HCPS IBS SOLUTION

HC PRECAST SYSTEM SDN. BHD.

QUALITY I ECO-FRIENDLY I ECONOMICAL

How does it benefit the Developer, the Consultants, fellow Builders, Property Owners and the Malaysian Construction Industry?

1. Reduce financing cost, overhead and preliminaries - Improves profit margin
   - Provide better finishing
2. More competitive property prices - Explore Various Design
3. Faster Vacant Possesion - Ability to take up more projects
4. Shorter construction period - Better Cash Flow
5. IBS is potentially cheaper than conventional method
6. Customizable & flexible to accomodate Architectural design intents
7. Higher accuracy in Quantity measurement - Minimal to no Variation Order
8. Earlier occupation of property - With Lesser Repair/Maintenance Works
9. Reduce currency outflow by reduction of foreign workers up to 40%
10. Cleaner construction area - Less debris, Less clearing works
11. Higher construction efficiency - Reduce site hacking/adjustment works for M&E
12. Higher Quality finishing - Reduce Wastages/Redundant Works
    - No primary undercoat for painting due to smooth skimcoat surface
    - Reduce the quantity of cement and screed on walls and slabs
13. And much more

"Paper To Property"

Your One-Stop-Center for

Industrial Building System (IBS) Solution

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A Little About Us

HC PRECAST SYSTEM SDN. BHD.

Specialist in Low to Middle Rise Residential House

HCPS was founded in year 2002 and specializes in **Precast Concrete Structure Construction** for **low to mid rise** buildings.

Our patented revolutionary **"shear key joint"** system have managed to resolve the very issue which have plaqued the precast industry, **water leakages**.

HCPS currently holds **six (6) Intelectual Properties (IP)** encompassing this proprietary Precast technology. Among the highlights of the HCPS's system is the ability of the structure to withstand **earthquake forces** (test conducted in collaboration with UTM).

The complete IBS rather than IBS components is in full compliance with the recent government's requirement. The company can undertake any design and build in fulfilling the architectural demand, unlike most other system which often poses certain restrictions due to structural limit or production/manufacturing impediment.

WHAT IS IBS?

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- IBS is a System, not Components or Machine
- IBS may vary in Material
- IBS follows a structured Sequence
- IBS is Simple and Fast

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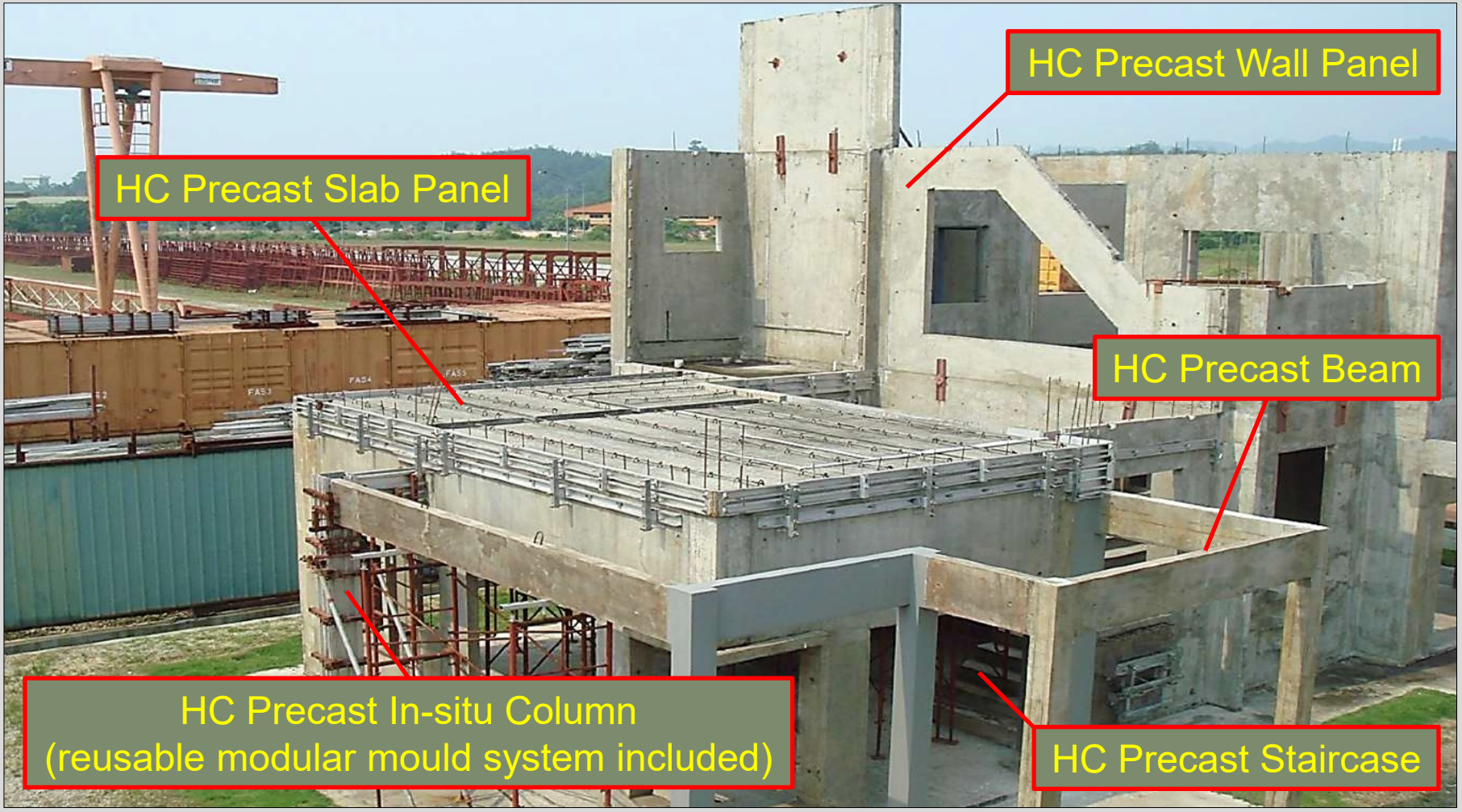
HC Precast System - The Complete IBS Solution



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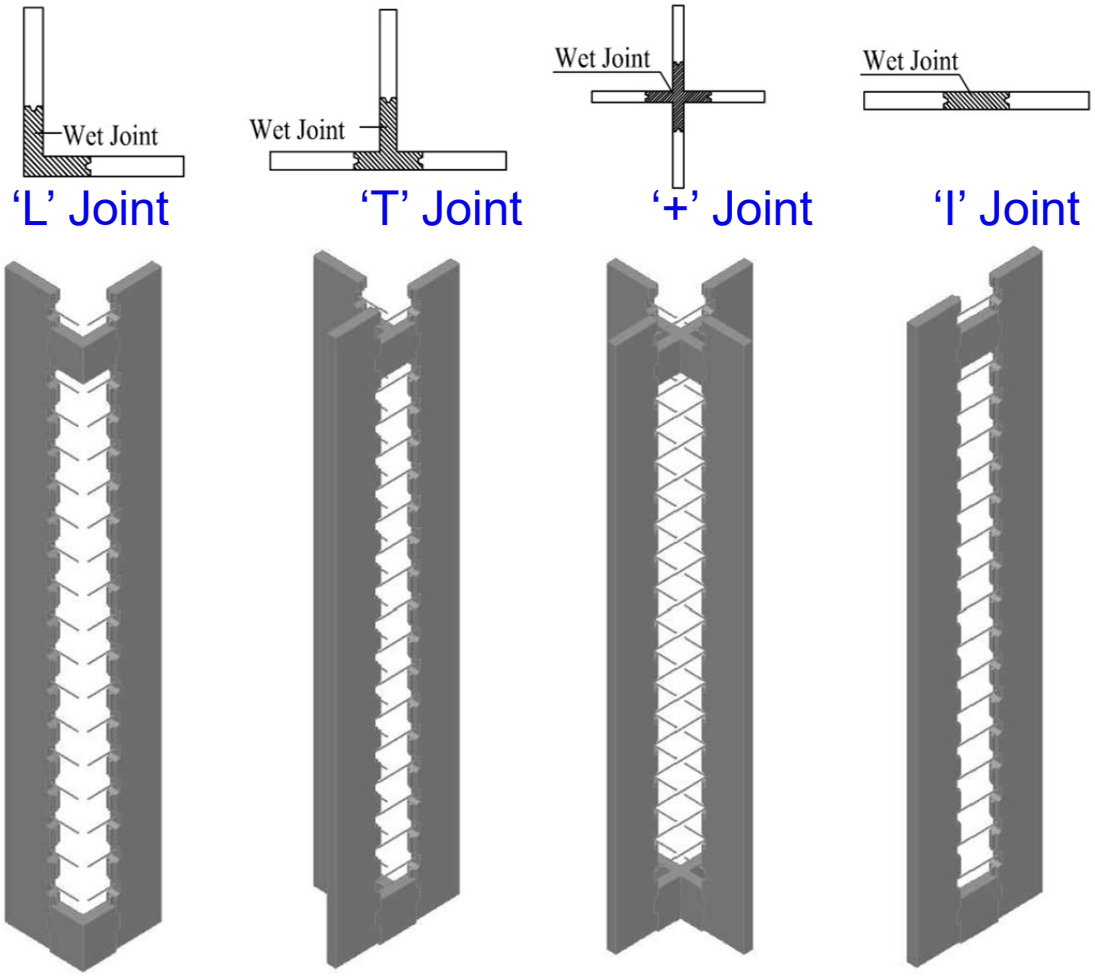
Bonded Together By - The Innovative "Shear Key Joint"



This patented system has helped to eradicate the most common issue with Precast Concrete construction, water leakages.

- Wet joint
- Tongue and groove
- Seamless interfacing

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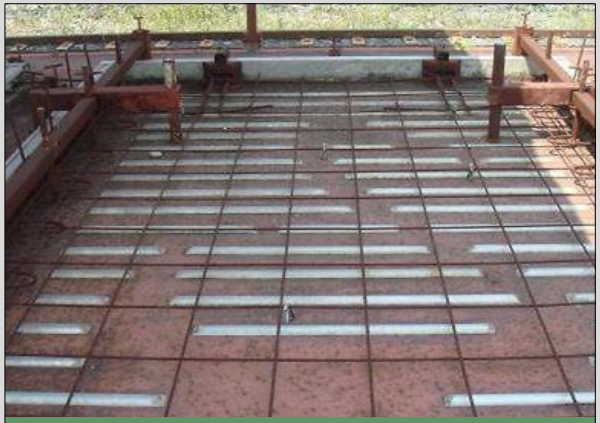
WE Fabricate - Megascale Production With Patented Technology & Methods



Embossed Patterns

Single Cast Coping

Chequered Plate Form

L-Panel Form

Door Opening

Half Slab Panel

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Your One-Stop-Center

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Your One-Stop-Center

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One-Stop-Center from Paper to Property

Produce State-of-art **Systemized Integrated 3D Digital Model**

Review and Finalize Design with Consultant Team for **Production**

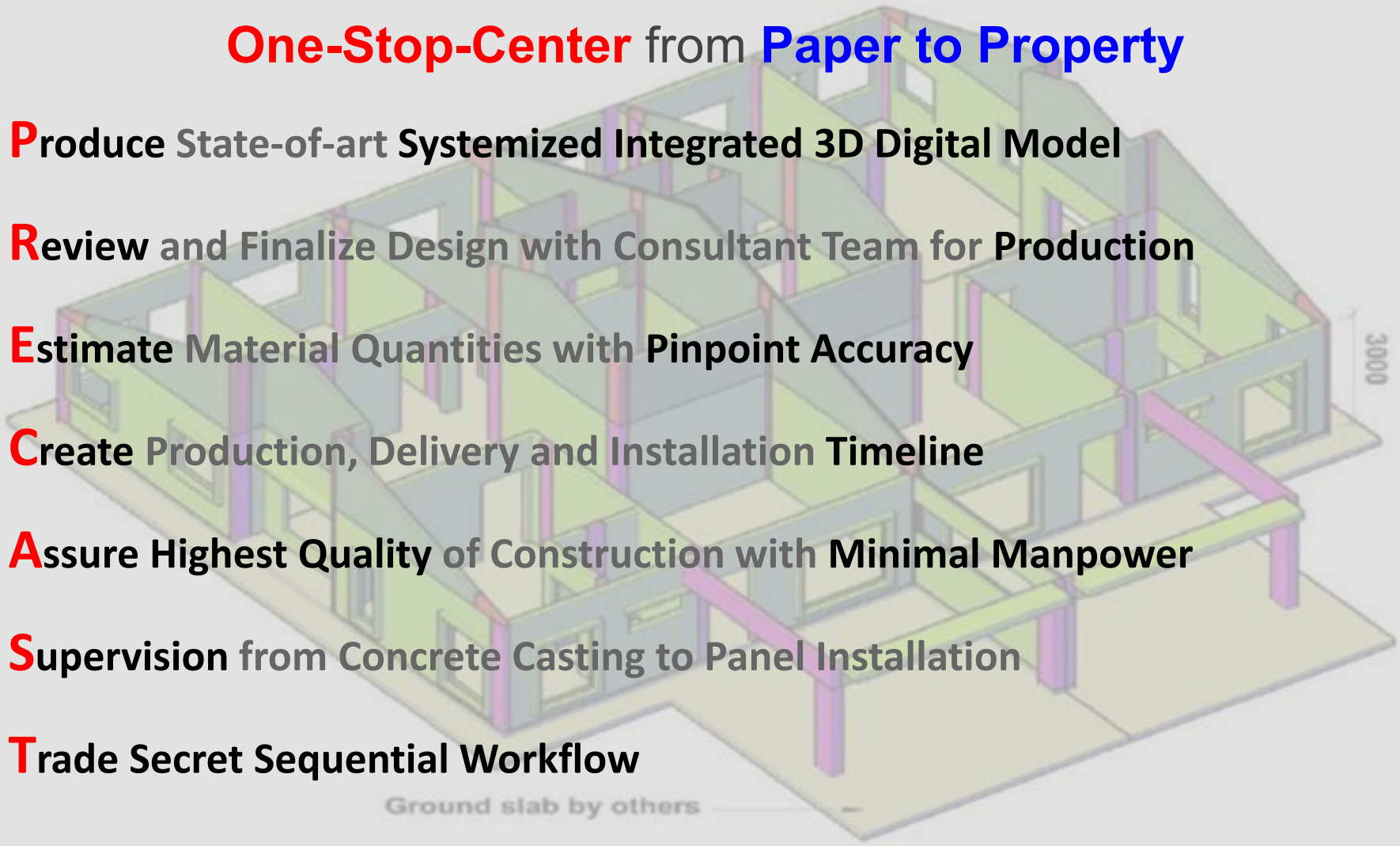
Estimate Material Quantities with **Pinpoint Accuracy**

Create Production, Delivery and Installation **Timeline**

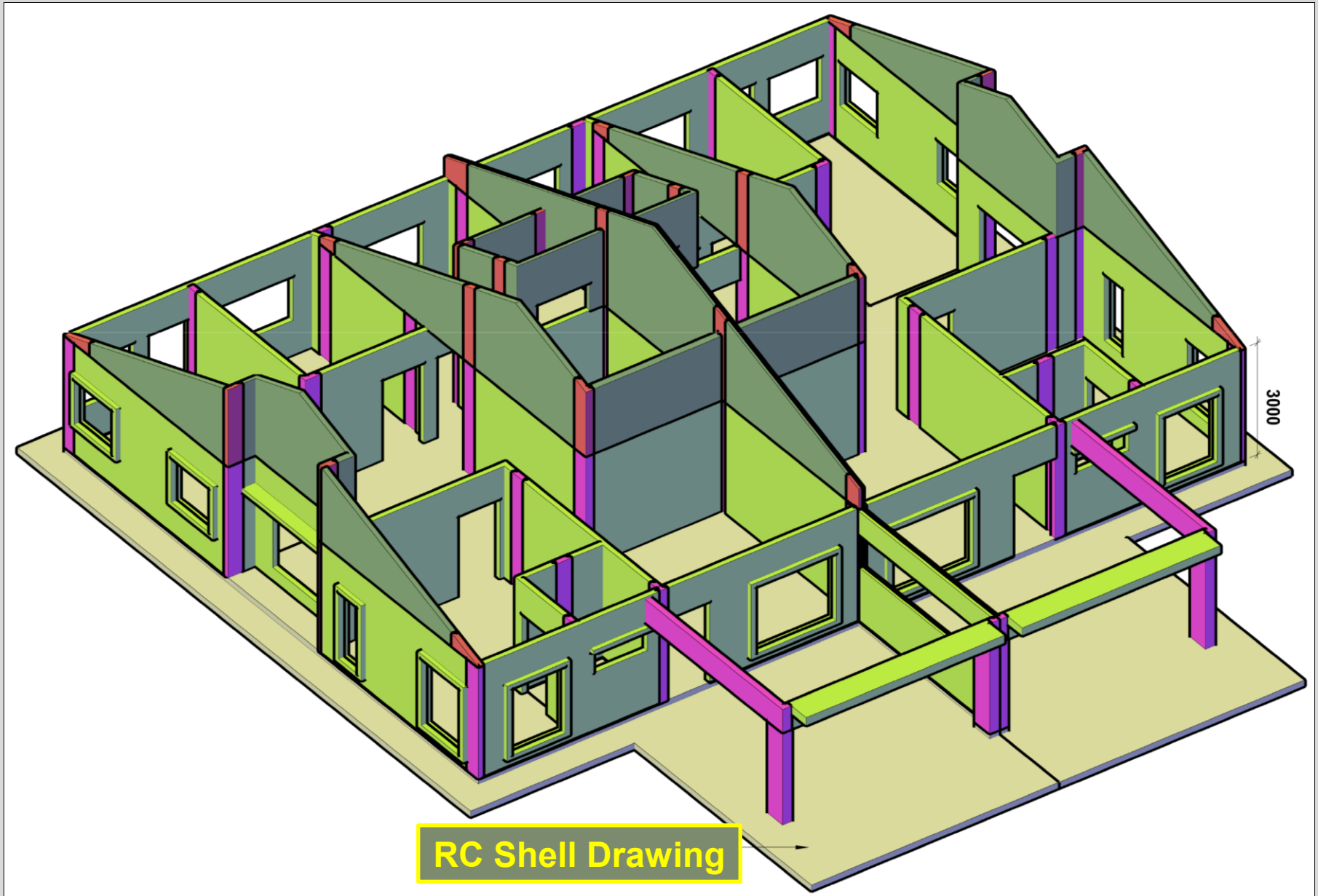
Assure **Highest Quality** of Construction with **Minimal Manpower**

Supervision from Concrete Casting to Panel Installation

Trade Secret **Sequential Workflow**



Produce State-of-art Systemized Integrated 3D Digital Model

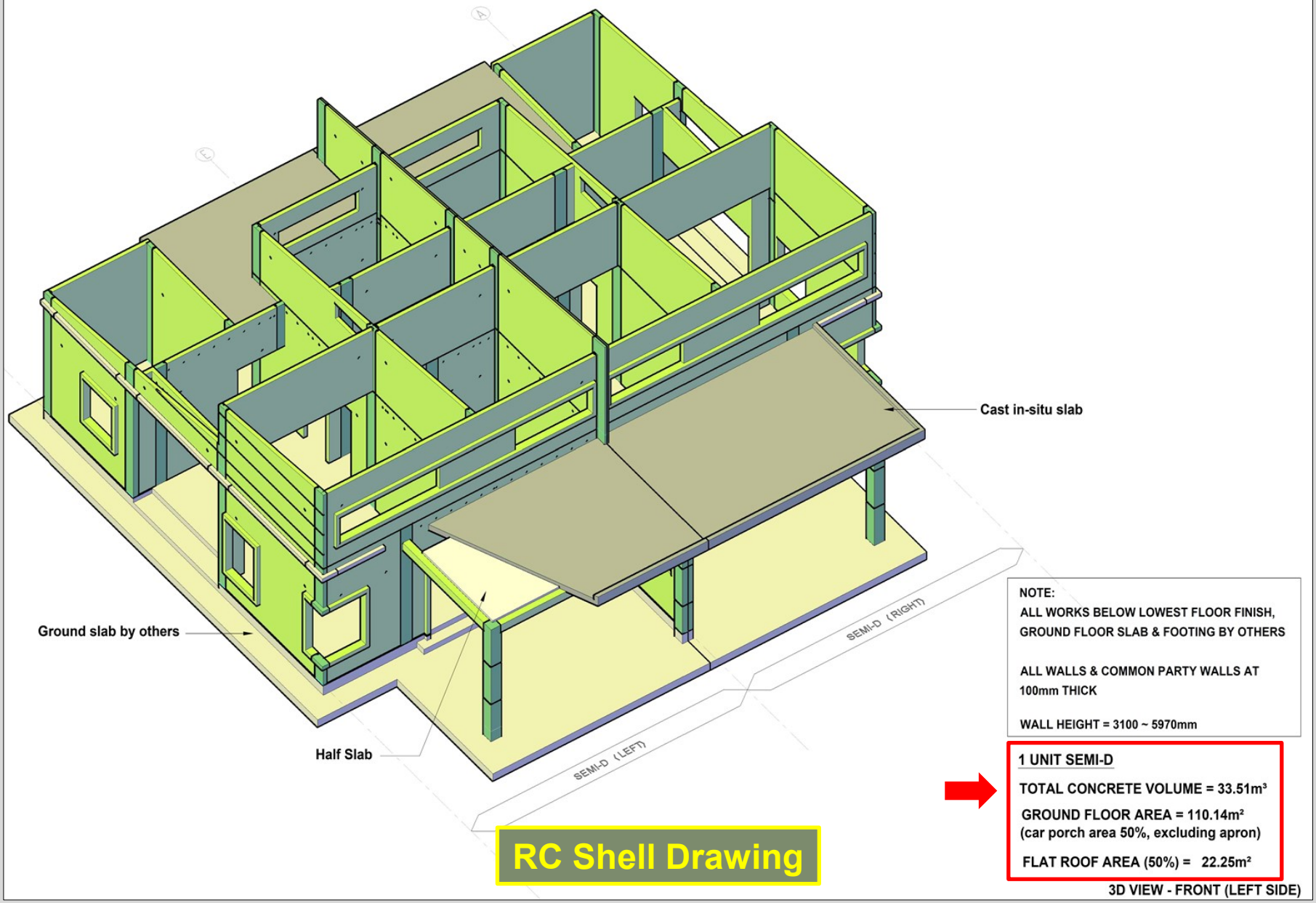


Review and Finalize Design with Consultant Team for Production

Our Rasa Manufacturing Plant

8 acres : 1,800 to 2,500 units of single storey (1000 ft2) / year or 7 to 9 units/day

Estimate Material Quantities with Pinpoint Accuracy



NOTE:
ALL WORKS BELOW LOWEST FLOOR FINISH, GROUND FLOOR SLAB & FOOTING BY OTHERS

ALL WALLS & COMMON PARTY WALLS AT 100mm THICK

WALL HEIGHT = 3100 ~ 5970mm

1 UNIT SEMI-D

TOTAL CONCRETE VOLUME = 33.51m³

GROUND FLOOR AREA = 110.14m²
(car porch area 50%, excluding apron)

FLAT ROOF AREA (50%) = 22.25m²

RC Shell Drawing

3D VIEW - FRONT (LEFT SIDE)

Create Production, Delivery and Installation Timeline

Logistic Option (Decide by Client)

1 *Option 1*
- Bay yard (factory) to block yard (project site)

2 *Option 2 : Advance Casting*
- Bay yard (factory) to site yard (project site)

3 *Option 3 : Advance Casting*
- Storage yard (factory) to block yard (project site)

4 *Option 4 : Advance Casting*
- Storage yard (factory) to site yard (project site)

Notes :

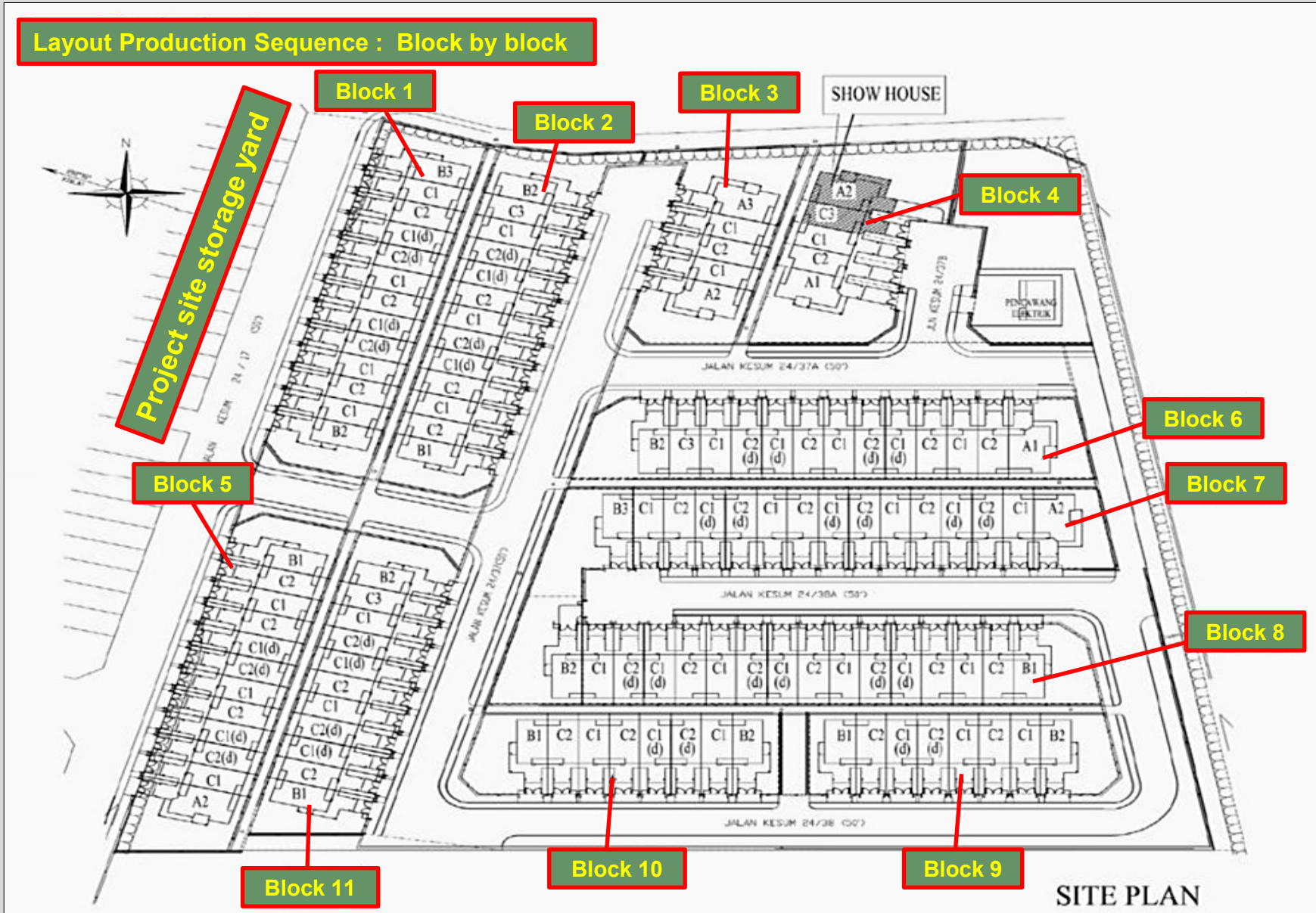
a) *Client / Consultant / Main contractor need to choose which option to be used before production.*

b) *Rate for RM 900.00 / m3 includes for option 1 & 3.*

c) *An additional of RM 30.00 / m3 need to be charges for option 2 & 4*

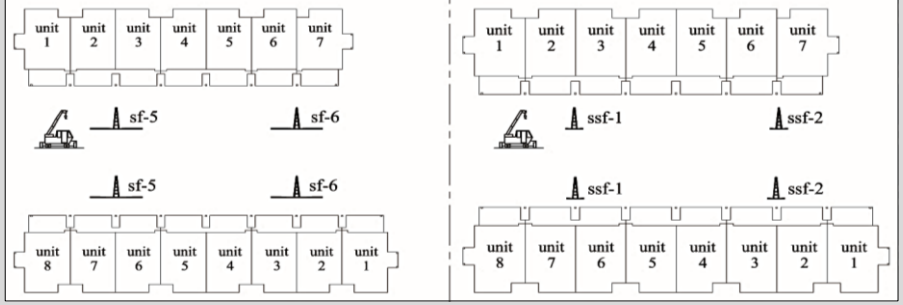
d) *Crusher run base to be provided at site yard for option 1 - 4.*

Create Production, Delivery and Installation Timeline



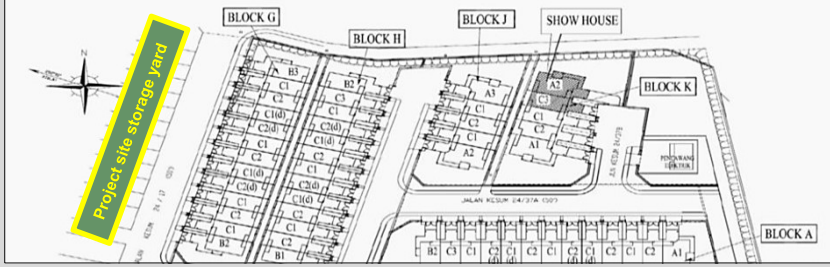
Create Production, Delivery and Installation Timeline

1. Bay Yard to Block Yard – Advance Casting

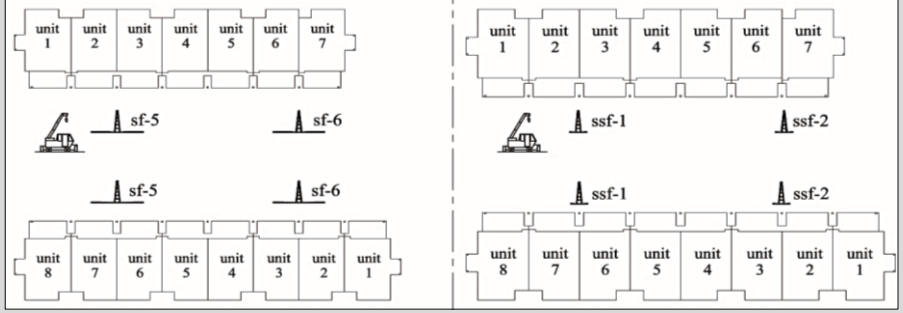


2. Bay Yard to Site yard (project) – Advance Casting

Layout Production Sequence

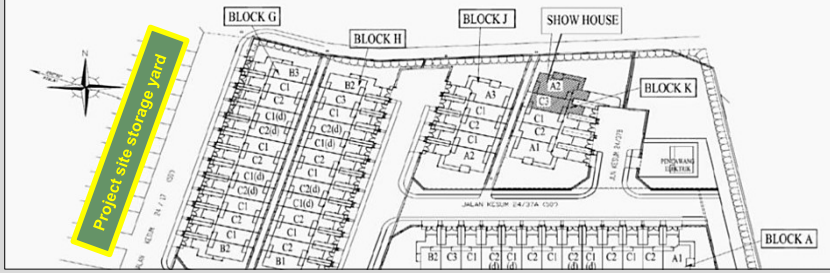


3. Storage Yard (factory) to Block Yard – Advance Casting



4. Storage Yard (factory) to Site Yard (project) – Advance Casting

Layout Production Sequence



Create Production, Delivery and Installation Timeline

Create Production, Delivery and Installation Timeline

Assure Highest Quality of Construction with Minimal Manpower

Every Truck

Every 20 m3

Casting & Leveling

Mould Dismantling

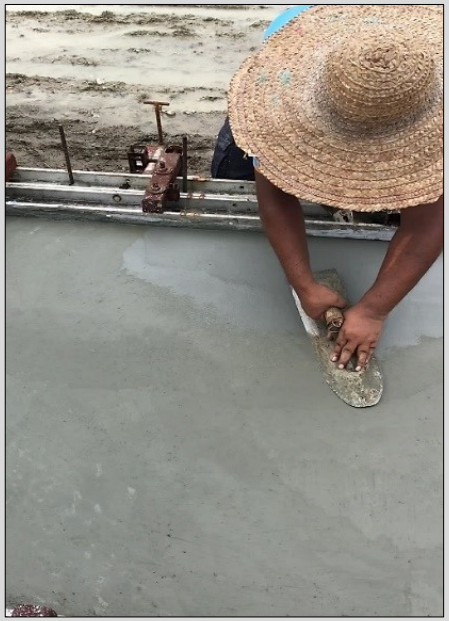
Rebound Hammer Test

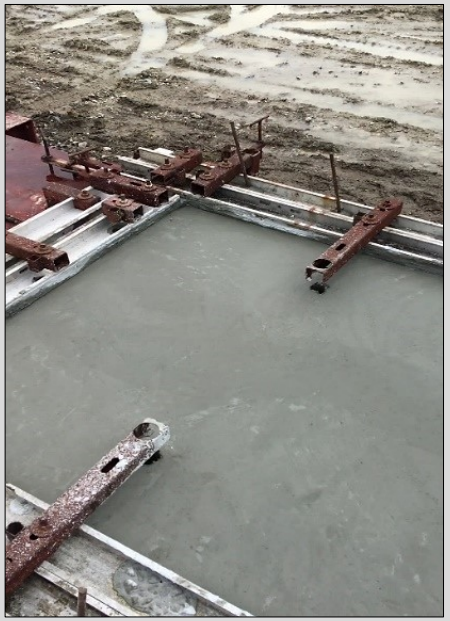
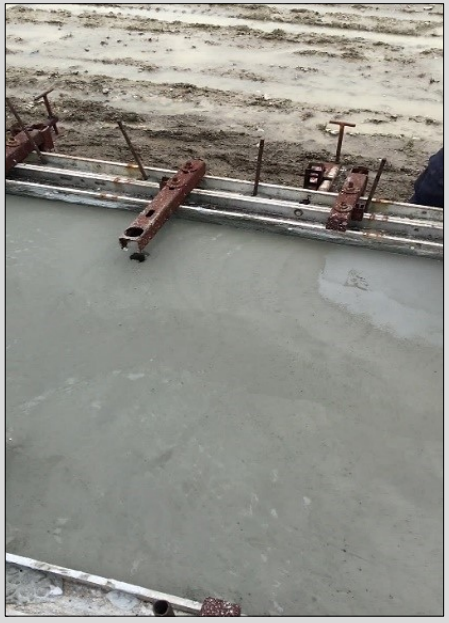
Panel Lifting

Vertical Curing 7 days

Proper Storage Yards

Assure Highest Quality of Construction with Minimal Manpower




Assure Highest Quality of Construction with Minimal Manpower

Assure Highest Quality of Construction with Minimal Manpower

install the Proprietary Precast Panel System

Supervision from Concrete Casting to Panel Installation

1. Setting Out

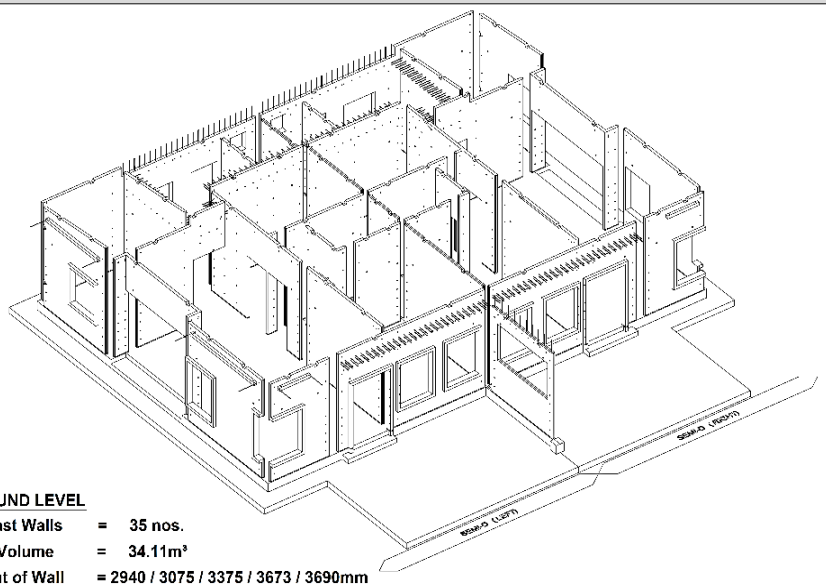
3. Shear Key Joint Casting

2. Panel Erection & Prop

4. Half Slab Placing

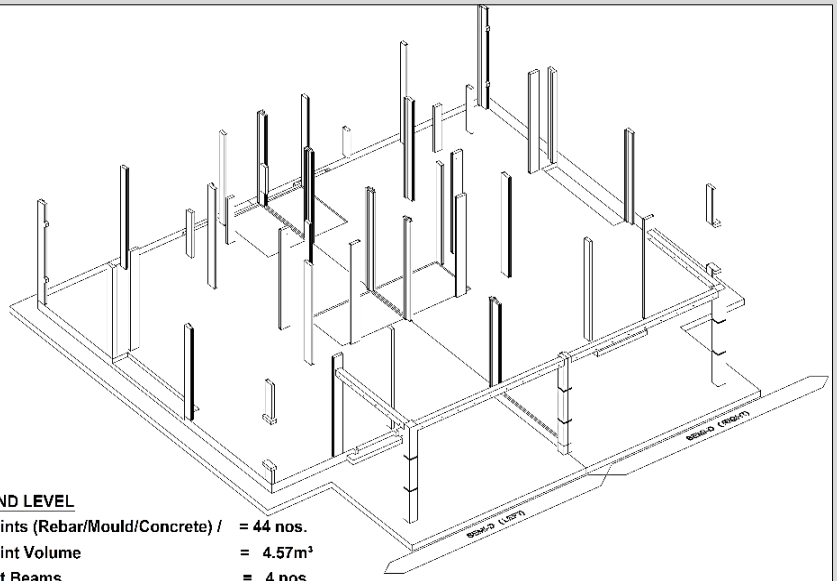
5. Slab Topping Up

Trade Secret Sequential Workflow



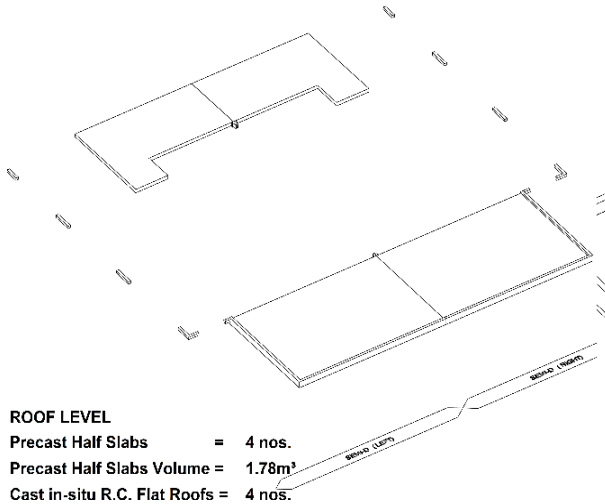
GROUND LEVEL

Precast Walls	=	35 nos.
Wall Volume	=	34.11m³
Height of Wall	=	2940 / 3075 / 3375 / 3673 / 3690mm
Built-up Area	=	186.74m²



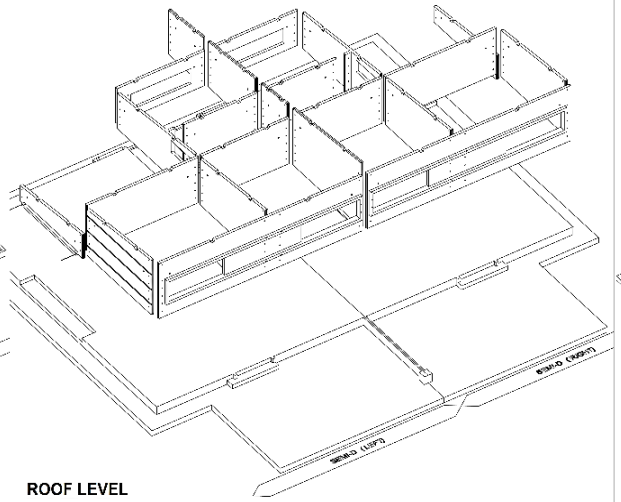
GROUND LEVEL

Wet Joints (Rebar/Mould/Concrete) /	=	44 nos.
Wet Joint Volume	=	4.57m³
Precast Beams	=	4 nos.
Precast Beams Volume	=	0.71m³



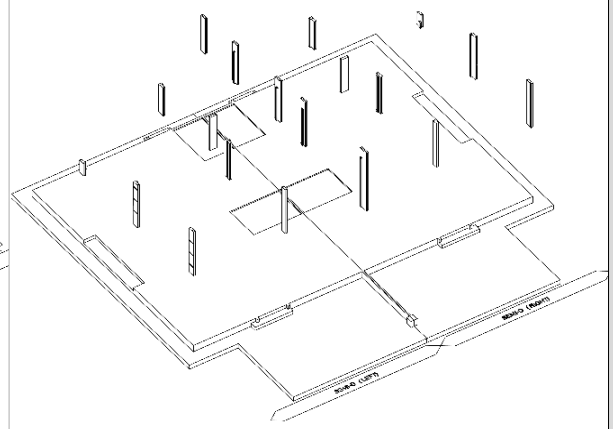
ROOF LEVEL

Precast Half Slabs	=	4 nos.
Precast Half Slabs Volume	=	1.78m³
Cast in-situ R.C. Flat Roofs	=	4 nos.
Cast in-situ R.C. Flat Roofs Volume	=	12.06m³
Cast in-situ Copings	=	10 nos.
Cast in-situ Copings Volume	=	0.07m³



ROOF LEVEL

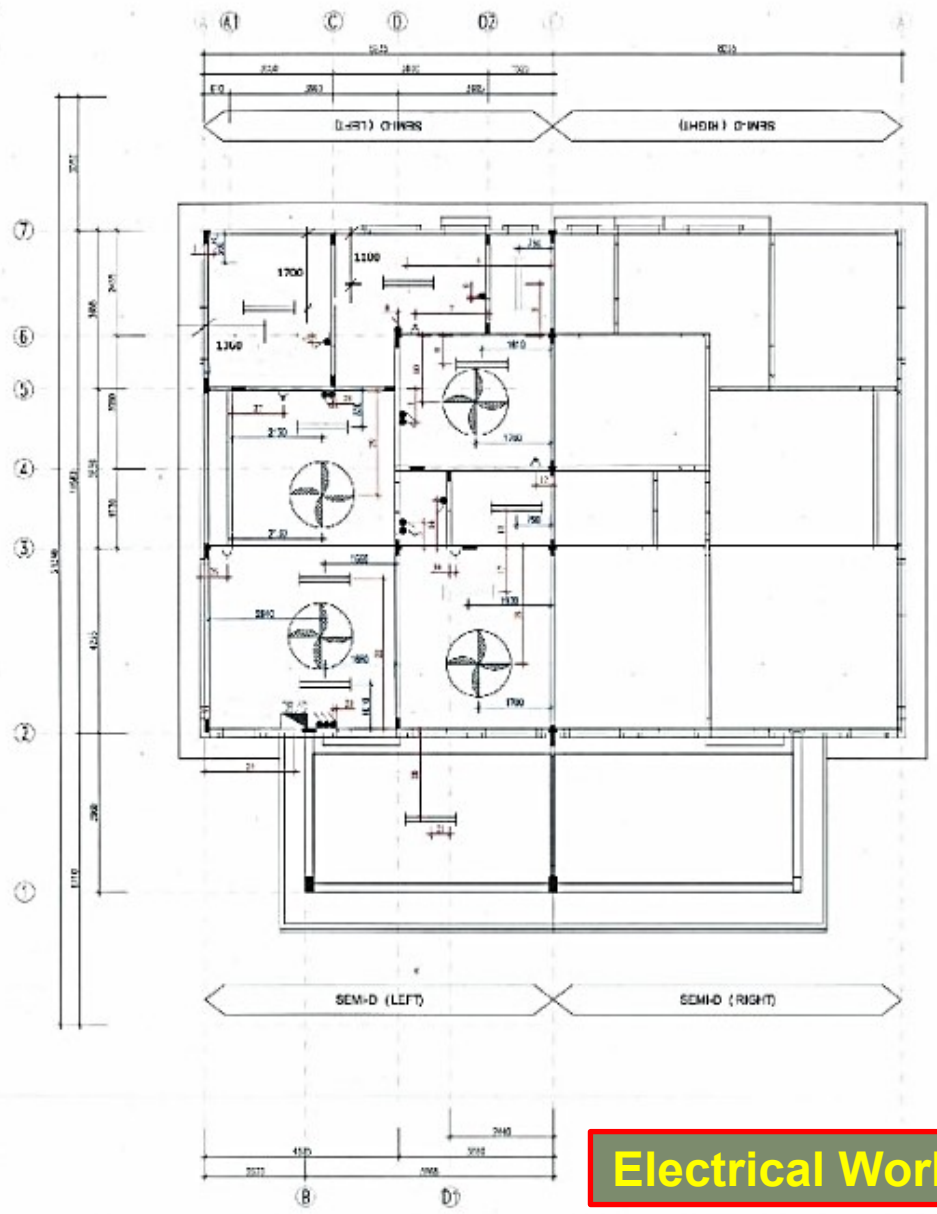
Precast Walls	=	22 nos.
Precast Walls Volume	=	14.42m³
Height of Wall	=	614~2522mm



ROOF LEVEL

Wet Joints (Rebar/Mould/Concrete)	=	19 nos.
Wet Joints Volume	=	1.19m³

M&E Shop Drawing by HCPS (included)



POSITION OF ELECTRICAL POINTS
(FROM STRUCTURAL LEVEL)

	Distance of Point (mm)	Height of Point (mm)	Confirmation by M&E Consultant
1	300	300	
2	50	1500	
3	omitted		
4	3500	CL	
5	1300	CL	
6	200	1500	
7	1700	1500	
8	0	1500	
9	600	CL	
10	1550	CL	
11	650	1500	
12	350	300	
13	900	CL	
14	1200	1500	
15	650	1500	
16	100	300	
17	1000	CL	
18	2600	CL	
19	omitted		
20	2200	CL	
21	800	CL	
22	3700	CL	
23	150	1500	
24	2100	1700	
25	omitted		
26	500	300	
27	1100	300	
28	200	1500	
29	2500	CL	

Notes:
1) Distance of Point has been scaled from M&E Consultant drawing.
2) Height of Point from schedule provided by M&E Consultant drawing.
3) M&E Consultant to fill in dimension not stated (Tbm)

Confirmed by M&E Consultant

Signature :

Name :

Date :

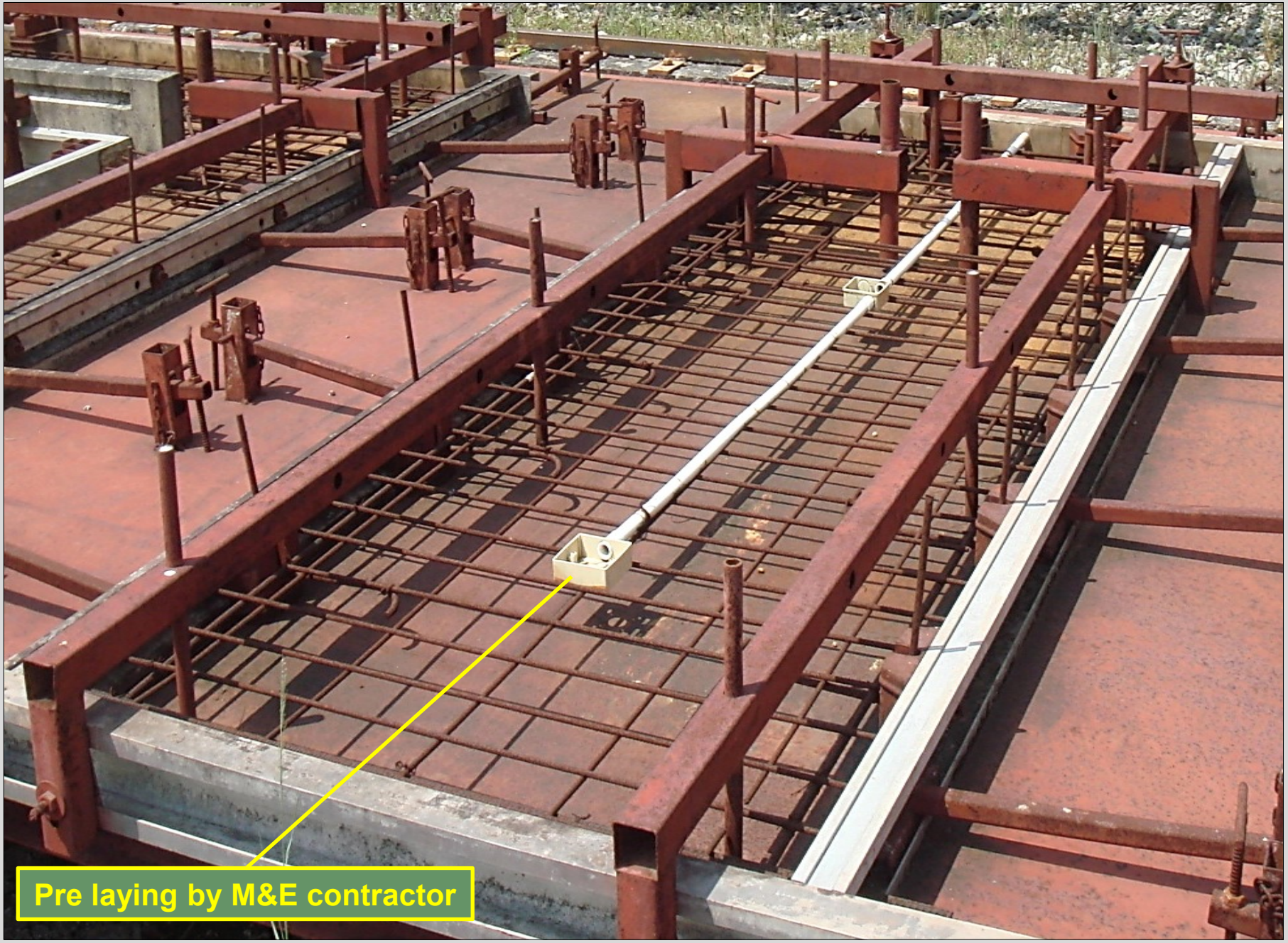
NOTE:
1. CL - CEILING LEVEL

Dimension for :

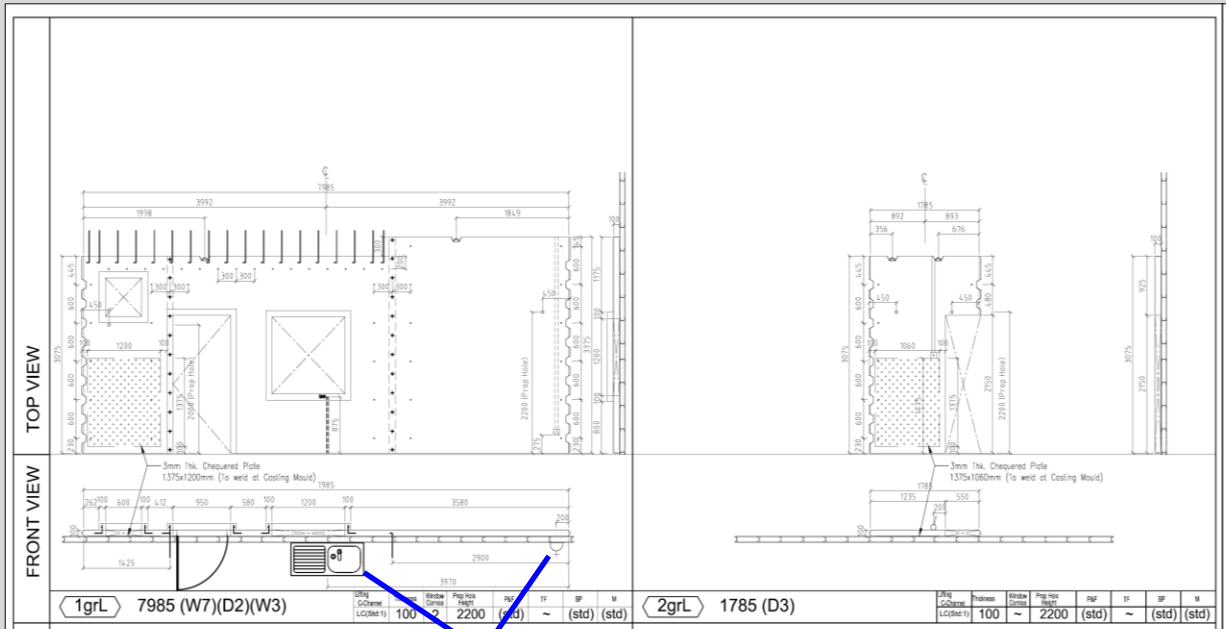
1. Light & Fan point
2. Power point
3. Switch point
4. Tel & MATV point

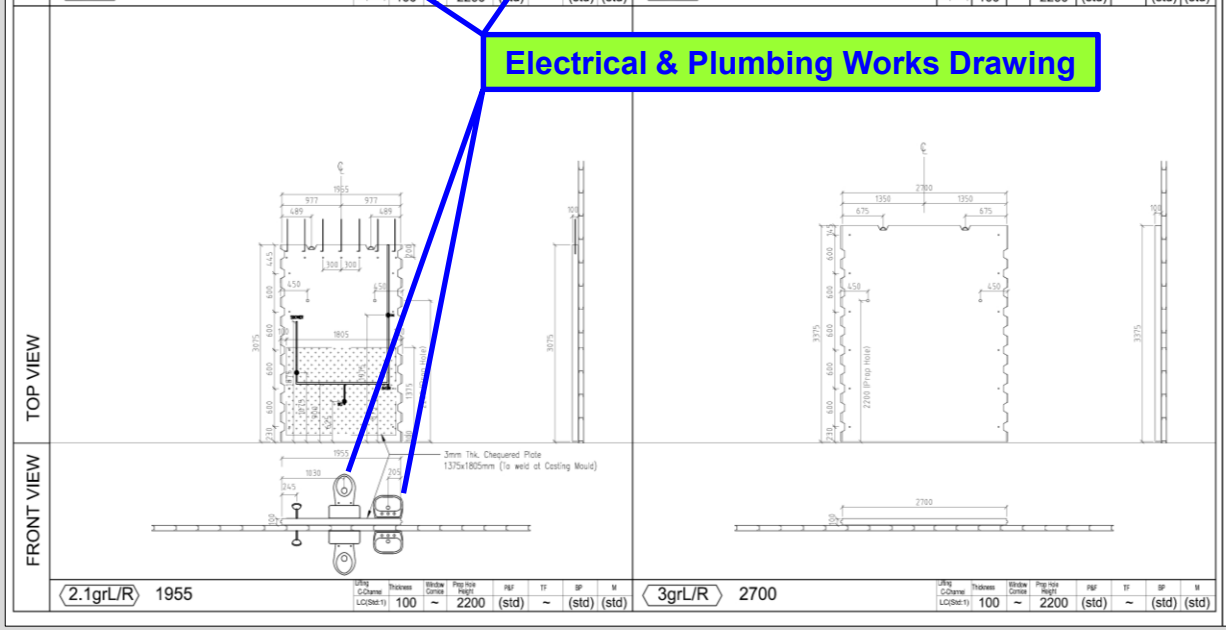
To be fill & confirm by consultant

Electrical Works Drawing

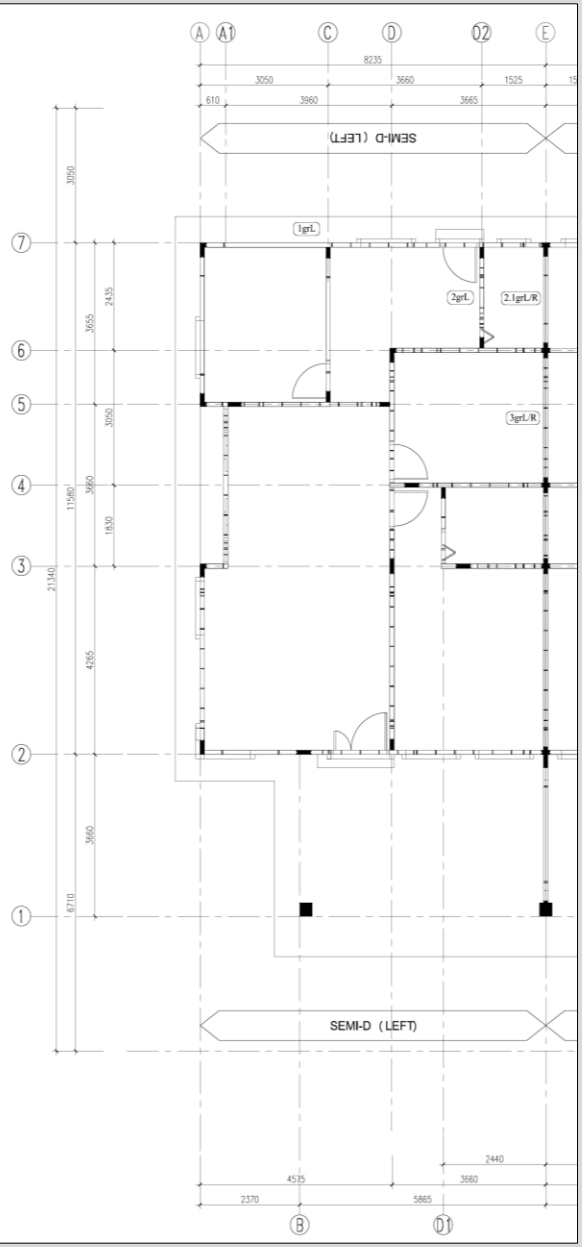

Pre laying by M&E contractor

M&E Shop Drawing by HCPS (included)



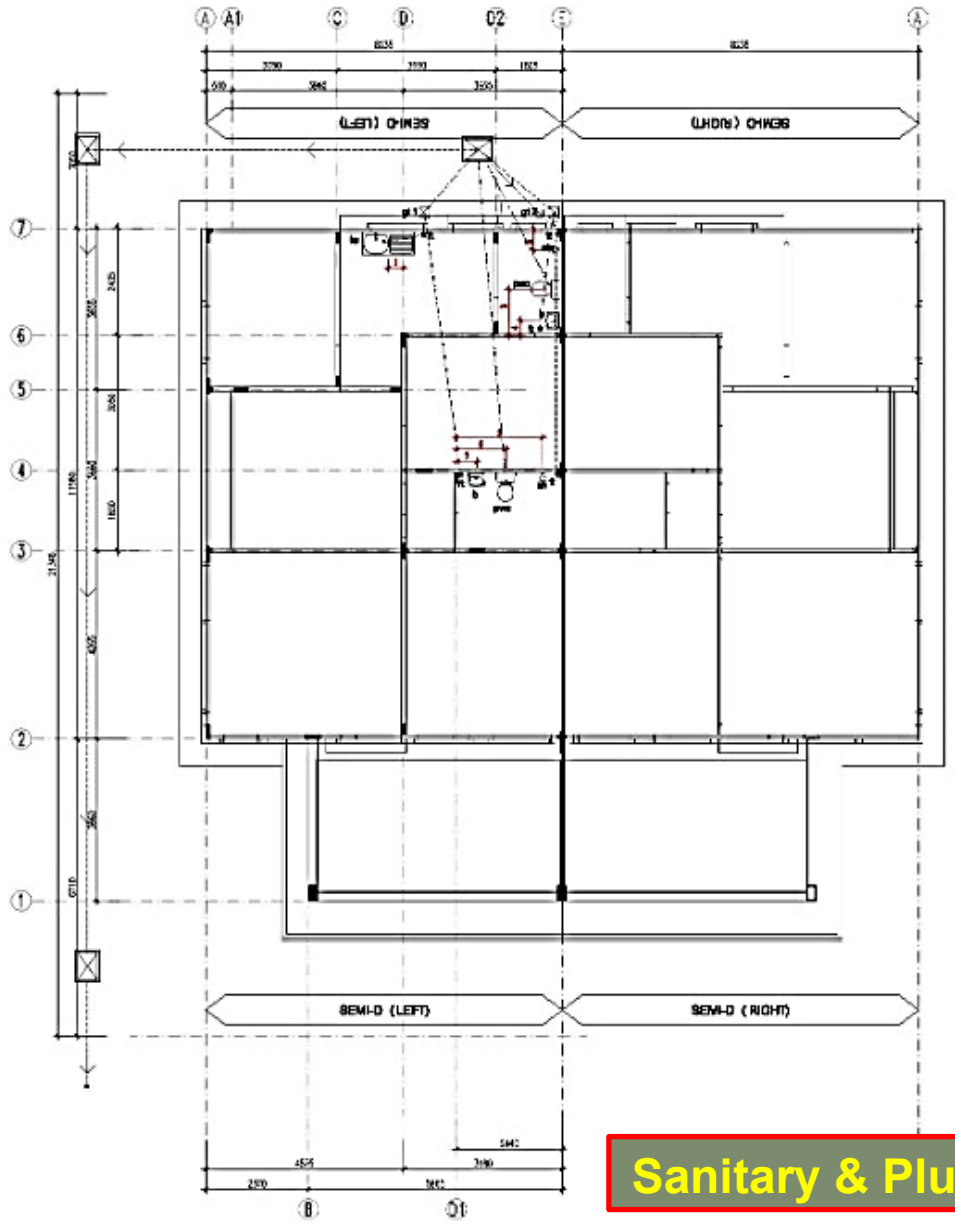


Electrical & Plumbing Works Drawing




Pre laying by M&E contractor

M&E Shop Drawing by HCPS (included)



POSITION OF FITTINGS
(FROM STRUCTURAL LEVEL)

	Distance of fitting (mm)	Height of fitting (mm)	Confirmation by M&E Consultant
1	450 mm	900 mm	
2	500 mm	1000 mm	
3	1100 mm	FFL	
4	300 mm	900 mm	
5	1000 mm	1900 mm	
6	1200 mm	FFL	
7	450 mm	900 mm	

Notes:
1) Distance of fitting not been scaled from M&E Consultant drawing
2) Height of fitting from structure provided by M&E Consultant drawing
3) M&E Consultant to fill in dimension not stated (Typ)

Confirmed by M&E Consultant
Signature :
Name : VENKATESAN CONSULT
Date : 10/10/2016

Dimension for :

1. Sanitary fitting & plumbing

To be fill & confirm by consultant

Sanitary & Plumbing Works Drawing

Compliance to fire resistance requirement stated in BS codes as well as Malaysia UBBL

British Standard (BSI) :
- BS 8110_1:1997 - Page 21 Table 3.3 - Nominal cover to all reinforcement and Table 3.4 - Nominal cover to all reinforcement (including links) to meet specified periods of fire resistance.

Table 3.3 — Nominal cover to all reinforcement (including links) to meet durability requirements (see NOTE 1)

Conditions of exposure (see 3.3.4)	Nominal cover Dimensions in millimetres				
Mild	25	20	20[a]	20[a]	20[a]
Moderate	—	35	30	25	20
Severe	—	—	40	30	25
Very severe	—	—	50[b]	40[b]	30
Most severe	—	—	—	—	50
Abrasive	—	—	—	See NOTE 3	See NOTE 3
Maximum free water/cement ratio	0.65	0.60	0.55	0.50	0.45
Minimum cement content (kg/m^3)	275	300	325	350	400
Lowest grade of concrete	C30	C35	C40	C45	C50

NOTE 1 This table relates to normal-weight aggregate of 20 mm nominal size. Adjustments to minimum cement contents for aggregates other than 20 mm nominal maximum size are detailed in Table 8 of BS 5328-1:1997.
NOTE 2 Use of sulfate resisting cement conforming to BS 4027. These cements have lower resistance to chloride ion migration. If they are used in reinforced concrete in very severe or most severe exposure conditions, the covers in Table 3.3 should be increased by 10 mm.
NOTE 3 Cover should be not less than the nominal value corresponding to the relevant environmental category plus any allowance for loss of cover due to abrasion.

[a] These covers may be reduced to 15 mm provided that the nominal maximum size of aggregate does not exceed 15 mm.
[b] Where concrete is subject to freezing whilst wet, air-entrainment should be used (see **5.3.3** of BS 5328-1:1997) and the strength grade may be reduced by 5.

Table 3.4 — Nominal cover to all reinforcement (including links) to meet specified periods of fire resistance (see NOTES 1 and 2)

Fire resistance h	Nominal cover						
	Beams[a]		Floors		Ribs		Columns[a] mm
	Simply supported mm	Continuous mm	Simply supported mm	Continuous mm	Simply supported mm	Continuous mm	
0.5	20[b]	20[b]	20[b]	20[b]	20[b]	20[b]	20[b]
1	20[b]	20[b]	20	20	20	20[b]	20[b]
1.5	20	20[b]	25	20	35	20	20
2	40	30	35	25	45	35	25
3	60	40	45	35	55	45	25
4	70	50	55	45	65	55	25

NOTE 1 The nominal covers given relate specifically to the minimum member dimensions given in Figure 3.2. Guidance on increased covers necessary if smaller members are used is given in section **4** of BS 8110-2:1985.
NOTE 2 Cases that lie below the bold line require attention to the additional measures necessary to reduce the risks of spalling (see section **4** of BS 8110-2:1985).

[a] For the purposes of assessing a nominal cover for beams and columns, the cover to main bars which would have been obtained from Tables 4.2 and 4.3 of BS 8110-2:1985 has been reduced by a notional allowance for stirrups of 10 mm to cover the range 8 mm to 12 mm (see also **3.3.6**).
[b] These covers may be reduced to 15 mm provided that the nominal maximum size of aggregate does not exceed 15 mm (see **3.3.1.3**).

Clearly stated of these BSI code are complied with.

Compliance to fire resistance requirement stated in BS codes as well as Malaysia UBBL

British Standard (BSI) :
- BS 8110_1:1997 : Page 134. Table 6.2 – Minimum period before striking formwork (concrete made with Portland cement 42.5 to BS 12:1991 or sulfate-resisting Portland cement 42.5 to BS 4027:1991).

Table 6.2 — Minimum period before striking formwork (concrete made with Portland cement 42.5 to BS 12:1991 or sulfate-resisting Portland cement 42.5 to BS 4027:1991)

Type of framework	Minimum period before striking	
	Surface temperature of concrete	
	16 °C and above	t °C (any temperature between 0 °C and 16 °C)
Vertical formwork to columns, walls and large beams	12 h	$\frac{300}{t+10}$ h
Soffit formwork to slabs	4 days	$\frac{100}{t+10}$ days
Soffitt formwork to beams and props to slabs	10 days	$\frac{250}{t+10}$ days
Props to beams	14 days	$\frac{360}{t+10}$ days

NOTE This table can be applied to PC and SRPC of higher cement strength classes.

Compliance to fire resistance requirement stated in BS codes as well as Malaysia UBBL

Uniform building by law :

- **Page 35 section 86 (2) clearly stated the single torey house may be in load-bearing 100mm solid masonry or in-situ concrete.**

(3) Every brick or masonry wall of a building founded on strip footings shall be provided with a damp proof course which shall be—

(a) at a height of not less than 150 millimetres above the surface of the ground adjoining the wall; and

(b) beneath the level of the underside of the lowest timbers of the ground floor resting on the wall, or where the ground floor is a solid floor, not higher than the level of the upper surface of the concrete or other similar solid material forming the structure of the floor.

(4) Where any part of a floor of the lowest or only storey of a building is below the surface of the adjoining ground and a wall or part of a wall of the storey is in contact with the ground—

(a) the wall or part of the wall shall be constructed or provided with a vertical damp proof course so as to be impervious to moisture from its base to a height of not less than 150 millimetres above the surface of the ground; and

(b) an additional damp proof course shall be inserted in the wall or part of the wall at its base.

(5) Where the floor or any part of the walls of a building is subject to water pressure, that portion of the floor or wall below ground level shall be waterproof.

Nominal thickness of walls.

85. For the purposes of this Part wherever references are made to the thickness of any brick wall, the maximum or minimum thickness of such wall shall not exceed the nominal thickness plus or minus the maximum tolerance permissible under any standard specification.

Party walls.

86. (1) All party walls shall generally be of not less than 200 millimetres total thickness of solid masonry or *insitu* concrete which may be made up of two separate skins each of not less than 100 millimetres thickness if constructed at different times:

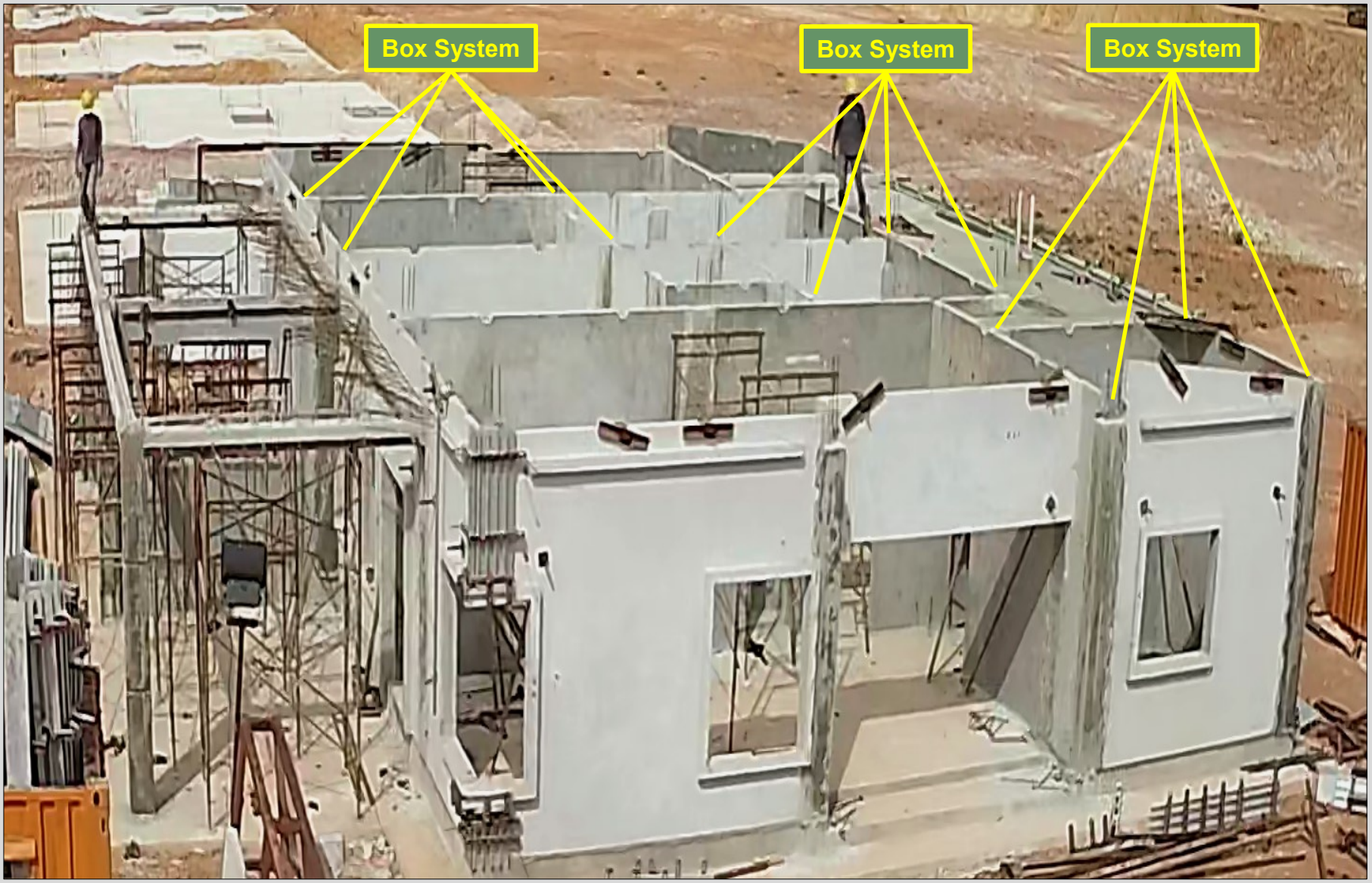
Provided that in multi-storeyed flats and terrace houses of reinforced concrete or of protected steel framed construction having floors and roofs constructed to the requirements of these By-laws, the party wall thereof shall not be less than 100 millimetres total thickness.

(2) Party walls in single storeyed houses may be in load-bearing 100 millimetres solid masonry or *insitu* concrete provided the requirements of Part V, VI and VII of these By-laws are complied with.

(3) All party walls shall be carried above the upper surface of the roof to a distance of not less than 230 millimetres at right angles to such upper surface.

Load bearing monolithic wall system (earthquake resistance tested)

HC Precast System is a complete IBS system which consists of load bearing monolithic wall system with wet joints and modular keys for strong connection. This allows the system to be customized in terms of material and joint strength to form a stable box-system construction



HCPS IBS SOLUTION

HC PRECAST SYSTEM SDN. BHD.

QUALITY I ECO-FRIENDLY I ECONOMICAL

Bonded Together By - The Innovative "Shear Key Joint"

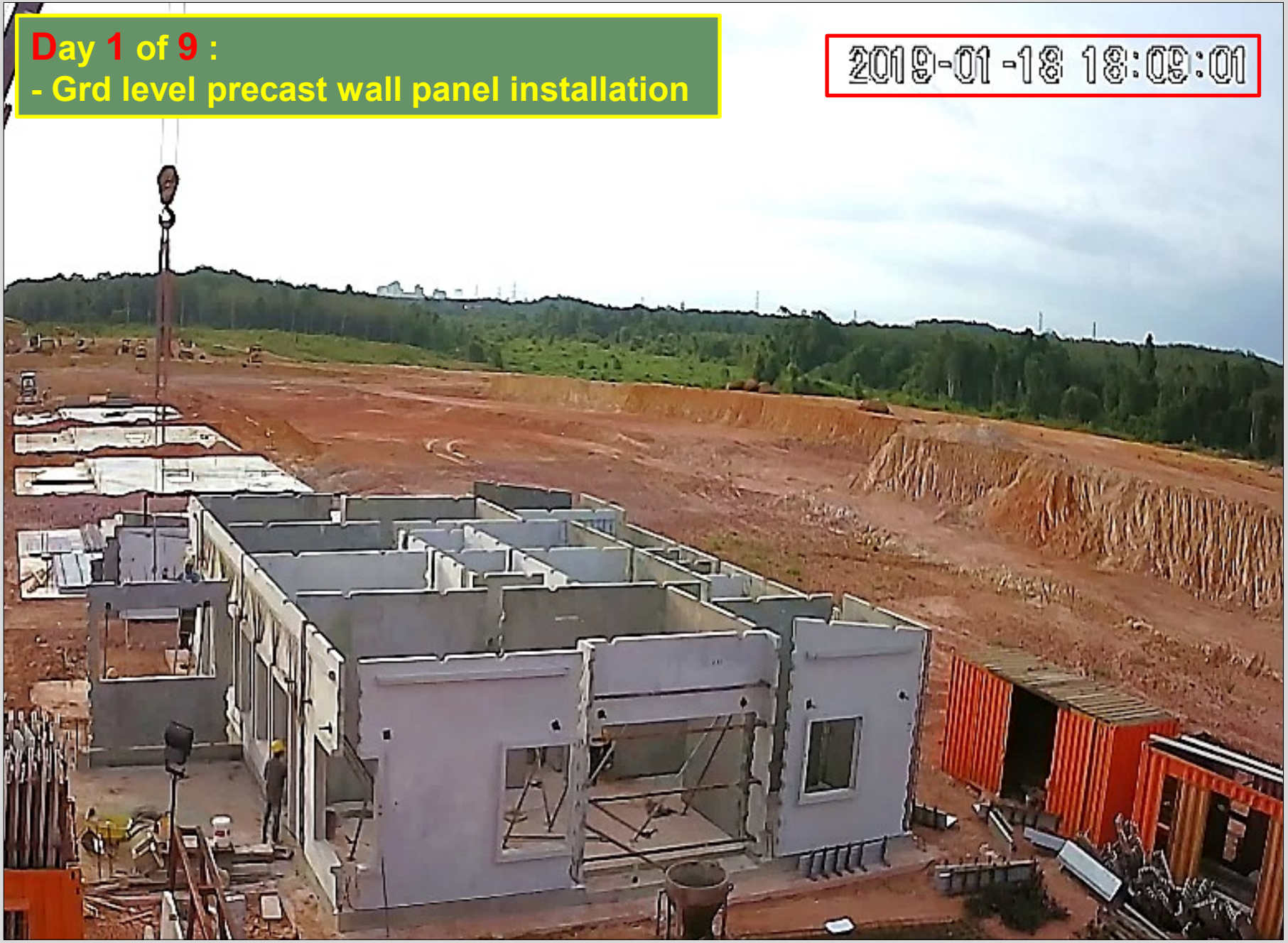
9

Days

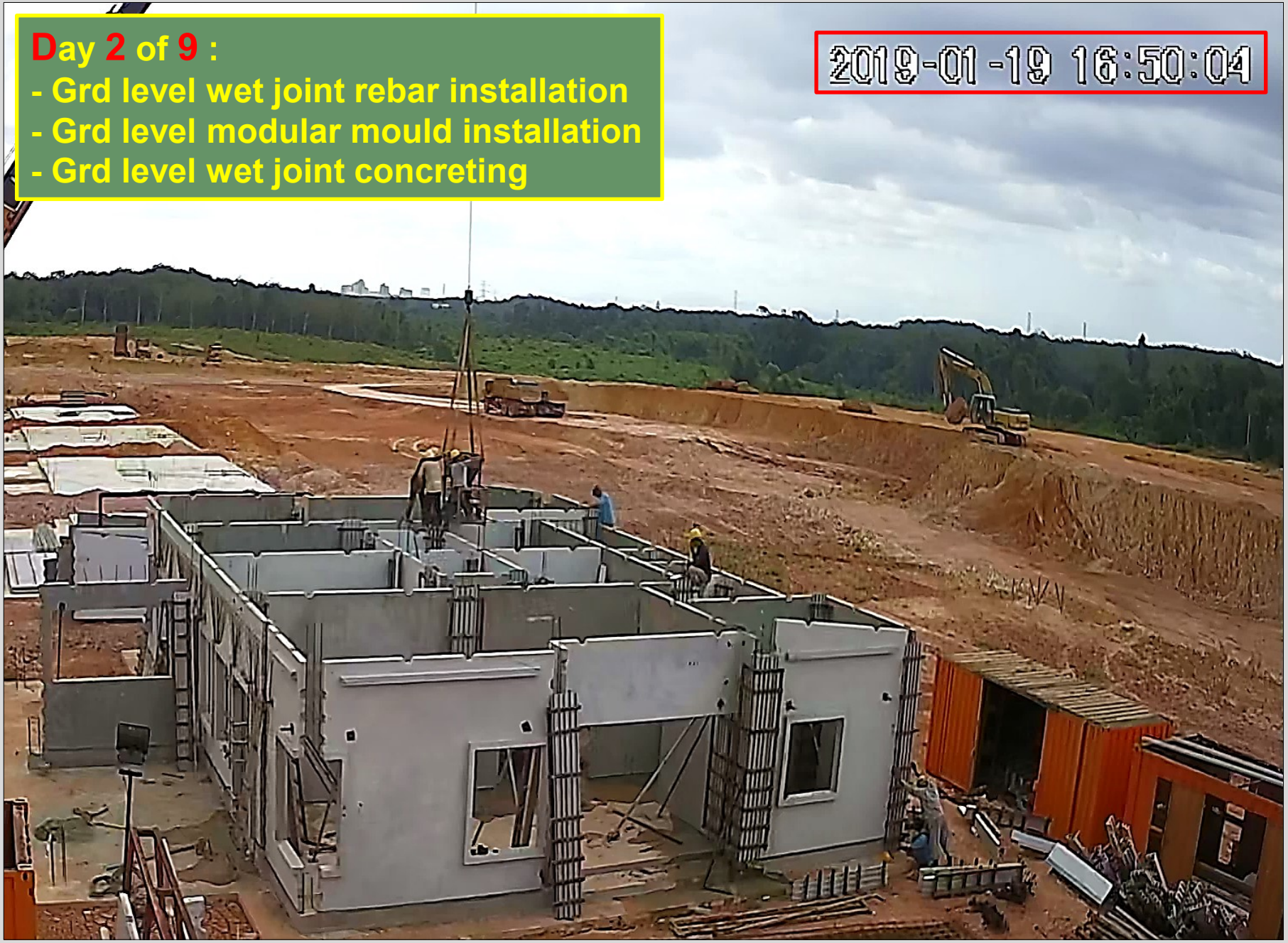
9

Workers


Day 1 of 9 :
- Grd level precast wall panel installation
2019-01-18 08:54:20

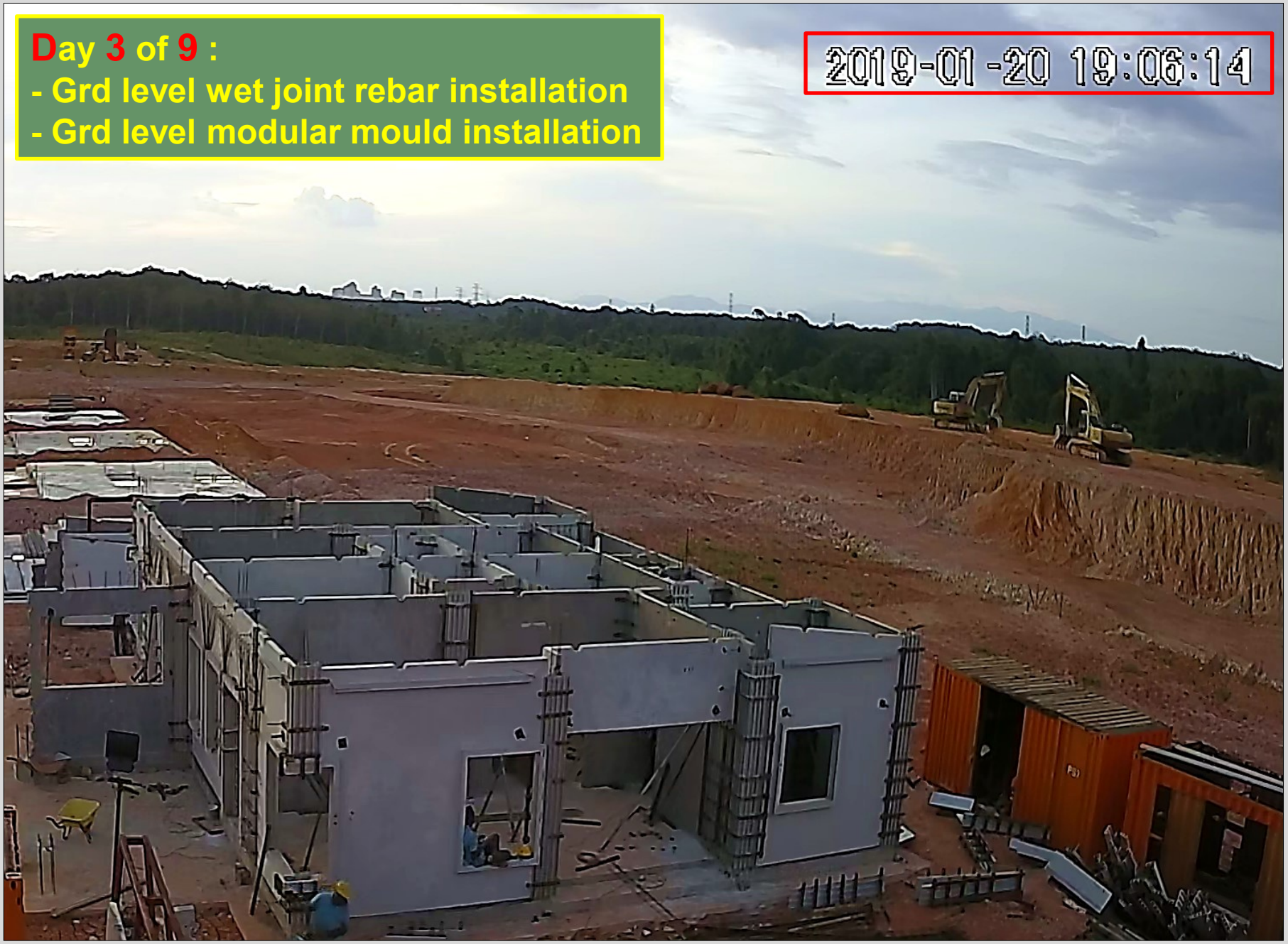

Day 1 of 9 :
- Grd level precast wall panel installation
2019-01-18 18:09:01

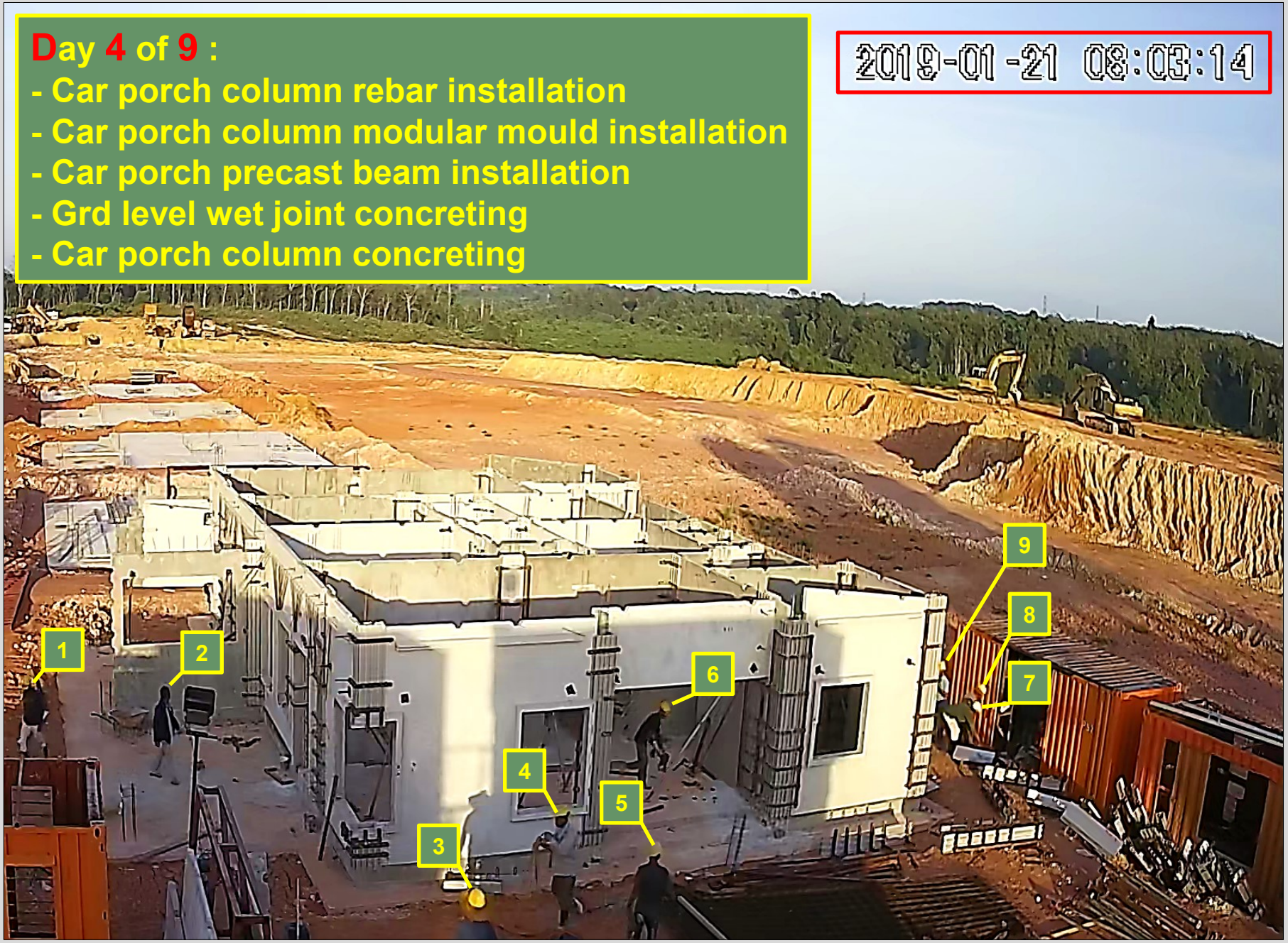

Day 2 of 9 :
- Grd level wet joint rebar installation
2019-01-19 08:26:29


Day 2 of 9 :
- Grd level wet joint rebar installation
- Grd level modular mould installation
- Grd level wet joint concreting
2019-01-19 16:50:04


Day 2 of 9 :
- Grd level wet joint rebar installation
- Grd level modular mould installation
- Grd level wet joint concreting
2019-01-19 18:02:38


Day 3 of 9 :
- Grd level wet joint rebar installation
- Grd level modular mould installation
2019-01-20 08:21:24


Day 3 of 9 :
- Grd level wet joint rebar installation
- Grd level modular mould installation
2019-01-20 19:06:14


Day 4 of 9 :
- Car porch column rebar installation
- Car porch column modular mould installation
- Car porch precast beam installation
- Grd level wet joint concreting
- Car porch column concreting
2019-01-21 08:03:14
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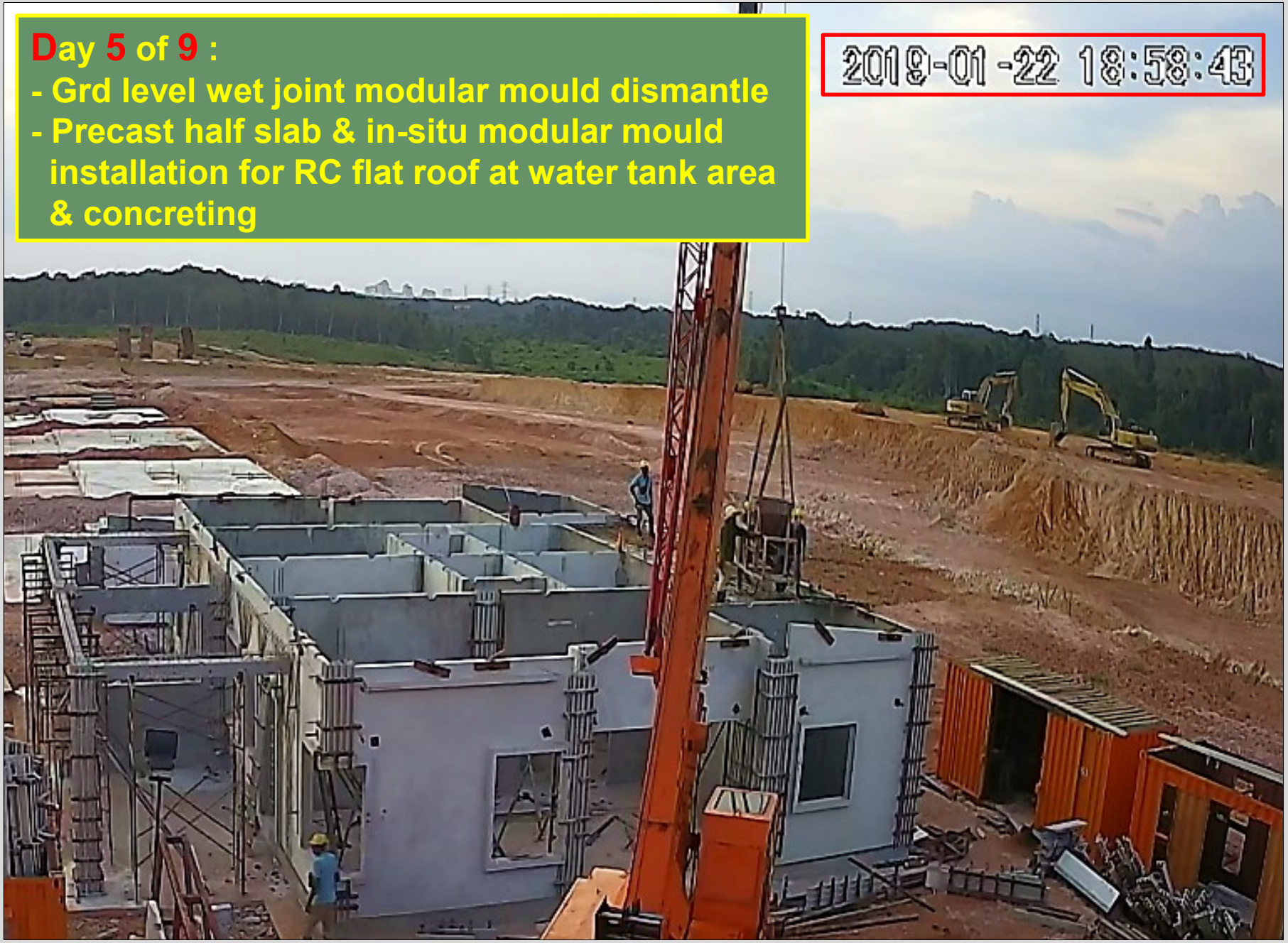
Day 4 of 9 :
- Car porch column rebar installation
- Car porch column modular mould installation
- Car porch precast beam installation
- Grd level wet joint concreting
- Car porch column concreting
2019-01-21 19:30:04

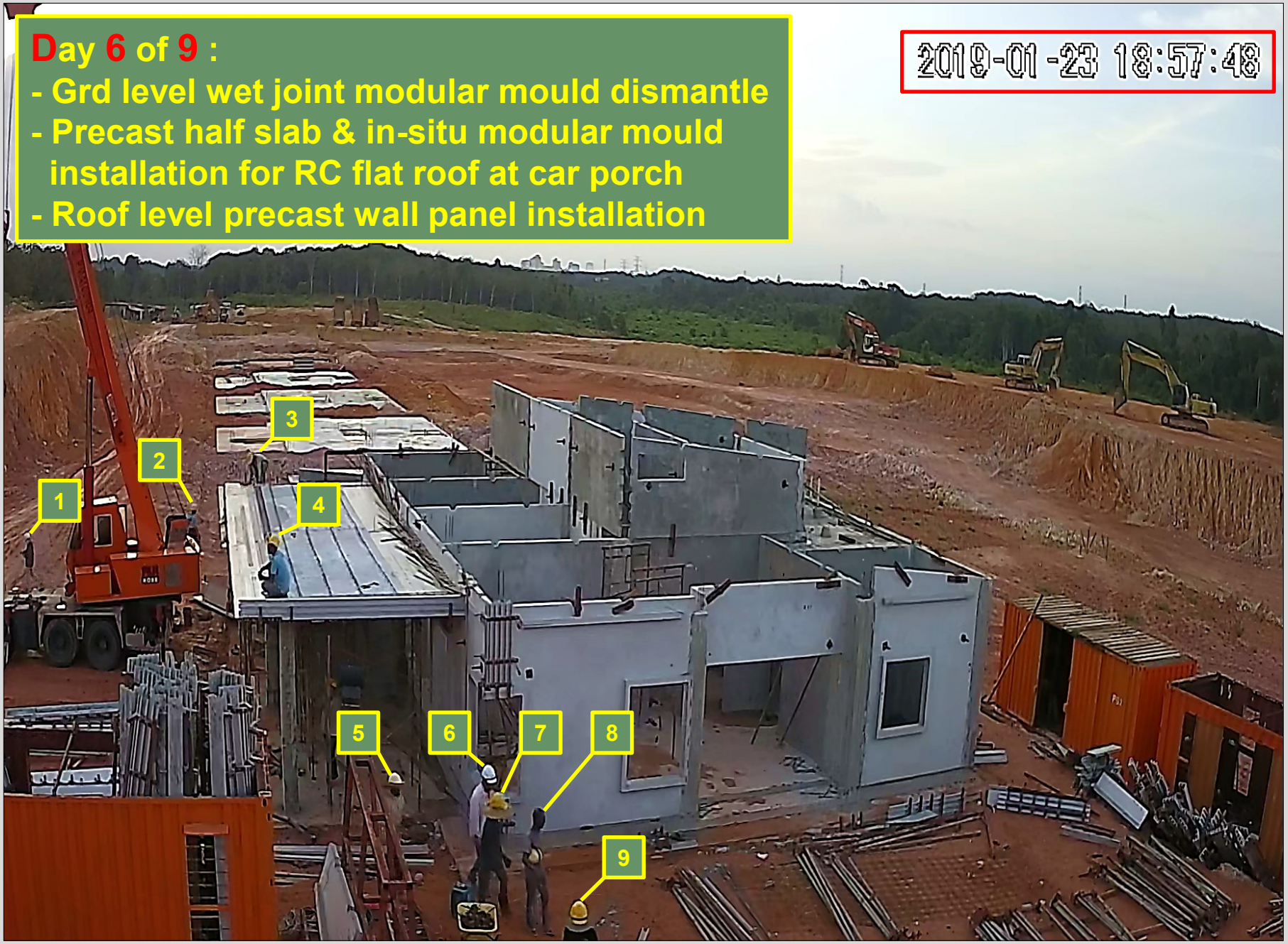
Day 5 of 9 :
- Grd level wet joint modular mould dismantle
- Precast half slab & in-situ modular mould installation for RC flat roof at water tank area & concreting

2019-01-22 08:25:34


Day 5 of 9 :
- Grd level wet joint modular mould dismantle
- Precast half slab & in-situ modular mould installation for RC flat roof at water tank area & concreting
2019-01-22 18:58:43

Day 6 of 9 :
- Grd level wet joint modular mould dismantle
- Precast half slab & in-situ modular mould installation for RC flat roof at car porch
- Roof level precast wall panel installation

2019-01-23 08:39:40


Day 6 of 9 :
- Grd level wet joint modular mould dismantle
- Precast half slab & in-situ modular mould installation for RC flat roof at car porch
- Roof level precast wall panel installation
2019-01-23 18:57:48
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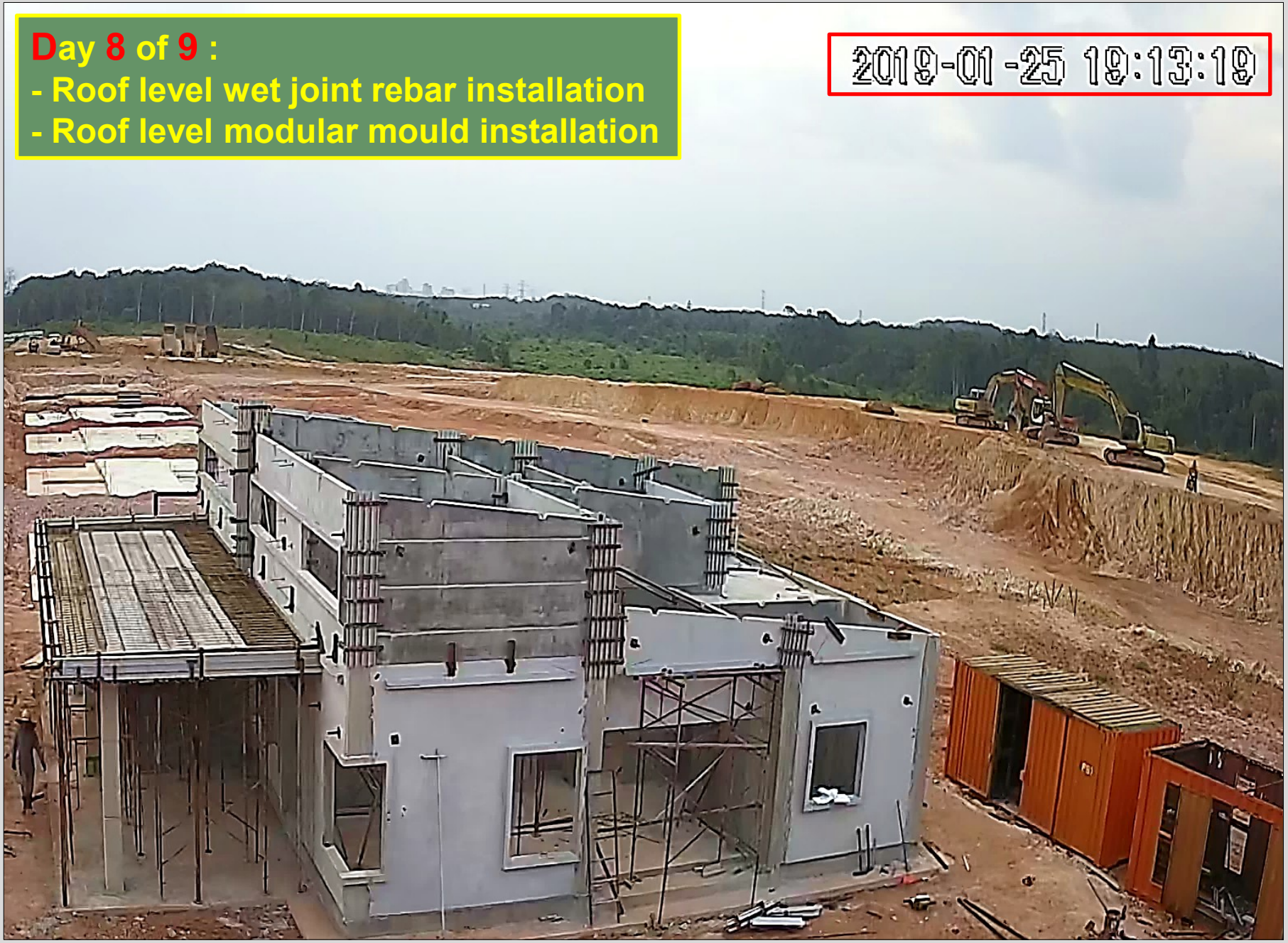
Day 7 of 9 :
- Grd level wet joint modular mould dismantle
- Car porch coping modular mould, in-situ slab rebar & BRC installation
- Roof level precast wall panel installation
- Roof level wet joint rebar installation
2019-01-24 08:30:14


Day 7 of 9 :
- Grd level wet joint modular mould dismantle
- Car porch coping modular mould, in-situ slab rebar & BRC installation
- Roof level precast wall panel installation
- Roof level wet joint rebar installation
2019-01-24 19:04:04


Day 8 of 9 :
- Roof level wet joint rebar installation
- Roof level modular mould installation
2019-01-25 08:28:28


Day 8 of 9 :
- Roof level wet joint rebar installation
- Roof level modular mould installation
2019-01-25 19:13:19

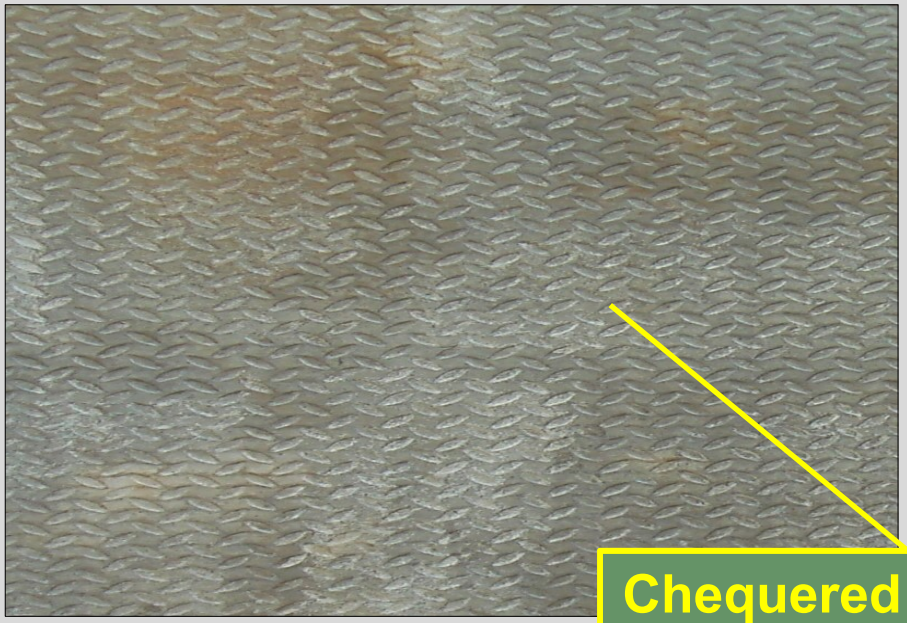

Day 9 of 9 :
- Roof level wet joint concreting
- Car porch in-situ flat roof concreting
- All support / prop to beam will be dismantle after 14 days (09/02/2019) as comply to BSI code
2019-01-26 08:06:07


Day 9 of 9 :
- Roof level wet joint concreting
- Car porch in-situ flat roof concreting
- All support / prop to beam will be dismantle after 14 days (09/02/2019) as comply to BSI code
2019-01-26 18:16:26


Day 14 :
“ All support / prop to beam will be dismantle after 14 days (09/02/2019) as comply to BSI code ”
BS 8110_1:1997 : Page 134. Table 6.2 – Minimum period before striking formwork (concrete made with Portland cement 42.5 to BS 12:1991 or sulfate-resisting Portland cement 42.5 to BS 4027:1991).
2019-02-09 08:04:12

Smooth and Even surface to received skimcoat

Reduce the quantity of cement and screed to receive tiling work



Chequered Plate Form
Thins cement mortar

No primary undercoat for painting due to smooth skimcoat surface

No Rubbish Cleaning

No Hacking for M&E Works

No Hacking for M&E Works

End Product : Full IBS

HC PRECAST SYSTEM SDN. BHD.

QUALITY I ECO-FRIENDLY I ECONOMICAL

2 Units Single Storey Semi-D House
Completed in 9 Days with 9 Workers.

QUESTIONS TO PONDER

HC PRECAST SYSTEM SDN. BHD.

Specialist in Low to Middle Rise Residential House

Regarding Issues On IBS Acceptance In Our Country

Talking about green technology, the term that is gaining popularity in recent years, IBS is indeed contributing to the sustainability of construction industry. It helps to reduce carbon footprint by minimizing wastage and increase construction efficiency. However, has this been accounted for when it comes to assessment of a green building technology?

Our country has no lack of professionals and professional bodies that oversee the construction industry. However, there is still lacking in harmonizing design standards and building by-law for all IBS system providers to be on common ground, i.e. efficiency measurement per building floor area or volumetric. This will make it easier for structural designers and building owners to have a clearer picture when they need to make comparisons between the IBS systems being proposed.

Building by-law has stated clearly that for common party wall, the minimum wall thickness has to be 225mm. However, it becomes questionable as there have been design of such wall that is only 150 mm thick that has been approved for construction. How does it happen?

In the event of fire, will the unit be covered by insurance if the thickness of party wall doesn't fulfil the minimum requirement in Malaysian building by law context?

Fire rating has always been the rule of thumb in concrete or steel design of structure. By providing adequate concrete cover for instance, this has always been the fundamental in reinforced concrete design. However, why is fire rating becoming an issue when precast wall system is proposed instead of conventional cast in-situ concrete?

Overseas country has demonstrated very positive trend when it comes to protection of IP and proprietary system of their local inventors. When can our community adopt such healthy practice to continue motivating local inventors to come up with good ideas and products.

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THANK YOU