

steel  
CONNECT

# 7 REASONS TO ADOPT IBS WITH STEEL



An hourglass with blue sand is positioned on a beach of smooth, grey and white pebbles. The background is a soft-focus sunset or sunrise over the ocean, with warm orange and yellow light. The hourglass is made of dark wood and has a glass bulb in the center. The sand is a vibrant blue color. The overall mood is contemplative and serene.

# BACKGROUND OF IBS

# TERMINOLOGY

## **Industrialized Building System**

### **Other Terms:**

- Prefabrication
- Modular
- Off-site Manufacturing
- Modern Method of Construction

### **Definition:**

A construction technique in which components are manufactured in a factory controlled environment (on or off site), delivered, positioned and assembled or erected into a structure with minimal additional site works.

# CONSTRUCTION INDUSTRY TRANSFORMATION PROGRAMME 2016 - 2020

*Driving Construction Excellence Together*



Source: <http://www.citp.my/>



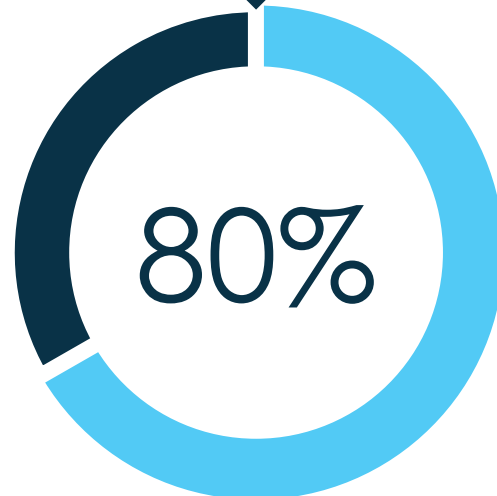
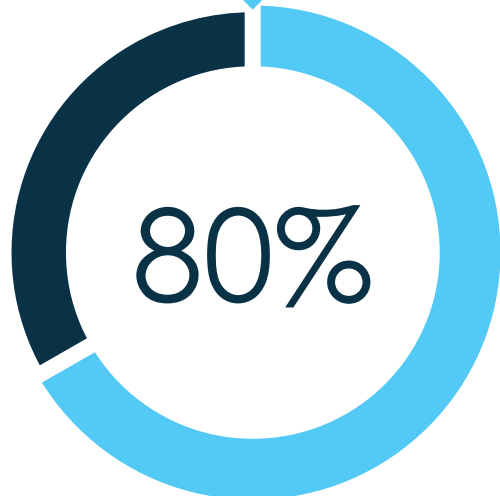
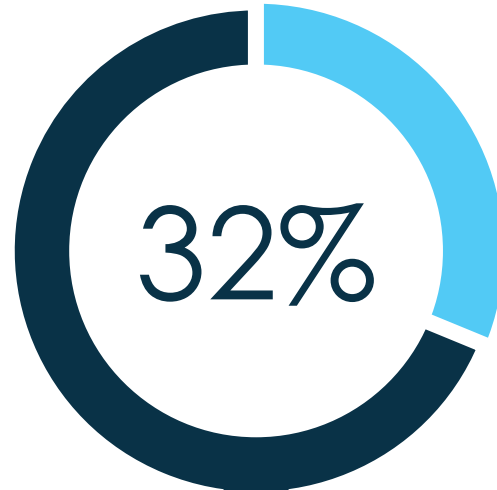
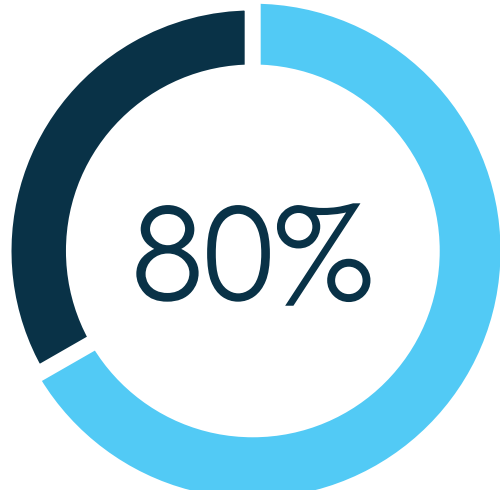
## Public Sector

## Private Sector

**Q1 2019  
result**

- Adopted IBS  
(IBS score >70)
- Have not  
adopted IBS

**Q4 2020  
target**



**IBS  
ADOPTION  
RATE**



# CONCRETE



# TIMBER

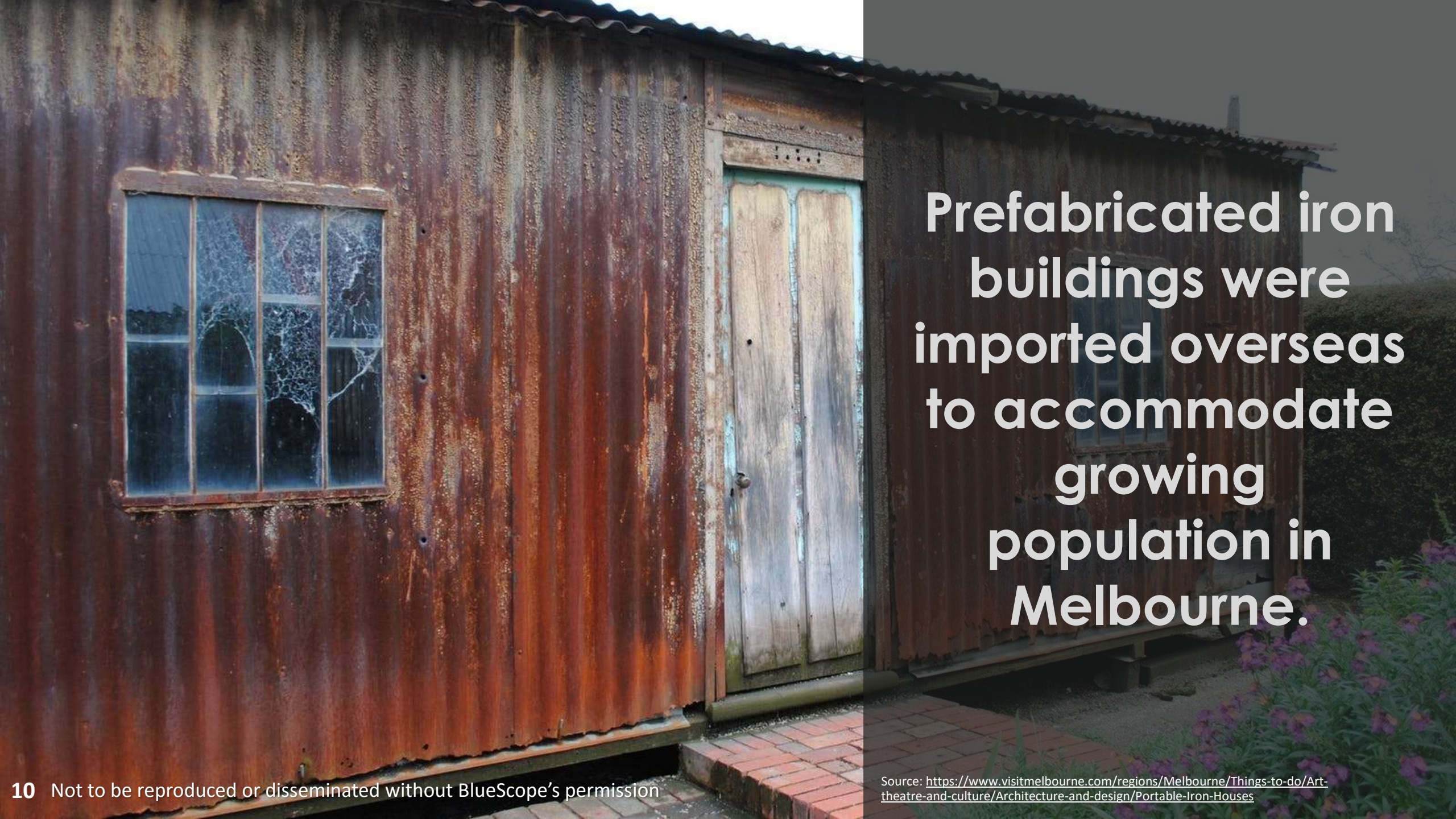


# STEEL



During the  
Victorian gold  
rush period in mid.  
19<sup>th</sup> century





**Prefabricated iron buildings were imported overseas to accommodate growing population in Melbourne.**

# Portable Iron Houses





# WELDED FRAME TECHNOLOGY 1970s

# TAB IN SLOT TECHNOLOGY 1980s

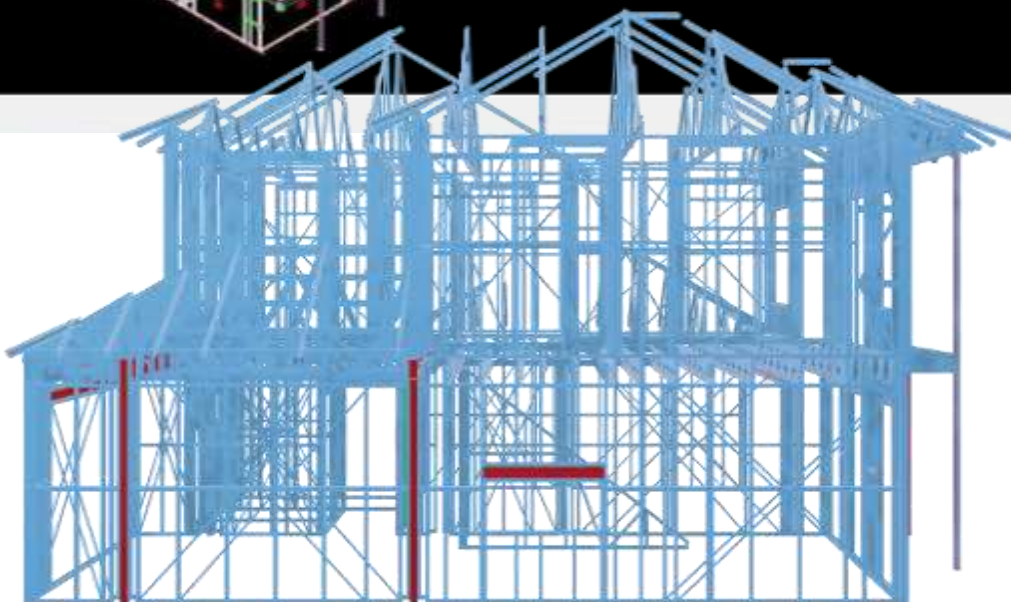




# TAB IN SLOT TECHNOLOGY 1980s



# EARLY CAD/CAM SYSTEMS 1990s





# EARLY CAD/CAM SYSTEMS 1990s

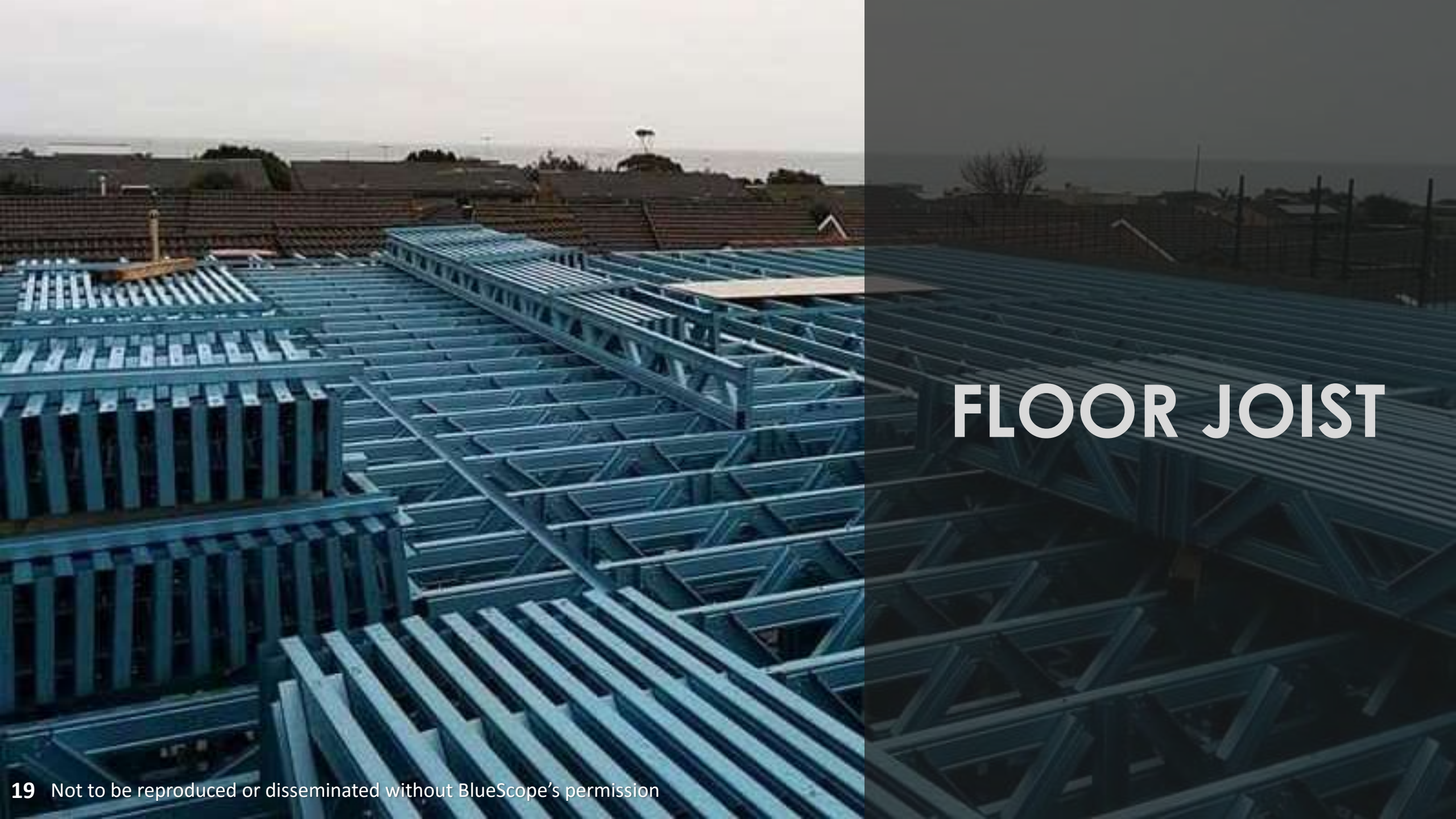




# ROOF TRUSS



# WALL FRAMES



# FLOOR JOIST



# FLOOR JOIST



# 7 REASONS TO ADOPT IBS WITH STEEL



1

**MINIMIZE  
ON-SITE  
WASTAGE**

# ① MINIMIZE ON-SITE WASTAGE



“Only foundations are constructed on site, while sections of the wall, floor and roof, and openings for the windows and doors are prefabricated in a factory.”

Mr Choo Chian Chee  
Framing Support Specialist, Enduroframe

# ① MINIMIZE ON-SITE WASTAGE







2

# INCREASE PRODUCTIVITY

# FOUNDATION

② INCREASE PRODUCTIVITY



# BUILDING MATERIALS

② INCREASE PRODUCTIVITY



"If you're talking about prefab technology, you always must push for productivity and efficiency."

Dr Chua Yie Sue

Lecturer, Monash University Malaysia

# UNAFFECTED BY WEATHER

② INCREASE PRODUCTIVITY



# JUST IN TIME DELIVERY

② INCREASE PRODUCTIVITY





3

FAST  
INSTALLATION



# 3 TYPES OF IBS

- SITE ASSEMBLY

# 3 TYPES OF IBS

- PANELIZED





# 3 TYPES OF IBS

## - VOLUMETRIC

# SITE ASSEMBLY



# SITE ASSEMBLY

3 FAST INSTALLATION



# SITE ASSEMBLY

3 FAST INSTALLATION



# SITE ASSEMBLY

3 FAST INSTALLATION



# SITE ASSEMBLY

3 FAST INSTALLATION



# SITE ASSEMBLY

3 FAST INSTALLATION



# SITE ASSEMBLY

3 FAST INSTALLATION





# COMPLETED IN 4 WEEKS

3 FAST INSTALLATION



School in Kg Suan Lamba, Kinabatangan, Sabah with 2 blocks of 3 classrooms with linkway and toilet.

# COMPLETED IN 4 WEEKS

3 FAST INSTALLATION



School in Maringgán, Pitas, Sabah with 3 classrooms with dedicated science classroom and toilet.

# PANELIZED

3 FAST INSTALLATION



# PANELIZED

3 FAST INSTALLATION



# COVID HOSPITAL IN 8 DAYS

3 FAST INSTALLATION



Hospital in Pulau Galang, Batam, Indonesia with 400 observation beds and 50 isolation beds.

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# VOLUMETRIC

3 FAST INSTALLATION

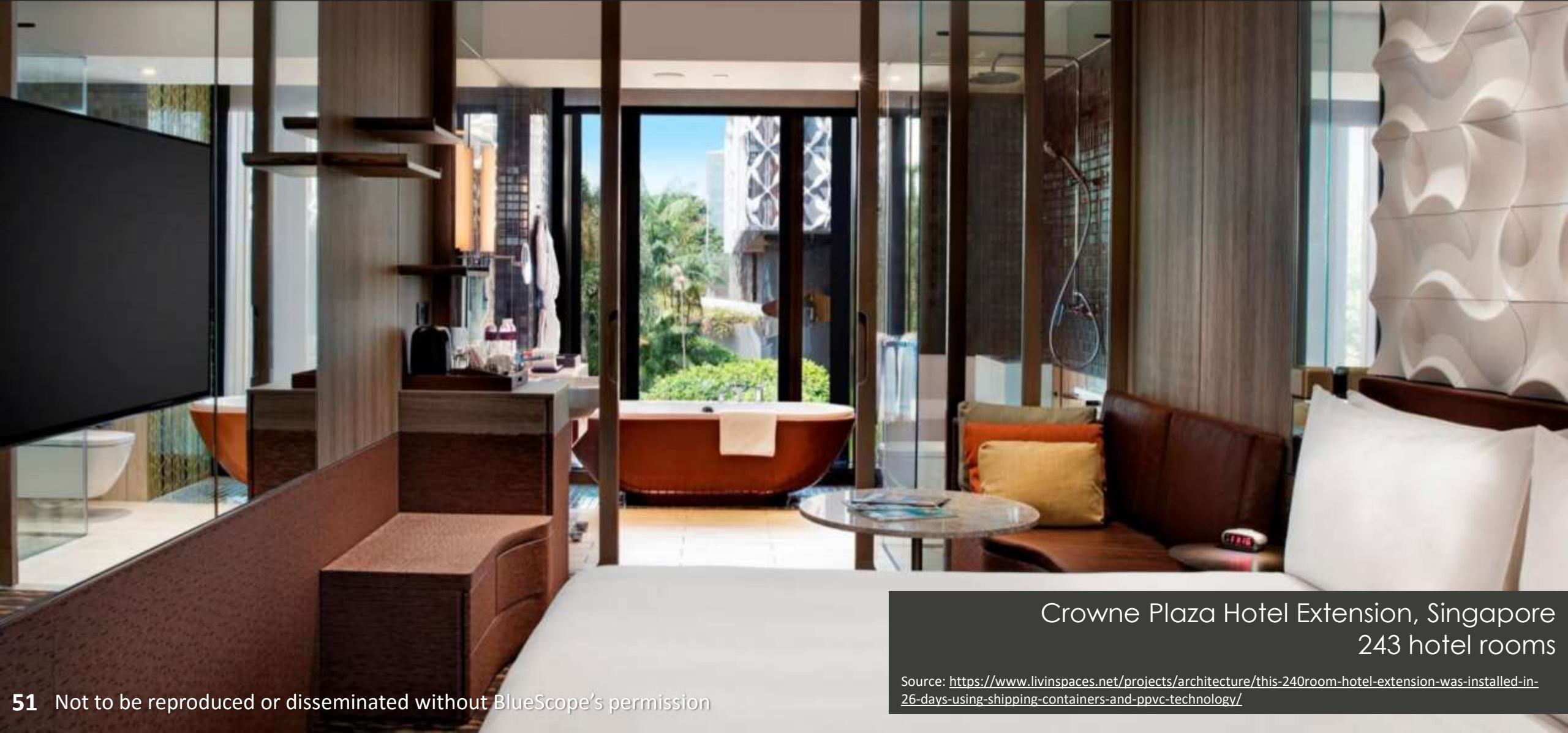


Crowne Plaza Hotel Extension, Singapore  
243 hotel rooms

Source: <https://www.livinspace.net/projects/architecture/this-240room-hotel-extension-was-installed-in-26-days-using-shipping-containers-and-ppvc-technology/>

# VOLUMETRIC

3 FAST INSTALLATION



Crowne Plaza Hotel Extension, Singapore  
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# VOLUMETRIC

3 FAST INSTALLATION



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# 15% - 20% FASTER

3 FAST INSTALLATION





④

**LIGHTWEIGHT**

# HIGH STRENGTH TO WEIGHT RATIO

④ LIGHTWEIGHT

“Strength to weight ratio of steel is higher, hence it's more efficient and lightweight.”

Dr Chua Yie Sue  
Lecturer, Monash University Malaysia

# LOWER FOUNDATION COST

④ LIGHTWEIGHT



“Steel frames are much lighter. Due to the lightness, it can reduce the foundation size, therefore reduce the foundation cost.”

Mr Choo Chian Chee  
Framing Support Specialist, Enduroframe



# LOWER FOUNDATION COST

④ LIGHTWEIGHT



# LOWER LOGISTICS COST

④ LIGHTWEIGHT



# MINIMIZE CRANE USAGE

④ LIGHTWEIGHT





5

**MINIMIZE  
ON-SITE  
LABOUR**

# FRAMING: 3 WORKERS, 2 WEEKS

5 MINIMIZE  
ON-SITE  
LABOUR



# FRAMING: 3 WORKERS, 2 WEEKS

5 MINIMIZE ON-SITE LABOUR



# FRAMING: 3 WORKERS, 2 WEEKS

5 MINIMIZE  
ON-SITE  
LABOUR



# 40% LESS MANPOWER

5 MINIMIZE ON-SITE LABOUR



Crowne Plaza Hotel Extension, Singapore  
243 hotel rooms

Source: <https://www.livinspaces.net/projects/architecture/this-240room-hotel-extension-was-installed-in-26-days-using-shipping-containers-and-ppvc-technology/>



# MINIMIZE SAFETY EXPOSURE

5 MINIMIZE  
ON-SITE  
LABOUR



Logistic costs



Concrete Volumetric

Concrete Panelized

Steel Volumetric

Steel Panelized

Site Assembly (Steel)

Site-cast concrete (traditional method)

Higher on-site labour costs

Graph shown estimated cost of construction only.

“Light gauge steel framing prefabrication construction method is flexible enough to cater for any scenario for a project.”

Mr Choo Chian Chee,  
Framing Support Specialist, Enduroframe



6

# DESIGN FLEXIBILITY

# DESIGN FLEXIBILITY



“Our technology involve around domestic residential houses from 1 to 2 storey. And it caters for different home designs as it can be easily modelled, manufactured, assembled and installed to client's requirements.”

Mr Choo Chian Chee,  
Framing Support Specialist, Enduroframe

# CURVED ROOF



# CURVED ROOF



# DESIGN FLEXIBILITY (BEFORE)

⑥ DESIGN FLEXIBILITY



# DESIGN FLEXIBILITY (AFTER)

6 DESIGN FLEXIBILITY





# DESIGN FLEXIBILITY (BEFORE)

⑥ DESIGN FLEXIBILITY



# DESIGN FLEXIBILITY (AFTER)

⑥ DESIGN FLEXIBILITY



# SUPPORT FOR PANELS





7

**NON-  
FLAMMABLE**

Source: <https://thebugskiller.com/how-to-kill-termites-and-get-rid-of-them-forever/>,  
<https://ecos.csiro.au/raising-the-standard-for-bushfire-proofing-houses/>

# NON-FLAMMABLE

7 NON-FLAMMABLE



**BEFORE**



**AFTER**



# FUTURE OF IBS WITH STEEL

# LANDED RESIDENTIAL



Example in Australia

# MID-RISE APARTMENT





# MID-RISE COMMERCIAL LOT



# HIGH-RISE HOTEL



# SKYSCRAPER



The Exchange 106, Kuala Lumpur

Source: <https://www.straitstimes.com/asia/se-asia/malaysias-upcoming-tallest-skyscraper-the-exchange-106-has-signed-up-major-tenants>



**MINIMIZE WASTAGE**

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**INCREASE PRODUCTIVITY**

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**FAST INSTALLATION**

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**LIGHTWEIGHT**

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**MINIMIZE ON-SITE LABOUR**

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**DESIGN FLEXIBILITY**

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**NON-FLAMMABLE**

steel  
CONNECT

# Question & Answer Session



## SPECIAL THANKS TO

Mr Choo Chian Chee,  
Framing Support Specialist, Enduroframe

Dr Chua Yie Sue  
Lecturer, Monash University Malaysia



# steel CONNECT

**Colorbond®**

**Zincalume®**

**TrueCore®**



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[bluescope.com.my](http://bluescope.com.my)



Colorbond Steel Malaysia