

Introduction of Eurocode2: Design of concrete structures

Nikken Sekkei Civil Engineering LTD Regular Member Toshinori Monzen

1. INTRODUCTION

Recently Eurocodes, the European structural design standards, have been widely adopted for designs in countries outside of Europe and have increased influence on the international standards. In this paper, the design process in Eurocode2, the structural design standard for concrete structures, as well as systems of Eurocodes will be introduced. By comparing Eurocodes with Design Standards for Railway Structures and Commentary, Japan etc., this study attempts to consider Japanese construction field how to correspond to international standards considering expansion into international markets.

2. OUTLINE OF EUROCODES

Eurocodes are unified structural standards of Europe issued by CEN (European Committee for Standardization). These standards have been adopted in the EU (European Union) and EFTA (European Free Trade Association). Figure 1 shows the whole structure of Eurocodes. As a performance design criteria, general rules and basis are summarized in EN 1990: Eurocode and EN 1991: Eurocode 1. Eurocode 2-6 and 9 specify technical rules for the design of each structure (e.g. Concrete structures, Steel structures, etc.). Eurocode 7 which specify the design of Geotechnical Structures and Eurocode 8 which relate to seismic design are applied to each structure in common. Also, in order to cope with differences in such as weather and some other specific situation in EU area, National Annex is published for getting flexibility. Recently, Eurocodes have been widely adapted in non-EU countries such as Southeast Asia and Middle East which are expected infrastructure development in near future. Singapore, Malaysia, Vietnam and India have been adopted or review Eurocodes as structural design standards of their countries. Eurocodes are being established a position of de facto standard of structural design standard and have increased influence in the international standardization.

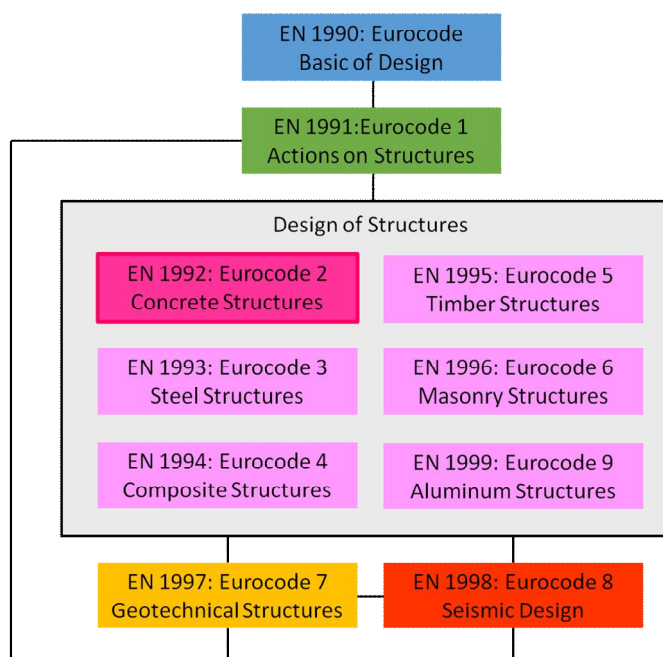


Figure 1. Whole Structure of Eurocodes

Table 1. Subdivided parts of Eurocode2

Part 1.1	General rules and rules for buildings
Part 1.2	Structural fire design
Part 2	Reinforced and prestressed concrete bridges
Part 3	Liquid retaining and containing structures

Keywords: Eurocodes, Concrete structures, International Standard

Contact address: 1-4-27 Koraku, Bunkyo-ku, Tokyo 112-0004, Japan, Tel: +8180-6770-1851

3. VERIFICATION PROCESS IN EUROCODE 2

This section shows outline of EN 1992: Eurocode 2 which specify technical rules for the design of concrete structure and introduce its verification process. Eurocode 2 is subdivided into some parts (e.g. Part1-1: General rules and rules for buildings) and covers reinforced concrete, prestressed concrete and plain concrete structure. Table 1 shows the parts of Eurocode 2. Eurocode2 is based on the limit state design philosophy. As limit state, ultimate limit state and serviceability limit state are used. Load cases and corresponding partial factors are provided for each limit state. Figure 2 shows verification process of limit state design method in Eurocode 2. For comparison, Figure 3 shows verification process of Japanese Design Standard for Railway Structures and Commentary (DSRSC). DSRSC is also based on limit state design method. However there are some differences in detail, both standards use similar verification process.

4. CONCLUSION

Outline of Eurocode and design standard of concrete structures (Eurocode 2) were introduced. Through the comparison of verification process between Eurocode 2 and DSRSC, it is showed that these standards are based on similar verification process. It is believed that there will be a possibility for using Eurocode 2 and Japanese standard as alternative structural design standard each other with complement such as National Annex. Considering with international market of construction, understanding of Eurocode which is being de fact structural design standard and comparison with Japanese structural design standards are highly important.

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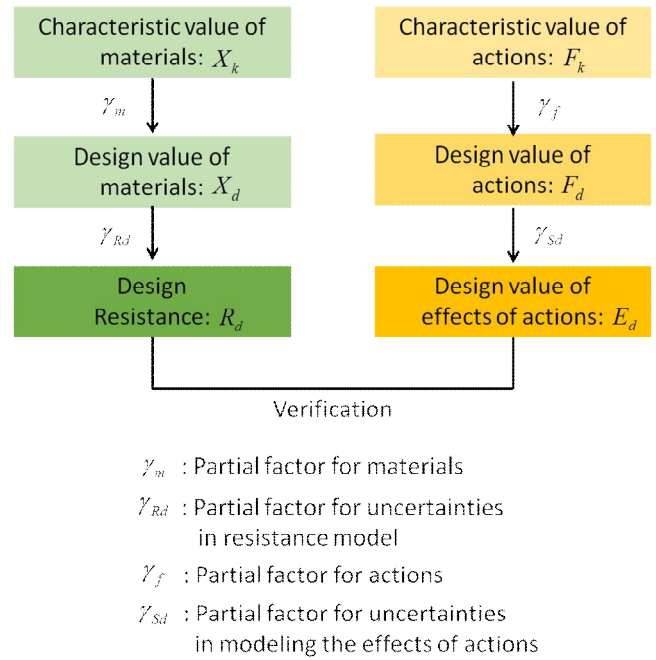


Figure 2. Verification process in Eurocode2

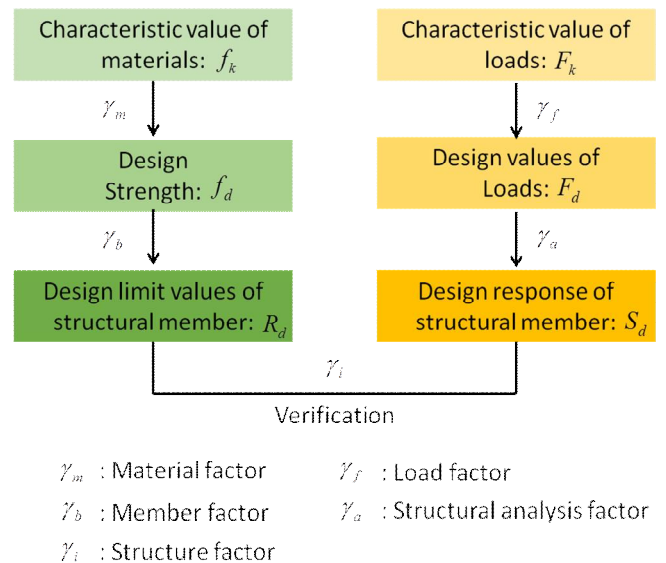


Figure 3. Verification process in DSRSC