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PRECAST BUILDING SYSTEM

01 : Kitchen Pod

02 : Precast Beam

03 : Bathroom Pod

04 : Precast Lift Wall

05 : Precast Parapet

06 : Precast Staircase Wall

07 : Solid Concrete Slab

08 : Prestressed Slab

09 : Precast Staircase

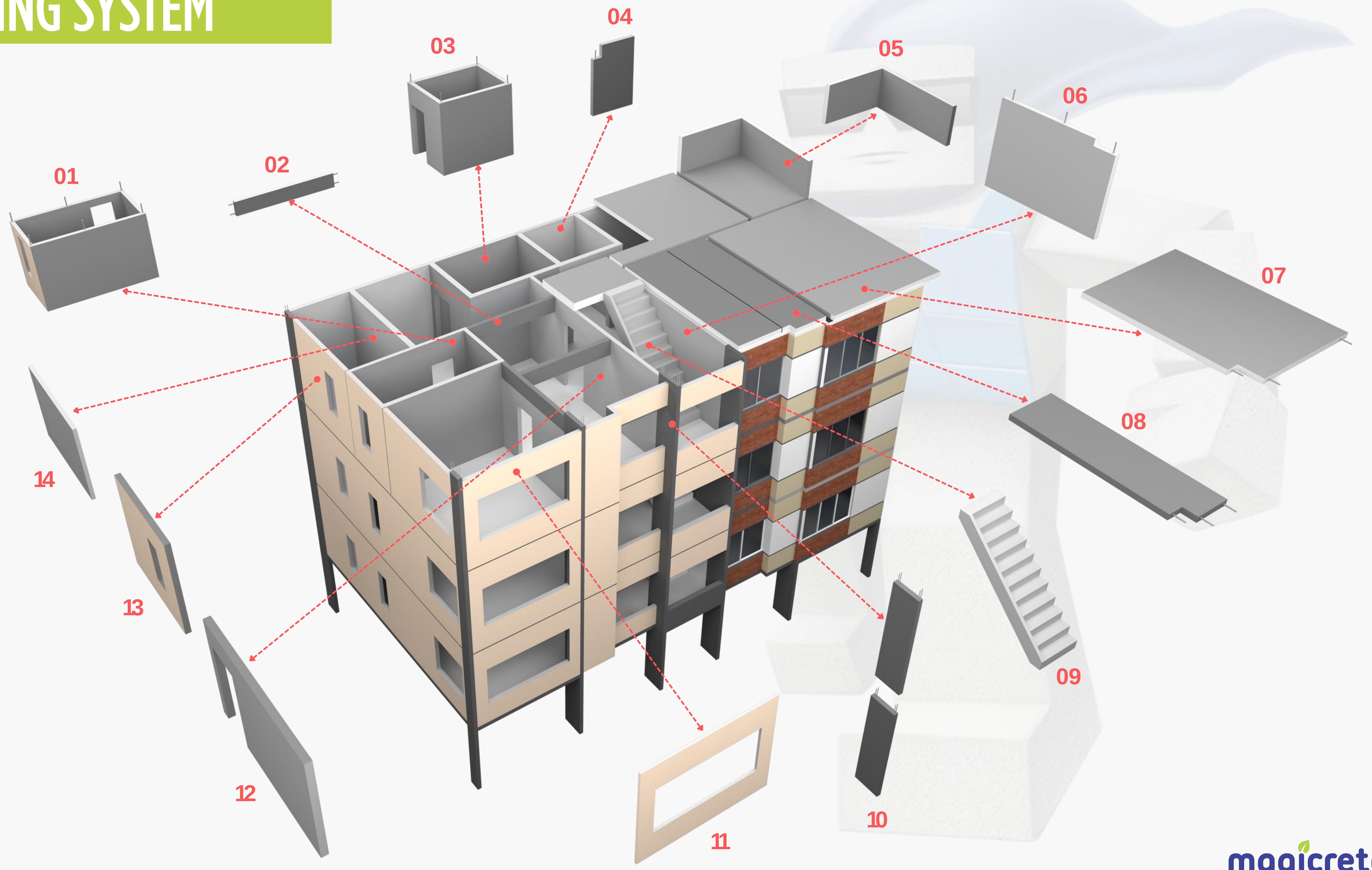
10 : Precast Column

11 : Precast Facade

12 : Precast Load-Bearing Wall

13 : Prestressed Gable End Wall

14 : AAC Wall Panel



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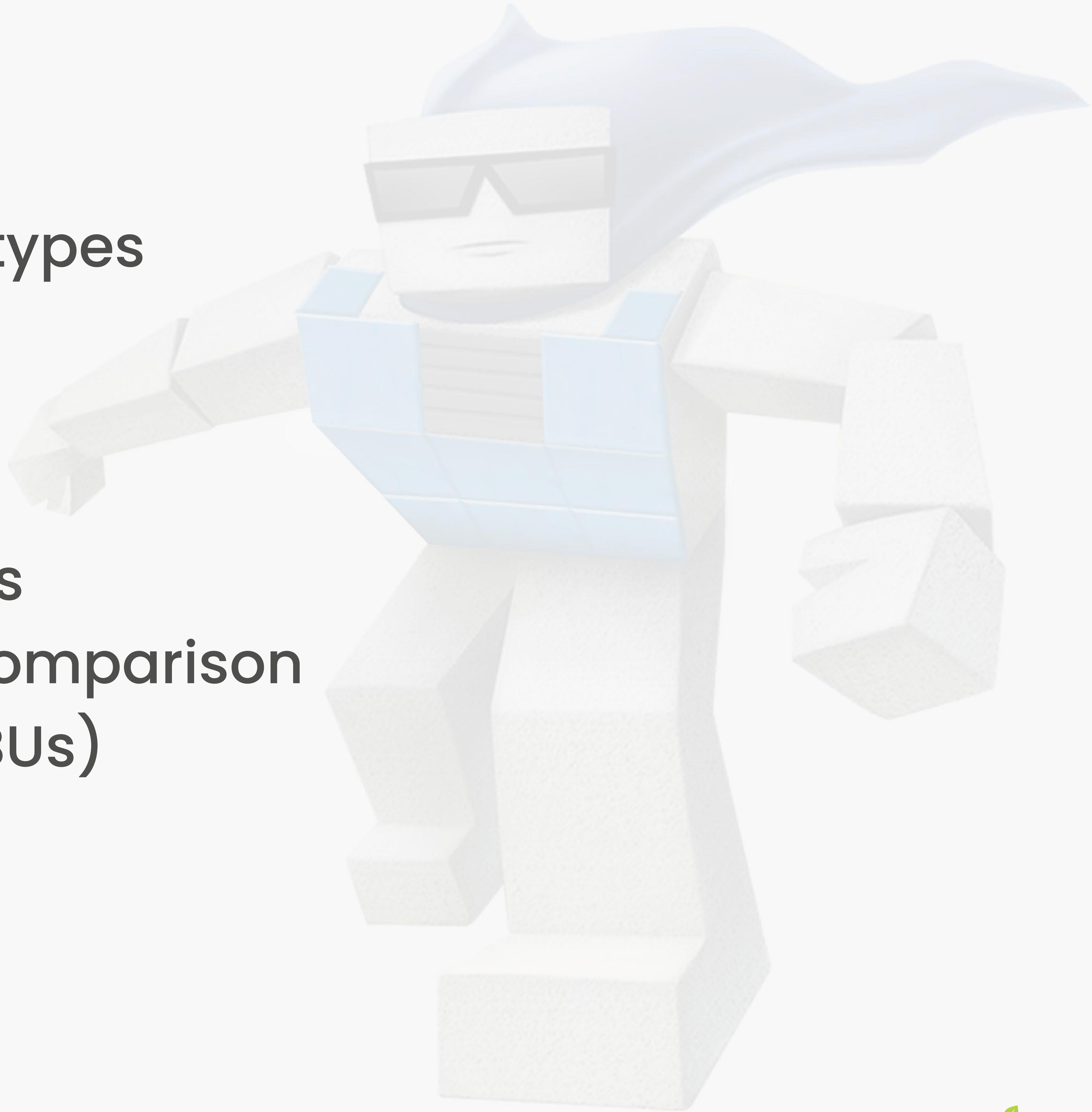
DISCUSSION POINTS

- What is 3D Modular Precast & Its types
- Why Modular Construction
- How to Modularize
- Production Process
- Transport and Installation Process
- Technology Specifications and Comparison
- Prefabricated Bathroom units (PBUs)
- Case Studies
- QnA



INTRODUCING

3rd GEN CONSTRUCTION

TECHNOLOGY

- ☑ Lego like plug and play modules
- ☑ Cast and finished in factory
- ☑ Assembled on site
- ☑ 90% work done in factory

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Types of Modular Construction

- Prefab/Offsite Construction
  - 3D Volumetric
    - 3D Precast Concrete Pods
    - Steel Pods
    - Wooden Pods
    - Hybrid
  - 2 Dimensional
    - 2D Precast (Beam, Column, Walls)
    - Steel Structures
    - Wooden Structures (Prefinished Walls)

Prefabricated Prefinished Volumetric Construction (PPVC)

Offsite:
- Structure
- MEP
- Doors & Widows
- Tiling

Onsite:
- Erection
- Connections
- 10-20% Finishing

Offsite:
- Structure
- Electrical Conduiting
- Doors & Widows

Onsite:
- Erection
- Connections
- 80% Finishing
- 50-80% MEP

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WHY MODULAR CONSTRUCTION ?

- ☑ Construction industry lags in Labour Productivity
- ☑ Needs Industrialized Technologies
- ☑ Factory based approach, just like automobiles
- ☑ Prefab/Volumetric Construction is the solution to fill this Gap.

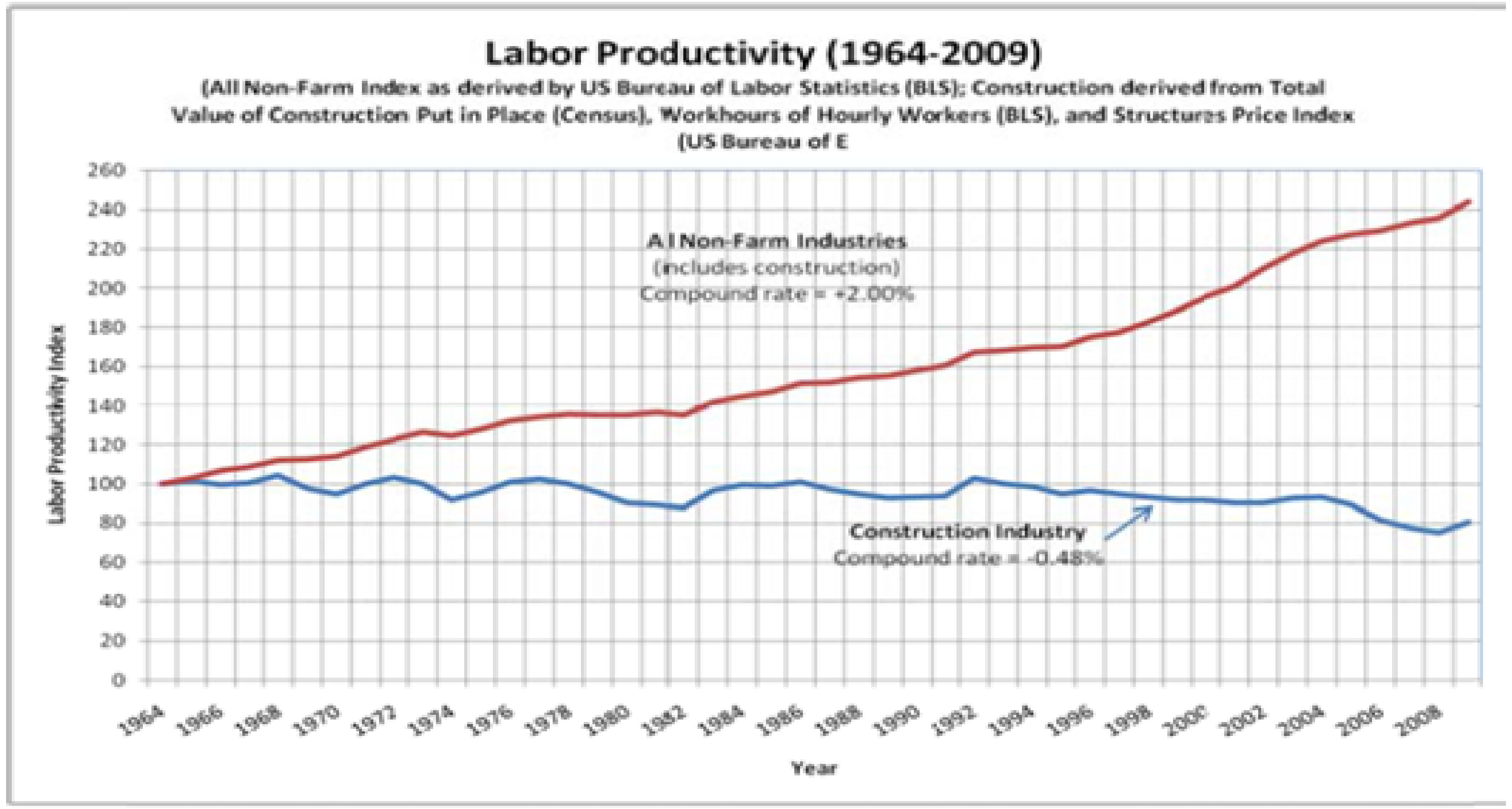

Figure 1 (Source: Chapman and Butry, "Measuring and Improving the Productivity of the U.S. Construction Industry: Issues, Challenges, and Opportunities." Building and Fire Research Laboratory, National Institute of Standards and Technology: Gaithersburg, MD, 2008.

WHY MODULAR CONSTRUCTION ?

OTHER BENEFITS

- ☑ Reduce labour cost
- ☑ Less material waste
- ☑ Higher quality structures
- ☑ Less site disturbance
- ☑ Flexible & adaptable
- ☑ Movable and permanent

Building options

Traditional Construction Timeline

FINISH

Inspection & walk Through

Final Finishes

Building Site Tie-Ins

Building Construction
Building Inspection

Site Preparation Infrastructure

Design, Permitting
Engineering, Approval
Process

Traditional Construction Timeline

Modular construction Timeline

UPTO
50%
FASTER

FINISH

Final Connections
Inspection &
walk Through

Site Preparation
Infrastructure
Manufacturing Off site

Design, Permitting
Engineering,
Approval Process

Modular construction Timeline

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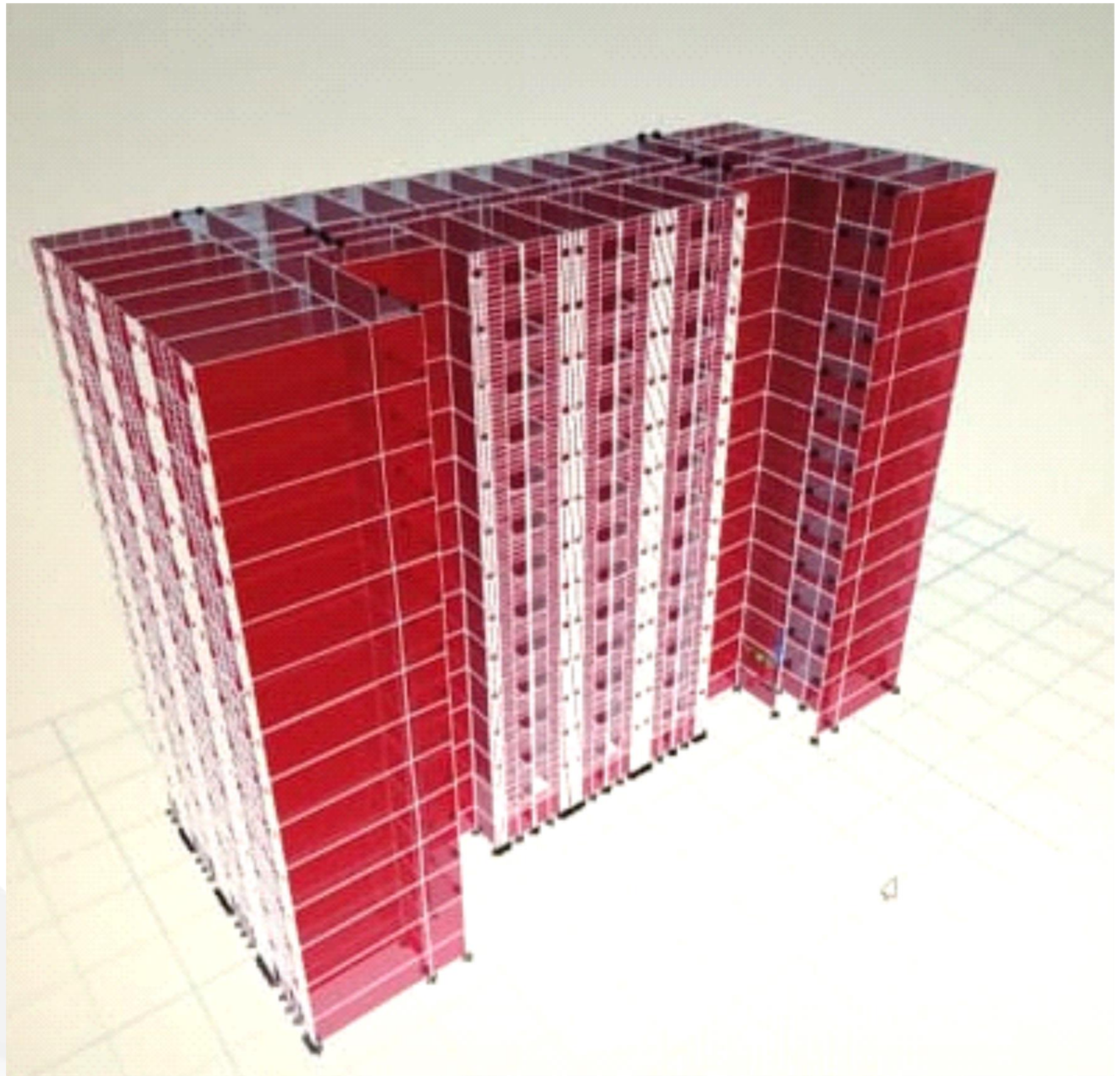
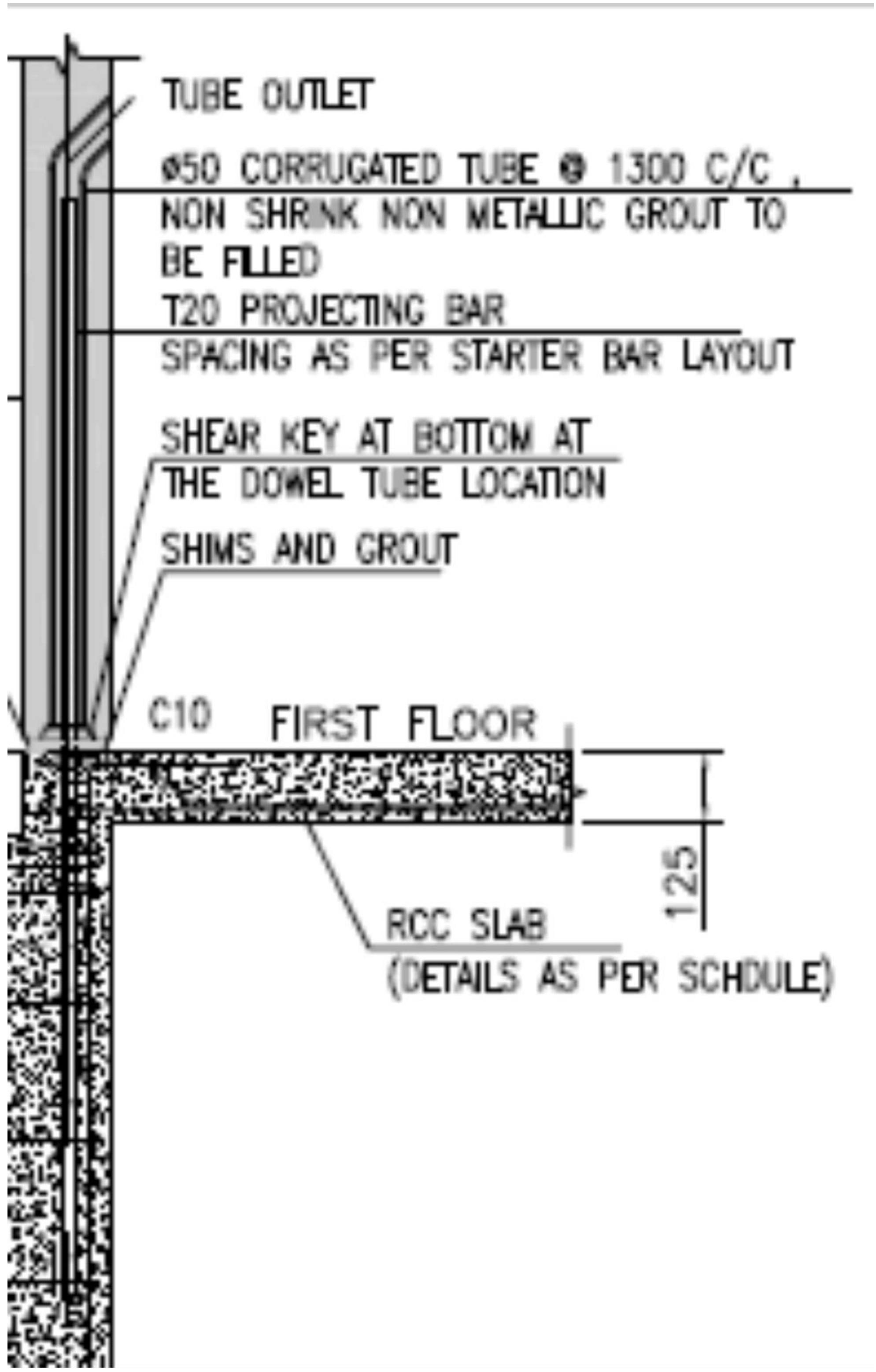
EARTHQUAKE RESISTANT DESIGN

Specially designed inter-pod connections for high seismic zones





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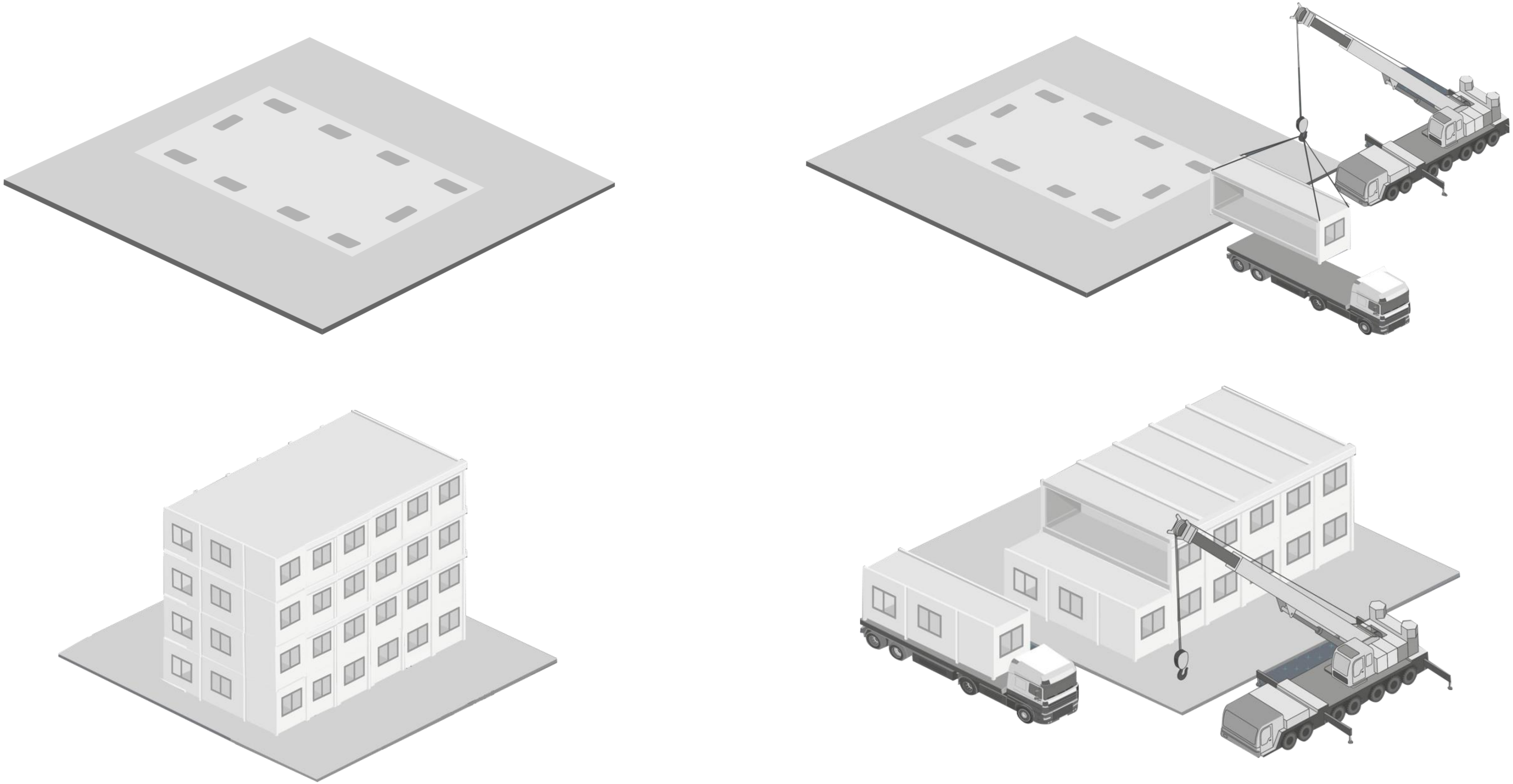
HOW TO MODULARIZE ?



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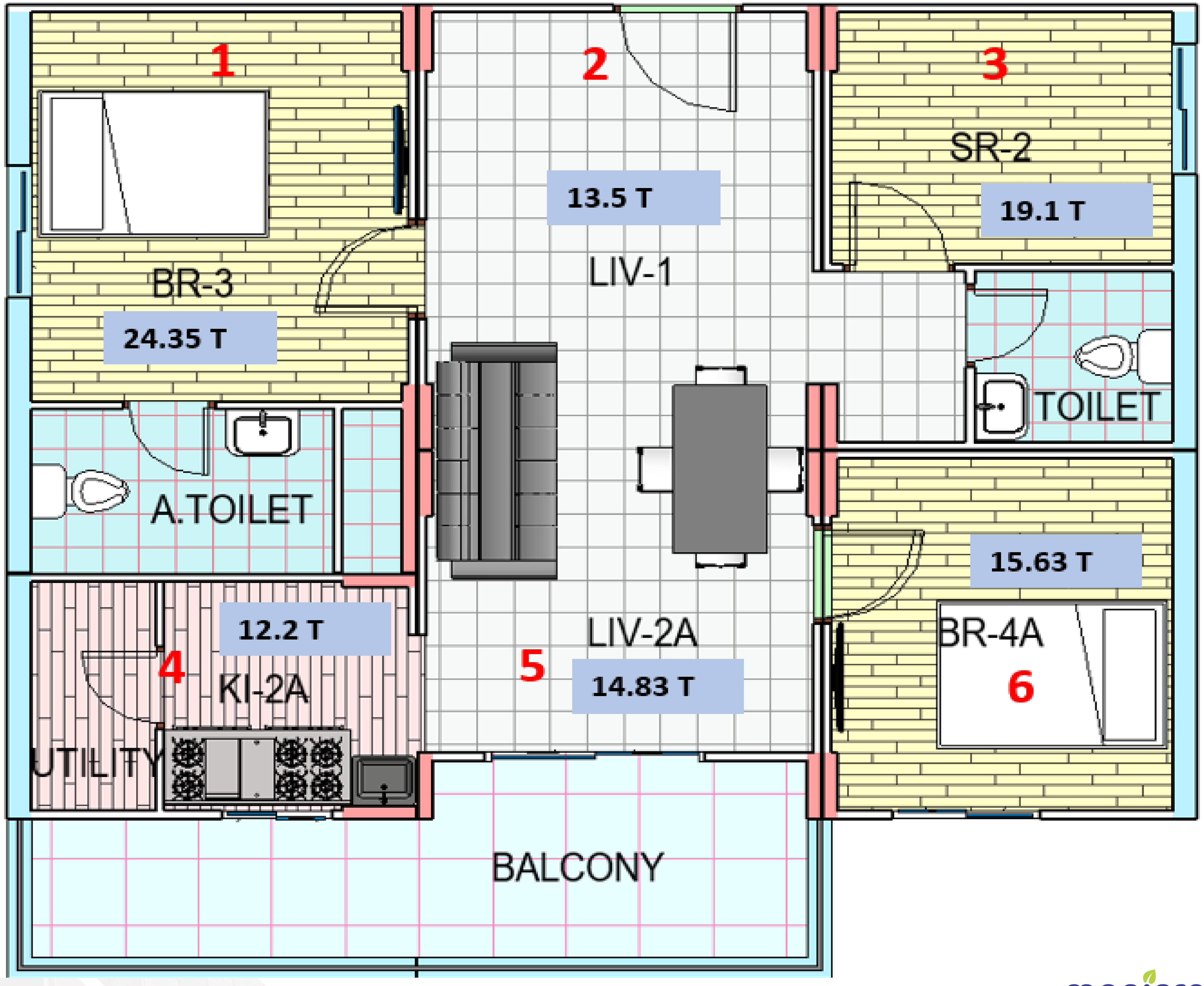
MODULARIZATION OF FLOOR PLAN



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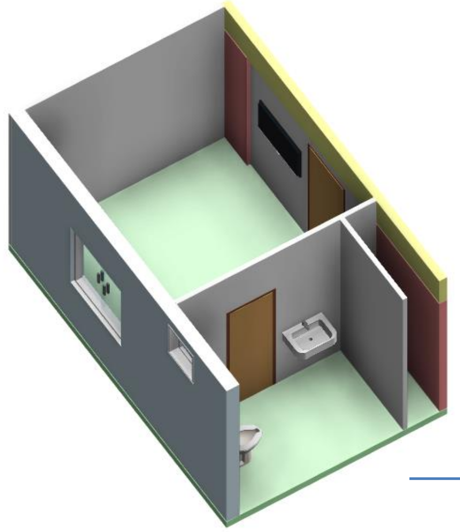
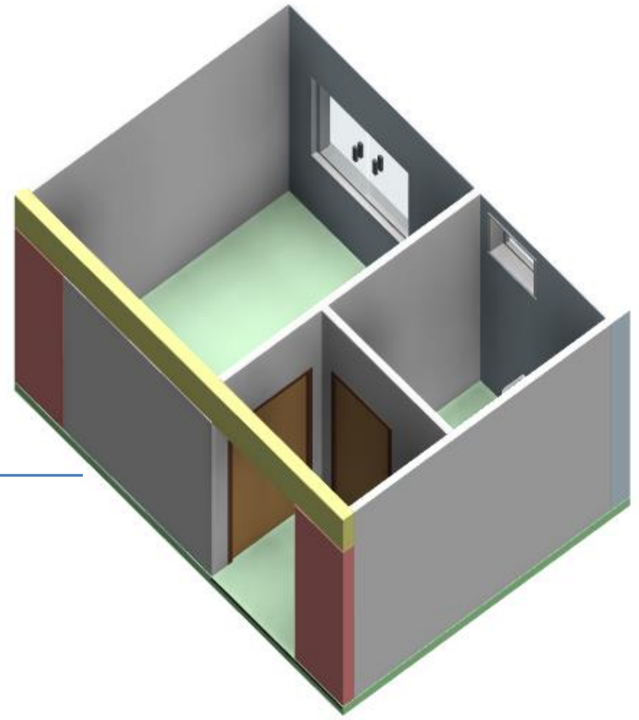
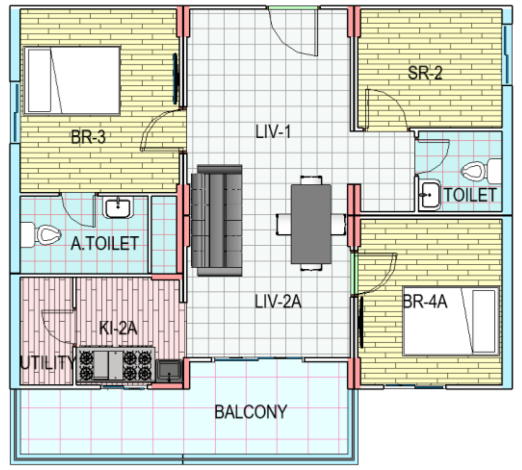


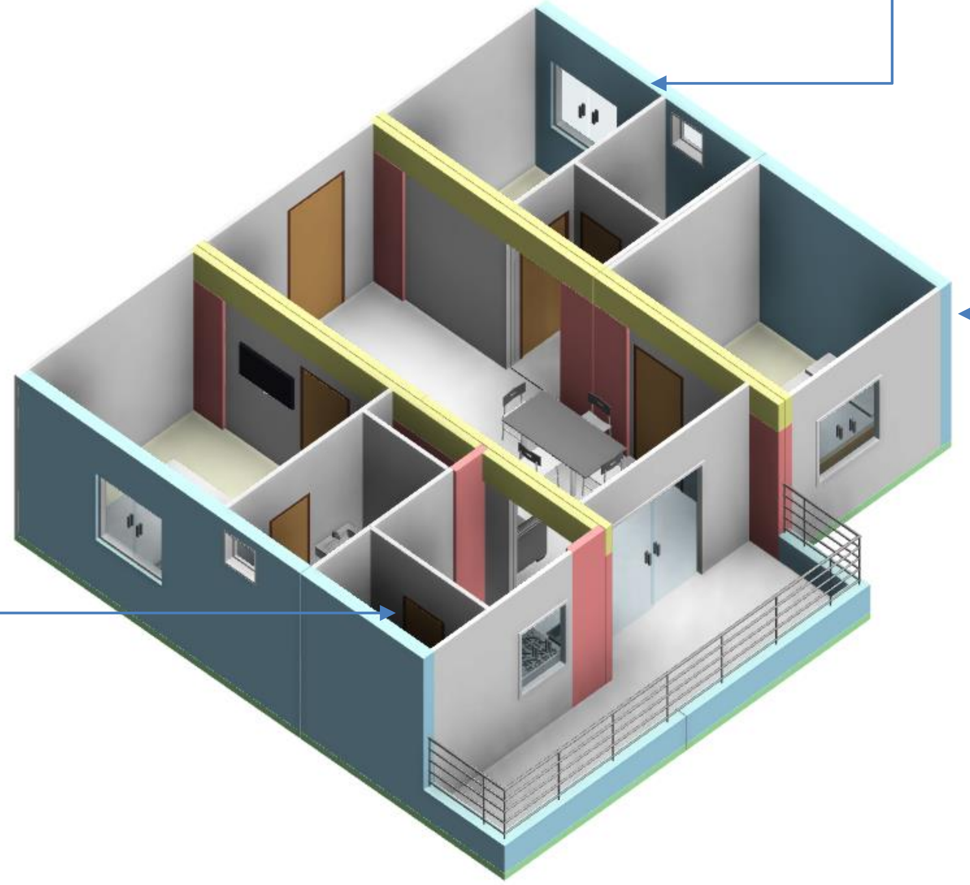
1. BR-3 MODULE



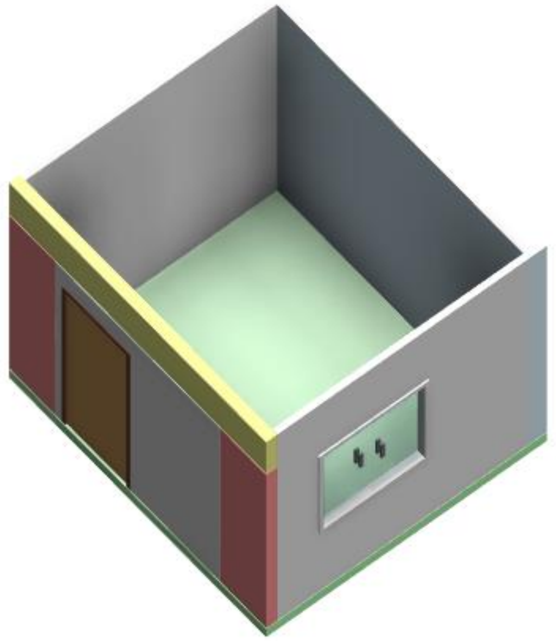
3. SR-2 MODULE



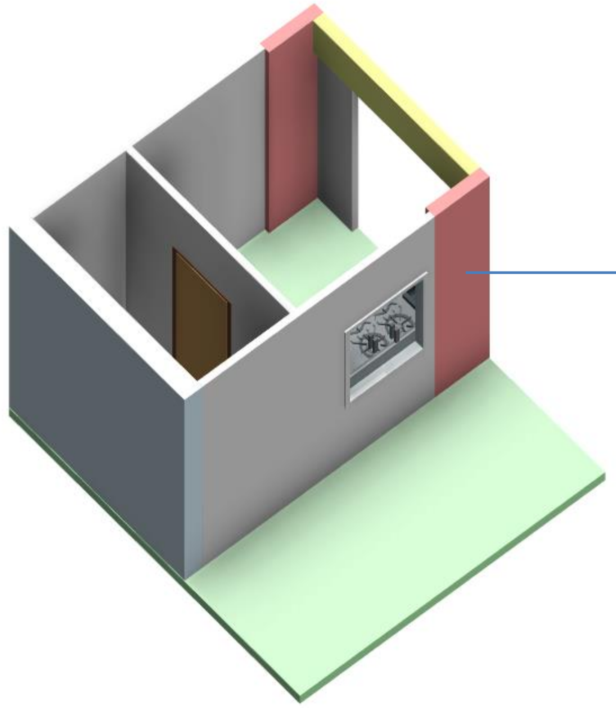
KEY PLAN



TYPE-4
UNIT/FLAT



6. BR-4A MODULE



6. KI-2A MODULE

MODULARIZATION OF FLOOR PLAN

- ☑ Not all areas are modular
- ☑ It's a combination of both 3D modular and 2D elements
- ☑ We have to find the right balance to optimize the structure stability, productivity & erection ease
- ☑ Modules should be easy to handle and transport

Image courtesy : United Tech

PRODUCTION PROCESS FLOW

Steel Processing Area

3D Mould Preparation

Casting of Modules

MEP Works

Logistics

Painting Works

Tiling Works

Joinery Works

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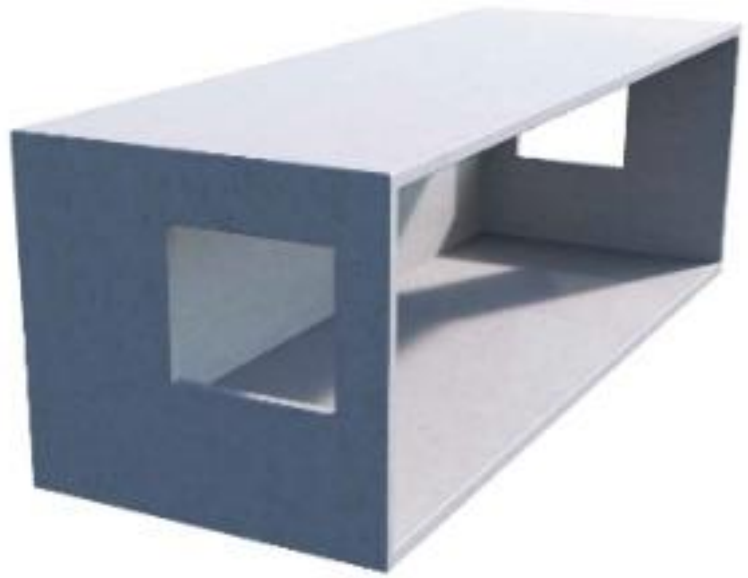
TYPES OF PODS BY FORM



Walls + Roof + Slab
- Pros – 100% Finishing @ Factory, limited structural connections
- Cons - More weight, High precision required during erection, difficult to cast, Repeating Floor/Slab

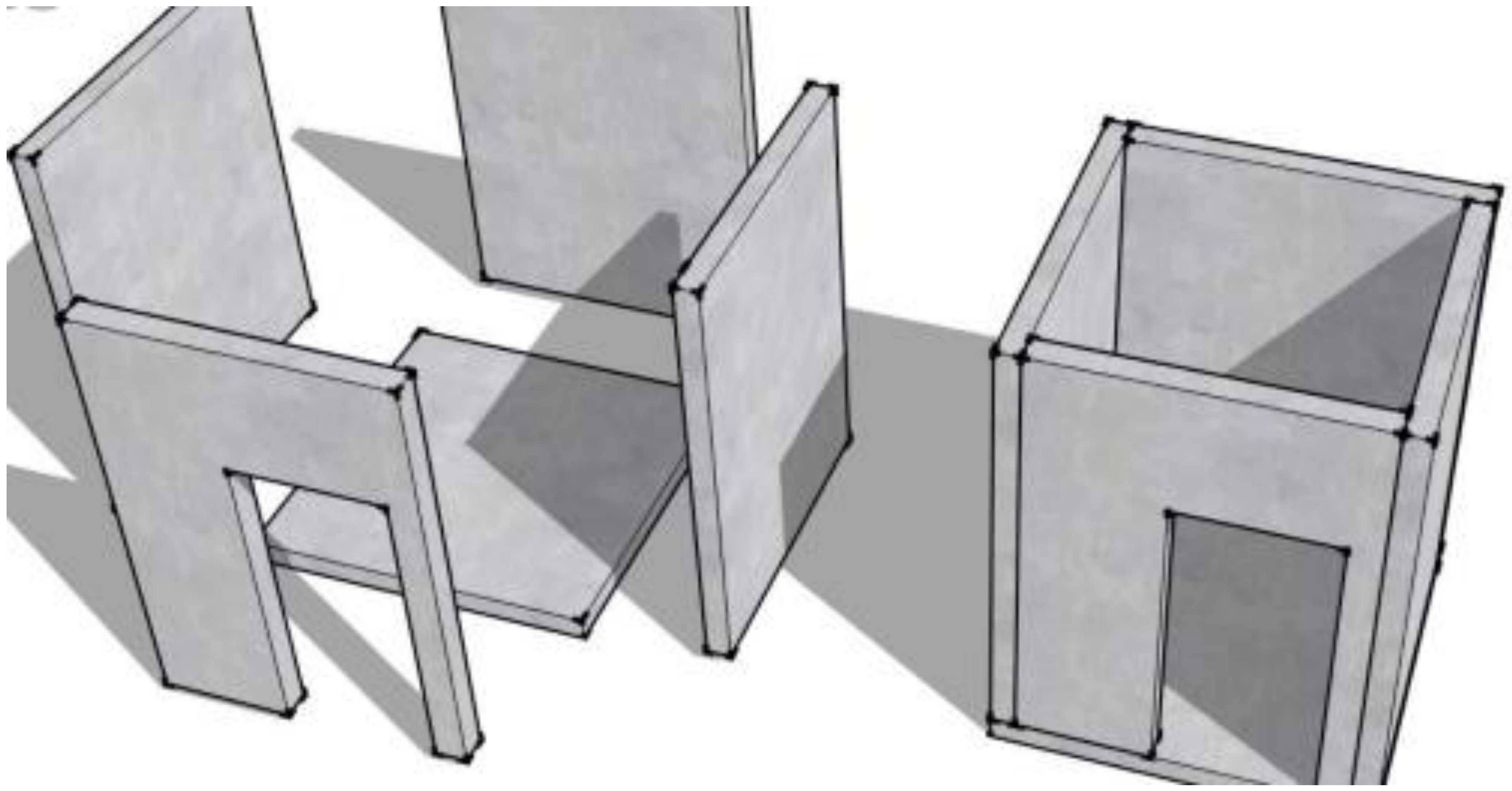
Walls + Roof
- Pros – Lesser weight, easy to cast, Easy to lift
- Cons - More weight, High precision required during erection

Walls + Floor
- Pros – Lesser weight, Tiling & MEP works @ Factory
- Cons - More weight, High precision required during erection, difficult to lift

CASTING PROCESS- BY ASSEMBLING 2D WALLS

ADVANTAGES

- ☑ Most flexible for different precast elements
- ☑ High automated working steps
- ☑ High production output
- ☑ Pre-defined working position



Source: Volert

DISADVANTAGES

- ☑ High investment
- ☑ Large working space
- ☑ Additional working step -> assembling of the precast parts (PBU)

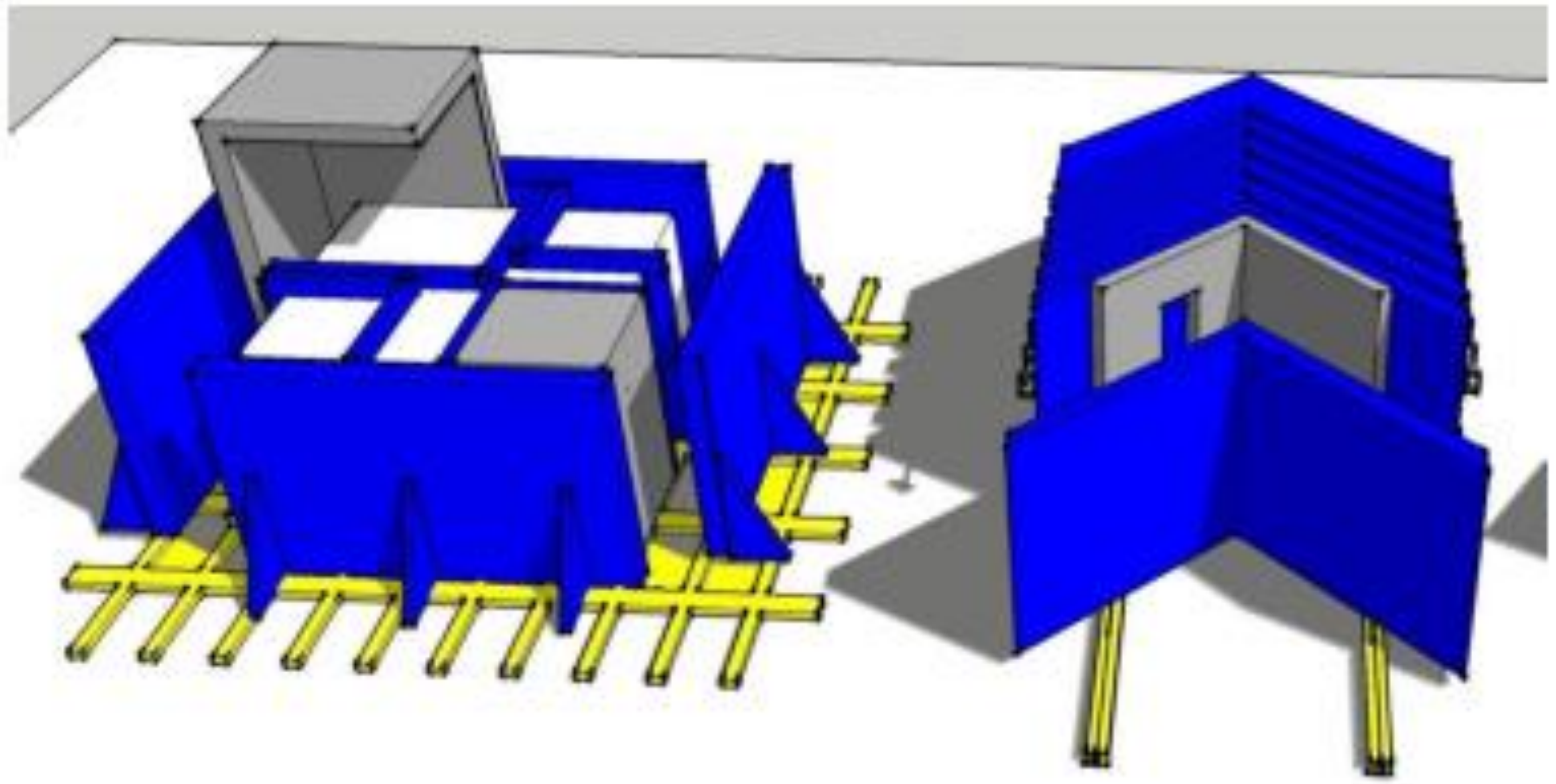
CASTING PROCESS- 2 PARTS SYSTEM

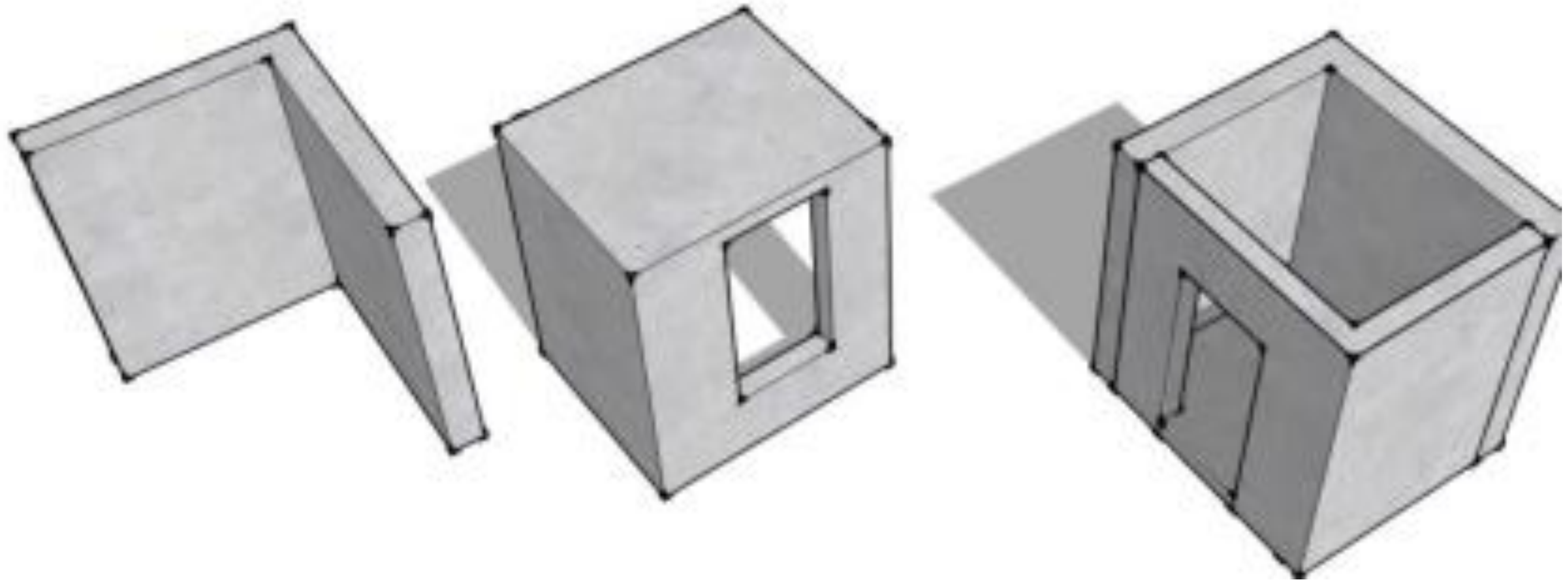
ADVANTAGES

- ☑ Flexible for different precast design
- ☑ Small working space
- ☑ Few connections
- ☑ Very rigid, almost monolithic
- ☑ Production of several elements in one mould

DISADVANTAGES

- ☑ Two different moulds
- ☑ Additional working step -> assembling of the precast parts (PBU)*
- ☑ Needs to be turned (depending on design)



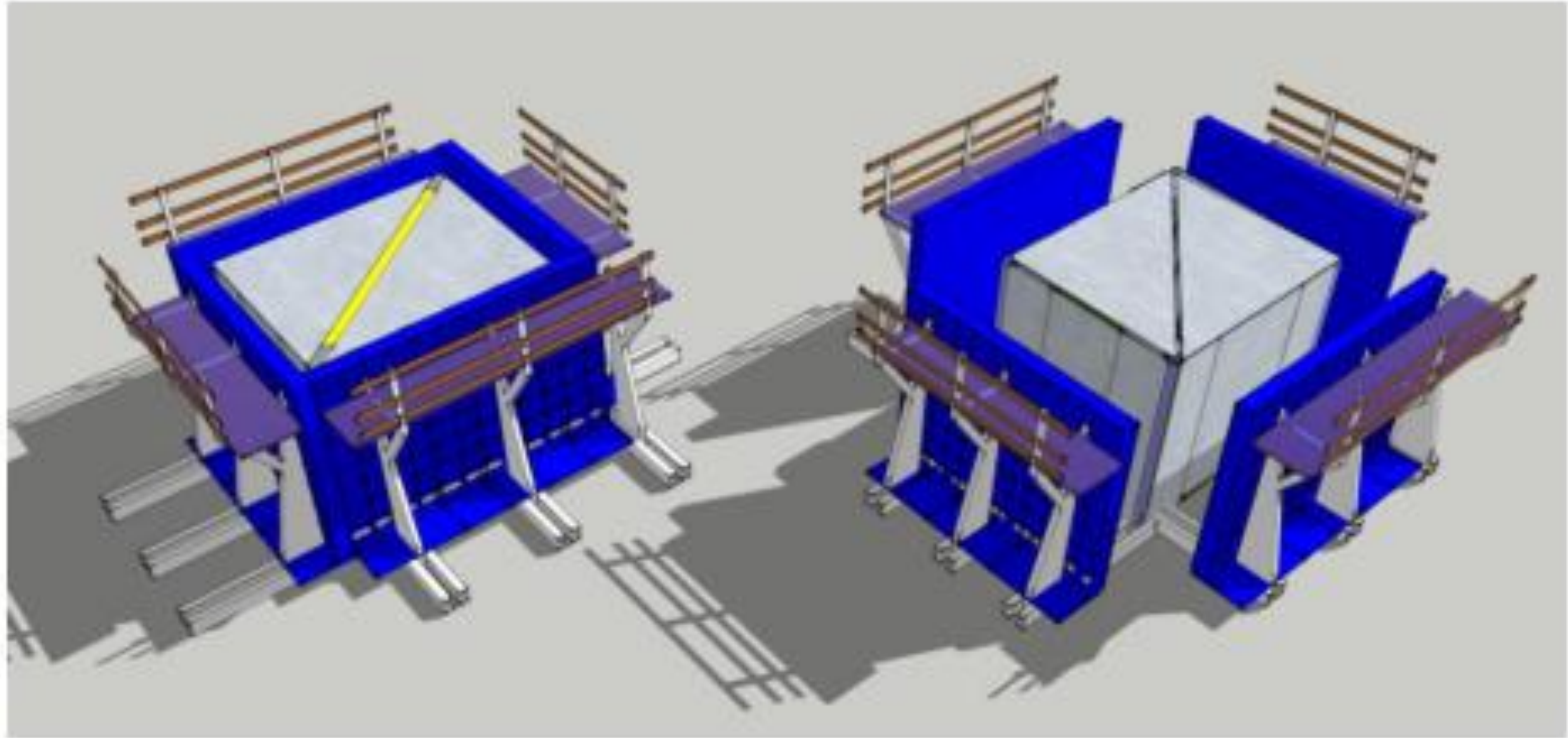


Source: Volert

CASTING PROCESS- SINGLE CAST

ADVANTAGES

- ☑ Monolithic element
- ☑ No connections
- ☑ Small working space
- ☑ Pre-defined Mould configuration



DISADVANTAGES

- ☑ Inflexible for different elements
- ☑ High Investment (shrinkage core)
- ☑ Needs to be turned (depending on design)
- ☑ Cleaning / mechanical parts

CASTING LINE

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FINISHING LINE

Source: Volert

INSTALLATION

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INSTALLATION

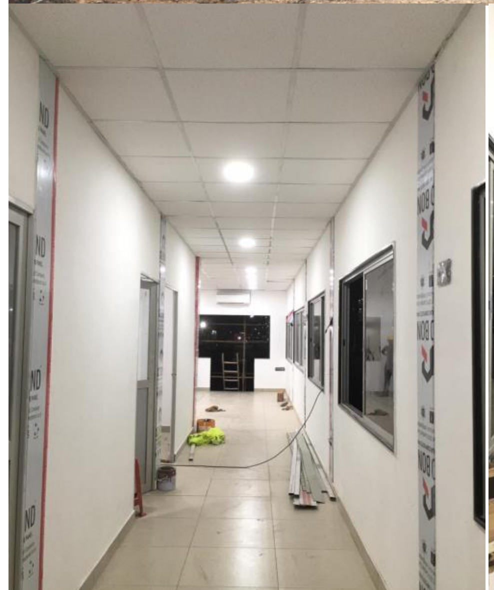
TRANSPORT & INSTALLATION












TRANSPORT & INSTALLATION

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TECHNOLOGY COMPARISION

Parameter	(3D Modular Precast)	Conventional Construction
Resource Efficiency	Excellent (up to 60% less manpower)	Poor
Time Reduction	50% lesser	-
Cost Reduction	0.85 x	1.00 x
Safety	Low risk to manpower (only 10% of work on site)	High Risk of injury to manpower
Sustainability	High (uses less & recyclable materials)	Low
Functionality Parameters		
Thermal performance	Provides for use of light weight concrete /polystyrene infill	Normal
Seismic Stability	High (suitable upto zone 4)	Medium
Acoustic	>45dB sound reduction for 100mm wall	>40-45dB average sound reduction
Water Tightness	High due to lesser joints	Depends on workmanship

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TECHNOLOGY COMPARISION

Factors	MagicPod (3D Precast Modular)	Light Gauge Steel Modular	2D Precast	Reinforced EPS Wall Panel	Monolithic Concrete Const.
%age Industrialization	**90%**	60 - 90%	30%	10%	0%
Durability	**High**	Medium	High	Medium	High
Life Cycle Cost	**Low**	High	Medium	Medium	Low
Strength	**High**	Low	High	Medium	Medium
Automation Possibility	**High**	Low	Medium	Low	Low
Finishing @ Plant	**100%**	60 - 80%	0%	0%	0%
Weight of Modules	**High**	Less	Less	Less	Less
MEP	**Concealed**	Exposed/Concealed	Concealed	Concealed	Concealed
Scalability	**Very high**	Low	Medium	0%	Medium
Speed of Exec.	**Very high**	High	Medium	0%	Medium
Mandays for 300 Sq. Ft. Work	**12**	22	18	34	31

60% less manpower

HOW CAN CONVECTIONAL BUILDING BENEFIT FROM MODULAR CONSTRUCTION

By Using Bathroom Pods

Bathroom is a repeatable component – hence can be modularized.

Fixed Cost - no cost overruns.

Involves all trades - RCC, Waterproofing, Tiling, Plumbing, Joinery in a cramped place of 50-100 sft, hence a critical job in project completion. Should be done offsite in parallel to building super structure construction.

Quality – can be easily controlled in a factory environment rather than on site.

Ready to use – fully finished bathrooms ready to use post installation.

Man hour density is highest in bathrooms. Hence ideal for modularization

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TYPES OF PBUs

Normal Concrete Pod

Lightweight Concrete Pod

Drywall Pod

Reasons for Adopting Bathroom Pods:

13 trades are done offsite, 40 % manpower reduction, 20% faster construction

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INSTALLATION METHODS

CRITICAL PATH INSTALLATION : DROP IN

- Suitable for concrete type PBU
- Co-ordination is critical
- Protection of finishes is a challenge

NON-CRITICAL PATH INSTALLATION : SLIDE IN

- Suitable for non- concrete type PBU
- Able to finish with architectural works and fittings

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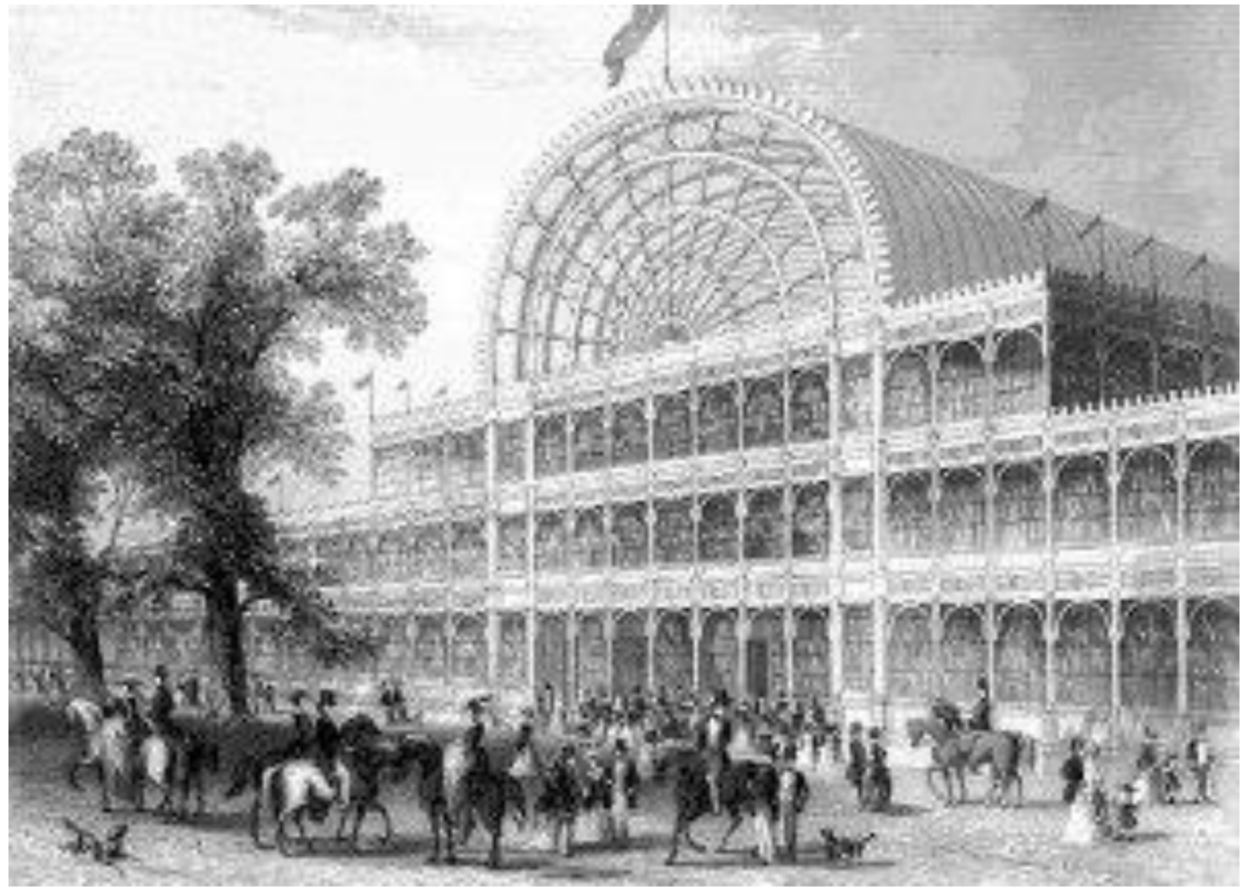
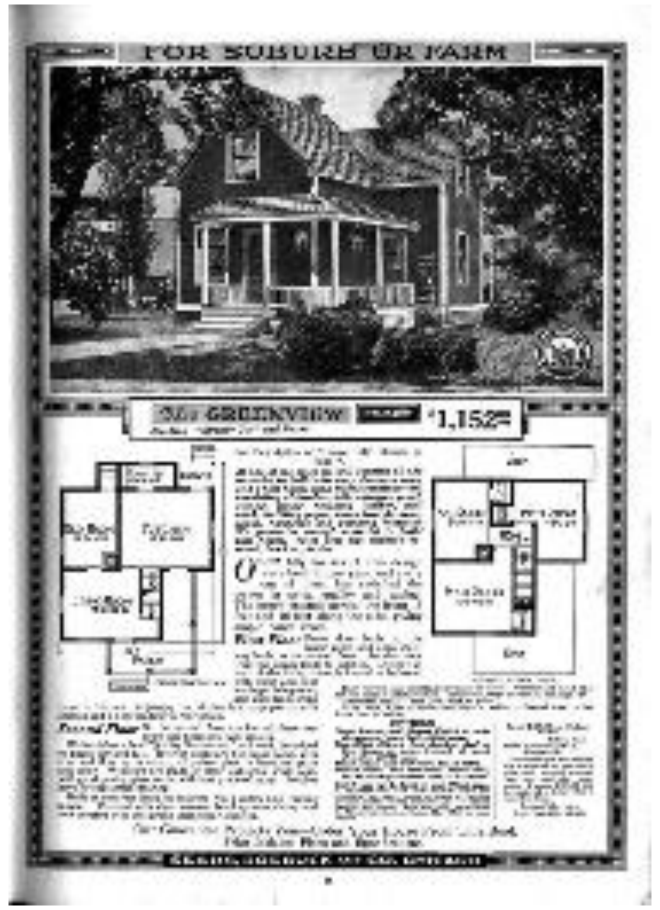
MODULAR BUILDINGS - HISTORY



Among the earliest examples of prefabrication in during Britain's Great Exhibition of 1851, when the Crystal Palace was constructed in a few months and assembled using a series of prefabricated parts. The exhibit was also taken apart after the event and reassembled at another site. This is the precursor to modular or factory-based fabrication of buildings



In the 1900s (1922) the United States entered 14 the market when the Sears Roebuck Company so prefabricated homes via mail order. The purchaser would receive a kit of parts that assembled onsite to build the home

The Hilton Palacio del Rio Hotel was among the first concrete high rise modular buildings in the world. The project was across from the Texas World's Exposition of 1968, the 500-room hotel was designed, completed and occupied in an unprecedented period of 202 working days. The hotel's room modules were pre-cast from light-weight structural concrete. Before arriving on the construction site, each room was fully decorated, including color TV, AM/FM radios, beds, carpeting, and all FF&E. The units are 32 feet 8 inches and 29 feet 8 inches long, 13 feet wide and 9 feet 6 inches high. They weigh 35 tons each and were manufactured at a plant located eight miles from the project site. All units were installed in 46 days.

MODULAR BUILDINGS - HISTORY

Habitat 67, Built in 1967 in Montreal, Qubec, Canada. Habitat 67 comprises 354 identical, prefabricated concrete forms arranged in various combinations, reaching up to 12 stories in height

Nakagin Capsule Tower, Completed in just 30 days in 1972, The building is composed of two interconnected concrete towers, respectively eleven and thirteen floors, which house 140 self-contained prefabricated capsules

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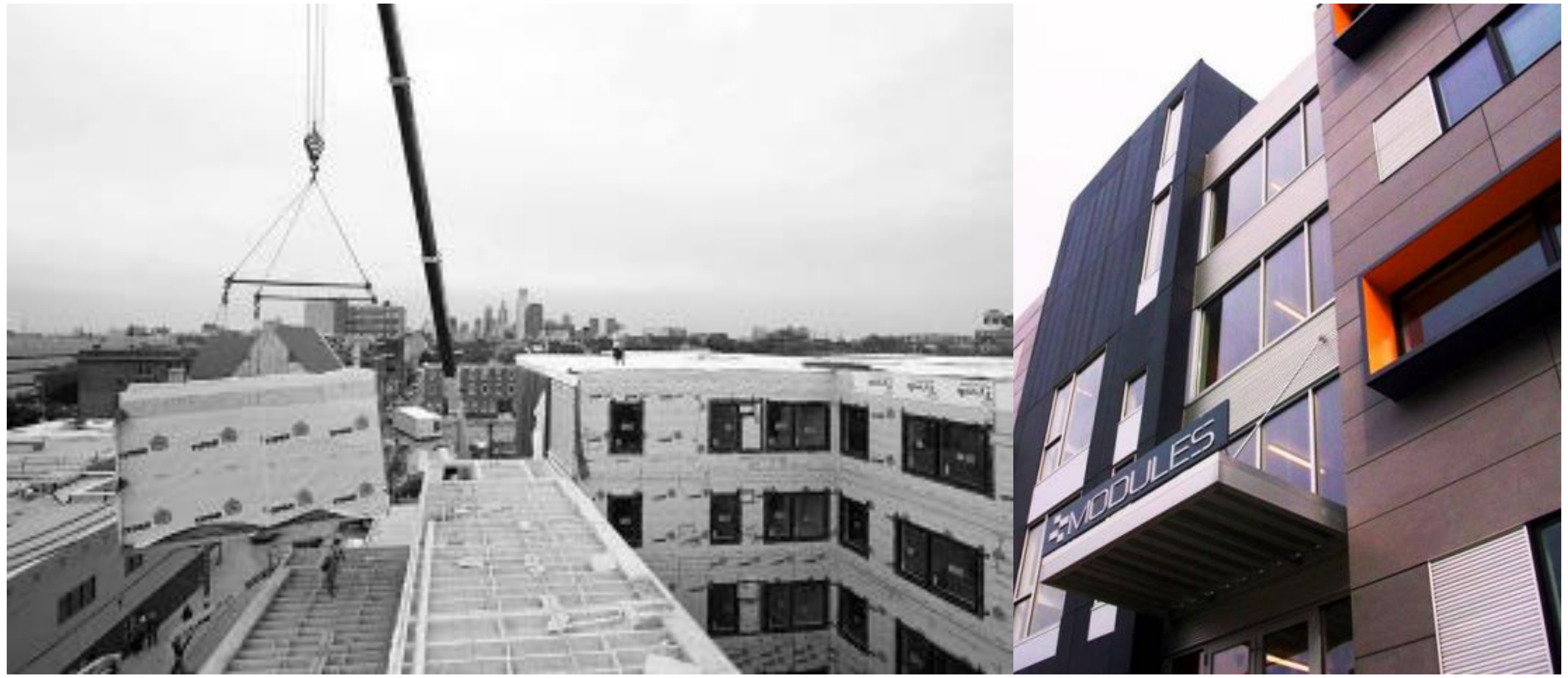
MODULAR BUILDINGS - NOW



The Modules, Philadelphia, Constructed in 2010 using Wooden based modules, approx. 80,000 and 160 bed.

2011, Victoria Hall, Wembley, UK. 19 story high.

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CASE STUDY - SINGAPORE

CASE STUDY - SINGAPORE

CASE STUDY - AUSTRALIA

SOHO Towers, Darwin Australia. 29 story high. The modules were completed & Finished in Ningbo, China & shipped to Darwin, Australia.

CASE STUDY - INDIA

3RD GEN CONSTRUCTION TECHNOLOGY

- **Lego like plug and play modules**
- **Cast and finished in factory**
- **Assembled on site**
- **90% work done in factory**

GLOBAL HOUSING TECHNOLOGY CHALLENGE INDIA

- Magicrete wins the Global Housing Technology Challenge
- Organized by the Ministry of Housing & Urban Affairs .
- Location - Ranchi
- Client - Ministry of housing & Urban Affairs
- Time Period - 3 months planning + 12 months execution
- Technology - 3D Modular Precast (MagicPod)
- No. of Homes to be built - 1008
- No. of Buildings - 7 x G+8 floors

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POD APPLICATION

HOTELS

HOSPITALS

OFFICES

COMMERCIAL

VILLAS

RESIDENTIAL

HOSTELS

SCHOOLS

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ESTEEMED CLIENTELE

सत्यमेव जयते
Ministry of Housing and Urban Affairs
Government of India

प्रधान मंत्री
आवास योजना-शहरी
Pradhan Mantri Awas Yojana-Urban

SRF
We always find a better way

PIL

LARSEN & TOUBRO

TATA
TATA CONSULTANCY SERVICES

SURAT MUNICIPAL CORPORATION

Panoli Intermediates
India Pvt. Ltd.

MARUTI
INFRACREATION PVT LTD
CONCEPT TO CREATION

DHP&A

KKB

RKC
INFRABUILT PVT. LTD.

KALPA-TARU

BAYER

atul
touching lives...

ShethBuilders

PATH

KUTCH CHEMICAL IND. LTD.

UPL

ireo

THANK YOU

Magicrete Building Solutions Pvt Ltd
Siddharth Sharma
9967870753
Siddharth.Sharma@magicrete.in

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WHO WE ARE ?

"We help people build their homes **better, faster and cheaper** by using innovative construction technologies".

More than a decade of innovation and continuing.

- The largest manufacturer of AAC Blocks in India (installed capacity of **13,00,000CBM/annum**) near high growth markets of West and North
- **Seven lacs+** homes built over the past decade using Magicrete products.
- **Motilal Oswal Private Equity** (2013) & **India SME** (2023) invested in Magicrete.
- Launch of **Magicrete AAC Wall Panels** - the next significant shift in wall construction built using European Technology.

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GROWTH STORY

2008

Sourabh Bansal, Puneet Mittal, and Sidharth Bansal, Co-founders, Magicrete spot a promising market for AAC blocks to replace the **$ 10 bn** industry of Red Clay Bricks.Sets up first AAC blocks factory of **150,000 CBM** at Surat, Gujarat.

2012

Magicrete increases its annual capacity to **400,000 CBM,** making the Surat plant India's Largest single-location AAC plant.

2013

Motilal Oswal Private Equity invest in Magicrete. Set up another **AAC blocks factory** on **4,00,000 CBM** at Jhajjar, Haryana

2014

Launch of **Ready mix plaster and Wall putty** and **Precast**

2020

Won Global Housing Technology Challenge (GHTC) organized by MoHUA to build **1000+ homes** in Ranchi with **3D Modular Technology**. Launch of **Tile & stone fixing solutions** and **Waterproofing solutions.**

2022

Commision new AAC Unit at Wada, Maharashtra making **Magicrete** largest producer AAC Blocks with an annual capacity of **13,00,000 CBM**

2023

India SME, a PE fund Invests in Magicrete

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WHY MAGICRETE ?

BEST IN CLASS PRODUCTS

- First AAC Company to provide complete Walling Solution
- ISI Marked
- Grade 1 Material
- Material, 33% Higher Strength
- Range of Products

WORLD CLASS INFRASTRUCTURE

- Present in **18 states**, top **120 Indian Cities** through more than **5000** retail outlets.
- Operational excellence achieved through **TPM,** use of **BSC** as a strategic tool, and **SOP** driven systems.
- India's top AAC players with **13,00,000 CBM** annual installed capacity.
- Strategically located within 250kms of major urban centres and thermal power plants.

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WHAT WE DO ?

Walling Products

- AAC BLOCKS
- AAC WALL PANELS
- BLOCK JOINING MORTAR
- READYMIX PLASTER
- WALL PUTTY

Construction Chemicals

- TILE & STONE ADHESIVES
- EPOXY & CEMENTITIOUS GROUTS
- TILE & STONE CARE
- WATERPROOFING

Precast Solutions

- PRECAST BUILDING SYSTEM
- PRECAST INFRASTRUCTURE PRODUCTS

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