# 1.0

# AN OVERVIEW OF BUILDABLE DESIGN AND QUALITY

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"Buildabilty" is the extent to which the design of a building facilitates ease of construction.

Buildable design often has a direct implication on quality achievement in a project. Projects with better quality performance (as measured by CONQUAS- Construction Quality Assessment System) invariably are also those that had adopted good buildable designs. Examples of such projects, which can be found in I-QUAS (Information on Construction Quality-ref: **www.bca.gov.sg**) include commercial, residential, institutional and mixed developments like The Esparis, Monterey Park, Savannah Park, The Pier, Icon, One Marina and ITE Simei.

The developer, designer and builder each has a significant role towards achieving better buildable design and quality in construction. This chapter illustrates examples of good buildable designs and its contribution to quality.

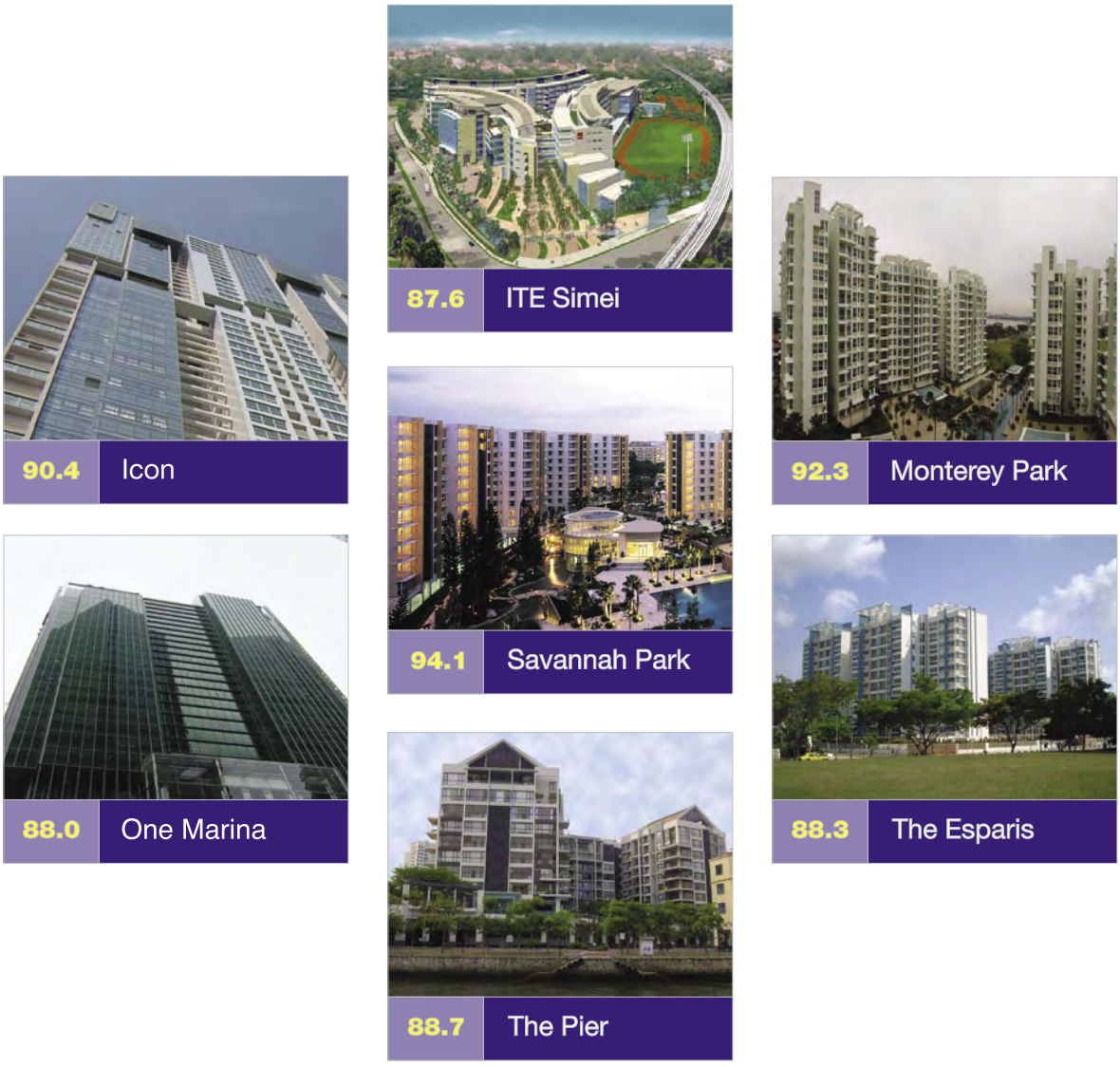


Fig. 1.1 - Examples of projects with good buildable designs and high quality performance scores.

## 1.1 EXAMPLES OF GOOD BUILDABLE DESIGNS

The following are examples from residential projects that adopted good design concepts such as flat plate slab, curtain wall, drywall partitions, prefabricated bathrooms, screed-less floor, etc. All these buildable systems facilitate ease of construction leading to good quality workmanship.

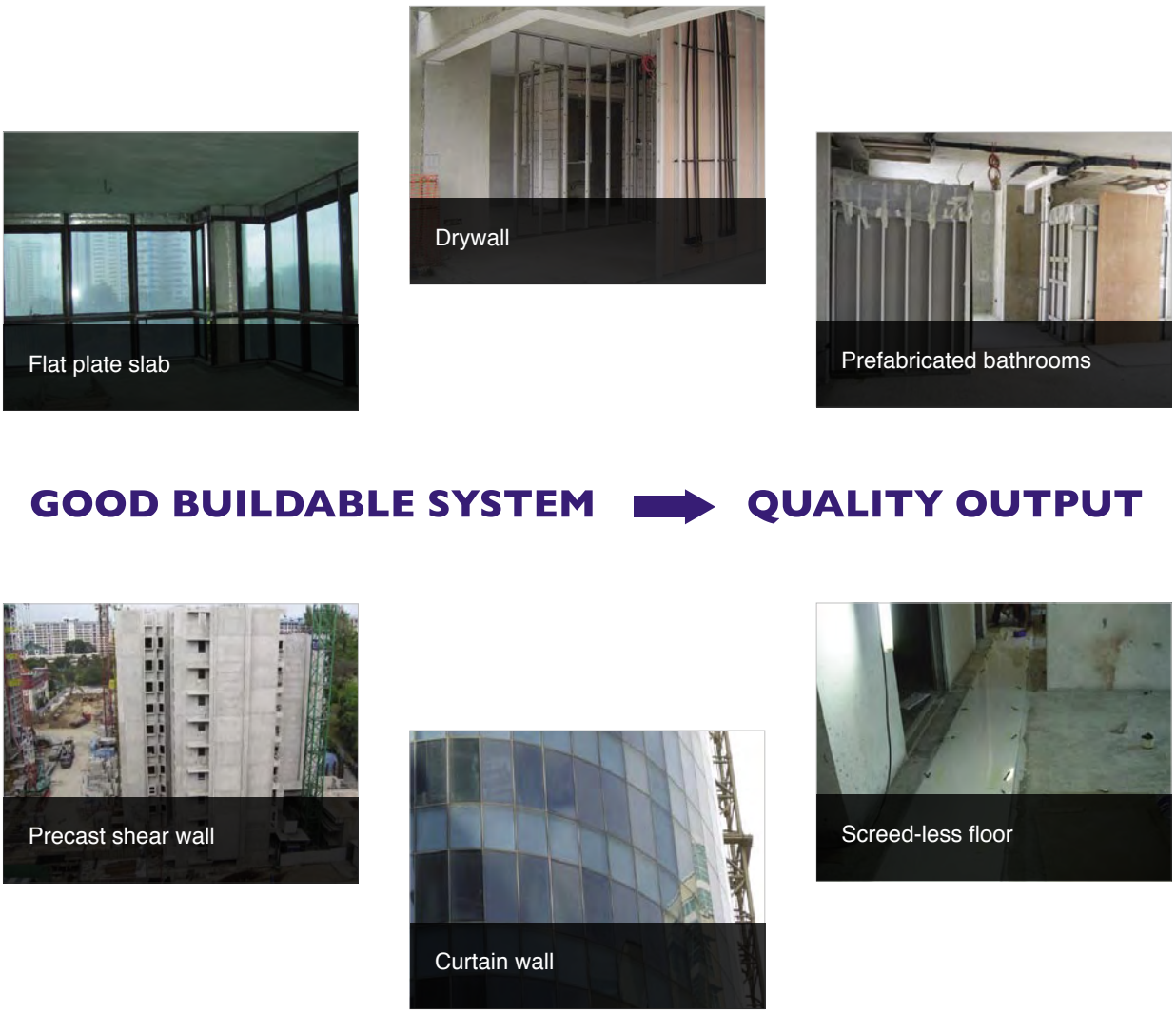


Fig. 1.2 - Buildable systems contribute to efficient and quality construction.

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## 1.1.1 Flat plate slab

The floor slab has no intermediate or secondary beams. This improves the construction cycle time and productivity. The quality of the slab surface is also better as there are less joints in the system formwork. The M&E system can be accommodated easily under the slab since there are no intermediate beams causing obstructions.

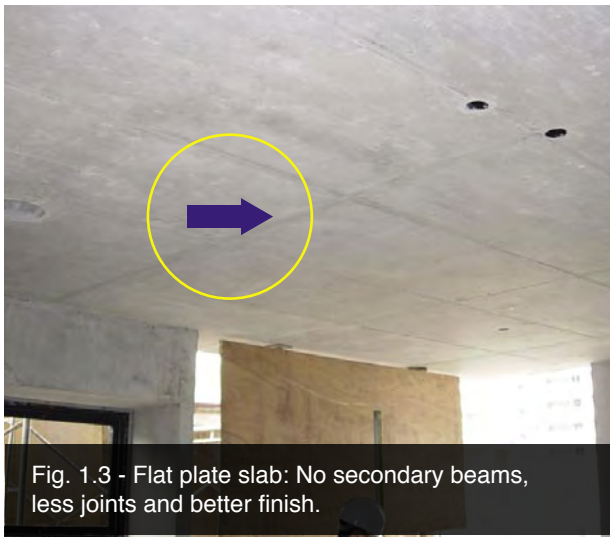

Fig. 1.3 - Flat plate slab: No secondary beams, less joints and better finish.

## 1.1.2 Drywall partitions

Drywall partitions have many advantages compared to conventional wet trade partitions. Quality finish, speed of construction, ease of installation and reconstruction are the key attractions. See Chapter 5.2 for more details of its features and advantages.

Fig. 1.4 - Drywall partitions: Increasing use in residential building construction.

## 1.1.3 Prefabricated bathrooms

Bathrooms are prefabricated in a factory and installed on site. This innovative method results in better tolerances and the workmanship is significantly better than conventional bathroom construction. The off-site production often makes the manufacture of the bathroom no longer a critical activity that may affect other construction works on site. The different techniques in production and installation are explained in Chapter 5.1.


Fig. 1.5 - Prefabricated bathrooms: Improved technology for quick installation.

### 1.1.4 Screed-less flooring

A combination of suitable adhesives and a leveled concrete floor slab makes the system practical. Using this method, screeding, one of the "messy" trade in flooring installation, can be eliminated. Hollowness in flooring, which is caused mainly by incompatibility between substrate and screed, can also be minimized.

Fig. 1.6 - Screed-less flooring installation: Better productivity and quality.

### 1.1.5 Curtain wall

The fabrication of curtain wall components are carried out in the factory and this reduces site work and allows greater control over component quality. The site operations require only installation works. The process of installation is much faster compared to wet trade methods. Since the method of assembly is a dry process, the required tolerances and workmanship can be controlled closely. When selecting curtain wall system, considerations should be given to sustainability and environmental factors such as using Low-E glass panels.

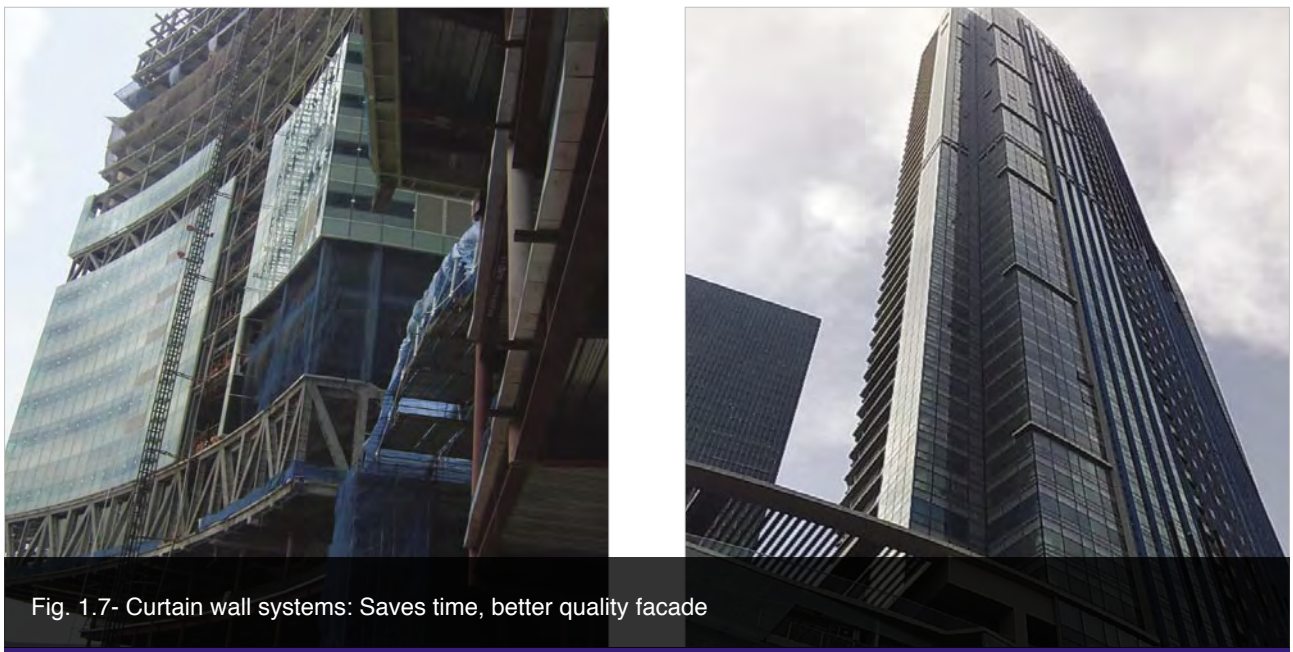

Fig. 1.7- Curtain wall systems: Saves time, better quality facade

**Curtain walls**

- No scaffolding
- No wet trades
- Less workmanship issues

### 1.1.6 Modular system walls

The modular system RC (Reinforced Concrete) perimeter walls have less joints and the surfaces are smoother. A thin skim-coat is sufficient to carry the final architectural finish. Construction is neater and productivity higher compared to conventional walls. This system reduces risk of hollowness, surface cracks and unevenness in wall surface, which are usually associated with plastered finish walls.

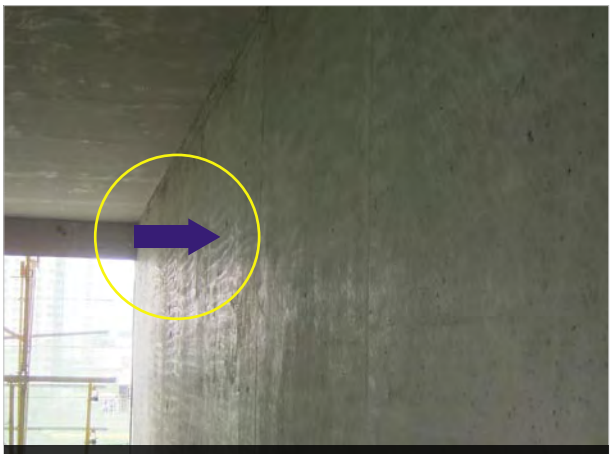

Fig. 1.8 - Less joints and good surface finish in modular system RC walls

### 1.1.7 Precast shear walls

The precast shear wall system eliminates infill work like brick or block work and wet trades like plastering. External walls have better water tightness against the elements. Proper design and execution of precast system will give good quality finish surfaces that require minimum preparatory work before painting. Gondolas, instead of scaffolding, can be used to carry out the finishing work; this saves costs and expedites the construction process. Other features and advantages of using precast elements are highlighted in Chapter 4.2.

Fig. 1.9 - External shear walls: Better water - tightness

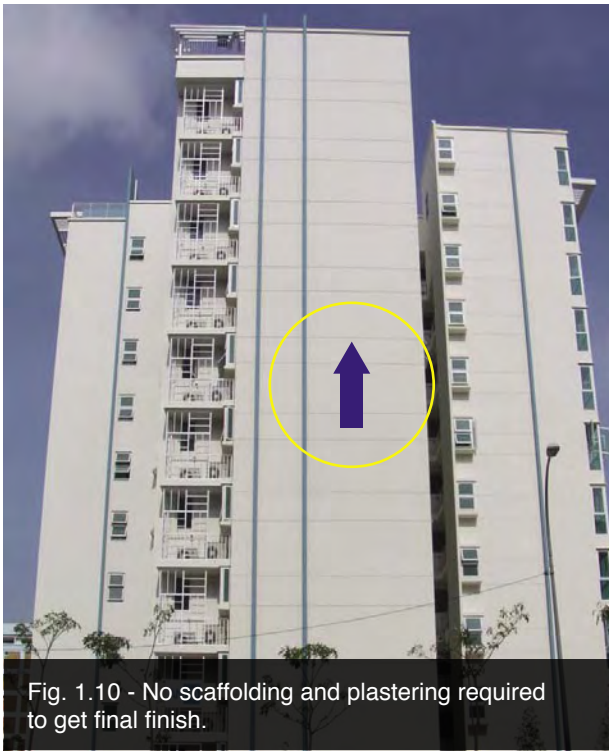

Fig. 1.10 - No scaffolding and plastering required to get final finish.

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Good buildable design requires careful consideration and planning. It should lead to designs that improve construction processes, ease of construction, reduced dependency on on-site manpower and improved quality. Although the initial cost of construction of buildable designs may be higher than conventional methods in some cases, consideration should be given to its benefits of higher productivity, faster completion time and better build quality.