



# PREFACE

To the uninitiated engineer, prefabrication of concrete structure is often considered as a variation of the cast in-situ technique. The approach has been to assemble the precast components in parts of the structure at the site in a manner that the initial cast in-situ concept structure is obtained as close as possible. This misconception is due to a lack of understanding in the design philosophy and the special characteristics and rules associated with precast concrete design and construction. Wider appreciation of the technique also suffers from a lack of design instruction at the undergraduate level and a limited exposure of the engineer to the design concepts, manufacturing and erection stages as most, if not all, precast concrete design is carried out by in-house engineers employed by precast manufacturing companies.

The publication of this Handbook aims to provide the engineering profession with a wider understanding of the procedures of precast concrete structural design. Besides serving as a useful guide and source of information, the Handbook will be particularly valuable to engineers who are less familiar with this type of method of design and construction.

Chapter 1 of the Handbook provides an overview on the general design principles of some of the most basic structural systems in precast buildings. The chapter emphasises on the design philosophy to achieve overall coherence in terms of stabilising system and structural integrity which are important and critical to precast construction.

In Chapter 2, detail information is given on the design of some of the more common type of precast components such as prestressed hollow core slabs, planks, reinforced concrete beams, columns and load bearing walls. Prestressed precast concrete beams and single or double tee slabs are intentionally excluded as they are not commonly used locally at this stage of time. Where appropriate, examples are used to illustrate the design approaches. Further design aids are also provided in the form of a series of graphs and charts.

Chapter 3 attempts to catalogue and present the principles, design criteria, design formulae or equations to some of the common types of connections used in different types of precast structures.

The design concepts and procedures outlined in Chapters 1 to 3 are applied in Chapter 4 in the design of two precast concrete buildings. The need to consider specific construction requirement in precast concrete design is demonstrated in one of the building design examples.

Chapter 5 aims to give the reader a general idea of the various possibilities of jointing and connection between different types of precast concrete structure. Apart from showing some connections commonly used locally, the readers are also exposed to overseas practices, particularly European practices, where considerable advancement in precast construction has been made.

The design methods and approaches in the Handbook are based on established design rules and revised in accordance with the Singapore Standard on Code of Practice For Structural Use of Concrete - CP65:1999 in this edition. Wherever applicable, the relevant clauses from the Code are given and when parts which are not covered by the Code, other sources or literature are quoted. A list of references is also given at the end of the Handbook for readers who are interested in furthering their understanding of precast concrete design and construction.

