

Regulatory Framework for Strengthening Existing Buildings in the Philippines

Overview

Country: Philippines

Stakeholders: Department of Education (DepEd), Department of Public Works & Highways (DPWH), Local Government Units (Barangays, Municipalities/Cities, Provinces), school communities.

Hazards: Earthquakes, volcanoes and typhoons



Summary: The Philippines suffers from frequent and multiple natural hazards which pose a significant risk to education infrastructure. Addressing this risk to existing schools through a safer and resilient education infrastructure program is challenging due to the lack of building codes for upgrading existing buildings. Lessons have been shared from international experience, particularly the need to prioritize schools for retrofitting which will maximise the impact of the investment based on the number of potential lives saved. This should typically be complemented with capacity-building for government departments and associated institutions responsible for the development and enforcement of appropriate regulations and building codes.

CONTEXT

Developing appropriate regulations and enforcement are critical for school safety

The Philippines is an archipelago of more than 7,600 islands exposed to some of the most intense and frequent natural disasters in the world. Hazards, including earthquakes, typhoons and monsoon rains all limit the country's development. The DepEd identifies 44,619 public schools nationwide that are exposed and potentially vulnerable to these natural disasters. Urban migration, overcrowding, poor construction quality and a weak regulatory environment further contribute to the vulnerability of education infrastructure. Since 2011, the World Bank has provided technical assistance to the DPWH through the Safe and Resilient Infrastructure Program which assesses the vulnerability of schools in Metro Manila as part of a wider aim to strengthen key public buildings against natural hazards.

This case study is based on lessons from the World Bank Forum on Safe and Resilient Infrastructure in the Philippines in 2014 and focusses on the regulatory environment.

could be changed or introduced in order to mitigate future disasters and promote resilience.

The regulatory framework may be overly complicated or detailed which can inhibit effective enforcement and adoption. Conversely, aspects of the built environment may be overlooked or entirely absent from the planning and building regulations. Identifying the appropriate form of regulation and enforcement is critical to a successful regulatory framework. In the Philippines, it was plainly identified that regulation of the existing education infrastructure was lacking and that guidelines for retrofitting would constitute an important first step toward pro-actively improving the safety of education infrastructure.

OBJECTIVES

Identifying pro-active improvements to the regulatory framework

The objectives of diagnosing the regulatory framework are to understand the strengths and weakness of the planning and building regulations in order to identify opportunities to improve the safety of education infrastructure. The regulatory framework tends to be reactionary so it is important to understand the historical events which may have provoked changes to the planning and building regulations. A systematic review of the regulatory framework can identify pro-active measures that

METHODOLOGY

Learning from international experience

A seismic evaluation and risk assessment of schools and hospitals developed by the DPWH identified that upgrading a relatively small number of systematically prioritized structures can save a disproportionately large number of lives, and be more cost effective than building new schools. Thus, the importance of regulating and upgrading existing infrastructure was clearly defined as the key priority to improve education infrastructure in the Philippines.

As part of this process, the DPWH and World Bank hosted the 2013 Forum on Safe and Resilient Infrastructure in Manila for countries who have invested in nationwide disaster risk management. The core themes addressed the initiation of policy actions to support multi-hazard resilience in design and construction that go beyond current Building Code provisions. Lessons were drawn from international experience about the impact of previous disasters and wide-

scale intervention strategies to reduce the vulnerability of communities, facilities, and infrastructure.

The current Philippine building codes (including the National Structural Code of the Philippines (NSCP)) and regulations are orientated towards construction of new buildings. While the codes are aligned with most modern international building codes, including the US codes on which the Philippine building codes were originally based, they were not intended for strengthening or upgrading existing buildings.

The World Bank funded the development of guidelines to supplement the NSCP in order to address the seismic design requirements for existing public school and hospital buildings in Metro Manila. The guidelines aim to implement procedures that lead to safeguarding Metro Manila school and hospital buildings against catastrophic damage from future earthquakes. The intention is to inform a cost-effective methodology to implement retrofitting interventions on-schedule and in line with appropriate quality standards. These interventions should enhance school and hospital infrastructure buildings to meet specific performance objectives.

For all structures, including school buildings, the NSCP requires a minimum performance objective of ‘Life Safety’ (LS) for new construction and existing buildings. The NSCP defines the ‘Life Safety’ performance objective as “primarily to safeguard against major structural failures and loss of life, not to limit damage or maintain function”. However, in some cases

higher performance objectives may be required, such as “Immediate Occupancy” (buildings will suffer only minor damage, can be quickly repaired, and immediately occupied) or “Operational” (strategically identified buildings to be used for post-disaster emergency operations, e.g. school buildings used as refuge and evacuation centres). The guidance developed sought to clarify the provisional details in the NSCP on how school buildings can meet these higher performance objectives. Depending on the condition of the existing buildings, the cost of retrofitting existing schools to these higher performance objectives may prove prohibitive and reconstruction may need to be considered as an alternative intervention.

CHALLENGES & OPPORTUNITIES

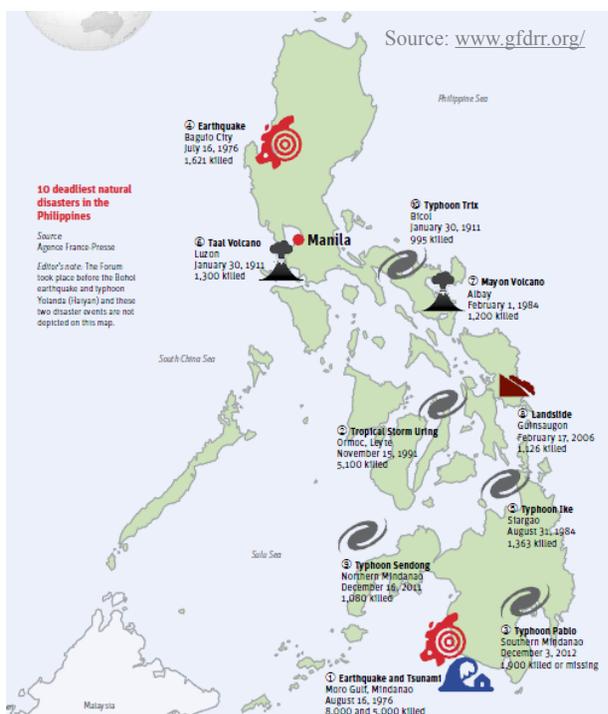
Developing Regulatory Framework for Retrofitting Existing Buildings

In many areas of the Philippines, natural hazards are either underestimated or inadequately reflected in building code requirements. Hazard maps (which show distribution of intensity with given probabilities of occurrence in specific geographical areas) are used in creating and updating building codes, land use planning, and insurance pricing. Hazard mapping in the Philippines has historically been quantified at a relatively large scale which tends to underestimate intensity for specific locations. Thus, many buildings in the Philippines were designed to meet standards corresponding to a lower hazard intensity than they are actually exposed to.

While the complementary NSCP code guidance now addresses existing buildings, the regulatory processes do not currently include the assessment and strengthening of existing buildings. Thus while the code and retrofitting guidelines exist, they are not yet enforceable as the DPWH as not issued an Administrative or Department Order.

Enforcement of building codes is crucial to reducing structural damage, financial and human losses. A field assessment by the Association of Structural Engineers of the Philippines (ASEP) after the M7.2 Bohol earthquake of 2013 showed much of the damage was due to inadequate structural detailing and substandard material quality. The technical capacity and capability of local building officials need to be strengthened to manage the regulation of construction more effectively, including the assessment and retrofitting of existing buildings. The lack of clarity in the building approval process, and responsibilities of building officials were also identified as challenges that need to be addressed.

The variety of school building construction typologies provides a challenge in applying building codes for new construction as well as developing guidelines for existing schools. The current building codes do not generally cover vernacular construction materials typically used in rural school buildings. The recently developed retrofitting guidelines are targeted at the most common and most vulnerable structural typologies, but are not appropriate for all school buildings nationwide.



Ten deadliest natural disasters in the Philippines – the frequency and intensity of multiple natural hazards cause significant risk to education infrastructure.

Regulations for Strengthening and Upgrading Existing School Buildings

The DPWH Safe and Resilient Infrastructure Program was informed by lessons learned from international experience which has established public policies and an initial cross-sectorial strategy for improving the resilience of public infrastructure facilities, particularly schools.

In 2014 the DPWH developed a guidance document to supplement the existing 2010 NSCP, which addresses the seismic design requirements for existing public school and hospital buildings in Metro Manila and reflects the updated earthquake provisions in the structural building code. This guidance includes technical requirements, and methodologies for prioritizing investments to maximise the impact on risk reduction and potential number of lives saved. It also contains specific examples for upgrading and strengthening typical school buildings in Metro Manila. This process was supported by the World Bank and GFDRR through their safer schools program in Metro Manila.

Future actions are now required to support the successful implementation of a disaster risk management program for education infrastructure in the Philippines. These include the development of small scale multi-hazard maps and incorporating them into the planning and building regulatory documents; and building capacity within the DPWH and local building officials to strengthen enforcement of planning, design and construction processes (including the recently developed retrofitting guidelines).

Learning

- Building codes and regulations should, but often do not, include provisions for the assessment and retrofitting of existing school buildings. The development of retrofitting guidelines can act as a first step toward inclusion of these provisions.
- A systematic review of the regulatory framework and existing education infrastructure can reveal strategic opportunities for intervention, e.g. retrofitting in the Philippines.
- Experience from around the world can provide useful insight for decision makers in the Philippines to address these key issues and develop a safer schools program founded on a strong regulatory environment.

Find out more

Read:

Safe and Resilient Infrastructure, World Bank, 2014, <https://goo.gl/2u5TUj>

Contact:

Jolanta Kryspin-Watson, World Bank, jkryspin@worldbank.org

Artessa Saldivar-Sali, World Bank, asaldivarsali@worldbank.org