Good Practice Building Inspector Guidelines for Emerging Economies

INTERNATIONAL BUILDING QUALITY CENTRE

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INTRODUCTION

The International Building Quality Centre (IBQC) publication, *Good Practice Guidelines and Principles for the Development of Building Regulations in Low Income Countries* ("Building Regulations Guidelines"), explores the need to adopt different building regulatory systems for the different construction contexts in emerging economies, as building regulatory regimes that are transplanted from developed countries and meant to be applied in a 'one size fits all' methodology are not necessarily fit for purpose in these economies. These new *Good Practice Inspector Guidelines for Emerging Economies* ("Inspector Guidelines")[1] are intended as a supporting document that fits into this framework. They are meant to focus that same discussion on the role of building inspectors, particularly as that role differs significantly when the type of construction veers from that which is typical in developed countries.

These Inspector Guidelines are designed as a tool to help policymakers establish fit-for-purpose inspection regimes as well as for setting out the core competencies and associated training needed for building inspectors. The building safety focus remains the same: protecting building inhabitants. However, the methodology that inspectors must follow and the standards to which construction is held needs to be considered differently in different contexts, namely what is referred to by the IBQC as vernacular and informal construction contexts.

As was reported in the aforementioned Building Regulations Guidelines, emerging economies face several different building control challenges to high-income economies.[2] Economic capacity restraints often limit their ability to adopt regulations characteristic of high income countries on account of a lack of:

- institutional capacity;
- sufficient numbers of qualified design and construction practitioners;
- the ability of citizens to afford to construct engineered solution buildings[3] that are prevalent in higher-income contexts; and
- infrastructure (power, water, sewerage, telecommunications) necessary for effective operation and function over the life a building.

Even though emerging economies build a percentage of buildings in accordance with engineered solution building standards, the majority of buildings are informally constructed - neither involving the inputs of qualified building professionals, nor built in accordance with legally mandated building standards (that were specifically designed for engineered solution settings). In some of these economies, up to 80 per cent of buildings fall into the latter category. These buildings and their occupants tend not to have access to the benefits of the building safety and regulatory processes, that is, the assurance of healthy, resilient, and safe places to live, work and congregate.

1 The IBQC would like to acknowledge the dedication of the working group that developed these guidelines, including working group chair Judy Zakreski, IBQC board members Michael de Lint, Professor Charles Lemckert, Professor Kim Lovegrove, Professor Alfred Omenya, Professor Jose Torero, and Professor Bob Whittaker. A special debt of gratitude is owed to the outside experts who shared so generously of their time and expertise to produce this work: Louisa Barker, Rosemary Killip, Professor Stephen Kip, and Ziggy Lovegrove.

2 This portion of the introduction is largely extracted from the IBQC *Good Practice Guidelines for Low Income Countries* publication available on the IBQC web-site at www.ibqc.org.au.

3 An engineered solution building would typically refer to a building constructed in accordance with technical design and construction standards that are aligned with scientific principles and are consistent with the international body of knowledge of best-practice building construction methods, techniques and materials

In rural settings, buildings are often constructed in the local and traditional vernacular, where local elements and materials are utilised and traditional construction techniques are applied by people who, in the main, lack formal qualifications. A lack of formal qualification is not a derogation of their construction skills as some of the building techniques have been passed down by construction artisans familiar with building in the vernacular intergenerationally.

A bigger challenge is the prevalence of informal settlements within or bordering urban settlements. Some estimates indicate that further urbanisation in emerging economies is growing by 70 million people a year. Informal settlements are typically characterised by buildings that are constructed illegally where building components are added incrementally, when funding and materials become available; absent planning or urban approval, land title security, building permits or connection to essential services such as safe power and reticulated utilities.[4] This leaves some cities and their citizens vulnerable to chronic disease and natural hazards, with a disproportionate impact being visited upon the poor and the disenfranchised.[5]

Building regulations developed for emerging economies can best achieve practical application if they are sympathetic to the following three distinct construction contexts:

- engineered;
- vernacular; and
- informal.

A 'one size fits all' approach to national regulation is unlikely to work. These categories, how they are defined and applied must, of course, be sensitive to the specific contexts in which they are implemented. Countries such as Malawi and Nepal are starting to experiment with a tiered approach to building regulation.[6]

It follows that a building inspection system for an emerging economy needs to interact with the three discrete construction contexts. Therefore, as illustrated in Figure 1, a building inspection regime should be designed to ensure that separate inspection systems can be calibrated with:

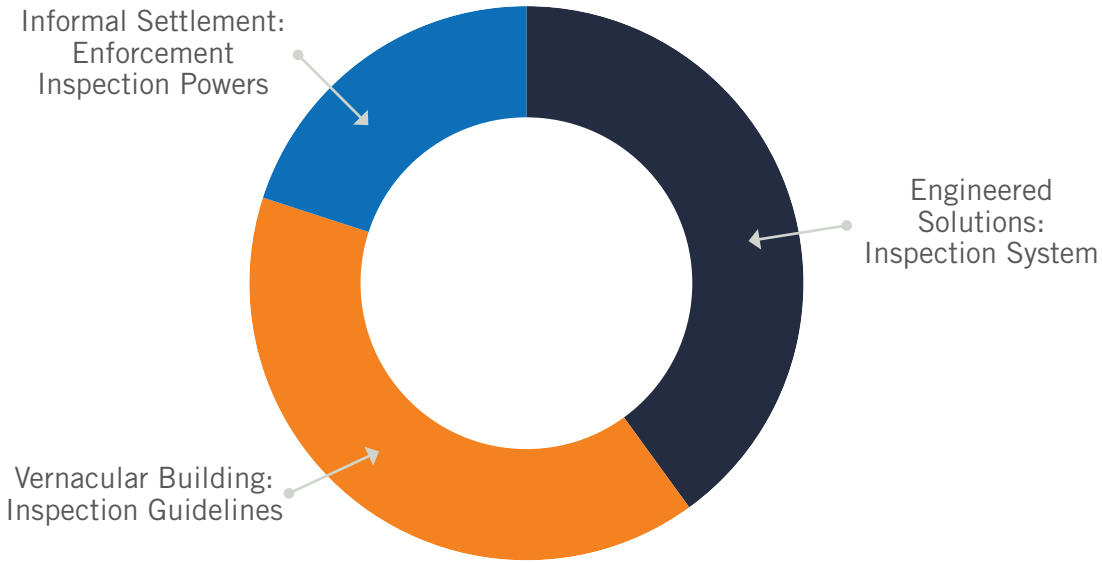
- engineered design and construction systems;
- general guidelines for construction in the vernacular setting; and
- enforcement inspection powers in informal settings where there is danger to life and limb.

4 World Bank, 2015, Building Regulation for Resilience: Managing Risks for Safer Cities.

5 Hallegatte, Stephane; Vogt-Schilb, Adrien; Bangalore, Mook; Rozenberg, Julie. 2017. Unbreakable: Building the Resilience of the Poor in the Face of Natural Disasters. Climate Change and Development. Washington, DC: World Bank.

6 A tiered approach would entail utilization of different regulations that apply to different construction contexts.

Figure 1: Building Inspection Regimes (proportion of inspectorate resources)



Building inspectors in certain contexts might find themselves to be the only 'qualified' persons onsite. Informal settlements and vernacular buildings are largely constructed using traditional intergenerational skillsets rather than based on building sciences and construction methods. Therefore the building inspectorate regime in these countries, while primarily focused on ensuring building safety in compliance with existing good practice inspection guidelines, may in some respects differ from those of high income countries in that the inspector may in certain specific contexts (such as the vernacular) provide a supplementary mentoring role in the promotion of broad uptake of good practice.

There are core and common skillsets required of building inspectors across jurisdictions, including:

- the general duties of a building inspector;
- soft skills such as communication;
- how to conduct inspections; and
- ethical considerations.

Depending on the jurisdiction, inspectors need to have a high level of understanding of the legislative regime which they are tasked with enforcing, including the accompanying powers with which they are vested.

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ENGINEERED SOLUTION BUILDING INSPECTION SYSTEM

Context

Engineered solution buildings are buildings that are constructed in accordance with technical design and construction standards that are aligned with scientific principles and are consistent with the international body of knowledge of best-practice building construction methods, techniques and materials.[7]

In many emerging economies, this is the city and township context where many buildings are built in accordance with construction design and engineering principles that are also prevalent in high income countries. Examples of cities that illustrate this principle include Addis Ababa, Nairobi, Blantyre and Lusaka.

Problem Statement

Even though many buildings in city or township settings in emerging economies are built in accordance with engineered solution protocols and systems that are common in high income economies, there is a profound lack of uniformity with regards to the administration of regulations, by-laws and codes that govern the construction of these buildings.

In some emerging economies, there are centralised fledgling building regulations. In other emerging economies, the building regulations or by-laws are regional in their application. Furthermore, there is a huge disparity of compliance and inspectorial capability which can range from the minimal to the more advanced.

It is rare for there to exist a system of mandatory and systematically implemented inspection protocols in light of institutional capacity constraints. This is problematic because ad-hoc, infrequent inspections, underpinned by under-resourced inspection capabilities, have been evidenced to contribute to greater risk of structural failure, and ultimately loss of life, even in higher income countries.[8]

As natural disaster events like earthquakes have a catastrophic effect on low-income economies, the magnitude of this kind of disaster can be more profound.

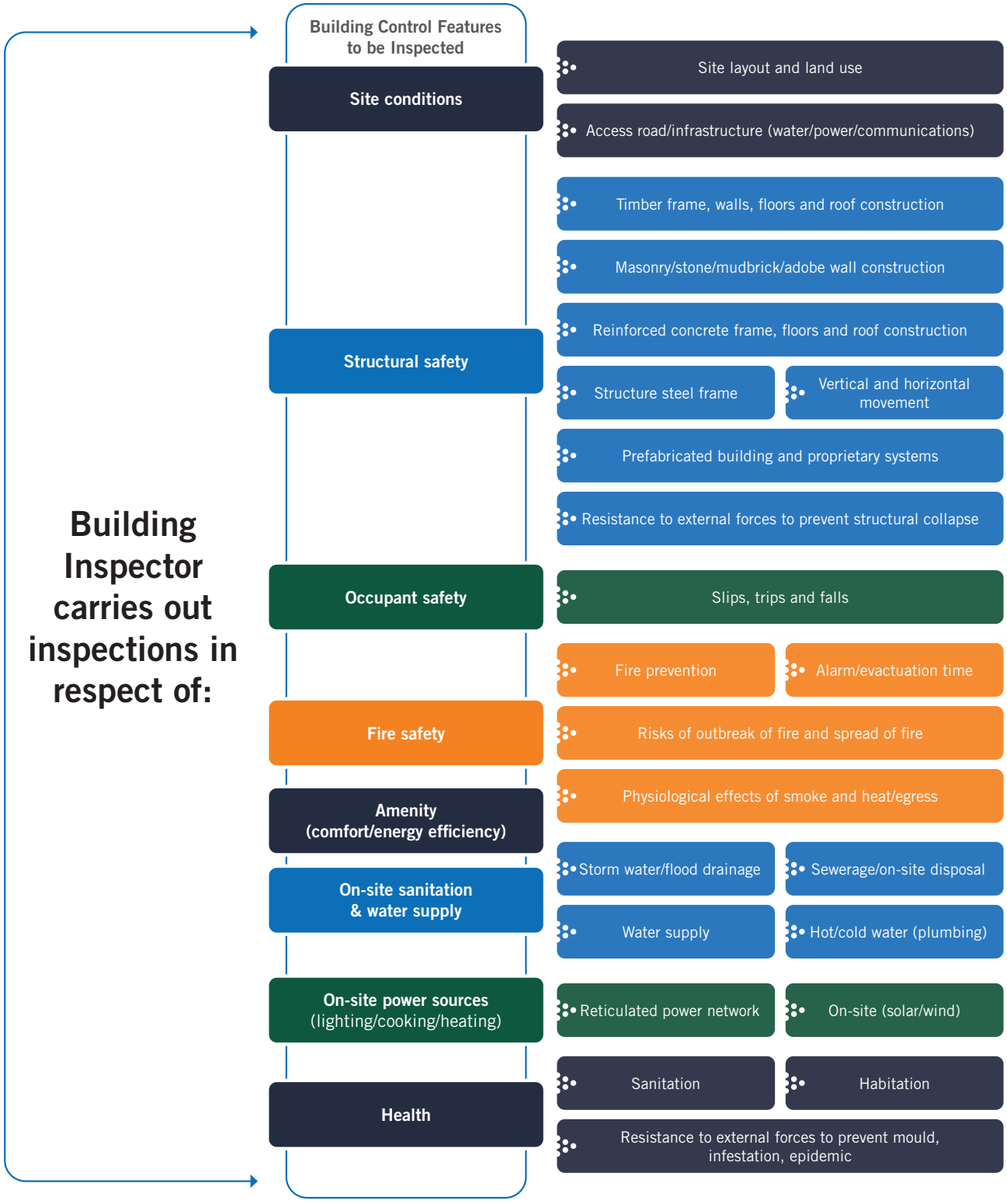
The inspection flowchart for engineered solutions (Figure 2) that has been designed by the IBQC provides a good practice inspection system that captures key construction milestones that ideally should be in place.

While the regulations concerning engineered solutions are likely to lead to safer construction outcomes, the enforcement regime must also include powers that enable building officials to take urgent and remedial action in order to remove imminent threat to life and limb. These powers would be akin to those set out in the Enforcement Powers for the Informal Settlement context discussed below.

7 Good Practice Guidelines and Principles for the Development of Building Regulations in Low Income Countries, [13].

8 World Bank, 2016, Converting Dsaster Experience into a Safer Built Environment: The Case of Japan.

Figure 2: Good Practice Inspection Flowchart for Engineered Solutions



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VERNACULAR BUILDING INSPECTION GUIDELINES

Context

Vernacular buildings are buildings constructed predominantly in rural areas in accordance with traditional construction methods characteristic of that culture where mediums such as mud brick, mud and stick frames and facia, thatched roof, local habitat and vegetation is used to generate the construction materials. Such buildings are typically constructed by those not formally qualified in any building discipline, more in the nature of owner builders, local construction workers, be they family or community members who cooperate to construct buildings that are affordable and in keeping with the style of building that is characteristic of the community and its traditions.[9]

Problem Statement

As one of the realities in many emerging economies is that most buildings are vernacular and constructed by members of the community who have inherited intergenerational construction techniques, this is a largely unregulated setting.

It is an unregulated setting because the citizens cannot always afford to construct buildings in accordance with engineered construction methodologies, nor do they always have the resources to do so. The problem is compounded by the fact that as engineered solutions are premised on achieving a high level of overall safety to the citizen, such level of safety is often not attainable in the vernacular setting. It therefore follows that this can adversely impact:

- Structural integrity;
- Access to and supply of fresh and uncontaminated water;
- Access to and supply of power;
- Compartmentalising cooking facilities in order to prevent smoke and fire spread; and
- Access to appropriate sanitary and waste disposal facilities.

Furthermore, in certain regions, there can be a high number of vernacular buildings built in disaster prone areas, be they flood-prone, seismically active, high fire risk, or at risk of destructive weather hazards.

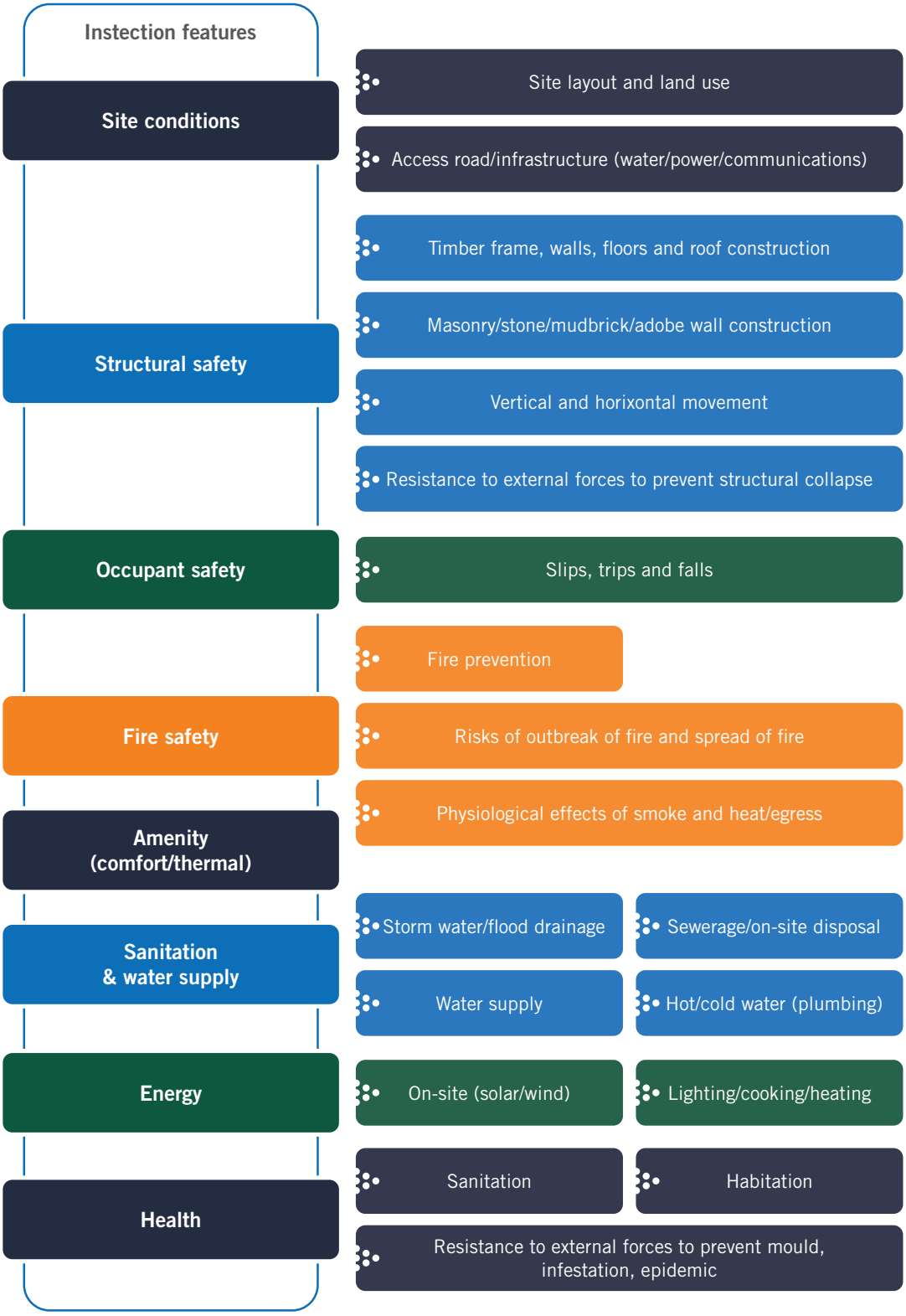
Inspection Guidelines

The underlying philosophy and approach that needs to govern inspection protocols for vernacular buildings is recognition that the guidelines have to be practical and capable of application in a “boots-on-the-ground” fashion. There is no practical and logical point in imposing an inspection system that has been designed for an over-engineered context on a vernacular paradigm where the financial constraints make it impossible to construct and approve buildings of the engineered solution derivation.

The guidelines for inspection must therefore be somewhat generalised, and must be aimed at improving the benchmarks of citizen safety by providing for an interaction between local government building inspectors and the urban leaders that can influence a more harmonised approach to rural and traditional building. In this context, the ultimate focus should be on the key construction factors that can pose the greatest risk to life and limb. Such factors are illustrated in Figure 3.

9 Good Practice Guidelines and Principles for the Development of Building Regulations in Low Income Countries, [13].

Figure 3: Good Practice Inspection Flowchart for Vernacular Buildings



The inspector will therefore provide community construction mentoring and guidance to facilitate more universal uptake of good construction practices for vernacular building. The key emphasis of inspection will therefore be the provision of guidance with respect to:

- Ensuring that non-engineered external waste (e.g. pit toilet) facilities are constructed safely and a safe distance from habitable abodes to alleviate any risk of disease spread;
- Buildings being constructed in a fashion to ensure that sewerage extraction methods can be fully operational without causing risk of contagion;
- Compartmentalization of cooking facilities to prevent fire spread;
- Ensuring buildings are built in a fashion that will alleviate risk of wall, floor or roof collapse;
- Ensuring that safe and practical access to fresh water supplies is available and not compromised by the risk of waste contamination;
- Ensuring that abodes are built in a fashion that provides adequate protection from temperature extremes;
- Ensuring safe access is provided to energy supply, where available; and
- Ensuring buildings are situated appropriately in relation to high-risk hazard zones, such as flood zones, fire prone areas, or areas of high seismic activity.

To conduct inspections in line with these minimum standards in a systematic way, the inspector will need to have access to good practice vernacular construction guidelines. These guidelines should be designed for uniform application and be capable of assisting with the upgrading of buildings in need of remediation in a practical and affordable fashion. Examples of these include the Safer Housing Guidelines in Malawi and the Peruvian Adobe Code.[10]

Notwithstanding, the inspector should also have the power to demand emergency evacuation, with the assistance of the police, and issue emergency orders for the demolition of buildings that pose public life-safety risk.[11]

10 For additional background, please see https://blogs.worldbank.org/africacan/building-safer-healthier-more-resilient-malawi and https://www.getty.edu/conservation/publications_resources/pdf_publications/pdf/gsap_part2a.pdf

11 The inspection guidelines for vernacular building is also set out in the inspection flowchart for vernacular buildings.

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INFORMAL BUILDING INSPECTION GUIDELINES

Context

Informal settlements include buildings constructed irregularly or illegally, absent the availability of and interconnectivity with legally sanctioned and regulated utilities such as electricity, water and sewerage management and devoid of planning, building permits or property title registration. These settlements are often characterised by a preponderance of buildings that have been built organically rather than as a result of governmentally sanctioned urban design and planning.[12,13]

Problem Statement

A bigger challenge is the prevalence of informal settlements within or bordering urban settlements. Some estimates indicate that further urbanisation in emerging economies is growing by 70 million people a year. Informal settlements are typically characterised by buildings that are constructed illegally where building components are added incrementally, when funding and materials become available; absent planning or urban approval, land title security, building permits or connection to essential services such as safe power and reticulated utilities. This leaves some cities and their citizens vulnerable to chronic disease and natural hazards, with a disproportionate impact upon the poor and the disenfranchised.

Inspection Guidelines

Both the central government regulator (CGR) and the local municipal authority may hold certain powers with respect to maintaining the safety of citizens housed in these areas where there is a building-related threat to life.

Upon notification of a potentially dangerous situation, the building inspector will investigate and take proper action to remedy the situation.

The CGR or the local municipal authority should be empowered to:

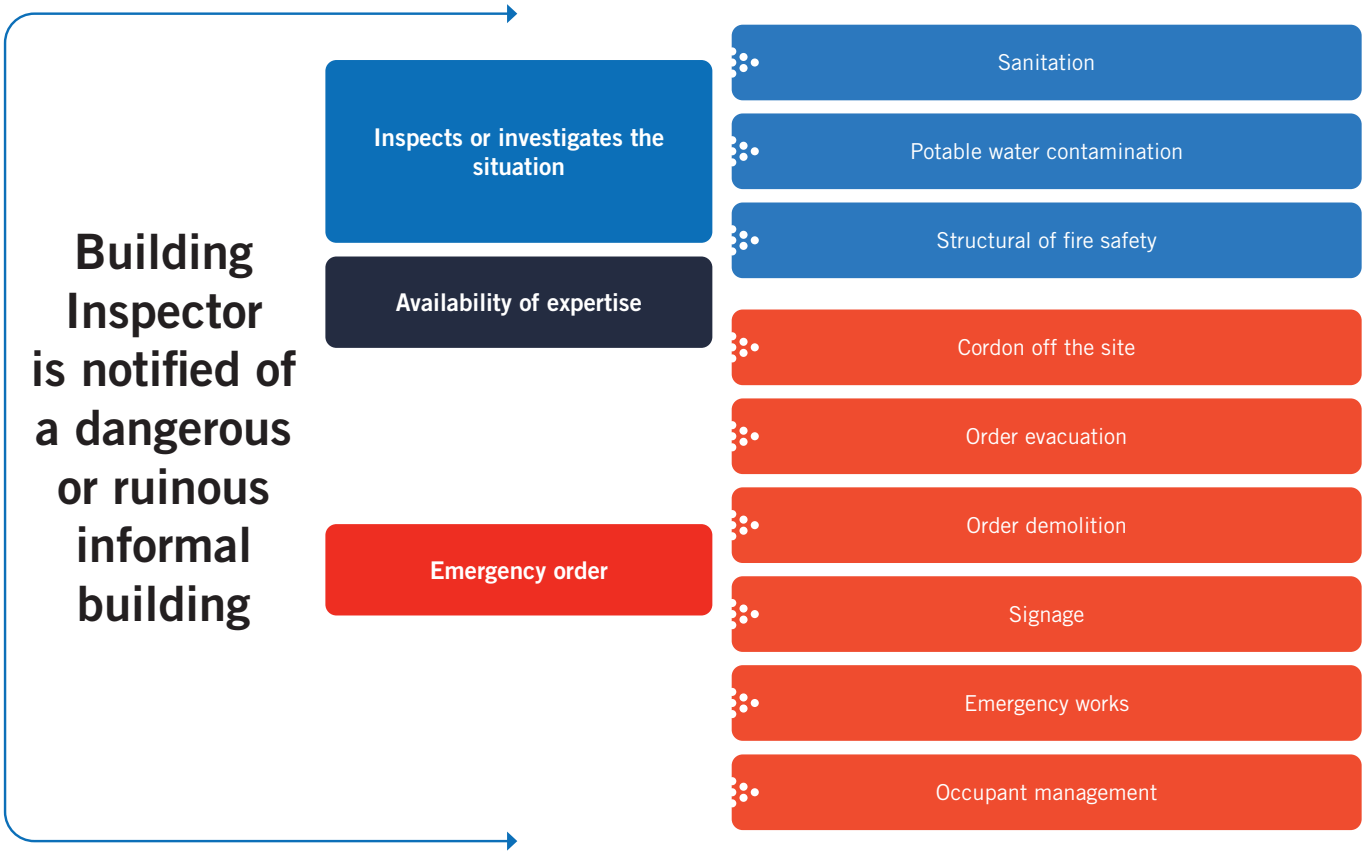
- Inspect buildings where they harbour a reasonable suspicion that the buildings are dangerous or ruinous and pose an immediate threat to life or limb;
- Inspect buildings where they harbour a reasonable suspicion that the buildings are unhealthy or contain chemical or biological hazards;
- Effect building closure and cordoning off of such buildings if it meets either of the above two criteria;
- Demand expedited evacuation and/or prohibit re-occupation;
- Demand remediation;
- Demand demolition where the danger cannot be averted by remediation or renovation;
- Any evacuation or demolition should be done in a humane manner, providing sufficient time for occupants to extract and relocate their belongings; and
- Refer affected citizens to agencies that can assist with relocation.

This set of powers is illustrated in Figure 4.

12 Good Practice Guidelines and Principles for the Development of Building Regulations in Low Income Countries, [13].

13 A more comprehensive description can be found in the UN Habitat guidelines (at Brown 2015 b).

Figure 4: Good Practice Flowchart of Enforcement Powers for Informal Settlements



Any citizen that is given a compliance directive by a building inspector must by law comply with such directives.

The building inspector in this context will be empowered to inspect dangerous or unsanitary situations which may come to their attention through complaint, observation (such as post-disaster), or community request. The inspection may result in enforcement action in accordance with the regulations. Notwithstanding, good practice is to work with communities in conjunction with urban leaders and/or civil society organisations (and the police if need be) to resolve matters quickly to prevent injury and loss of life.

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CONCLUSION

It is clear that the traditional 'one size fits all' building regulations have failed to provide building safety to majority of the people in developing countries. This has been recognised by many institutions supporting building safety globally, e.g. the World Bank. It is this realisation that led the IBQC to develop *Good Practice Guidelines and Principles for Development of Building Regulations in Low Income Countries*[14] as well as this supporting document targeted at building inspection regimes. This set of guidelines recommends the need for building regulations that are relevant to these economies, dealing adequately with three main building typologies - engineered construction, construction in informal areas and vernacular construction. A building inspector is needed in all of these realms, undertaking key tasks towards overall building safety as highlighted in this document. Some of their responsibilities will need to be buttressed in law; but many others only require technical skills and expertise within the realm of guidelines. The overall aim of these guidelines is to develop regulatory regimes that offers maximum safety to citizens of emerging economies.

DEFINITIONS

Act - means the Building Act

Code - means the building code that is called by the Act

CGR – "Central Government Regulator", being the centralised national building regulatory authority

Disaster prone area - is an area, as defined and designated by the sovereign jurisdiction, susceptible to extreme climate, geographical or seismic conditions such as; drought, flood, fire, tornado/cyclone/hurricane, earthquake/tsunami, landslip or avalanche.

Natural disaster – is a phenomenon including severe seismic calamities (such as earthquakes/tsunamis), droughts, floods, fires, tornadoes/cyclones/hurricanes, landslips or avalanches.

Inspector – a qualified building inspector, building official, municipal authority, building department, or CGR, that pursuant to building regulation has the power to inspect buildings in accordance with the requirements of the operative legislation

Regulation – means "Act" or "code", above, and by-laws or subordinate legislation

Urban leader - means village or communal leader, chief or principal or senior elder.

14 Good Practice Guidelines and Principles for the Development of Building Regulations in Low Income Countries