

Overview of the Development and Implementation of the Mandatory Building Inspection Scheme (MBIS) in Hong Kong

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Abstract

Purpose – The study aims to provide a concise overview of the problem of building decay in Hong Kong, the current government measures concerning dilapidated buildings, and the latest development and implementation of the Mandatory Building Inspection Scheme (MBIS). A comparison of various mandatory building inspection schemes from other jurisdictions of the world is also given.

Design/methodology/approach – A desktop study of building inspection procedures, repair and maintenance policies was carried out, followed by an industry-wide opinion survey conducted by means of self-administered questionnaires. Target respondents are within the construction community of Hong Kong. The perceived benefits, potential difficulties and insightful recommendations or good practices are investigated. A comparison of the relative ranking of individual mean scores from various groups of respondents is presented in this paper.

Findings – The execution of MBIS was found to be effective in enhancing public awareness of the importance of building upkeep and recognition of the property owner's legal responsibilities in this respect. Private property owners were made aware of the necessity to take holistic preventive measures to maintain the overall safety of their own buildings. A comparison of MBIS with other similar mandatory building inspection schemes across different cities, revealed similarities as regards the inspection cycle, scope of inspection and qualifications of inspectors. The main difference related to the age rather than the height of target buildings.

Practical implications – Proper inspection and maintenance is necessary to keep buildings in good condition to avoid injury or loss of life due to sudden collapse of structures or their elements such as concrete spalling and fall of window frames. The official launch of MBIS on 30 June 2012 is one of the proposed effective measures to resolve the long-standing problems of building neglect and deterioration in Hong Kong with particular regard to the existing old private premises.

Originality/value – The execution of MBIS should be useful in improving the safety and health status of the dilapidated premises and in so doing safeguarding the residents and general public. To further identify the perceived benefits and potential difficulties of MBIS, and to suggest insightful recommendations or good practices for its successful future implementation, an opinion survey was launched among construction practitioners in Hong Kong between March and April of 2012.

Keywords – Building, Health and Safety (H&S), Inspection, Management, Repair and Maintenance, Hong Kong

Paper type – Review paper

1. Introduction

Currently, urban decay is one of the contemporary issues in the cities of developed countries around the world. A safe and healthy building can offer people a comfortable place for various human activities, whereas a dilapidated building may endanger the lives and property of the building occupants and also the general public. Therefore, proper regular inspection and maintenance should be implemented to ensure that the building is in safe and healthy conditions at all times, for example, through such as the introduction of the Mandatory Building Inspection Scheme (MBIS) in Hong Kong.

1.1. Overview of old buildings in Hong Kong

In Hong Kong, building dilapidation is an acute and urgent problem which needs to be resolved. The problem has been exacerbated by the building boom in the 1960s and early 1970s which leads to the completion of a large number of buildings within a short period of time (Leung and Yiu, 2004). Chan and Morris (1997) pointed out that, at this time, building construction speed was achieved at the expense of quality. Law (2008) opined that the condition of the buildings will deteriorate with the passage of time.

Examples of building defects, such as concrete spalling, water leakage, structural and non-structural cracking is commonly observed in buildings over 30 years old. It has also been noted that there is a close relationship between the built environment and people's health (Schmitt *et al.*, 1978; Tanaka *et al.*, 1996; Yau *et al.*, 2009). Over the past decade, people have been more aware of the problems associated with the poor upkeep of their buildings. Hence there appears to be a growing need for building maintenance practices to be introduced and followed to prevent further deterioration (Law, 2008).

A government study undertaken in 1999 estimated that the number of old buildings will have increased tremendously. In particular, and more significantly, buildings over 30 years old will almost be double by 2016 (Hong Kong 2030, 2001). The Housing, Planning and Lands Bureau (2006) reported that of 39,000 private buildings in Hong Kong, about 13,000 were over 30 years old and that the number will increase to 22,000 within ten years' time. Hui *et al.* (2006) confirmed that the number of buildings over 30 years old would increase from about 16,000 to more than 22,000 and commented on the trend of fast decaying building stock.

The Legislative Council Brief (Development Bureau, 2010a) reported that currently there are around 4,000 buildings over 50 years old or above in Hong Kong and that the number will increase by 500 each year. It is noteworthy that the majority of buildings in Hong Kong are made of reinforced concrete and are designed to have a serviceable life of around 50 years. A series of recent building inspections by the Buildings Department (2010a) confirmed this statement. Inspections by the Buildings Department (BD) after the Ma Tau Wai Road incident in which a tenement block of flats collapsed in less than 20 seconds revealed that, although buildings aged 50 years old or above are generally structurally safe, one in four have different repair and maintenance problems, while the building conditions survey carried out by the Urban Renewal Authority (2009) of 7,000 buildings aged 30 years old or above in support of the Urban Renewal Strategy Review found that 20% of these buildings were in dilapidated states of various degrees.

Regarding the problem of dilapidation for the old buildings, Chan and Morris (1997) believed that there was a need to expedite the programme of clearing clusters of old buildings. It is also obvious that today's new buildings will catch up and become old in their turn, and have similar problems if nothing is done to ensure their maintenance and care (Chan, 2004). Therefore, the problem of building neglect is urgently needed to be resolved without any delay.

Further results of poor upkeep of buildings include such as structural deterioration, defects in fire safety provisions, defective plumbing and drainage systems unauthorised or abandoned signboards and illegal internal alterations to building structures. Minor defects can evolve into serious problems or even tragic consequences, such as fatalities due to the sudden collapse of either part of the building or their structural elements. Ho and Yau (2004) confirmed that these problems have created numerous deaths and injuries over the past years. The Task Force on Building Safety and Preventive Maintenance (2001) reported on an increasing trend in the number of building-related accidents in private housing since 1990, and at least 101 lives were lost and 435 injuries confirmed between 1990 to 2001.

Common accidents like concrete spalling and falling of window frames pose imminent danger to building occupants and the general public. The underlying reasons are that some flat owners ignore the importance of building maintenance and do not take seriously responsibility for regular inspection and maintenance. The general awareness of property owners of the need and obligation to maintain their properties is low and often a passive "wait-and-see" attitude is taken until problems arise (Chan, 2004). The following incident illustrates the need for systematic maintenance of buildings.

1.2. Case study of the collapse of a 5-storey residential building in Hong Kong

Overview of the case study incident

A. Introduction	On 29 January 2010 at about 1:40 pm, the front portion of the residential building at 45J Ma Tau Wai Road (45J) collapsed. The building at 45J was a 5-storey tenement building of reinforced concrete. It was situated at the end of a row of tenement buildings of similar age and construction. The building comprised a G/F unit with an approved cockloft (or mezzanine floor) over and 1/F to 4/F approved with one flat on each floor for domestic use. An occupation permit was issued on 1 September 1955.
B. Consequences	4 fatalities and 2 injuries.
C. Investigation	After the collapse of the building at 45J, investigation was carried out by the BD based on the building records, site inspections, witness statements, interviews with relevant parties and structural analysis with a view to establishing the cause of the collapse. From the evidence available, the following situations were revealed: (a) Alterations in the form of sub-divided flats were noted on all upper floors. (b) Repair works and removal of unauthorized building works on G/F commenced on 23 January 2010 and were still in progress in the morning of 29 January 2010.
D. Conclusion	Based on the site inspections, structural analysis and statements obtained from the interviewees, the collapse of the building at 45J was likely to be triggered by the disturbance of a column by some external forces. As for the identification of the origin of these forces, further investigation has to be conducted including building material testing and forensic study.
E. Sources	Buildings Department (2010b) and Mingpao (2010).

In view of that background, the MBIS has the potential of offering an innovative effective long-term solution to cope with the dilapidated buildings described above.

1.3. Backdrop of MBIS

Prior to the actual implementation of MBIS, inspection and maintenance cost in connection to building repair and maintenance were the overwhelming concerns, thus, it is wise that only building components essential to public safety are incorporated into MBIS, in an effort to minimise financial cost and other burdens on property owners (Housing, Planning and Lands Bureau, 2007). Much literature recommends elements or items to be incorporated in building inspection or maintenance. For example, Horner *et al.* (1997) proposed the execution of building maintenance practices based on the significant failure items in such buildings. These items were those directly affecting health, safety, environment or utility. Wright (1999) suggested facade inspection regulations for the following six cities in the United States: New York, Detroit, Boston, Columbus, Ohio and Chicago.

In addition to financial problems, lack of related skills and knowledge has been identified as major constraints to building care actions (Kangwa and Olubodun, 2003). Thus, it is advisable for the average home owner to have access to technical support. Such a service in line with the implementation of MBIS could be provided by the government in the form of consultation centres and briefing sessions. However, it is also important to recognise that negotiation and co-ordination exercises are both time-consuming and costly (Chen and Webster, 2005), hence when providing advice during the MBIS implementation stage owners should be well co-ordinated to save the time and cost arising from the delay caused by unnecessary additional meetings.

To support the implementation of MBIS, an extensive literature review revealed that proper maintenance of buildings can maintain or enhance their property values (Chau *et al.*, 2003; Hui *et al.*, 2008; Martinaitis *et al.*, 2004; Robinson and Reed, 2002). Small (2009) reported that a well-organised and proper preventive maintenance programme can ensure healthy building conditions by avoiding maintenance failures.

1.4. Current government measures for dilapidated buildings

Two main approaches are available to deal with the dilapidated buildings: (1) To demolish the existing building and redevelop a new one at the same location; and (2) To extend the service life span of the building through proper repair and maintenance. The current measures adopted by the government and their associated deficiencies are given below:

1.4.1. Redevelopment by Urban Renewal Authority (URA)

Redevelopment is an effective approach to handle old and dilapidated buildings. Currently tremendous efforts have been devoted to facilitating urban redevelopment by both the public and private sectors (Development Bureau, 2010a). Redevelopment, however, is a time-consuming process and therefore is not an ideal solution. Additionally, land acquisition is costly. Hence proper building maintenance and timely repairs offer a satisfactory alternative.

1.4.2. Investigation on dangerous buildings or defective drains by Buildings Department (BD)

The Buildings Department (BD) responds to all reports of dangerous or defective buildings and advertising signs. It also initiates building surveys to ensure general building safety and sanitary conditions, to identify dangerous buildings or defective drains and to order any negative findings to be investigated, repaired or demolished. In emergency or dangerous cases, the BD carries out any necessary repair works in the first instance and afterwards recovers the costs from the respective owners (Buildings Department, 2011a). The deficiency of this approach is that it is a corrective approach in response to only reported dangerous or defective buildings. Dilapidated buildings with potential problems are unreported. Such buildings should be subject to a preventive approach. As indicated above, without government supervision, many private property owners avoid taking responsibility for the upkeep of their own premises. Under such circumstance, the government becomes the only party responsible for carrying out any regular building inspections even though the legal responsibility of safety and health of the properties rests on the specific owners.

Chan (2004) maintained that the government has taken a passive role in preventing the deterioration of private buildings and that the laws are inadequate as regards promoting the maintenance of existing buildings. Thus there appears to be evidence to support the maintenance of a clear policy in line with a mandatory scheme, to hold owners responsible for keeping their own properties in good and safe conditions at all times. The most effective way to prevent the occurrence of the serious accidents described above is through a periodic and holistic inspection and maintenance of dilapidated buildings by respective property owners under legislation. The Mandatory Building Inspection Scheme (MBIS) proposed by the government firstly in Mid-2007, should serve as a long-term preventive approach, requiring property owners to inspect their buildings on a regular basis and carry out rectification works where necessary, as after inspection as a legal responsibilities (Housing, Planning and Lands Bureau, 2006).

2. Latest development of MBIS

To engage the whole community in putting long-term measures into place to resolve the problem of building neglect and deterioration, the Housing, Planning and Lands Bureau (HPLB) conducted a two-stage public consultation in 2003 and 2005 (Development Bureau, 2010b). Based on a community consensus reached through extensive public consultations over this period, the government announced in Mid-2007, a plan for the legislation of the implementation of the Mandatory Building Inspection Scheme (MBIS). According to the Development Bureau (2010a), the Buildings (Amendment) Bill 2010 had already stipulated the statutory framework for MBIS. It was introduced into the Legislative Council (LegCo) on 3 February 2010 for scrutiny by the members.

With the enactment of relevant amendments to the Buildings Ordinance (BO) through the Buildings (Amendment) Ordinance 2011 in June 2011 and the subsidiary legislations including the Building (Inspections and Repairs) Regulation in December 2011, the MBIS was introduced (Buildings Department, 2012a). The Buildings Department (2012a) indicated that the registration for Registered Inspectors (RIs) has commenced since 30 December 2011 and full implementation of MBIS commenced on 30 June 2012. The milestones of the development of MBIS are highlighted in Table I.

The government's solution to the control of building decay is based on MBIS. Enactment of the scheme ensures regular building inspections and timely repairs. The MBIS legislation was based on a community consensus achieved by extensive public consultations over the years. The MBIS is designed to cover buildings aged 30 years old or above, with the exception of domestic buildings not exceeding three storeys. The BD requires building owners to carry out inspection and repair works, of the common parts of the buildings, such as the external walls, projections and signboards, once every ten years.

3. Implementation mechanism of MBIS

According to the Buildings Department (2012a), the Buildings (Amendment) Ordinance 2011 promulgated both the MBIS and Mandatory Window Inspection Scheme (MWIS). The essential features of MBIS are enumerated in Table II.

Table I. Milestones of the development of MBIS in Hong Kong (Chan *et al.*, 2012)

Time	Event
December 2003	First stage of public consultation paper on building management and maintenance was published (Housing, Planning and Lands Bureau, 2004)
October 2005	Second stage of public consultation paper on proposed mandatory building inspection was published (Housing, Planning and Lands Bureau, 2006)
Mid-2007	Government announced the legislative plan for the implementation of MBIS.
3 February 2010	The Buildings (Amendment) Bill 2010 was introduced into LegCo for scrutiny by the members.
June 2011	The Buildings (Amendment) Bill 2010 was passed as the Buildings (Amendment) Ordinance 2011 and enacted.
August 2011	The draft Code of Practice for MBIS was published by the Buildings Department.
December 2011	The subsidiary legislations including the Building (Inspection and Repair) Regulation of the Buildings (Amendment) Ordinance 2011 introducing MBIS was enacted.
30 December 2011	The registration of Registered Inspectors (RIs) commenced.
30 June 2012	Full implementation of MBIS commenced.

Table II. Essential features of MBIS (Chan *et al.*, 2012)

Feature	Details
Age of target buildings	Any private buildings aged 30 years old or above (except domestic buildings not exceeding 3 storeys in height)
Inspection cycle	Once in every 10 years
Scope of inspection items	Only building elements essential to public safety: External elements and other physical elements; structural elements; fire safety elements; drainage systems; and unauthorised building works (UBWs) in the common parts and on the exterior of the building
Qualifications of professional service providers	Registered Inspectors (RIs) under the Buildings Ordinance: Authorised Persons (APs), Registered Structural Engineers (RSEs), Registered Architects, Registered Professional Engineers of the relevant disciplines, and Registered Professional Surveyors of the relevant disciplines, who have possessed relevant work experience in the field of building construction, repair and maintenance based in Hong Kong
Implementation of prescribed building repair and maintenance works	Registered Contractors (RCs): Registered General Building Contractors (RGBCs) and Registered Minor Works Contractors (RMWCs) of the appropriate class or type under the Buildings Department

3.1. Selection of target buildings

Regarding the selection of buildings, the BD targets urgent cases and issues statutory notices to owners to carry out prescribed inspections and repairs. This request is mandatory. The initial target is to select 2,000 buildings each year for both the MBIS and MWIS to be carried out concurrently (Buildings Department, 2012a).

The target buildings selected each year represent a mix of buildings in different conditions, and with different age profiles and in different districts. A selection panel has been established to render necessary advice and opinions to the BD for the selection of target buildings. As indicated above, the panel comprises representatives from:

- i. relevant professional institutions such as architects, engineers, surveyors;
- ii. relevant non-government client organisations such as Urban Renewal Authority, Hong Kong Housing Society, property management companies, District Councils in old districts; and
- iii. relevant government departments such as Development Bureau, Buildings Department and Home Affairs Department.

The BD issues pre-notification letters to building owners advising them of the selection of their buildings as target buildings, hence ample time is given for preparation and forward planning.

3.2. Procedures of MBIS

The procedures as regards the implementation of MBIS are as follows (Buildings Department, 2012a):

- i. The BD issues pre-notification letters to the owners of the selected buildings six months before the issue of statutory notices to alert them to get prepared and organized for carrying out the required prescribed inspection and repair.
- ii. Six months after the pre-notification letters are issued, the BD issues statutory notices to the owners of the selected buildings requiring them to carry out the prescribed inspection and the prescribed repair works if found necessary in respect of the common parts, external walls and projections or signboards within the specified time frame.
- iii. The building owners served with a notice under the MBIS (in most of the cases, the co-owners or Owners' Corporation (OC) of the building concerned) are required to appoint a RI to carry out the required inspection within the stipulated time frame.
- iv. The RI is required to carry out the prescribed inspection personally according to the BD requirements, unless exempt by the relevant provisions of the subsidiary legislation, to ascertain whether the building is dangerous or is liable to become dangerous.
- v. Where the RI considers that a prescribed repair is required, the owners concerned must appoint a registered general building contractor (RGBC) or a registered minor works contractor (RMWC) to carry out the prescribed repair under the supervision of a RI (who may be the same as or different from the RI that carried out the prescribed inspection).

- vi. Upon completion of the prescribed inspection and prescribed repair, the appointed RI is required to conduct examination and testing, and submit an inspection report and a completion report respectively, together with a specified certificate, to the Building Authority (BA) for record and audit check.
- vii. When satisfied, the BD informs owners, in writing, that they have fulfilled the mandatory inspection requirements.

3.3. Registration of Registered Inspectors (RIs)

The RI appointed to carry out the prescribed building inspection or supervision of the prescribed building repair works under the MBIS must be on the Building Authority's Inspectors Registrar. A RI may be an Authorised Person (AP), Registered Structural Engineer (RSE), Registered Professional Engineers of the relevant disciplines (i.e. Building, Building Services, Civil, Materials and Structural), and Registered Professional Surveyors of the relevant disciplines (i.e. Building Surveying and Quantity Surveying). RI should have gained relevant practical experience in the field of building construction, repair and maintenance based in Hong Kong and their names must be enlisted in the Inspectors Registrar (Buildings Department, 2012a).

3.4. Governance of professional service providers

With reference to the Buildings Department (2012a), the government ensures proper regulation of professional service providers through the following measures under the BO and its subsidiary regulations including the Building (Inspection and Repair) Regulation (B(I&R)R). The Buildings Department is responsible for:

- i. Establishing a register and regulatory mechanism under the BO, as well as an Inspectors Registration Committee to scrutinise and monitor the professional standards for registration as RIs.
- ii. Developing detailed guidelines as to the requirements and standards of building inspections, window inspections and repair works, the Code of Practice for MBIS and Practice Note on Best Practices on Tendering Procedures.
- iii. Conducting random detailed audit checks of inspection reports submitted by RIs, and imposing appropriate sanctions for irregularities identified.
- iv. Issuing more MBIS promotional materials to the general public and providing enquiry/complaint channels for the public to inform of any malpractices of RIs.

3.5. Legal consequences for not complying with statutory requirements

Any property owners or owners' corporations (OCs) who do not comply with a statutory notice for mandatory building inspection and/or stipulated repair works without any reasonable excuse may be prosecuted and upon conviction is liable to a fine of HK\$50,000 and imprisonment for one year (Buildings Department, 2012a).

The BD may also arrange for the required inspection and repair works to be carried out by its consultant and contractor, and then recover the costs of inspection and repair works as well as supervision charge from the property owners or OC concerned, together with a surcharge of not exceeding 20% of the costs (Buildings Department, 2012a).

3.6. Assistance to property owners

To complement the implementation of the MBIS, the government, in collaboration with the Urban Renewal Authority (URA) and the Hong Kong Housing Society (HKHS), will launch various assistance schemes to help property owners in complying with the statutory requirements. Owners may contact the BD on matters regarding the enforcement of the statutory notices. A one-stop service contact point is provided for contacting the URA/HKHS for the provision of information for technical and financial assistance. Eligible owners are able to obtain various forms of assistance and support from the URA/HKHS and the government at different stages of the two mandatory inspection schemes – MBIS and MWIS (Buildings Department, 2012a):

3.6.1. Organisation stage

- At the organisation stage, briefing sessions will be arranged for the owners concerned to assist them in complying with the statutory notices.
- Technical advice in respect of appointment of RIs and RCs will be given.
- Assistance to building owners to form OCs will be provided.
- A subsidy of up to HK\$3,000 will be made available to each OC formed as well as technical assistance to enable the OC formation.

3.6.2. Inspection/Repair stage

- At the inspection / repair stage, a subsidy will be given towards the cost of appointment of RIs for the first prescribed building inspection to eligible owners, subject to a cap.
- Technical advisory services, in respect of matters relating to building and window inspection and maintenance will be provided. Reference to representatives of relevant professional bodies is given to enable collection of free professional advice.
- The one-stop Integrated Building Maintenance Assistance Scheme (IBMAS) providing financial assistance and technical support to building owners.

Under the IBMAS, to carry out building repair works, owners can simply complete one set of application forms for multiple applications which include the various types of grants and/or interest-free loans to those who meet the eligibility criteria of the respective assistance schemes:

3.6.3. After repair

- After repair works under the IBMAS, a subsidy of 50% of the insurance premium for the public liability insurance/third party risks insurance for the common parts of the building of up to HK\$6,000 per annum for 3 consecutive years will be provided to eligible buildings with repairs completed.

3.7. Recognition of well-maintained buildings

The HKHS launched the Voluntary Building Assessment Scheme (VBAS) to give positive recognition to those existing well-managed and properly-maintained buildings. Any buildings certified by the VBAS with satisfactory safety ratings is recognised by the BD to have fulfilled the requirements under MBIS within the respective inspection cycles, and thus they are exempted from mandatory inspection. The HKHS aims to start receiving applications from building owners for participating in the VBAS in the second quarter of 2012 (Buildings Department, 2012a).

4. Comparison of various building inspection schemes in different cities

Mandatory building inspection schemes similar to that in Hong Kong have been executed in Singapore, New York and Chicago in the United States. Table III gives a comparison of these schemes with the MBIS of Hong Kong. Attention is drawn to their similarities and differences.

Singapore, New York and Chicago have had their own building inspection schemes implemented since the 1990s, hence earlier than MBIS by at least 10 years. It is of interest to note that a public consultation regarding the proposal of a mandatory Building Safety Inspection Scheme (BSIS), a predecessor of MBIS, was proposed in 1997 in Hong Kong. It was abandoned due to the failure of reaching a consensus within the community (Housing, Planning and Lands Bureau, 2004).

In Singapore, the target buildings requiring inspection include non-residential buildings up to the age of 5 years and residential buildings up to the age of 10 years old are mandated to be inspected in Singapore. In contrast, no age limit is stipulated in both New York and Chicago. Given Hong Kong's history of apparent "laissez-faire", and in line with community consensus, the MBIS sensibly focuses on private residential buildings aged 30 years or over. It will, if possible, eventually cover younger buildings (Housing, Planning and Lands Bureau, 2007).

As far as the inspection cycle is concerned, no specific time interval is set for Chicago. The remaining three cities are similar in setting the inspection cycle of either 5 years or 10 years. In one respect, this appears to be appropriate as excessive inspections and unnecessary disturbance to the general public and the residents are avoided.

The scope of inspection items, across the four different inspection schemes, primarily includes the structural elements and external walls of the buildings, the maintenance of which is important to public safety. MBIS, recently launched in Hong Kong, is the most extensive maintenance scheme, encompassing fire safety elements, drainage systems and unauthorised building works (UBW). All elements are closely related to safety and health of occupants and the general public (Development Bureau, 2010b).

Exemptions from mandatory inspection for all the above cities except Singapore, have either a height or storey exemption. Exemptions are granted to those buildings of three storeys or less under the MBIS in Hong Kong. The underlying reason for such exemptions in Hong Kong is that such problems related to these buildings pose a lower risk to public safety (Housing, Planning and Lands Bureau, 2007). The motivation for the exemption of buildings accredited under the Voluntary Building Assessment Scheme (VBAS) aims to provide stronger encouragement for private property owners to carry out inspections of their properties on a voluntary basis (Development Bureau, 2010b). Buildings with less than six storeys and buildings less than 80 feet in height are exempted in New York and Chicago.

Table III. Comparison of various building inspection schemes in different cities (Lo *et al.*, 2012)

Country/City	Hong Kong	Singapore	New York City	City of Chicago
Title of building inspection scheme / measure	Mandatory Building Inspection Scheme (MBIS)	Periodic Structural Inspection	Periodic Inspection of Exterior Walls and Appurtenances of Buildings	Maintenance of Exterior Walls and Enclosures
Year of promulgation	2012	1999	1998	1990
Relevant Ordinance(s)	Buildings Ordinance (BO) & Buildings (Amendment) Ordinance 2011	Building Control Act (Inspection Of Buildings) Regulations	Local Law 11 of 1998	Chapter 13-196 Existing Buildings-Minimum Requirements of Municipal Code of Chicago
Target buildings	Any buildings aged 30 years old or above	Non-residential buildings: inspection starting at the 5th year; residential buildings: inspection starting at the 10th year	All kinds of buildings with more than six storeys in height	Exterior walls and enclosures of buildings that are 80 feet or more in height
Inspection cycle	Every 10 years	Non-residential buildings: every 5 years; residential buildings: every 10 years	Every 5 years	Required for periodic critical examinations and submitted critical examination report; at intervals designated in rules and regulations
Scope of inspection items	Only building elements essential to public safety: External elements and other physical elements; structural elements; fire safety elements; drainage systems; and unauthorized building works (UBW)	Structural elements	All publicized exterior walls	Exterior envelope of a building or structure
Exemption(s)	Buildings of 3 storeys or less and buildings accredited under the Voluntary Building Assessment Scheme (VBAS)	Detached houses, semi-detached houses, terraced or linked houses and temporary buildings	Building with lower than 6 storeys above a basement; building is maintain subject to Department of Buildings	Buildings below 80 feet in height
Qualifications of inspectors	Registered Inspectors (RIs) under Buildings Ordinance: Authorised Persons (APs), Registered Structural Engineers (RSEs), Registered Architects, Registered Professional Engineers of the relevant disciplines, and Registered Professional Surveyors of the relevant disciplines	Structural engineers	Professional engineers or licensed architects	Licensed architects or registered structural engineers

Country/City	Hong Kong	Singapore	New York City	City of Chicago
Related department(s) involved	Buildings Department (BD); Development Bureau (DEVB); Home Affairs Department (HAD); Hong Kong Housing Society (HKHS) & Urban Renewal Authority (URA)	Building and Construction Authority (BCA); Housing and Development Board & Land Transport Authority of Singapore	NYC Department of Buildings	City of Chicago Department of Buildings
Sources of information	Buildings Department (2012a)	Building and Construction Authority (2011) & Law (2008)	The NYC Department of Buildings (2011) & Law (2008)	American Legal Publishing Corporation (2011) & Law (2008)

The professional qualifications of building inspectors in Singapore are solely those of structural engineers, while licensed architects are also qualified as inspectors in New York and Chicago. In Hong Kong, the pool of inspectors is wider and consists of Authorised Persons (APs), Registered Structural Engineers (RPEs), Registered Architects, Registered Professional Engineers and Registered Professional Surveyors of the relevant disciplines. All those enlisting in the Inspectors Registrar are vetted by the Inspectors Registration Committee and will have some form of relevant work experience in the field of building construction, repair and maintenance and be based in Hong Kong (Development Bureau, 2010b). This discipline breadth is possibly due to there being insufficient construction professionals available to undertake the potential volume of prescribed inspection works in near future.

5. Empirical research study

An empirical research questionnaire survey was undertaken between March and April of 2012, to investigate the perception of stakeholders regarding the effectiveness of implementing the proposed MBIS within the construction community of Hong Kong. Included were such as relevant government works departments, related non-government client organisations, private property developers, project consultants, contractors, and property management companies. Specifically the study aimed at:

- i. Identifying the perceived benefits of introducing MBIS to various key stakeholders and the community as a whole.
- ii. Determining the potential difficulties in implementing MBIS regarding such as the assistance measures, law enforcement, registered inspectors, registered contractors, quality control, supervision.
- iii. Suggesting insightful recommendations or good practices for the successful implementation of MBIS in near future.

The research study is both timely and necessary as MBIS is still at the initial implementation stage, having been newly registered on 30 June 2012. Investigation of both the perceived advantages and potential deficiencies of MBIS, at this time is valuable. Both positive and negative areas can be identified based on the knowledge gained and suitable measures can then be designed to further improve the smooth implementation of MBIS in Hong Kong. The same survey should also be launched one year after the initial launch of MBIS. Comparison of results should lead to enhancing the efficiency and effectiveness of the scheme. A detailed research framework of this study is given by Chan *et al.* (2012).

6. Highlights of key findings from questionnaire survey

Preliminary results derived from the analysis of the empirical questionnaire survey are presented in Tables IV-VI and highlight the major three benefits, three difficulties and three recommendations attention to which combine to ensure good or at least better practice for the implementation of MBIS. A mean score was applied to analyse the data collected from the questionnaire survey. The mean score of each MBIS's benefit, difficulty and recommendation or good practice was calculated according to the level of agreements given by each respondent to the survey form (i.e. 5 = Strong agree; 4 = Agree; 3 = Neutral; 2 = Disagree; and 1 = Strongly disagree). The score was then used to determine the relative ranking by comparing each individual mean score (Chan *et al.*, 2012).

6.1 Perceived benefits of implementing MBIS

Out of a total of 13 perceived benefits listed on the survey form, the most respondents agreed that MBIS will raise the overall building safety for residents and the general public. This was ranked top with a mean score of 4.13. It is consistent with the primary objective of MBIS, which is to avoid unsafe hazards (Buildings Department, 2012a; Development Bureau, 2010a; Housing, Planning and Lands Bureau, 2006). The demand for Registered Inspectors (RIs) and Registered Contractors (RCs) engaged in building inspection and repair works is expected to increase as a result of the implementation of MBIS. Of obvious social benefit is growth in job openings and business opportunities. This result is in line with the findings from Choi (2008). Building decay, as previously stated, is an urgent problem in Hong Kong, and MBIS is thought to be an effective solution to mitigate the problems associated with ageing and deterioration (Buildings Department, 2012a; Development Bureau, 2010a; Leung and Yiu, 2004), this finding ranked third with a mean score of 4.04.

Table IV. Top three perceived benefits of implementing MBIS

Rank	Benefits of MBIS	Mean
1	Raise the overall building safety towards residents and the general public.	4.13
2	Create more job openings and business opportunities in building repair and maintenance services.	4.06
3	MBIS is an effective solution to address the problems with building decay (e.g. dilapidation and control over existing unauthorised building works).	4.04
	Number of survey respondents (N)	323

6.2 Potential difficulties in implementing MBIS

Amongst the 16 potential difficulties identified, the top three difficulties are substantially related to both co-ordination and co-operation between the property owners, owners' corporation and property management companies. They relate to major difficulties in executing regular inspection and necessary repair and maintenance works of private residential buildings (Chan, 2004; Choi, 2008).

Table V. Top three potential difficulties in implementing MBIS

Rank	Difficulties of MBIS	Mean
1	Difficulty in co-ordinating the individual flat owners for carrying out building inspection and necessary repair and maintenance works (e.g. without owners' corporation).	4.14
2	Disagreements or disputes amongst individual flat owners, owners' corporation or property management company will hinder the implementation process.	3.89
3	Lack of property owners' initiative or owners' co-operation.	3.87
Number of survey respondents (N)		299

To combat this difficulty, Yip and Forrest (2002) advised the formation of owners' corporation as an essential method to solve building maintenance problems. The foremost difficulty as regards the execution of maintenance works is that the common parts of buildings in Hong Kong have multi-ownership. This is exacerbated by the buildings being multi-storey buildings (Lai and Chan, 2004; Yau *et al.*, 2008).

6.3 Recommendations or good practices for implementing MBIS

Of the 14 recommendations or good practices suggested, the respondents' highest level of agreement related to government assistance. It was felt that the government should develop detailed guidelines on MBIS requirements and standards necessary for adequate building inspection and repair works. This recommendation ranked top, with a mean score of 4.05. The government has recently published the "General Guidelines on Mandatory Building Inspection Scheme and Mandatory Window Inspection Scheme" and the "Code of Practice on MBIS and MWIS" to guide the relevant building inspection and repair works for the general public and the construction professionals (Buildings Department, 2011b & 2012b).

The government is also expected to provide more technical and financial support to property owners to support the execution of MBIS. This recommendation ranked second in the survey. In addition, the government is expected to increase the promotion on MBIS, it ranked third in the survey. These recommendations or good practices should be very useful in overcoming some of the major potential difficulties encountered during the implementation of MBIS.

Table VI. Top three recommendations or good practices for implementing MBIS

Rank	Recommendations or Good Practices for MBIS	Mean
1	Develop detailed guidelines on the requirements and standards of building inspection and repair works under MBIS.	4.05
2	Provide more technical and financial support from the government to property owners via different consultation centres and subsidy / loan schemes to complement the implementation of MBIS.	4.01
3	Increase the promotion on MBIS towards the general public via various media.	3.98
Number of survey respondents (N)		306

7. Conclusions

The problem of building decay will become more and more serious in Hong Kong if no further action by government or owners is taken; therefore there is a strong imminent need to find an effective way to address long-standing social issues related to building ageing and deterioration. The execution of MBIS, if successful, will ensure that private property owners will take legal responsibility for holistic preventive measures to maintain the overall safety of their own buildings, and to enhance the public awareness of the importance of building upkeep. In the long term, the number of prematurely ageing buildings will be reduced, and the service life span of existing private premises should be prolonged.

In fact, maintenance of the building assets can be made easier and more economical if more easily maintained structures are designed in the first instance. The valuable opinions and constructive feedback from in-house maintenance teams or property/facility management companies can help improve the maintainability of future building designs. This is in line with the sustainability principle of providing a better living and working built environment for the community as a whole.

An industry-wide empirical survey was conducted between March and April of 2012 among the Hong Kong construction practitioners to find out the perceived benefits, potential difficulties and effective recommendations or good practices regarding MBIS implementation for existing private buildings. It should be noted that plausible suggestions were made before the implementation of MBIS on 30 June 2012 and are based on current knowledge at this time, thus the findings are only intuitional and cannot be generalised. However, it is of interest to carry out the same survey as conducted in this study, after the actual implementation. The new study should be conducted over one year or more. The results should then be compared with those of the survey described in this paper, with the objective of discerning any improvements in housing maintenance and conditions.

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10. List of Abbreviations

Authorised Person	AP
Building and Construction Authority	BCA
Buildings Authority	BA
Building (Inspection and Repair) Regulation	B(I&R)R
Building Safety Inspection Scheme	BSIS
Buildings Department	BD
Buildings Ordinance	BO
Development Bureau	DEVB
Health and Safety	H&S
Home Affairs Department	HAD
Hong Kong Housing Society	HKHS
Housing, Planning and Lands Bureau	HPLB
Integrated Building Maintenance Assistance Scheme	IBMAS
Legislative Council	LegCo
Mandatory Building Inspection Scheme	MBIS
Mandatory Window Inspection Scheme	MWIS
Owners' Corporation	OC
Registered Contractor	RC
Registered General Building Contractor	RGBC
Registered Inspector	RI
Registered Minor Works Contractor	RMWC
Registered Structural Engineer	RSE
Unauthorised building works	UBWs
Urban Renewal Authority	URA
Voluntary Building Assessment Scheme	VBAS