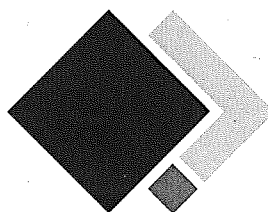


# **Design aspects for construction - Composite steel framed structures**

**by**

**Anthony Ng and Gary Yum**

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## PREFACE

This publication has been prepared by the Australian Steel Institute.

The ASI is the nation's peak body representing and serving the steel industry. The ASI achieves industry and professional development by conducting regular technical seminars, publishing technical manuals available through its own bookshop (and online), operating the largest steel library in the Southern Hemisphere, by delivering guest lectures at colleges and universities and hosting a range of national and state-based committees providing cross-industry representation.

The objective of this publication is to introduce the design and construction of steel framed buildings with composite steel and concrete floors. It provides builders and engineers with the key issues that need to be addressed and discussed with other key decision makers in a logical progression so that the end result is a cost effective, low risk and readily constructible building with the flexibility for future alterations with changing tenancy.

Key items, highlighted in ***bold italics***, signify that a decision should be made between the builder and the relevant parties such as fabricator and engineer. For instance, within Section 2.1.1 Beam Orientation, it is stated .... "***generally more cost effective to orientate the secondary beams in the long direction***" should initiate some dialogue between the fabricator, structural and mechanical services engineers with the focus being to provide a beam layout with low steel intensity, minimal number of lifts and the smallest number of web penetrations and notches.

As this publication is designed to be an introduction and directory, references have been added to direct the reader to more detailed information on the relevant design and construction aspects raised.

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## CHAPTER ONE – INTRODUCTION

There has been a growing trend to construct buildings in steel frame. The benefits are many. Prefabricated erection and prop-free floor slab construction speeds up construction and with significantly less workers at site reduces exposure to onsite risks. Design flexibility with composite construction methods allows larger span floors and smaller column sizes without extra cost. Future alteration to facilitate occupancy change is routine for steel beam floors. Steel building structures are cost competitive with other material structures and increasingly so with innovation to composite floor slab and beam and column section types. New technology introduced into fabrication equipment is reducing costs and increasing the accuracy of fabrication. Structural steel frames from demolished buildings are recycled or reused indefinitely, not disposed of, to landfills as is often the case with other materials.

This publication highlights the main features of design and construction with steel frames and composite steel floor buildings, focusing on low to medium-rise buildings. Its purpose is to stimulate developmental discussions between builder, fabricator and design engineer to ensure the most cost-effective solution is utilised.

The publication has been laid out so that it may be read from cover to cover or simply used as a reference by going to the colour coded chapter of interest. It follows a logical progression from the fundamental components of a composite steel framed building through to the design and construction aspects that need to be considered, then discusses the specific features of various building types.

Thus Chapter Two covers the general aspects of the structural frame providing guidance to certain options and the advantages of each (identified by a green margin).

For the most appropriate framing system the builder, engineer and fabricator need to be involved in the preliminary design stages of the project.

The number of cranes, beam lifts, connection design, erection sequence and general issues of buildability need to be considered and directed by the builder and conveyed to the design team to ensure that an appropriate steel design is achieved.

Chapter Three of the book covers the design aspects that a builder needs to consider in order to direct his design team to facilitate ease of construction (identified by a blue margin).

The fourth section of this book deals with the construction aspects of a steel framed building. It provides options and insight into common practices that have been developed and used successfully on previous projects (identified by a purple margin).

In the final section of the book, issues specifically related to certain situations or occupancies are addressed (identified by a red margin).

Appendices A, B and C contain drawings and span tables as referenced in the previous sections (identified by an orange margin).

The publication's layout is shown diagrammatically in Figure 1.1.

