Provisional Myanmar National Building Code and Guidelines for High-rise Buildings

U Than Myint
Chairman
Myanmar National Building Code Development Project Coordinating Committee, Myanmar Engineering Society
Chairman
Committee for Quality Control of High-rise Building Projects (CQHP)

11th March, 2014
Park Royal Hotel, Yangon
Provisional Myanmar National Building Code and Building Regulations

- Natural Hazards of Myanmar to consider in Design of Buildings
- City Development Committees
- Provisional Myanmar National Building Code
- Design Review Guidelines and Procedures from Committee for Quality Control of High-rise Building Projects (CQHP)
Natural Hazards of Myanmar to consider in Design of Buildings
Myanmar indeed is earthquake-prone as it lies in the Alpide Earthquake Belt that extends from northern Mediterranean, through Turkey, Iran, Afghanistan, Pakistan, northern India, Myanmar, Andaman Islands, down to Indonesia.
Seismicity and Seismic Hazard in Myanmar
Source: Dr. Inoue, JICA
Geomorphology and Tectonic Setting

WESTERN FOLD BELT

CENTRAL BASIN

EASTERN HIGH LAND

Kabaw Fault

Sagaing Fault

Kyaunkkyan Fault

Papun Fault

Spreading Centre
Earthquakes along the Sagaing Fault in 1930s

Most of the Major Cities are on Sagaing Fault
Probabilistic Seismic Hazard Map of Myanmar for 10% probability of exceedance in 50 years (475 years recurrent interval), the seismic hazard is described in term of peak ground acceleration (PGA) in g.

Seismic Zone Map of Myanmar (2012)
Liquefaction

Niigata, Japan
June 16, 1964
Magnitude 7.4

Photo Credit: National Geophysical Data Center
Natural Hazards in Myanmar

- Earthquake
- Cyclone
- Floods
- Landslide
- Tsunami
- Fire
Building Regulations

Naypyitaw Development Committee
NCDC

Yangon City Development Committee - YCDC

Mandalay City Development Committee
MCDC

Township Development Committees in other Towns
Engineering Department - Building

- Building Construction Permit
- Fencing Construction Permit
- Building Demolition Permit
- Building Major Repair Permit
- Building Minor Repair Permit
- Building Completion Certificate
Engineering Department - Building

1. Form/ permission section
2. Inspection section
3. Electricity section
4. Planning section
5. Administration/ land section
6. Maintenance section
7. Construction section
8. Estimate & Research section
• For High-rise Building (9 storey and above), YCDC has High-rise Building Inspection Committee. This committee look into the City Development requirements, utilities and other requirements and submit to Regional Government for planning approval.

• For High-rise Building (12 storey and above), YCDC send to Committee for Quality Control of High-rise Building Projects (CQHP) for design review and recommendation.
Building Height Limitations

Yangon City

For better view of famous SHWE DAGON Pagoda of Myanmar and other development control building heights are limited in Yangon
516 FT

417 FT

190 FT----
Shwe Dagon Limit Area

Not more than 417 FT

Not more than 190FT
Permission for the construction of 9 storey / 12 storey and above buildings

- YCDC send the following documents to Committee for Quality Control of High-rise Building Projects (CQHP) to review the technical detailed design and to get the recommendation from CQHP for issuing construction permit.
  - Architectural Drawing
  - Structural Drawing
  - Electrical Drawing
  - Sanitary Drawing
Fire Safety in Building

- Fire Safety in Building is looked after by Fire Service Department. Ministry of Home Affairs.

- Building Plan Approval from Fire Department is needed.
Design Review for Fire Safety of Buildings

Guidelines of the proposal set for Fire Department approval.

The submission set shall include the following subjects; however registered architect would expand or modify to suit his presentation.

**General Data**
1. Data sheets, which would include the total floor area, floor areas of every storeys, Occupancy types and Loads, Fire resistance of main structural system of building.

**Means of Egress**
2. Plans highlighting occupancy types (if mixed), the travel distances, egress component such as corridor widths and exit discharge path.
3. Plans of exit stair at exit discharge level and other typical levels showing egress width of exit doors, stair width, stair riser/tread and fire resistance of exit stair case walls and doors.
4. Plans with exist signs and emergency lighting points.

**Fire Engine Accessibility**
5. Ground floor plan/plan outlines the Fire Engine driveways which are paved to withstand the load of fire Engines and highlighting Breeching inlet locations and Fire hydrants locations if they are provided.
6. Section showing Fire Engine Access to Firemen access panels.
7. Elevations showing firemen access panels.
Guidelines of the proposal set for Fire Department approval.

8. This would include the alarm systems such as fire alarm system, heat/smoke detection system.
9. Description of how audio and visual advisory systems are provided.

**Fire Fighting System**

10. Plans highlighting the locations of fire extinguisher, hose reels, rising mains, fire hoses, and how fire hoses can cover.
11. Diagrammatic section showing how the rising main system, sprinkler system is include together with water storage, break tanks and pumps system.
12. Raising mains, water pressure, pumps specification.
13. Plans showing locations of smoke/heat detector and sprinkler coverage if it is provided.
Check List for Designing Means of Egress

- General Requirements for Means of Egress (Ceiling height, floor surfaces, level changes etc.)
- Occupancy Type
- Exist Access
- Exist Staircases
- Travel Distance
- Egress Width
- Exists Discharge
- Smoke Stop Lobby
- Ventilation
Provisional Myanmar National Building Code
(MNBC)
2012
Urbanization of Cities

• Cities are not like before
• Population is increasing
• Buildings are now in Masonry and Concrete, if not built well it is dangerous, high Vulnerability
• New Cities are coming up, Exposure is high now.
For Myanmar

- Hazard is High
- Exposure becoming Higher
- If Building Design and Building construction works are not well controlled and not well built it will be high Vulnerability.

Risk = Hazard $\times$ Vulnerability $\times$ Exposure

So, to mitigate the Natural Hazard Risk we need Building codes and Control
Building Code

- Building Code is systematic statement of a body of rules that govern and constrain the design, construction, alteration, and repair of buildings.
- Building Codes are for Safety, Health and Quality of Life for Building Users and Neighbors
Myanmar National Building Code Development

- In view of increasing urbanization and to ensure recovery and development gains made in the country are not lost due to potential future disasters, and ensuring structural resilience from potential hazards, it is planning for formulation of national building codes for the country.
- As it is initial step for development of National Code, adaptation of international codes have to follow.
- The review of existing building codes and by-laws were carried out in consultation with relevant departments and institutions.
Codes Used in Myanmar

- Myanmar used British Codes and Specifications before.
- Departments are using Departmental codes and rules
- City Development Committees have By-Laws, Rules and Regulations.
- Technological universities are using American Codes for Building Design Courses
- Practicing Structural Engineers are more familiar with American Codes and Specifications
- M&E Engineers are following BS Codes, US Codes and Singapore Codes
After studying Building Codes from neighboring countries, developing countries and developed countries, and based on existing position of Myanmar, codes from following countries are referred and adapted.

- US Codes
- BS Codes
- Indian Codes
- Singapore Codes
Level of Code

• As we are going to take reference to existing international codes, we start with International and neighboring countries level which we can follow.

• After the first code we plan to do for majority users in Cities and Town which can be followed by local engineers and users.

• We also plan to issue guidelines for non-engineered buildings to use in village level.
Project Activities

• Formation of Technical Working Group (TWG)
• Formation of Project Coordinating Committee (PCC)
• Formation of Review and Coordination Committee (RCC)
• Collection of Documents, Building Codes, By-Laws, international and local
• Studies and Discussions
• Comparison of Selected Codes
• Discussions for modification to suit existing level and needs of Myanmar
• Discussions for adaptation and addition for Myanmar National Building Code (MNBC)
• Drafting of Myanmar National Building Code (MNBC)
• Invite comments and suggestions from stakeholders
• Invite comments and suggestions from relevant agencies and experts
Technical Working Groups (TWGs)

- TWG 1 - Planning, Environment, Administration and Legislation
- TWG 2 - Architecture and Urban Design
- TWG 3 - Structural Design
- TWG 4 - Soil and Foundation
- TWG 5 - Building Services
- TWG 6 - Material
- TWG 7 - Constructional Practices and Safety
MNBC Development Organization Set-up

- MES Working Group
- Project Coordination Committee (PCC)
- Technical Working Groups (TWG)
- REVIEW AND COORDINATION COMMITTEE (RCC)

TWG 1  TWG 2  TWG 3  TWG 4  TWG 5  TWG 6  TWG 7
Myanmar National Building Code Development Implementation Plan

- **Phase 1: First Draft** - June-11 to Dec-11
- **Phase 2: Provisional Code** - Jan-12 to Dec-12
- **Phase 3: Provisional MNBC Code Review and Getting Comments** - Jan-13 to Dec-14
- **Phase 4: MNBC –final- Code** - Jan-15 to June-15
Myanmar National Building Code (MNBC) (Provisional) 2012
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Design Review at Committee for Quality Control of High-Rise Building Construction Projects (CQHP) and Guidelines for High-rise Buildings
Background of the Committee for Quality Control of High-Rise Building Construction Projects (CQHP)

- To get high–rise buildings of good quality with seismic resistant design, some technical problems need to be solved.

- CQHP was commissioned in 2003 by government aiming to check the designs of High–rise buildings and give advice where necessary.

- Committee defines that high–rise buildings are buildings having more than eight stories.

- The committee is constituted of eleven senior professional engineers who are from Ministries, from Myanmar Engineering Society and from Yangon Technological University and there are seven civil engineers, two electrical engineers, a mechanical engineer and an architect in the committee. CQHP has Technical Consultative Groups also.
CQHP Committee Members

- Architects
- Structural Engineers
- Electrical Engineers
- Water and Sanitary Engineers
- Mechanical Engineers
Responsibilities of CQHP

(a) To specify guidelines for the design calculations of the high-rise buildings that are to be built in Myanmar.

(b) To specify guidelines for the quality control of the high-rise buildings that are bound to be observed by the project superintendents and site engineers.

(c) To check that the design calculations submitted by the respective structural designer are in accordance with the CQHP's guidelines and that they are acceptable according to the international codes of practice and, if necessary, to give advice on how to perform the corrections.

(d) To go to the construction sites regularly (and necessarily) and to check whether or not they follow the CQHP's guidelines and to give advice on quality control.

(e) To cooperate with all other relevant departments and organizations to get high-rise buildings of good quality.
CQHP Guidelines for High-Rise Construction Projects

(1) Guidelines for High- Rise Building Construction Projects (Architecture)
(2) Guidelines for High- Rise Building Construction Projects (Structure)
(3) Guidelines for High- Rise Building Construction Projects (Sanitation)
(4) Guidelines for High- Rise Building Construction Projects (Mechanical)
(5) Quick Guide to Guidelines for High- Rise Building Construction Projects (Mechanical)
(6) Guidelines for High- Rise Building Construction Projects (Electrical)
(7) Electrical Installation Design Guide for High- Rise Building Construction Projects
(8) Guidelines for High- Rise Building Construction Projects (Safety)
(9) Inspector Guideline
Design Checking Procedures
Private Development Project

• 1-Design and Drawing are submitted to YCDC by Developer.
• 2-Initial Checking - YCDC Bye-law, City Development requirements, Administrative requirements and others are checked by YCDC.
• 3- Design and Drawings are forwarded to CQHP for Design Review and Recommendation.
• 4-Architect and Designer are called to CQHP for explanation of their design, representative of Fire Brigade also present at review meetings.
• 5-CQHP give comments and suggestions to fulfill the code requirements and CQHP Guidelines. Mainly US Codes are followed in Structural Design, for M&E US, British and Singapore Code are accepted.
Design Checking Procedures

- 6-Detail checking by Accredited Checker and Technical Assistants
- 7-Reports of Accredited Checker and Technical Assistants
- 8- CQHP Committee members review the Design and Drawing and approve for recommendation
- 9- CQHP issue recommendation to YCDC
- 10-Developer need to get approval from Fire Service Department for Fire Safety
Design Checking and Procedures

Development Project Initiated by Department of Housing Development and Human Settlement (DHSHD)

• Development Projects which are sent to CQHP from DHSHD are also reviewed by CQHP as mentioned above.
• CQHP send recommendation to DHSHD after the proposed design is conformed to Codes and Guidelines
Check List and Submission Guideline

- To expedite the design review process CQHP had issued the booklet on Design Review Check List for Designers on Architectural, Structural, Electrical, Sanitary and Water Supply.
- To expedite the submission process and to start the construction work as soon as possible CQHP had issued the booklet on Submission Stages and List of Document to submit.
CQHP Design Review Check List Booklet

CQHP Design Document Submission
Requirements for Design Review
Supporting and Collaborating Technical Groups

- For Consultation and Development of Guidelines for advancement following Technical Groups are formed in CQHP with the corporation of experienced Engineers.
  - Structural Technical Group
  - Electrical Technical Group
  - Architectural Technical Group
  - Air conditioning and Ventilation Technical Group
Construction Site Inspection
Bored Pile Load Test
Deep Excavation
Detailing
Awareness in Building Construction

• Building in right way is the first step we need to follow-in Non-Engineered buildings and Engineered buildings

• Awareness of Building Regulations, Codes and Local needs is important in Development Projects.

• Corporation, Collaboration is much needed for successful implementation of Building Construction Projects
Thank You