RI should consider the following rectification and repair methods and any other methods suitable and necessary in the circumstances of the building under repair:

- (a) Obstructions of access to building or within building shall be removed;
- (b) Dilapidated emergency vehicular access shall be repaired; and
- (c) Damage to integrity of fireman's lift lobby shall be reinstated.

5.5.3 Fire Resisting Construction

For fire resisting construction, the RI should consider the following rectification and repair methods and any other methods suitable and necessary in the circumstances of the building under repair:

- (a) Defective or dilapidated materials with inadequate fire resistance shall be repaired, replaced or reinstated;
- (b) Ventilation ducts shall be provided with dampers when passing through fire compartments;
- (c) Defective fire doors including self-closing devices, hinges and wire mesh glass panes shall be repaired, replaced or reinstated;

- (d) Fire door or glazing with inadequate fire resistance shall be replaced;
- (e) Non-emergency services in the escape staircases and lobbies shall be properly fire protected;
- (f) Damaged staircase enclosure and enclosure of protected lobby shall be reinstated to a standard not inferior to the original design;
- (g) Defective fire stops or sealing systems for services passing through compartment or fire resisting elements shall be replaced or reinstated; and
- (h) Defective or blocked staircase top vents shall be repaired or rectified.

5.5.4 Regular Maintenance

Regular maintenance is essential to ensure the upkeep of fire safety standards until the next cycle of inspection. The RI shall inform the owners to provide the following measures:

- (a) Ensure the fire doors are not wedged open;
- (b) Ensure the self-closing devices of fire doors are functional;
- (c) Clearance of obstructions in the escape routes and staircases; and
- (d) Do not allow unauthorised alterations and additions, particularly those that may adversely affect the fire safety standard of the building.

5.6 Drainage System

All drainage rectification and repair works shall comply with the following provisions:

- (a) Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations applicable at the time when the building was built; and
- (b) Relevant guidelines and requirements issued by the Drainage Services Department and the Environmental Protection Department.

5.6.1 Common Drains

For common drains, the RI should consider the following repair methods and any other methods suitable and necessary in the circumstances of the building under repair:

- (a) Defective sections shall be replaced;
- (b) All plastic pipes and fittings shall be durable, non-flammable, ultra-violet proof, resistant to corrosion and hot, acidic or alkaline liquids;
- (c) All cast iron pipes and fittings shall be suitably coated internally and externally to prevent corrosion;
- (d) All accessories such as fixing brackets, screws, bolts and nuts shall be resistant to corrosion;
- (e) All pipes used in vertical stacks shall be securely fixed immediately above and below all horizontal branch connections. All fixings for the brackets and connections shall be properly anchored; and
- (f) Pipes passing through walls or floors shall be protected by sleeves. The gap shall be filled and rendered waterproof and/or fireproof as necessary.

5.6.2 Underground Drains

For underground drains, the RI should consider the following repair methods and any other methods suitable and necessary in the circumstances of the building under repair:

- (a) Defective sections shall be replaced or repaired by using resin drain liner or other feasible means;
- (b) All materials used shall be chemical resistant. Flexible joints shall be provided for connecting pipes of rigid materials such as precast concrete pipes or clay pipes;
- (c) Minor blockage may be cleared by high-pressure water jet or rodding; and
- (d) Complete replacement of drain pipes.

5.6.3 Manholes, Surface Channels, Gullies and Catch Pits

For manholes, surface channels, gullies and catch pits, the RI should consider the following repair methods and any other methods suitable and necessary in the circumstances of the building under repair:

- (a) For concrete repair, the strength of the repair material shall not be inferior to that of the substrate;
- (b) For serious defects which are beyond repair, recasting shall be considered; and
- (c) Realignment and level adjustment shall be made if movement or settlement has occurred.

5.6.4 Regular Maintenance

The RI shall list out those components such as fixing brackets, screws, bolts and nuts requiring regular maintenance and replacement as necessary for maintaining the safety until the next inspection cycle.

5.6.5 Proof Tests

The RI shall conduct or direct the following or other suitable proof tests or survey to be carried out so as to ascertain the quality of the repair works:

(a) Ball Test

A ball is blown into the pipe to test clearing of obstructions and adequacy of fall.

(b) Air Test

For drains above ground, the pipe is filled with air at a pressure equal to 38mm water gauge and the pressure shall be maintained for 3 minutes. For underground drains, testing pressure is taken as 100mm of water gauge and shall be permitted to drop not more than 25mm water head in a period of 5 minutes.

(c) Water Test

For drains above ground and sections below the level of the lowest sanitary appliance, the pipe is filled with water up to flood level of lowest sanitary appliance or to a maximum static head of 5m measured from the plugged end and there is no visual sign of leakage for 15 minutes.

For underground drains, a minimum testing pressure of 1.5m water head above the invert level of the pipe shall be maintained throughout the test. The leakage shall be measured at 5 minutes interval for 30 minutes. The leakage shall not exceed the permitted value as determined in accordance with the equation given below:

$$\text{Permitted leakage} = d \times l \times \frac{t}{60} \text{ litre}$$

where d is the internal diameter of the pipe (m);

l is the length of the pipeline tested (m); and

t is the test period (min).

(d) Smoke Test

Pipe exceeding 300mm diameter is filled with smoke to test for smoke tight.

(e) CCTV survey

The CCTV survey is conducted by colour camera with integral lighting unit. The camera is capable of operating in 100% relative humidity and fitted with a rotating mirror for complete circumferential viewing. The system is capable of producing a clear, high quality picture of the entire periphery of the pipe that can be displayed on a monitor screen or saved as electronic record.

Proof tests may not be necessary for exposed vertical drains provided that the RI shall carry out inspection to ensure that the performance of such repaired vertical drains is not inferior to the required standards.

6. SUPERVISION AND CONTROL

6.1 Scope

Proper supervision and control is essential during the course of rectification and repair works for ensuring material quality, workmanship and safety.

Supervision and control shall cover the following:

- (a) Adequate measures to ensure a safe working environment;
- (b) Adequate control on the sequence of rectification and repair works, the erection and maintenance of scaffolds; and
- (c) Adequate measures to ensure that the rectification and repair works are carried out in accordance with the inspection findings of the RI.

The RI and the RC each have a role to play in safety and quality management. The RI and the RC should adopt the practice set out in the Code and make reference to PNBI, PNAP and PNRC, wherever appropriate. The RI and the RC shall comply with the BO and regulations and shall provide supervision to the rectification and repair works to ensure that the works are prepared, carried out and completed safely and up to the required standards, and that the building has been rendered safe after completion of the repair works. If emergency in relation to building safety is revealed during the course of repair works, the RI shall notify the BA and alert the owners and occupants immediately.

6.2 Safety Measures

Safety measures shall be provided during the course of rectification and repair works to safeguard the workers, occupants and the public as well as the adjacent buildings. The RI and the RC shall ensure that such measures have been provided and are suitable for the kind of rectification and repair works. The RI and the RC shall ensure that the works are carried out safely.

When carrying out rectification and repair works, proper protection and safe passage for the workers, occupants and the public must be provided and maintained at all times. Debris should be removed regularly to avoid overloading structures or obstructing the passage for the occupants and the public.

Bamboo scaffolds shall be designed and constructed in accordance with the Guidelines on the Design and Construction of Bamboo Scaffolds issued by the BD. Sufficient lighting shall be provided. Reference shall also be made to the Code of Practice for Bamboo Scaffolding Safety issued by the Labour Department.

More frequent inspections by the RI and the RC on the integrity of the bamboo scaffolds shall be made when a tropical cyclone warning signal or strong monsoon signal is announced or when there are severe gusts. The RI and the RC shall ensure that the bamboo scaffolds are dismantled and removed immediately after the completion of the rectification and repair works.

6.3 Security Measures

The RC should communicate with the property management company, Owners' Corporation and owners of the building for ensuring security. The RC should post notice on conspicuous parts of the building to remind owners and occupiers to enhance security of their premises. Reference should also be made to the relevant PNRC issued by the BA from time to time.

6.4 Supervision Requirements of Registered Inspector

The RI shall examine and supervise all the rectification and repair works carried out by the RC at such frequency and extent as he considers appropriate to ensure that the works are prepared, carried out and completed to the required standards.

Defects and deficiencies mentioned in the Inspection Report and those identified during the repair stage shall be repaired or rectified. The RI shall supervise and examine the preparation, rectification and repair works

to ensure that the works meet the minimum technical standards required. The RI may designate a person as his representative to provide supervision to the repair of the building elements at the stages of the rectification and repair works specified in Appendix VI. The qualification and experience required of the person shall be at least a certificate or diploma holder in the field of construction including architecture, building studies, engineering and surveying with minimum total relevant working experience of 2 years.

If the building owners appoint the same RI to carry out both the building inspection and supervision of building repair works, the RI may include the particulars, qualifications and experience of the RI's representative in the repair proposal of the Inspection Report for submission to the BA.

The RI shall notify the BA in writing of any appointment or change of his representative and provide the BA with the particulars, qualifications and experience of his representative in accordance with the requirements stipulated in the B(I&R)R. The RI shall assume the overall responsibility for the supervision of the RC, even when part of the supervision is performed by his representative.

Supervision requirements of some typical rectification/repair works and proof tests to be provided by the RI and his representatives are listed in Appendix VI. For rectification/repair works and proof test that are not covered in Appendix VI, the RI shall examine and supervise the repair works and proof tests at such frequency and extent as he considers appropriate in fulfilling his duties as an RI.

For rectification/repair works that fall within Class I minor works, supervision should also be made in accordance with the requirements of the Technical Memorandum for Supervision Plans and Code of Practice for Site Supervision as necessary.

The RI shall inspect the entire rectification and repair works of the building upon the completion of works by the RC prior to his submission of the certificate of completion to the BA.

6.5 Supervision Requirements of Registered Contractor

The RC shall provide continuous supervision to the workers for carrying out the rectification and repair works, and the erection and maintenance of scaffolds. The repair and rectification works shall be in compliance with the requirements stipulated in the BO and regulations.

The RC shall give sufficient advance notice to the RI for examination of the preparation, and rectification and repair works.

7. REPORTING

7.1 Scope

After completion of the prescribed inspection and the prescribed repair, as necessary, the RI shall be responsible for preparation of the Inspection Report and the Completion Report based on the inspection, assessment and detailed investigation (if any) and the rectification and repair works carried out.

7.2 Inspection Report

The Inspection Report shall contain the information specified in Appendix VII.

The Inspection Report together with a certificate of building inspection in the specified form (Form MBI 3 or MBI 3a) shall be submitted to the BA.

The RI shall duly sign the Inspection Report.

If rectification and repair works are required to be carried out after the inspection, the RI should demarcate in the repair proposal the part of works that are either minor works to be commenced in accordance with the simplified requirements under the MWCS, or subject to the prior approval and consent of the BA under the BO. The repair proposal should be signed by the RI and include the plans, method statements and details of the works.

For repair works where full approval and consent of the BA is required, a separate submission of the plans and the associated documents by the AP appointed by the owner for approval by the BA under section 14(1) of the BO should be made separately.

Whilst the MBIS requires the carrying out of basic repair works to render the building safe, the owners may wish to take this opportunity to carry out other improvement or upgrading works concurrently, including those under the purview of the FS(CP)O or FS(B)O. In such circumstances, the repair works required under the MBIS should be clearly stated in the repair proposal and should be distinguished from the additional improvement or upgrading works.

7.3 Completion Report

Upon completion of the rectification and repair works, the RI shall prepare a Completion Report containing all the information specified in Appendix VIII.

The Completion Report together with a certificate of building repair in the specified form (Form MBI 4) shall be submitted to the BA upon completion of the rectification and repair works.

The RI shall duly sign the Completion Report.

For the record of repair works, the RI should specify the part of works that have been completed under the MWCS or the full approval and consent system under the BO. If any record plans and/or photos have been submitted to the BD under the MWCS or the full approval and consent system, the same documents are not required to be submitted again to the BD under the MBIS. However, a statement should be provided to confirm the previous submission of such documents and quote the case references.

Part II MANDATORY WINDOW INSPECTION SCHEME

8. INTRODUCTION

This part of the Code applies to the inspection and repair of windows in a building carried out under the MWIS, in pursuance of a notice served by the BA under section 30C of the BO. It specifies the technical and procedural requirements for the carrying out of window inspection and repair works under the MWIS.

This part also provides for the scope of inspection, requirements on inspection and repair works as well as the acceptance criteria for quality control. The supervision requirements to be met by the QP and the RC are also set out for ensuring consistency of quality and standards.

The inspection shall cover all windows and glass louvers including window walls in individual private premises and common parts of the buildings.

Curtain walls are subject to the MBIS and not the MWIS.

Upon completion of the inspection, prescribed repair is required to be carried out to make good all the deficiencies and defects identified in the inspection. It is envisaged that the majority of the window repair works under the MWIS are minor works which are also subject to the control of the MWCS. Therefore, if the repair works to be carried out under the MWIS are minor works under the B(MW)R, the works shall be commenced according to the simplified requirements as stipulated in the BO and the B(MW)R.

For repair works which are not minor works nor exempted building works, the BA's prior approval of plans and consent to the commencement of works under the BO are required. The submission of relevant documents and specified forms required under the MWCS or the full approval and consent system, as the case may be, should be made apart from that required under the MWIS.

Procedural requirements for inspection and repair under the MWIS are given in Appendix IX.

9. DUTIES OF QUALIFIED PERSON AND REGISTERED CONTRACTOR

9.1 Qualified Person

The person appointed to carry out window inspection or supervision of window repair works under the MWIS shall be a person whose name is for the time-being on the authorized persons' register, structural engineers' register, inspectors' register, register of general building contractors or register of minor works contractors who are registered for window or window wall works, kept by the BA under the BO other than those subject to any disciplinary order under section 7(2)(bb) or (d) or 13(4)(d) or (e) of the BO (the QP).

For avoidance of doubt, the eligible RMWC acting as QP may also inspect the lower part of the window or window wall that acts as a protective barrier. However, as for the carrying out of the prescribed repair to the window or window wall, RMWC are only qualified to carry out minor works belonging to the class, type and item for which they are registered. In this connection, if the prescribed repair involves the part of a window or window wall which also serves as a protective barrier, the appointment of an appropriate RMWC qualified to carry out repair of protective barrier is required.

The duties of and the procedures required of the QPs under the MWIS are stipulated in the BO and the subsidiary regulations including the B(I&R)R. In this connection, QPs should observe, amongst others, the followings:

Main Duties:

- (a) Carry out window inspection personally where the QP is a natural person (i.e. an AP, RSE, RI or self-employed workers registered as RMWC) or carry out window inspection personally by a representative of the QP as prescribed in the B(I&R)R where the QP is a not a natural person (i.e. an RGBC or RMWC that is a company);
- (b) Provide proper supervision of the carrying out of window repair works; and where an AP has been appointed to provide supervision

of the works, coordinate for compliance with the BO and the B(I&R)R with regard to the requirements of the MWIS;

- (c) Ensure the repair materials to be used are not defective and comply with the provisions of the BO;
- (d) Ensure the repair materials to be used have been mixed, prepared, applied, used, erected, constructed, placed or fixed in the manner required for such materials under the BO;
- (e) Ensure the windows for which he is appointed to supervise the repair are safe or have been rendered safe;
- (f) Notify the BA of any case of emergency in relation to window safety revealed during the course of window inspection or supervision of window repair works; and
- (g) Comply generally with the BO.

If the appointed QP is an RGBC or RMWC registered for window or window wall works, the QP may also act as the RC to carry out the window repair works.

Main Procedural Requirements:

- (a) Notification to the BA of his appointment as QP in the specified form (Form MWI 1) within 7 days after the date of appointment;
- (b) Notification to the BA in writing of his cessation to act as QP within 7 days after the date on which the QP has ceased to act;
- (c) Where no prescribed repair is required, submission of a certificate in the specified form (MWI 2a) to the BA within 14 days after completion of a prescribed inspection and delivery of the same on the same day to the person for whom the prescribed inspection is carried out;
- (d) Where prescribed repair is required, and

- (i) the same QP is appointed for both the prescribed inspection and supervision of prescribed repair
 - submission of a certificate in the specified form (Form MWI 3) to the BA within 14 days after completion of a prescribed repair; and
 - delivery of the same on the same day to the person for whom the prescribed repair is carried out.
- (ii) the QP is appointed for the prescribed inspection only
 - submission of an Inspection Report⁶ and a certificate in the specified form (Form MWI 2) to the BA within 7 days after completion of a prescribed inspection;
 - delivery of the same on the same day to the person for whom the prescribed inspection is carried out; and
 - delivery of the same to the QP appointed for supervision of the prescribed repair within 1 month after the date of submission to the BA or before the commencement of the prescribed repair, whichever is the earlier.
- (iii) the QP is appointed for the supervision of the prescribed repair only
 - submission of any revised remedial proposal, if applicable, to the BA within 7 days after certain matter is revealed or circumstance arises, during the course of the prescribed repair, in response to which the QP considers it necessary to revise the proposal;
 - submission of a certificate in the specified form (Form MWI 4) to the BA within 14 days after completion of a prescribed repair;

⁶ Inspection Report should include a report on the findings of the window inspection (including inspection records and test results) and a proposal for the repair works required to render the windows safe.

- delivery of the same on the same day to the person for whom the prescribed repair is carried out; and
 - if the QP so appointed is not acting as the RC to carry out the prescribed repair, delivery of the Inspection Report before the commencement of the prescribed repair and any revised remedial proposal on the same day on which the revised proposal is submitted to the BA to the RC.
- (e) Where the window repair works are designated minor works or involving works that require the prior approval of plans and consent to commencement of works of the BA under the BO, apart from the above procedural requirements under the MWIS, the procedural requirements under the MWCS or the full approval and consent system, as the case may be, should also be complied with as appropriate.

The specified forms for the MWIS are listed in Appendix X.

9.2 Registered Contractor

The contractor appointed to carry out the necessary repair works under the MWIS shall be a contractor whose name is for the time-being on the register of general building contractors or register of minor works contractors who are registered for window or window wall works, kept by the BA under the BO (the RC). RMWC are qualified to carry out minor works belonging to the class, type and item for which they are registered.

Without prejudice to other provisions of the BO, the RC appointed to carry out repair works must ensure that the windows for which he is appointed to repair have been rendered safe.

10. INSPECTION

The QP shall carry out window inspection personally if he is a natural person. Where the QP is not a natural person, the window inspection shall be carried out personally by a representative of the QP as prescribed in the B(I&R)R. The inspection shall cover all window elements of openable and fixed panels.

All components of window elements shall be inspected from the interior of private premises and the common parts. The inspection and assessment shall include the following:

- (a) Rivets and screws;
- (b) Hinges;
- (c) Sliding tracks, shoes and window stays;
- (d) Glass panes;
- (e) Sealant and putty;
- (f) Frames; and
- (g) Any other elements that the QP considers may affect the safety of the windows under inspection.

The identification of signs of deterioration or defective window components shall cover the following:

- (a) Broken or cracked glass panes;
- (b) Defective sealant and putty;
- (c) Window sashes difficult to open or close;
- (d) Deformed or insecure window frames and sashes;

- (e) Greyish white powder or rust at hinges, tracks, screws, rivets and locks;
- (f) Loosen or missing rivets and screws;
- (g) Missing or defective gasket;
- (h) Deformed or missing hinges; and
- (i) Any other defects that the QP considers may affect the safety of the windows under inspection.

If emergency in relation to window safety is revealed during the inspection of windows, the QP shall notify the BA and alert the owners and occupants immediately.

11. REPAIR

All windows shall remain safe until the next cycle of inspection. Reference should be made to the relevant PNBI, PNAP and PNRC issued by the BA from time to time.

The specified fire resistance capability of windows shall be maintained after rectification.

All defective window components shall be replaced. The renewed components shall be of such material and size not inferior to that of the original design.

For repair or replacement of windows in buildings or commercial premises under the jurisdiction of the FS(CP)O or FS(B)O, QP's attention is drawn to the requirements on fire resistance capability for windows as required thereunder.

11.1 4-bar Hinges

Where a defective 4-bar hinge is to be replaced, it shall be of stainless steel with adjustable friction shoes, and all stainless steel bars of the hinge should preferably have a minimum thickness of 2.5mm.

11.2 Rivets and Screws

For better corrosion resistance, stainless steel rivets or screws shall be used to replace defective or missing rivets or screws. Stainless steel rivets shall be of 4.8mm diameter and stainless steel screws of 5mm diameter. Measures against bi-metallic action shall be provided.

When replacing a 4-bar hinge, sufficient anchorage shall be provided for the stainless steel rivet or screw to fasten the new hinge to the window frame and the openable sash. A positive mechanical fixing, for example, by inserting a stainless steel or hot dip galvanized steel plate or bar/angle of not less than 3mm thick inside the section to provide sufficient threads for the screws may be adopted.

As an alternative, the window sections for fixing the hinge may be thickened locally to not less than 5mm. When insertion of an extra piece of stainless steel or hot dip galvanized steel bar/angle inside the section or local thickening to 5mm is not adopted, the QP shall ensure that the thickness of the window frame and sash sections for fixing the 4-bar hinge can provide sufficient anchorage for the stainless steel rivet or screw.

Where the original rivet/screw holes have been enlarged due to corrosion, the QP shall consider adding stainless steel rivets or screws to the frame at proper positions in addition to the original to ensure safety.

Reference to the installation requirements of aluminium windows can be made to PNAP APP-116.

11.3 Regular Maintenance

Whilst the repair works are required to be safe until the next cycle of inspection, regular maintenance such as light lubrication of hinges and clearing of dust and dirt at hinges and tracks are required to maintain safety of the windows until the next inspection in five years. The QP shall advise the owners of the need for such regular maintenance.

12. SUPERVISION AND CONTROL

12.1 General

Proper supervision and control is essential during the course of window repair works for ensuring material quality, workmanship and safety.

Supervision and control shall cover the following:

- (a) Adequate measures to ensure a safe working environment;
- (b) Adequate control on the window repair works, the erection and maintenance of scaffolds, if required; and
- (c) Adequate measures to ensure that the window repair works are carried out in accordance with the inspection findings of the QP.

The QP and the RC each have a role to play in safety and quality management. The QP and the RC shall adopt the practice set out in the Code and make reference to the relevant PNBI, PNAP and PNRC, as well as the Technical Guidelines on Minor Works Control System wherever appropriate. The QP and the RC shall comply with the BO and regulations and shall provide supervision to the window repair works to ensure that the works are prepared, carried out and completed safely and up to the required standards including those on fire resistance, and that the windows have been rendered safe after completion of the repair works.

If emergency in relation to window safety is revealed during the course of supervision of window repair works, the QP shall notify the BA and alert the owners and occupants immediately.

12.2 Safety Measures

Safety measures shall be provided during the repair to safeguard the workers, occupants and the public as well as adjacent buildings. The QP and the RC shall ensure that such measures have been provided and are suitable for the window repair works concerned. The QP and the RC shall ensure that the works are carried out safely.

Removed window components shall be cart away immediately and not accumulated at places obstructing the passage for the occupants and the public.

Bamboo scaffolds shall be designed and constructed in accordance with the Guidelines on the Design and Construction of Bamboo Scaffolds issued by the BD. Sufficient lighting shall be provided. Reference shall also be made to the Code of Practice for Bamboo Scaffolding Safety issued by the Labour Department.

More frequent inspections by the QP and the RC on the integrity of the bamboo scaffolds shall be made when a tropical cyclone warning signal or strong monsoon signal is announced or there are severe gusts. The QP and the RC shall ensure that the bamboo scaffolds are dismantled and removed immediately after the completion of the repair works.

12.3 Security Measures

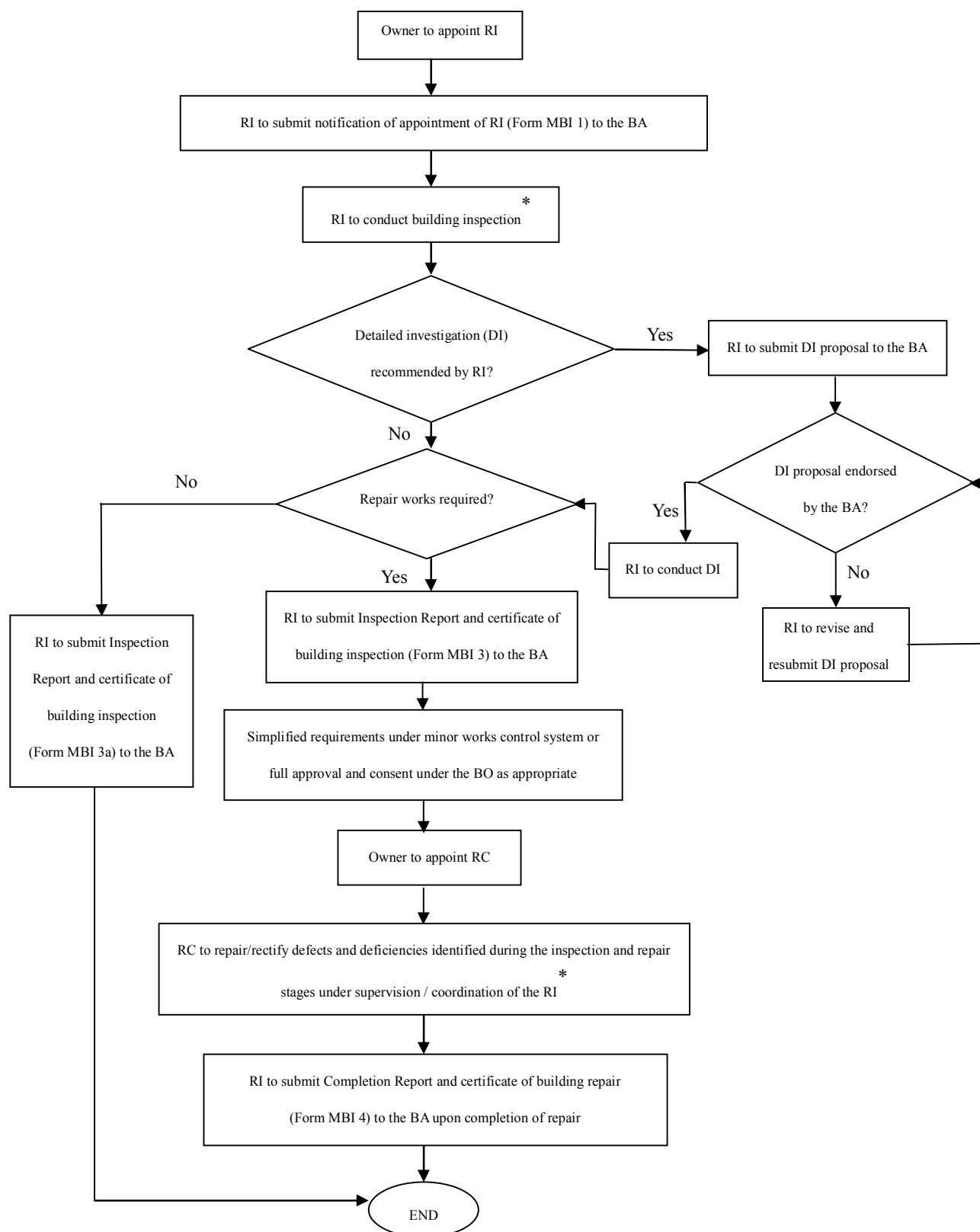
The RC should communicate with the property management company, Owners' Corporation and owners of the building for ensuring security. The RC should post notice on conspicuous parts of the building to remind owners and occupiers to enhance security of their premises. Reference should also be made to the relevant PNRC issued by the BA from time to time.

12.4 Supervision Requirements

The QP shall provide proper supervision to the window repair works carried out by the RC to ensure that the works are prepared, carried out and completed to the required standards. The RC shall carry out the window repair works in accordance with the inspection findings of the QP and shall be responsible for the safe erection and maintenance of scaffolds.

When the RC appointed for window repair works also acts as the QP for the window inspection, the RC shall carry out necessary window repair works to ensure that the windows shall be safe until the next cycle of inspection. The RC shall be responsible for the safe erection and maintenance of scaffolds.

Procedural Requirements for MBIS



* RI may be assisted by his representative in: (i) ascertaining the extent of defects that he has established the nature and cause; and/or (ii) supervision of repair works

Pre-inspection Preparation

The RI shall obtain and review the following background building information prior to the carrying out of building inspection:

- (a) OP date;
- (b) Usage;
- (c) Approved plans;
- (d) Plans and details of minor works carried out under the simplified requirements;
- (e) Plans and documents submitted to the BA under section 39C of the BO;
- (f) Whether the subject building or premises is subject to the FS(CP)O or FS(B)O and whether Fire Safety Directions or Fire Safety Improvement Directions have been served;
- (g) Previous records on building inspection, rectification and repair; and
- (h) Maintenance manual.

Factor of Structural Performance

The Factor of Structural Performance (FSP) shall be determined with recognized standards taking into consideration the following requirements:

Loadings

The characteristic dead, imposed, wind, water and soil loads shall be calculated in accordance with the provisions of the BO and allied regulations. The RI may use the original BO and original design codes which the approved building and structural plans based on. If the approved building plans and structural plans cannot be retrieved from the BD or the building owners, the RI may determine the appropriate design loadings based on the OP date.

Materials

The characteristic strengths and properties of materials in the original design may be used in the assessment where the RI is satisfied that the materials have not deteriorated below their design strengths and properties.

The RI shall ensure that the material properties assumed in the evaluation of FSP shall be valid until the next cycle of inspection. In this regard, the RI shall devise the repair proposal such that all the materials shall be adequately protected against deterioration.

Worst Credible Strength

Where the RI is not certain about the material properties, he may use the approach of WCS under the following circumstances:

- (a) An initial assessment using characteristic values has shown that a structural element may be incapable of carrying the full assessment loading;
- (b) A structure suffers from damage or deterioration resulting in the actual

strength being less than the characteristic values; or

- (c) Information in respect of the characteristic values adopted in the design cannot be retrieved.

For reinforcement and prestressing tendons, the WCS may be obtained by extracting and testing bar or tendon specimens. However, it is generally impractical to extract specimens from critical sections. In obtaining specimens for testing, the RI shall ensure that the removal of specimens will not reduce the load carrying capacity of the element under consideration. Care shall be taken to avoid mechanical damages of the specimens in removing the adjacent concrete. In cutting out the selected specimens, care shall be taken to avoid damages of the adjacent bars which may be highly stressed at the location in question.

For concrete, the RI shall define a region, where there is no more than the normal random variation in concrete strength. The WCS at a location may be taken as the lower-bound to the estimated in-situ concrete strength, which can be determined in accordance with the equation given below:

$$WCS = \frac{\sum_1^n f_c}{n} \left(1 - \frac{0.12}{\sqrt{n}} \right)$$

where f_c is the strength of individual specimen

n is the number of test specimens for determination of WCS

In applying the above equation, the RI must be satisfied that the concrete cores are representative of the location under consideration. The WCS should be based on a minimum of three cores.

For assessment of the WCS for a structure as a whole, the RI shall exercise professional judgment to determine the number and location of cores required to give a representative value for the in-situ concrete strength. However, the sampling rate shall be not less than one core per 50m³ of concrete. The WCS shall be taken as either the least of the individual test result or the value derived in accordance with the above equation.

Modified Partial Safety Factors

For determining factored load effects on reinforced concrete and steel structures based on the Code of Practice for the Structural Use of Concrete and the Code of Practice for the Structural Use of Steel respectively, modified partial safety factors for loads given in the table below shall be used.

Where the concrete strength is based on the WCS from cores, the partial safety factors for material strength (γ_m) for concrete in flexure or axial load may be taken as 1.25.

Where the reinforcement strength is taken from the characteristic or minimum specified strength, the value of γ_m for reinforcement shall be taken as 1.1. Where the reinforcement strength is based on a WCS from test results, the value of γ_m for reinforcement may be taken as 1.05.

If the RI uses other recognized standards for determining the FSP, the proposed standard shall be used in its entirety, modified partial safety factors given in this appendix shall not be used.

Modified Partial Safety Factors for Determination of Factored Load Effects (γ)

Load combinations and values of γ for the Ultimate Limit State							
Load Combination	Load Type						
	Dead		Imposed		Earth Pressure	Water Pressure	Wind
	Adverse	Beneficial	Adverse	Beneficial			
Dead and Imposed	1.2 ^a	1.0 ^b	1.5	0	1.3	1.1 ^c	-
Dead and Wind	1.2 ^a	1.0 ^b	-	-	1.3	1.1 ^c	1.4
Dead and wind and imposed	1.2 ^a	1.0 ^b	1.2	0	1.2	1.1 ^c	1.2

Notes :

- Dimensions shall be confirmed by site measurement.
- Applicable to all dead load when it causes the worst total load effects.
Patterned loading on alternate spans needs not be considered.
- Water pressure shall be calculated from the worst probable water level.

Repair of Rendering and Tiling

Repair Method and Materials

The RI shall ensure the removal of all debonded rendering or tile finishes including the mortar bedding until a sound substrate is reached. The substrate shall be free from dirt, grease, voids and loose particles etc

The RI shall ensure that the repair materials, their preparation and application are suitable for the defects. Application of proprietary materials shall be in accordance with the manufacturer's specifications.

In general, rendering should not have a total thickness in excess of 20mm. Each layer of cement rendering, consisting of 1 part cement and 3 parts sand, should not exceed 10mm thick. Reference should be made to the guidelines provided in Appendix A to PNAP ADV-31 with regard to application of bonding agent or proprietary tile adhesive.

Proof Tests

After completion of the repair works, the RI shall conduct or direct the proof tests to be carried out in accordance with the scope set out in the repair proposal. Integrity of the repair works shall be ascertained by suitable proof tests such as hammer-tapping or other feasible means. The integrity of all repaired areas and about 200mm from the surrounding of the repair shall be checked.

For tiling repair, the RI shall conduct or direct pull-off tests or other suitable proof tests to be carried out to ensure quality of the repair works. Pull-off tests shall be carried out at a minimum rate of one number per 25m² of repaired surface area for each type of wall tiles. A minimum of one number pull-off test shall be conducted for each building elevation repaired. For complete retiling, the pull-off test shall be conducted at a minimum rate of one number per storey. The pull-off stress shall be not less than 0.5N/mm².

Should any pull-off test fail, the RI shall order further tests in accordance with the following criterion, until all tests are successful:

$$\text{Number of further test} = (n^2 - 2n + 3)$$

where n is the total number of accumulated unsuccessful tests

The RI shall ensure that all defective repair shall be made good to comply with the requisite requirements.

Repair of Reinforced Concrete

(A) Spalling

(I) Patch Repair

(a) General

Patch repair is a common repair method for spalling, which is suitable for localized and non-critical defects with repair depth less than 75mm.

Patch repair is not suitable for situations where structural adequacy of an element is highly dependent on the repair. As such, this method is not suitable for the repair of critical structural elements like columns with extensive defects.

(b) Materials

Cementitious mortar and polymer modified cementitious mortar are the most common types of repair mortar. The RI shall ensure that the compressive strength of the repair mortar shall not be inferior to that of the concrete substrate.

Prior to the commencement of the patch repair works, the RI shall conduct tests on compressive strength and bond strength of the repair mortar at an age of 7 days. A minimum of two specimens shall be tested for each of the above strength properties. The RI shall include the test results in the Completion Report.

Primer for reinforcement may be rust inhibitor, cement-based reinforcement primer or epoxy-based reinforcement primer.

Bond coat may be cement-based, epoxy-based or acrylic-based.

All proprietary products (e.g. additives, primer, bond coat etc) shall be applied in accordance with the manufacturer's

specifications.

New reinforcement shall comply with Construction Standard CS2 and shall be of such material grade and size not inferior to the original design. The RI shall include the mill certificates in the Completion Report.

(c) Hacking

All spalled concrete shall be thoroughly removed. The reinforcement bar shall be exposed to such an extent having a gap of 10mm to 20mm around for ensuring effective adhesion of repair mortar to the concrete substrate. The exposed concrete surface shall be roughened to expose aggregates and to remove all loose parts and voids.

(d) Treatment to Reinforcement

The exposed reinforcement shall be wire-brushed to remove all loose mill scale and rust. Where the reinforcement is corroded seriously (i.e. loss of sectional area greater than 10%), it shall be replaced by new reinforcement with adequate lapped length to the remained existing reinforcement. The reinforcement shall be primed after cleaning so as to enhance protection against corrosion.

(e) Application of Repair Mortar

After the reinforcement primer has cured, bond coat shall be applied to the concrete substrate to enhance bond between the repair material and the concrete substrate.

Each layer of the repair mortar shall be placed in thickness not less than 10mm unless otherwise recommended by the manufacturer. The RI shall ensure that the patch repair works are sound and not hollow.

(f) Proof Tests

After the completion of patch repair, the RI shall conduct or direct proof tests such as hammer-tapping or other feasible means to be carried out so as to ascertain the integrity of the

repair works.

The RI shall conduct or direct pull-off tests or other suitable proof tests to be carried out to ensure quality of the repair works. Pull-off tests shall be carried out at a minimum rate of one number per 25m² of the patch repaired surface. However, a minimum of one number pull-off test shall be conducted for each day's patch repair works. Prior to conducting the pull-off tests, the RI shall ensure that the patch repair works have achieved adequate strength. The pull-off stress shall be not less than 0.5N/mm² unless fracture takes place within the concrete substrate.

Should any pull-off test fail, the RI shall conduct further tests, in accordance with the following criterion, until all tests are successful:

$$\text{Number of further test} = (n^2 - 2n + 3)$$

where n is the number of accumulated unsuccessful tests

The RI shall ensure that all defective repair are made good to comply with the requisite requirements.

(II) Recasting

(a) General

Where there is extensive spalling, significant deterioration or high chloride content (i.e. greater than 0.8% by weight of cement) in the concrete substrate, or significant corrosion of reinforcement, the RI should adopt recasting.

The RI shall provide formwork and adequate propping to the proposed recast reinforced concrete member until the repaired element has gained adequate strength.

(b) Materials

The RI shall ensure that the compressive strength of the new cast

concrete shall not be inferior to that of the parent concrete.

The RI shall conduct sampling of concrete and compressive test of concrete test cubes in accordance with Construction Standard CS1. Testing shall be carried out by a laboratory accredited under the Hong Kong Laboratory Accreditation Scheme. Concrete cube size, rate of sampling for testing and acceptance criteria for compressive strength shall be as set out in the Building (Construction) Regulation. The RI shall include the test reports in the Completion Report.

New reinforcement shall comply with Construction Standard CS2 and shall be of such material grade and size not inferior to the original design. The RI shall include the mill certificates in the Completion Report. If the extent of replacement of reinforcement is substantial, the RI should exercise professional judgment and conduct appropriate tests where necessary. Reference may be made to PNAP APP-45.

(c) Hacking

All spalled concrete shall be thoroughly removed. The exposed concrete surface shall be roughened to expose aggregates and to remove all loose parts and voids.

(d) Treatment to Reinforcement

The exposed reinforcement shall be wire-brushed to remove all loose mill scale and rust. All damaged reinforcement including those corroded seriously shall be replaced by new reinforcement with adequate lapped length to the remained existing reinforcement.

(e) Concreting

The RI shall ensure that the concrete has been compacted adequately by using vibrator or other suitable methods.

(f) Proof Tests

The RI shall conduct or direct rebound hammer test or other suitable proof tests to be carried out so as to ascertain the quality

of the recast concrete works.

(B) Cracks

Depending on the location, width and extent of cracks in reinforced concrete elements, the RI may select the following methods or other feasible means:

- (a) Brushing cement grout
- (b) Opening up of larger cracks and conducting patch repair
- (c) Pouring low viscosity polymer resin
- (d) Pressurized injection of epoxy resin

Prior to conducting crack repair, the cracks shall be thoroughly cleaned, dried and all loose debris removed by brushing or compressed air.

Application of epoxy resin for crack repair shall be in accordance with the manufacturer's instructions and by means of suitable devices. Compressive strength of the epoxy resin shall be compatible with the concrete substrate.

Supervision Requirements of RI

Building Elements	Level of Supervision
External Elements	
Preparation (a) Verifying hacking of loose finishes and preparation of bedding (b) Examining substrate prior to laying tile finishes (c) Checking location, alignment and size of drill holes for new anchor bolts	1 2 1
Repair (a) Examining first trial bedding mortar (b) Checking dimensions of replaced cladding panels and curtain wall elements (c) Supervising installation of new anchor bolts (d) Supervising installation of cladding panels (e) Supervising application of structural sealant for curtain wall works	2 1 1 1 1
Proof Test (a) Supervising hammer-tapping (b) Conducting pull-off tests	1 2

Building Elements	Level of Supervision
Structural Elements	
Preparation (a) Verifying hacking of damaged, loose, hollow sounding concrete, spalling and honeycomb (b) Supervising opening up of concrete for cracks (c) Checking spacing between sound concrete and exposed reinforcement (d) Checking removal of rust and mill scale	1 1 1 1
Concrete Repair (a) Checking new replacing reinforcement (b) Examining reinforcement and sound concrete prior to application of bond coat and repair mortar (c) Supervising application of bond coat and repair mortar (d) Supervising resin injection for cracks	1 2 1 1
Recasting (a) Checking formwork and falsework (b) Supervising concrete mixing (c) Examining reinforcement prior to concreting (d) Supervising concrete compaction and curing	1 1 2 1
Structural Steel Repair (a) Checking corrosion protection to steel elements and their connections (b) Supervising replacement of structural members including provision of temporary supports (c) Checking welded joints of structural members	1 2 1

Building Elements	Level of Supervision
Structural Elements	
Proof Test (a) Supervising hammer-tapping (b) Conducting pull-off test (c) Conducting rebound hammer tests, repair mortar compressive strength and bond strength tests, and concrete cube tests (d) Conducting strength tests on new reinforcement and structural steel wherever necessary (e) Conducting non-destructive testing of welds	 1 2 1 1 2

Building Elements	Level of Supervision
Fire Safety Elements	
Rectification and Repair (a) Supervising application of fire resisting materials including measurement of coat thickness (b) Supervising repair or rectification of fire safety elements such as elements of construction, walls, fixed light, doors, fire shutters.	 1 1

Building Elements	Level of Supervision
Drainage System	
Preparation (a) Checking alignment, fall and sub-grade material prior to laying underground drain pipes	1
Rectification and Repair (a) Checking fixings for brackets and connections (b) Checking connection of pipes and connections to last manhole prior to backfilling	1 1
Proof Test (a) Supervising ball tests, air tests, water tests and smoke tests (b) Conducting CCTV survey	1 2

Notes:

Level 1 supervision – may be performed by RI's representative

Level 2 supervision – shall be performed by the RI

Inspection Report - Essential Information

Cover Page

The cover page shall contain the following information:

- (a) Building name, address and the lot number
- (b) MBIS notice number
- (c) Name, certificate of registration number and date of expiry of registration of the RI
- (d) Date of the report

Summary

This section shall contain a concise summary on the condition of the building inspected and the RI's recommendations.

Building Information

The report shall contain the following building information:

- (a) OP date
- (b) Original and current usage
- (c) Number of storeys and units
- (d) Approved floor plans where available
- (e) Principal construction materials

- (f) Salient information of previous inspection and repair, if available
- (g) Name of Incorporated Owners and management company, if any

Reference Documents

This section shall list the documents which have been reviewed by the RI including the following:

- (a) Approved building, structural, drainage, alteration and addition plans
- (b) Plans and details of minor works carried out under the simplified requirements
- (c) Plans and documents submitted to the BA under section 39C of the BO
- (d) Fire Safety Directions served by the BD on the building owners, if any
- (e) Other relevant documents

Method Statement for Building Inspection

This section shall give the method statement for inspection of the various types of building elements covered by the MBIS. Where the RI conducts tests including those for the detailed investigation wherever applicable, details of the tests such as the type, sampling rate, location and method shall also be given.

Inspection Results

This section shall include the following information:

- (a) Daily inspection records, in which details including the time and date of inspections, locations and items or parts of buildings that have been inspected etc.

- (b) Particulars, qualifications and experience of the RI's representative that the RI has engaged to assist him in ascertaining the extent of the defects in accordance with section 3.3.2(B).
- (c) Photos for each elevation of the building
- (d) Summary of all building defects and deficiencies in table form accompanied by annotated photos and marked up plans, where necessary, or inspection results accompanied by annotated photos showing conditions of the building inspected where rectification and repair works are not required (see Appendix XI)
- (e) Record of defects extending from common parts or external walls to individual flats to which the RI intends to draw the BD's attention, e.g. sections 3.3.3 and 3.4.3 refer
- (f) Record of defective flat entrance door of private premises having adverse effects on the fire safety, section 3.5.3 refers
- (g) Results of all tests carried out during the inspection stage
- (h) A statement reporting that, if the building is subject to Fire Safety Directions, the upgrading works have not yet been completed, section 3.5.2(A) refers
- (i) Record of all UBW identified, including those obstructing the building rectification and repair wherever applicable, in table form accompanied by annotated photos and marked up plans, section 3.7.3 refers
- (j) Report on signs of suspected subdivision of flats, section 3.7.1 refers

Sample inspection records are given in Appendix XI for reference.

Assessment

Based on the findings of the building inspection and detailed investigation, where necessary, the RI shall assess the conditions of the whole building and its major elements. The RI shall prepare a repair proposal for all defects and deficiencies identified, wherever applicable.

The RI shall also highlight those building components and areas which require regular maintenance, replacement or management for maintaining safety until the next cycle of inspection and advise the owners of the need for regular maintenance and replacement of such components.

Repair Proposal

Under the MBIS, building elements that have become dangerous or liable to become dangerous shall be repaired. Where rectification and repair works are required, the repair proposal shall contain the following information:

- (a) Marked-up plans, where appropriate, showing the demarcation of the different types of rectification and repair works to be carried out in accordance with the simplified requirements under the MWCS (specifying the class, type, and item), exempted building works or works requiring prior approval of plans and consent to the commencement of works from the BA
- (b) Method statement for rectification and repair works including details of the proposed methods, materials, specifications and precautionary measures
- (c) Proposal of proof tests
- (d) Supervision proposal, if applicable
- (e) Particulars, qualifications and experience of the RI's representative where the RI is appointed for both building inspection and supervision of building repair works and he designates a person to provide supervision on his behalf in accordance with section 6.4

Whilst the MBIS requires the carrying out of basic repair works to render the building safe, the owners may wish to take this opportunity to carry out other improvement or upgrading works concurrently, including those under the purview of the FS(CP)O or FS(B)O. In such circumstances, the repair works required under the MBIS should be clearly stated in the repair proposal and should be distinguished from the additional improvement or upgrading works.

Completion Report - Essential Information

Cover Page

The cover page shall contain the following information:

- (a) Building name, address and the lot number
- (b) MBIS notice number
- (c) Name, certificate of registration number and date of expiry of registration of the RI
- (d) Name, certificate of registration number and date of expiry of registration of the RC
- (e) Date of the report

Rectification and Repair Works

This section shall contain the following information:

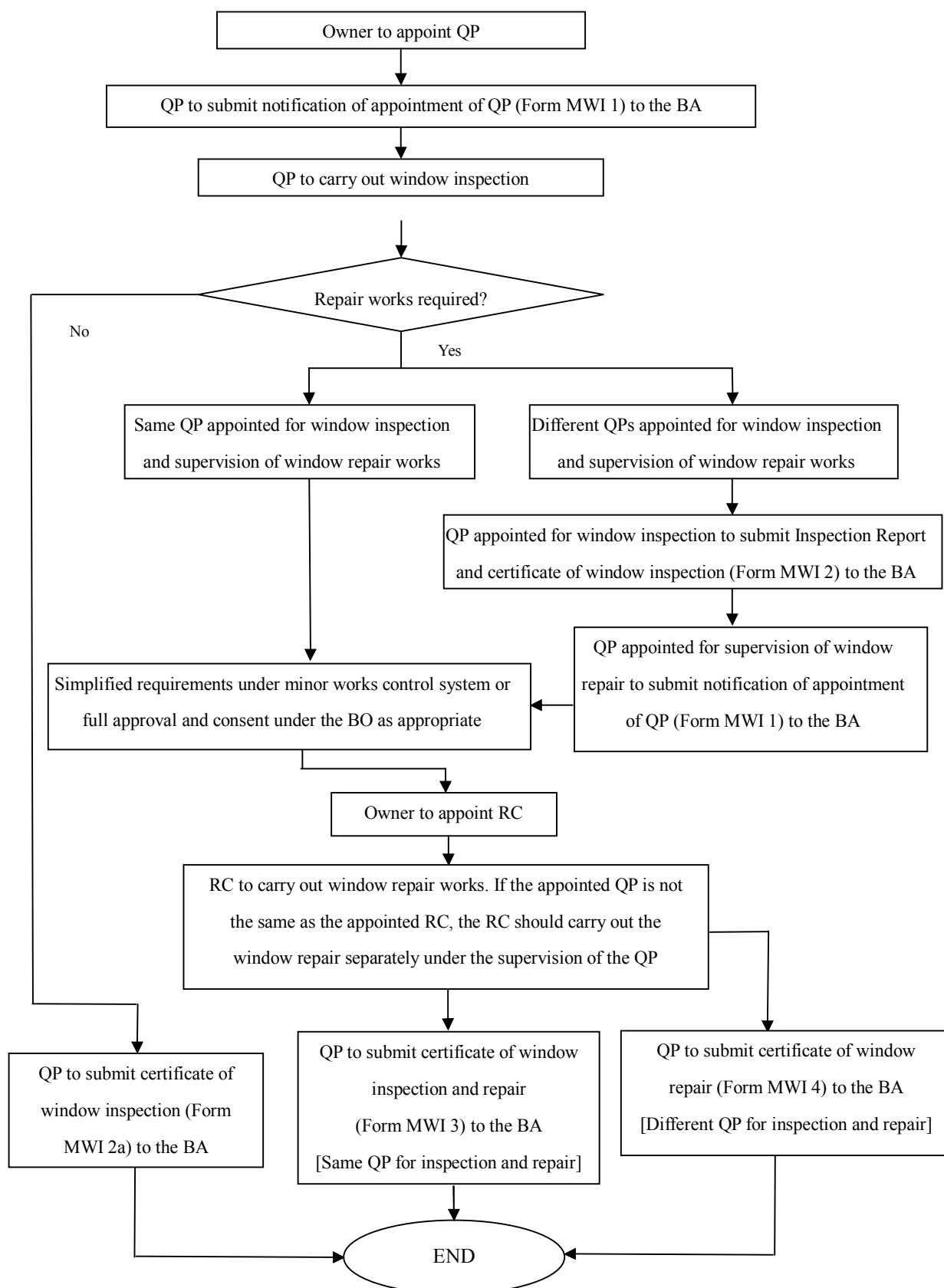
- (a) Summary of all rectification and repair works carried out, accompanied by annotated photos where necessary
- (b) Marked-up plans, where appropriate, showing the demarcation of the different types of rectification and repair works completed in accordance with the simplified requirements under the MWCS (specifying the class, type, and item), exempted building works or works having obtained the prior approval of plans and consent to the commencement of works from the BA
- (c) Photos for each elevation of the building after repair

- (d) Method statement adopted for and records of results of all proof tests
- (e) Certificates and reports of materials used, e.g. glass panes, structural sealant, reinforcement, concrete test cubes, repair mortar, structural steel, drainage pipes, fire doors etc
- (f) Summary of all rectification and repair works supervised by RI's representative
- (g) An account of all revisions to the repair proposal submitted with the Inspection Report

Details of Voluntary Removal of UBW

This section shall contain record of all voluntary removal of UBW accompanied by annotated photos and marked up plans.

Procedural Requirements for MWIS



Specified Forms for MBIS and MWIS

MBIS

Stage	Description	Form No.
Prescribed Inspection	Notification of appointment of RI for prescribed inspection and / or prescribed repair of building	Form MBI 1
	Certificate of building inspection (prescribed repair not required)	Form MBI 3a
	Certificate of building inspection (prescribed repair required)	Form MBI 3
Prescribed Repair	Notification of nomination of another RI to temporarily act in the stead of the original RI to supervise the prescribed repair	Form MBI 2
	Certificate of building repair	Form MBI 4
	Certificate of no business connection between the previous RI who carried out the building inspection and the RC	Form MBI 5

MWIS

Stage	Description	Form No.
Prescribed Inspection	Notification of appointment of QP (for prescribed inspection and / or prescribed repair)	Form MWI 1
	Certificate of window inspection (prescribed repair not required)	Form MWI 2a
	Certificate of window inspection (prescribed repair required and different QP for supervision is appointed)	Form MWI 2
Prescribed Repair	Certificate of window inspection and repair (by the same QP for inspection and supervision)	Form MWI 3
	Certificate of window repair (by the different QP for supervision)	Form MWI 4

Appendix XI

Inspection Forms for MBIS

Form 1 – External Elements and Other Physical Elements

Building Address:			Report Page No:		
MBIS Notice No.		Name of Registered Inspector:		Date of Inspection:	
Time:		Weather Condition:			
Inspection of External Elements and Other Physical Elements					

Element Type	Location			Defect Type*	Follow-up Actions Required		Photo No.	Remarks
	Floor	Elevation	Internal Common Part		Repair	Others		
Tiles	2/F	Facing XX Street		3	✓		001	Extent of tile delamination to be ascertained at the repair stage
Metal gate	G/F	Facing XX Street		11	✓		002	Defective hinge of metal gate to be replaced
Rendering	3/F - 4/F		Ceiling of stair	1	✓		003	

*** Defect Types:**

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Loose or missing tiles and rendering 2. Cracks 3. Bulging, bowing, separation, delamination, etc. 4. Stains 5. Deterioration 6. Spalling | <ol style="list-style-type: none"> 7. Displacement of cladding panels 8. Cracked or loose cladding panels 9. Defective sealing joints 10. Corrosion of fixing anchors or metal frames 11. Defective components such as hinges, track, guide rail and stopper 12. Others (please specify) |
|--|--|

Form 2 – Curtain Wall

Building Address:			Report Page No:
MBIS Notice No.	Name of Registered Inspector:	Date of Inspection:	
Time:	Weather Condition:		
Inspection of Curtain Wall			

Floor	Location	Defect Type*	Follow-up Actions Required		Photo No.	Remarks
			Repair	Others		
1/F	Elevation facing XX Street between grid lines A & B	1	✓		001	
3/F	Elevation facing YY Street between grid lines 1 & 2	4	✓		002	Defective bar hinge

***Defect Types:**

- | | |
|--|------------------------------------|
| 1. Cracked, loose, broken or missing glass panes | 5. Defective fire stop |
| 2. Corroded or loose fixings | 6. Water marks behind curtain wall |
| 3. Defective sealants (structural or non-structural) | 7. Others (please specify) |
| 4. Defective locking devices and bar hinges | |

Form 3 – Structural Elements

Building Address:		Report Page No:
MBIS Notice No.	Name of Registered Inspector:	Date of Inspection:
Time:	Weather Condition:	
Inspection of Structural Elements		

Location	Element	Defect Type *	Follow-up Actions Required			Photo No.	Remarks
			DI	Repair	Others		
4/F staircase	Beam	3		✓		001	
Swimming pool filtration plant room	Wall	4		✓		002	
3/F Flat 1 toilet	Slabs and beams	2, 4	✓			003	Serious spalling and reinforcement corrosion noted

Legend: DI – Detailed Investigation

***Defect Types:**

- | | |
|--|--------------------------------|
| 1. Dampness | 6. Exposed reinforcement |
| 2. Rust stains/Corrosion of reinforcement, structural steel or bolts | 7. Voids and honeycombing |
| 3. Cracks | 8. Deformation or displacement |
| 4. Spalling | 9. Others (please specify) |
| 5. Delamination | |

Form 4 – Fire Safety Elements

Building address:		Report Page No:
MBIS Notice No.:	Name of Registered Inspector:	Date of Inspection:
Time:	Weather Condition:	
Inspection of Fire Safety Elements		

Location	Element	Defects Type*	UBW Type**	Follow Up Action Required		Photo No.	Remarks
				Repair/ Reinstatement	others		
1st floor, Flat A	door	7	-	✓	-	4	
Staircase no. 2, 11 th floor	wall	8	-	✓	-	6	
21 st floor, staircase no. 1	door	3		✓		12	
Roof			F	-	✓	18	Report to BA immediately

Legend

* Defect Type

- 1 Staircase enclosure or protected lobby doors removed
- 2 Defective balustrades and handrails in staircases and escape routes
- 3 Wrong swinging direction of doors
- 4 Change in provision of fireman's lift
- 5 Blocked access to and within building, or inadequate emergency vehicular access
- 6 Inadequate fire fighting lift lobby
- 7 Doors/seals/materials with inadequate fire resisting construction
- 8 Openings or building services breaching the integrity of fire resisting construction
- 9 Defective or missing signs
- 10 Inadequate lighting

** UBW Type

- A Door openings from cocklofts to exit staircase;
- B Unprotected openings in exit staircase or compartment walls, floors and ceilings;
- C Structures on refuge floors;
- D Alteration to escape routes;
- E Doors, gates or roller shutters obstructing escape routes;
- F Inadequate fire resistance of fire door;
- G Structures on main or flat roofs resulting in inadequate means of escape;
- H Change in fire construction materials;
- I Insufficient number of exits; and
- J Structures blocking exits.
- *** Unauthorised Change in Use
- K Change in use for storage of hazardous materials; and
- L Change in use resulting in exceeding the approved capacity of a room or storey.

Form 5 – Drainage System

Building address:		Report Page No:
MBIS Notice No.:	Name of Registered Inspector:	Date of Inspection:
Time:	Weather Condition:	
Inspection of Drainage System		

Location	Element	Defect Type*	Type of Unauthorised drainage works**	Follow-up Actions Required			Photo No.	Remarks
				DI	Repair	Others		
External wall facing XX Road	Surface water pipes	1			✓		5	
Kitchen at 2/F Restaurant	Additional pipe		A	✓			8	Suspected unauthorised waste pipe connected to surface water system
5/F Flat B	Pipes within common pipe duct	1			✓		12	
8/F Flat B	ditto	1			✓		13	
Podium right below flat B	Pipe outlet	1			✓		14	
G/F rear lane	Surface channel	2			✓		26	Cracked and broken corner

Legend:

* Defects

- 1 Corrosion, leakage, deformation, displacement or surface damage of pipe
- 2 Damage of manhole or broken of surface channel, gullies and catch pits
- 3 Blockage of pipe, manhole, surface channel, gullies or catch pits
- 4 Corrosion, loosening or breaking of metal brackets
- 5 Missing grating of ventilating pipe
- 6 Deterioration of mica flap in fresh air inlet
- 7 Others (please specify)

** Unauthorised drainage works

- A Expedient connection of foul or waste water to surface water drainage system
- B Discharge of foul or waste water to external of building or open areas
- C Discharge of untreated trade effluent into drainage system
- D Discharge of untreated trade effluent to external of building or open space
- E Others (please specify)

Form 6 – Unauthorised Building Works

Building Address:			Report Page No:
MBIS Notice No.:	Name of Registered Inspector:	Date of Inspection:	
Time:	Weather Condition:		
Inspection of Unauthorised Building Works			

Location	Floor	Flat	Details of UBW		Condition* of UBW	Remarks
			Types	Photo No		
Block A	2/F	B	FRS	5	F	
“	8/F	D	DR	4	F	
“	8/F	D	FR	4	P	Owner was advised to remove the FR
Car Park	G/F	-	O	10	G	Prefabricated Structure

* Good (G), Fair (F) or Poor (P)

Types of UBW:

- A/C - A/C(e): Air conditioner rack projecting more than 600mm from external wall
 - A/C(a): Abandoned or dilapidated air conditioner metal frame
 SP - Projecting structures of solid construction
 SF - SF(S/E): Shop front extension projecting more than 300mm from external wall
 SF(B/H): Bulkhead of lightweight shop front decoration projecting more than 600mm from external wall
 PC - PC(e): Corrugated metal sheet canopy projecting more than 500mm from external wall
 - PC(a): Abandoned or dilapidated corrugated metal sheet canopy
 - PC(r): Retractable canopy projecting more than 2000mm from external wall
 - PC(s): Canopies of solid construction

- DR - Dilapidated drying rack
 FR - Flower rack
 MF - Abandoned or dilapidated metal frame
 MC - Metal cage
 FRS - Flat roof structure
 YS - Yard structure
 RTS - Roof top structure
 UU - UBW fixed on another UBW, or 2-storey UBW
 UA - Unauthorised alteration of structural elements
 CSB - Structures on or attached to approved cantilevered slab balconies
 AW - Unauthorised alteration of external walls or parapets
 DF - Removal or alteration of provisions for barrier free access
 O - Others (to be specified)