

ACMC – Performance Based Code for Design, Construction and Maintenance

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Summary

Asian Concrete Model Code (ACMC) is the first international code in the region as a performance based code, whose first version appeared in 2001. ACMC consists of design, construction and maintenance parts, which deal with concrete structures from birth to death. The required performance, whose verification method is provided, is safety, serviceability and reparability. ACMC introduces the multi-level document structure. Level 1 and Level 2 documents are the common code, while Level 3 document is the local/specific code. Since its birth ACMC has been serving to not only to Asia but also the whole world through ISO activities. It is believed that ACMC would be a good model for sustainable international model code because of its performance based nature and multi-level document structure.

Keywords: Performance-based code, international model code, multi-level document structure

1. Introduction

Asia is a fast growing region in the world. In Asia the size of construction market is much greater than one third of the whole world market and the consumption of cement is far more than a half of the world consumption. After constructing abundant structures in Asia, we are responsible to maintain them for a long period for the sustainable world. In order to construct new structures and maintain them with good quality and reasonable cost the role of structural code is vital. Since structures themselves are supposed to be of long life, structural codes should be sustainable. International Committee on Concrete Model Code for Asia (ICCMC) established in 1994 is a sole international body for concrete structures in Asia with the aim of developing and maintaining Asian Concrete Model Code (ACMC), which is a good example of a sustainable code.

2. Sustainable code and Asian Concrete Model Code

A sustainable code is universal and user-friendly. There are two keywords to make codes sustainable. They are “performance-based concept” and “multi-level document structure”.

The performance based code is the latest type and most suitable for any code, especially for international code. The concept of performance base is also accepted by ISO. The performance based concept is to specify the required performance but the method to achieve the required performance. With this concept any national and regional code can apply its suitable method for design, construction and maintenance of a structure, if it is proved that the structure satisfies the required performance, which can be universally adapted. Especially this concept is necessary for the part of the world, such as Asia, in which the big diversity of economical and technological level, climatic and social condition and available material and facility exists.

The performance-based design is with more general methodology than the rest of the design methodologies (Allowable Stress Design, Ultimate Strength Design and Limit State Design). PBD

clearly describes the required performance often in wording easily understood by ordinary people. Presently the following required performance is considered in various codes with PBD:

- Safety
 - Serviceability
 - Maintainability and Reparability (or Restorability)
 - Constructability
 - Sustainability (or Environmentability)
 - Economy
- } Durability

The way to make a structural code sustainable is to have a common code and local (or specific) code as a set (see an example in Fig. 1). The common code provides the basis of design, construction and maintenance, including the required performance, which should be applied to any local (or specific) code. The local code is a code of practice to provide all necessary technical guidance which can be different among different local codes to fit for any local condition.

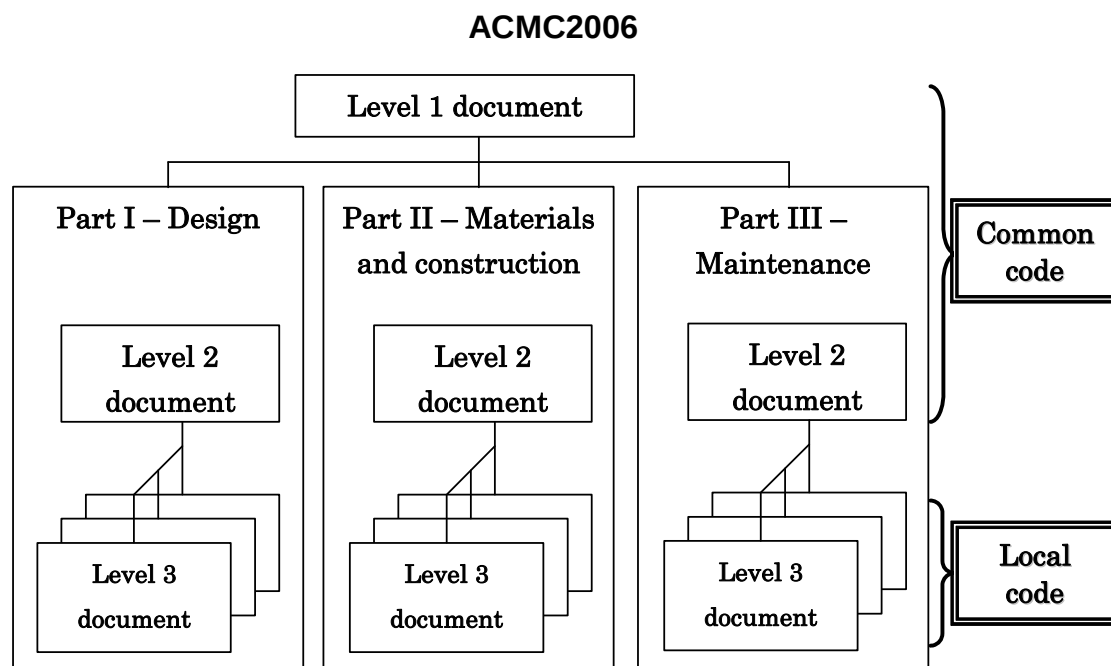


Fig. 1: Multi-level Document Structure of Asian Concrete Model Code

As shown in Fig. 1. ACMC 2006 consists of Level 1 and Level 2 Documents, both of which are the common code, while Level 3 Documents are local (specific) codes. Level 2 Document consists of three parts; Part I – Design, Part II – Materials and Construction and Part III – Maintenance. ACMC covers all kinds of concrete structure from its birth to death. As the required performance, only safety, serviceability and reparability (restorability) are dealt with. ISO/TC71/SC7 (Maintenance and repair of concrete structures) are drafting an umbrella code for maintenance and repair of concrete structures with Part III of ACMC as its basis. One of Level 3 Documents is the Vietnam National Standard for maintenance of concrete structures.

3. Conclusions

In order to make structures sustainable, structural codes should cover not only design and construction but also maintenance and repair. A sustainable code is universal and user-friendly. The performance-based concept and multi-level document structure are the key issue for the sustainable code. Asian Concrete Model Code is the first attempt in this kind in the region and shows a good example of the sustainable code.