



IKATAN AHLI PRACETAK DAN PRATEGANG INDONESIA
INDONESIAN ASSOCIATION OF PRECAST AND PRESTRESSED ENGINEERS

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Aplikasi BIM dan Keuntungannya bagi Pengguna Jasa Konstruksi

Hari Nugraha Nurjaman – Sekretaris Umum



BIM Innovation Conference 2017
Memungkinkan Kemustahilan
SHERATON GRAND HOTEL GANDARIA CITY JAKARTA
21 MARET 2017

Content

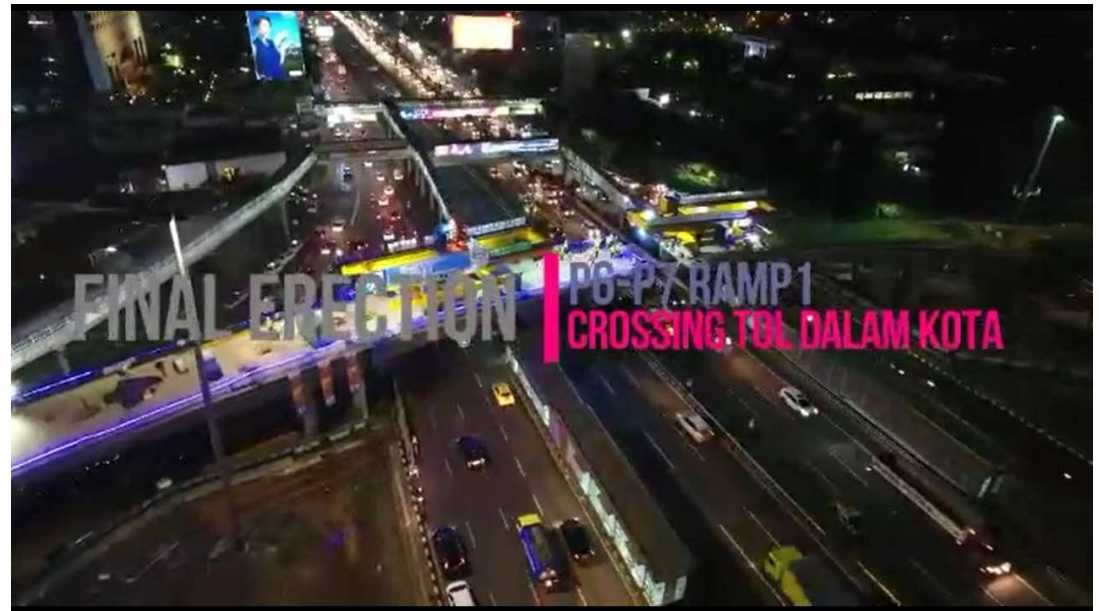
1. Industri Pracetak dan Prategang dalam dunia Konstruksi Indonesia
2. Building Information Modeling
3. Implementasi di Indonesia
4. Next Future Way of Design and Construction

1. Industri Pracetak dan Prategang di Indonesia

- Industri berbasis manufaktur yang selalu memdasarkan pada kreatifitas dan inovasi sehingga selalu menjadi pioneer milestone dunia konstruksi Indonesia
- → Memungkinkan kemustahilan kegiatan sehari2
- Mempunyai keunggulan komparatif terhadap industri konstruksi konvensional. Pada masa percepatan pembangunan, MEA dan persiapan Globalisasi, Kemen PU PR menargetkan industry ini berkontribusi 30% dalam industry konstruksi
- Industri pioneer penerapan BIM di Indonesia:

1. Industri Pracetak dan Prategang di Indonesia

- Semanggi Sutami 1962 – Semanggi 2017



Apresiasi Presiden terhadap Inovasi Teknologi yang “Real” (Bukan Pencitraan)

- "Nanti tolong ditanyakan langsung teknologi yang dipakai apa. Karena saya lihat pembangunan sangat cepat sekali dan pembiayaan juga sangat efisien, sangat murah. Dan tanyakan habisnya berapa? Saya dengar dari Menteri PU dan Gubernur DKI Rp 360 miliar. Saya acungi jempol pada cara-cara kerja cepat Wika dalam menyelesaikan Simpang Susun Semanggi ini,"

Ditemani Ahok, Jokowi Tinjau Proyek Simpang Susun Semanggi

Ray Jordan - detikNews



ALIH TEKNOLOGI - INOVASI

- Pada tahun 1995, dicanangkan program pembangunan rusunawa secara massal. Sistem pracetak merupakan pilihan utama dalam metoda konstruksi. Sehubungan dengan program tersebut, dilakukan alih teknologi sistem pracetak di proyek rumah susun sederhana sewa Perumnas di Cengkareng, agar pembangunan rusunawa dapat dilakukan oleh putra-putra bangsa Indonesia sendiri .



Ongkos Alih Teknologi ;

US\$ 500.000,-

Ambil Resiko Terukur !



PENERAPAN SISTEM PRACETAK/PRATEGANG



Saling Mendukung
dengan Pemerintah



Slide-7

R & D



Earthquake test of interior precast joint

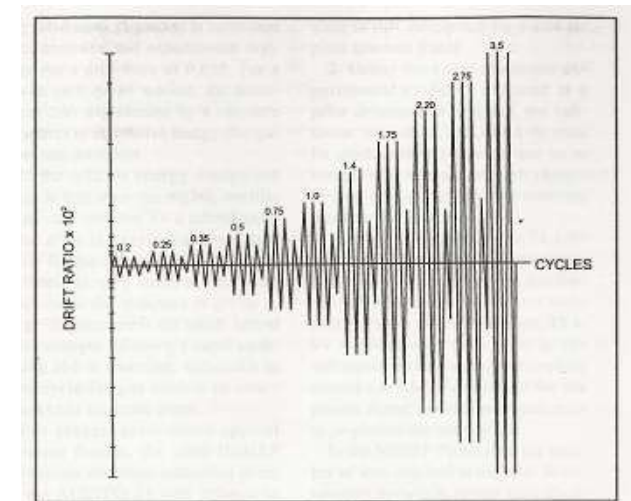
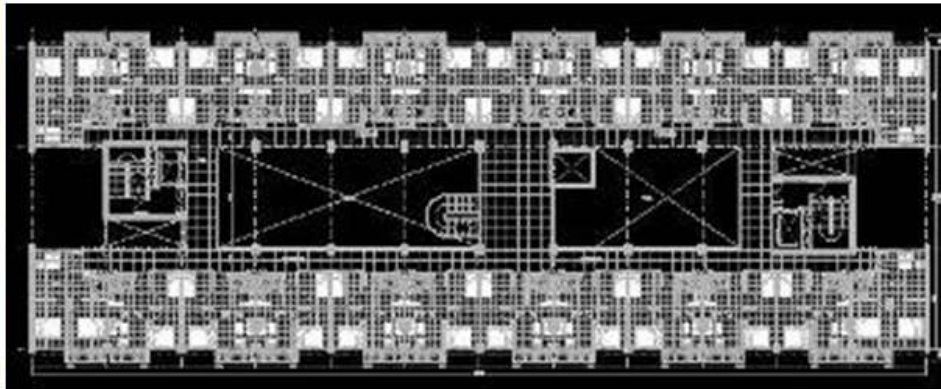


Fig. 5. Cyclic deformation history for validation testing.

R & D is 'blood' in MEA & Globalization
R & D is dream for the poor
R & D is choice for the wise

Sistem Pracetak Tahan Gempa Bangunan Bertingkat Tinggi



Prototype Rusunami T30 16 lantai Kementerian Perumahan Rakyat



Rusunami Pulogebang 16 lantai dengan sistem struktur pracetak

PROJECT APPLICATION



Industri pracetak dan prategang Indonesia siap mensupport program sejuta rumah



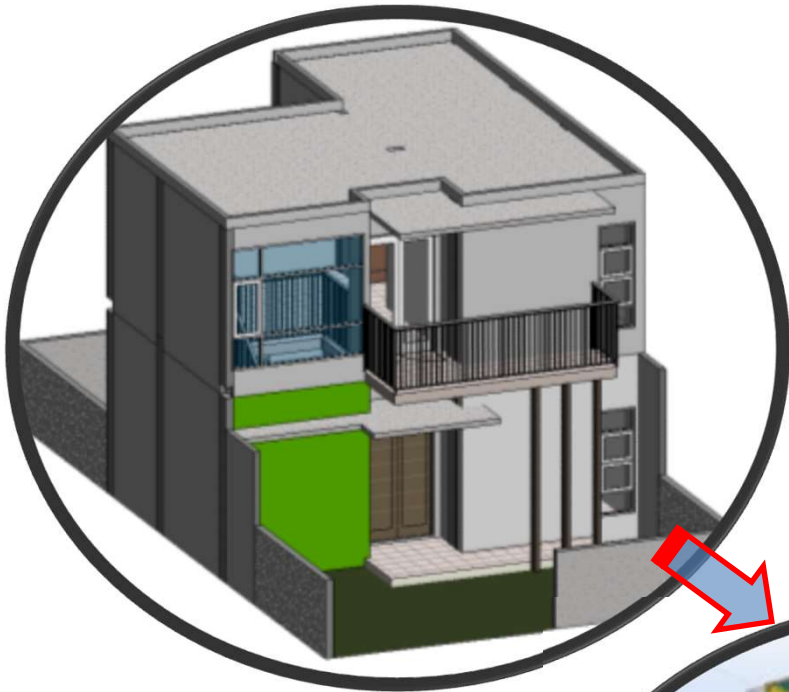
Apresiasi Menteri PU PR terhadap rumah instant pada Konstruksi Indonesia 2015, diminta juga untuk mendukung Badan Nasional Penanggulangan Bencana (BNPB)

Sistem Pracetak Tahan Gempa Bangunan Bertingkat Tinggi Berkinerja Tinggi

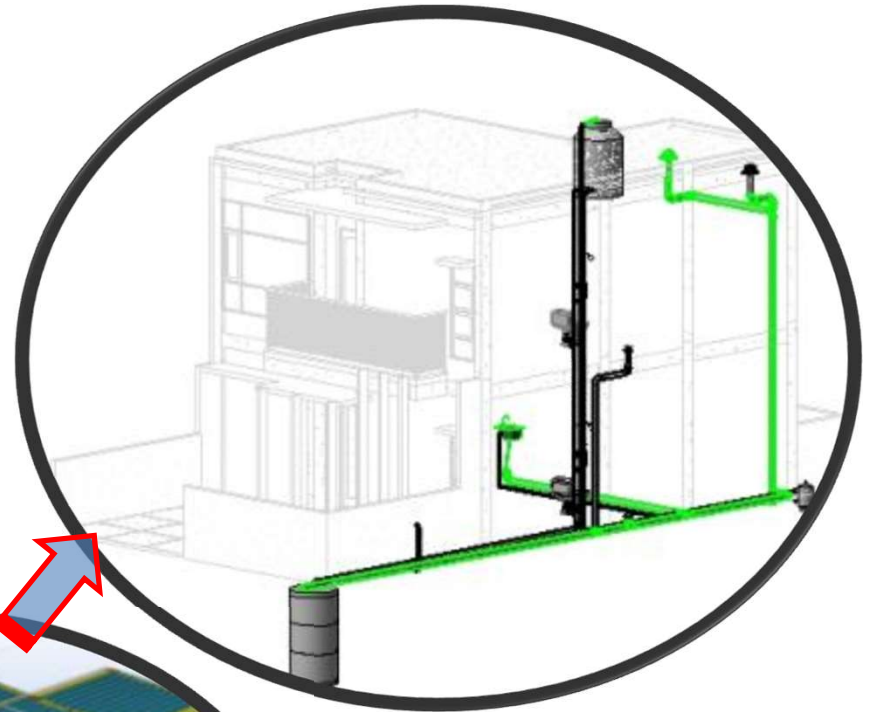
WIKABETON
Innovation and Trust



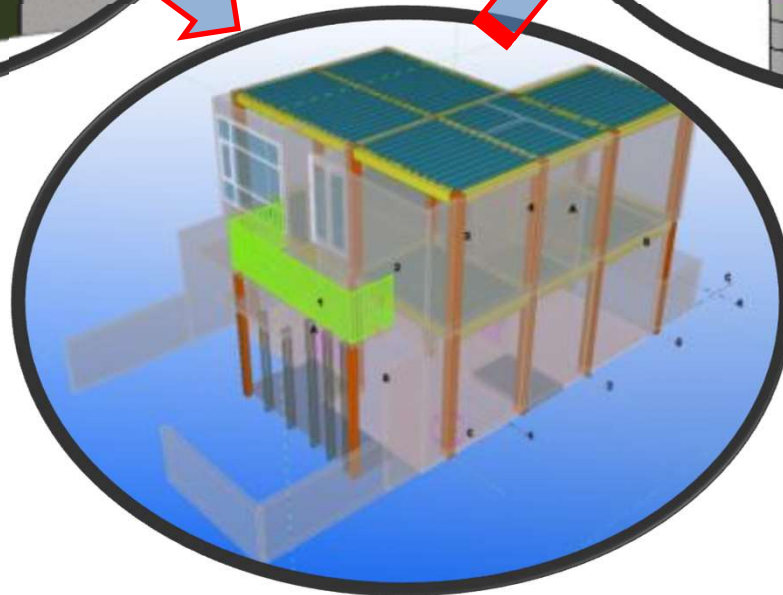
BUILDING INFORMATION MODELLING



•Revit
Architec



•Revit MEP



•Tekla Structure

Several 3D software
With data base and
Can communicated
each other

HOUSE PROJECT

2. Building Information Modelling

- Suatu cara kerja yang

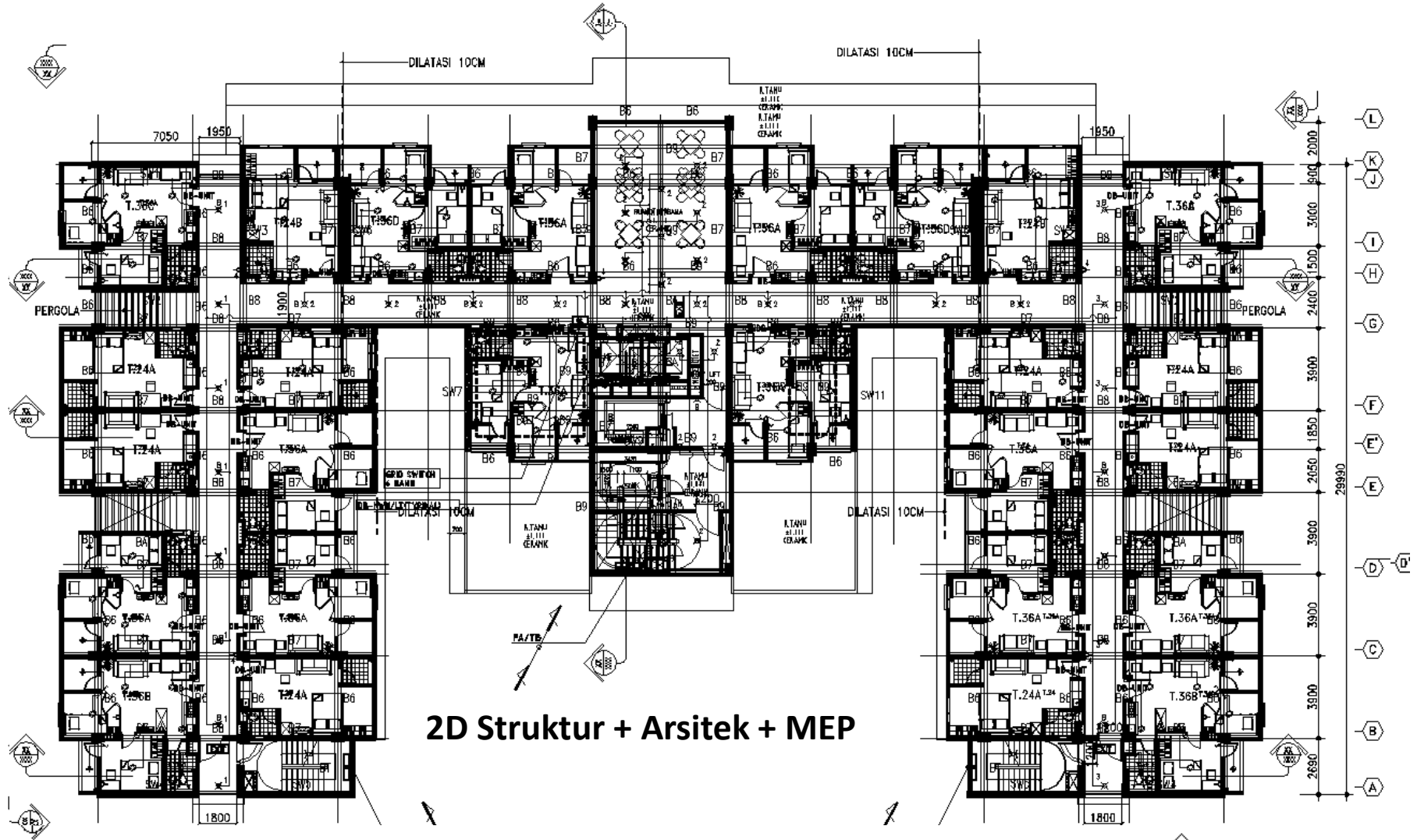
ENGKE KUMAHA

- Dibanding cara kerja konvensional

KUMAHA ENGKE

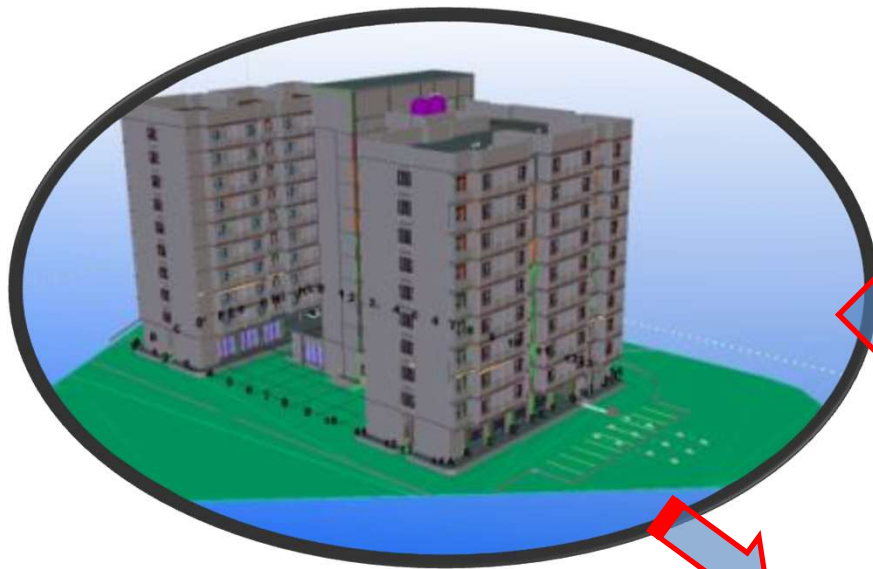
BUILDING INFORMATION MODELLING

2D Superimpose handle design Revision

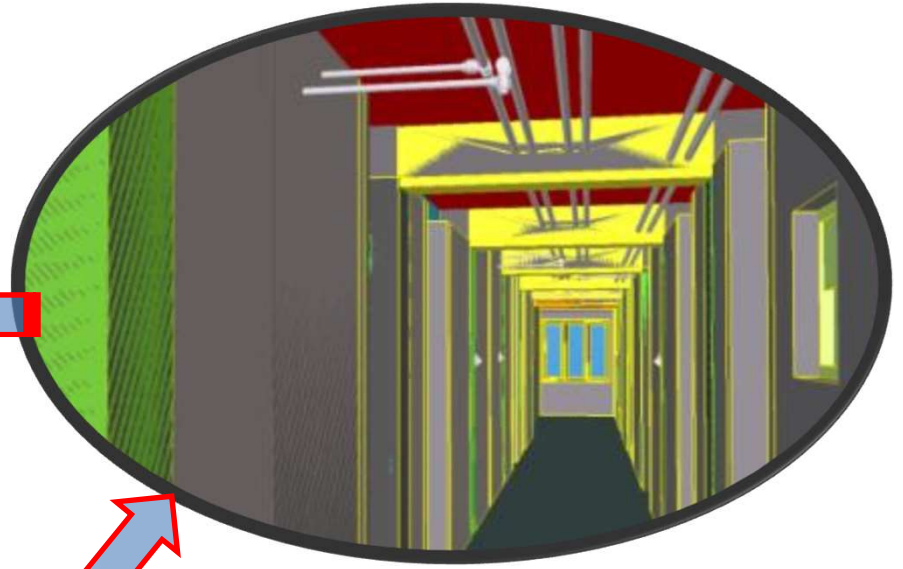


2D Struktur + Arsitek + MEP

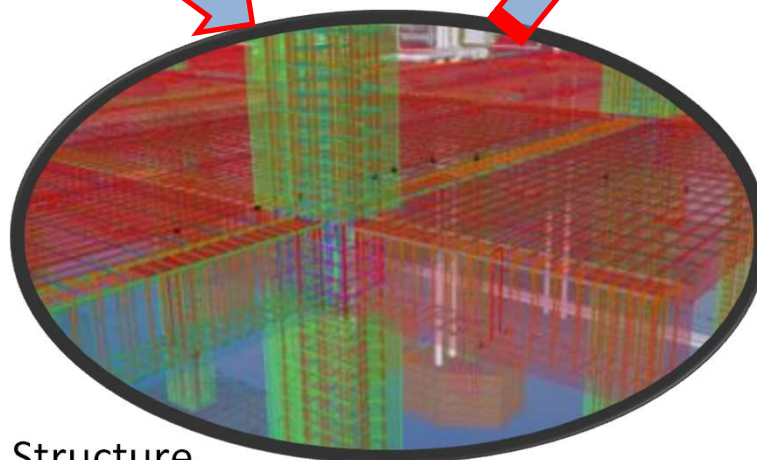
BUILDING INFORMATION MODELLING



•Revit Architec



•Revit MEP

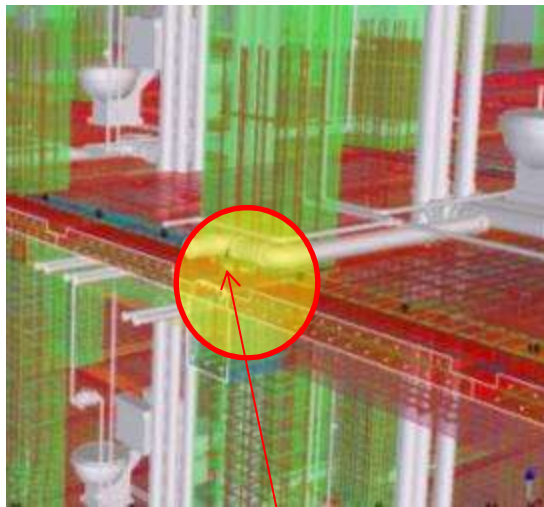


•Tekla Structure

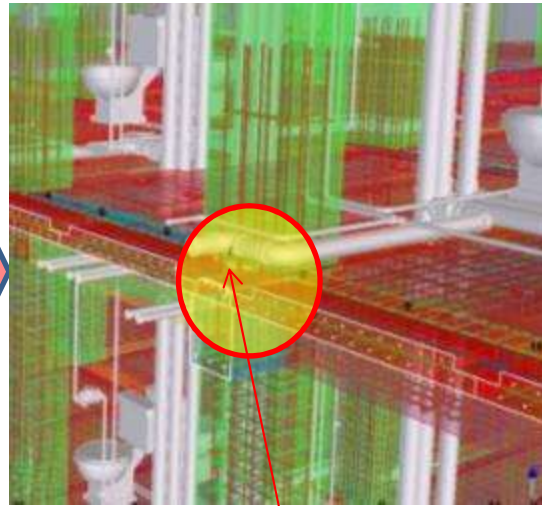
FIATS PROJECT

BUILDING INFORMATION MODELLING

Easy to handle design Revision



CLASH
Warning



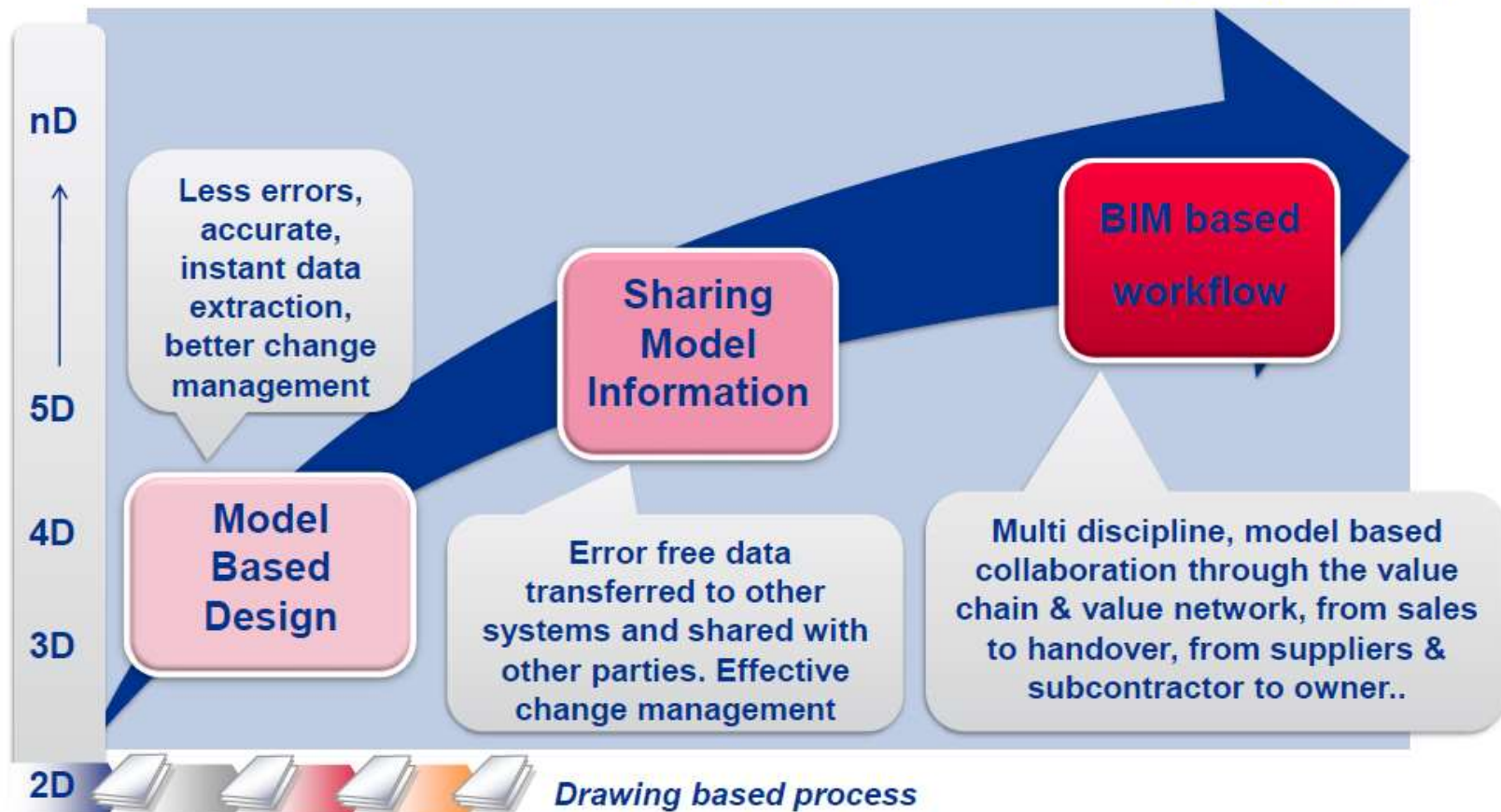
Tekla
Editing In
the
model



Automatically 2D drawing
Was change

BUILDING INFORMATION MODELLING

Towards BIM based Workflow



ZERO RFI !!!!

Comparative Study



Fig. 4: Efficiencies of BIM Technology in each Stage of Construction (Heino,2012)

PROMISE BY BIM !

3. Implementasi di Indonesia

- 2010 : IAPPI dan Tekla bertemu
- IAPPI melihat BIM adalah 'Next Future'
- Berapa Biaya ?

US\$ 22.000.

No Problemo !

- Important thing
Membuat customer bisa menggunakan untuk
mengefisiensikan kegiatan konstruksi sehari-hari

3. Implementasi di Indonesia

- Carilah ilmu sampai ke negeri China

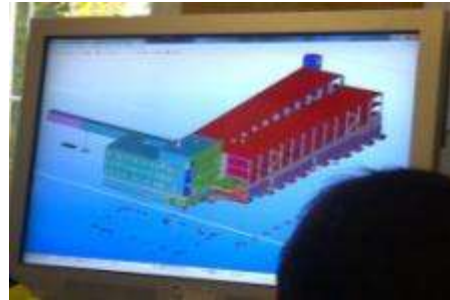
2012 : IAPPI studi banding ke Finlandia

learn directly from the source, see the real application, and hear some testimony from customer

- Jika ingin belajar.....carilah Guru Terbaik !

MOU IAPPI – TEKLA untuk membuat
“Competency Centre”

Comparative Study



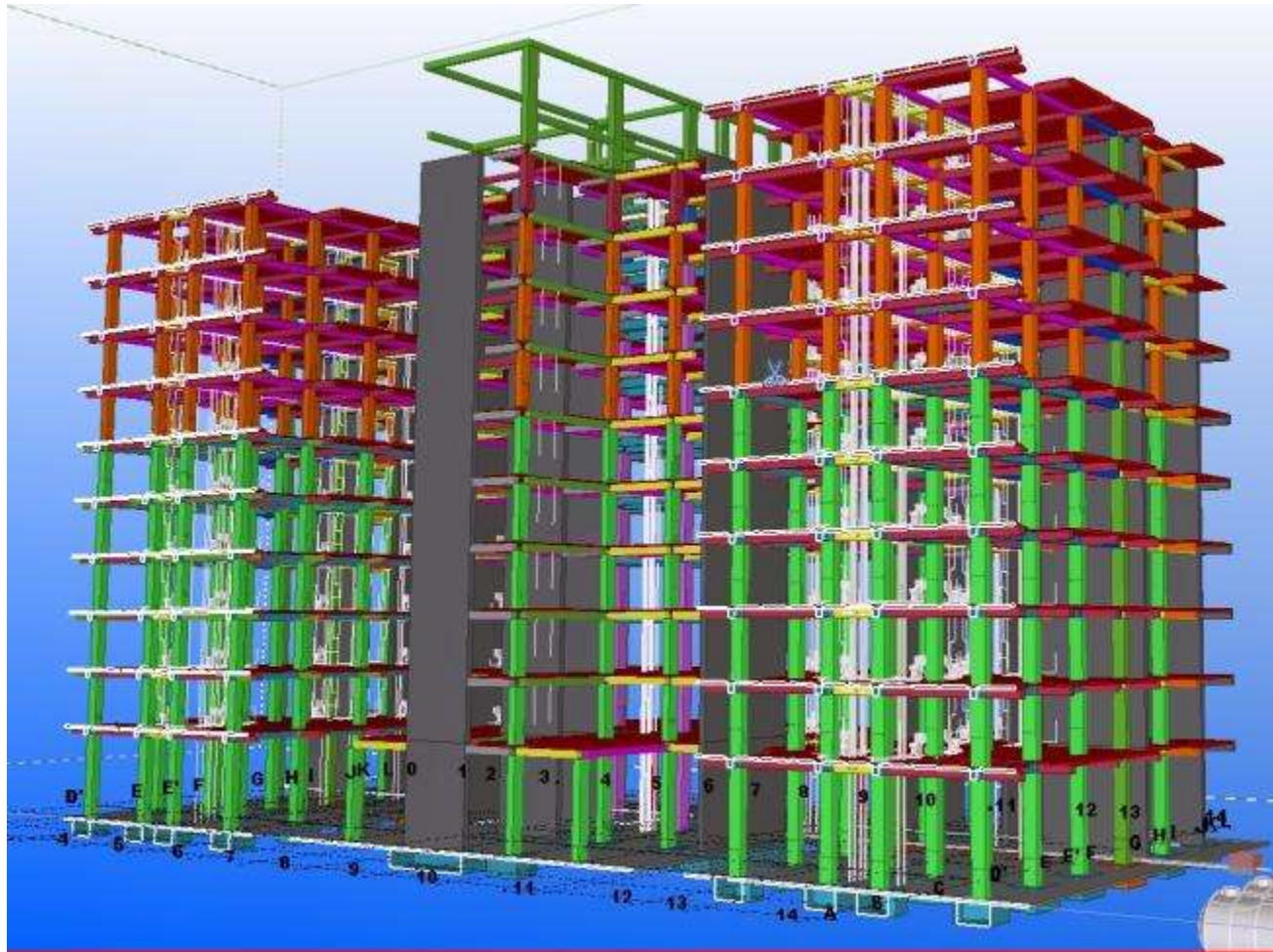
3. Implementasi di Indonesia

- Belajar BIM lebih ke “mental” , mau maju ?

THROW CAD 2 D to the Garbage !

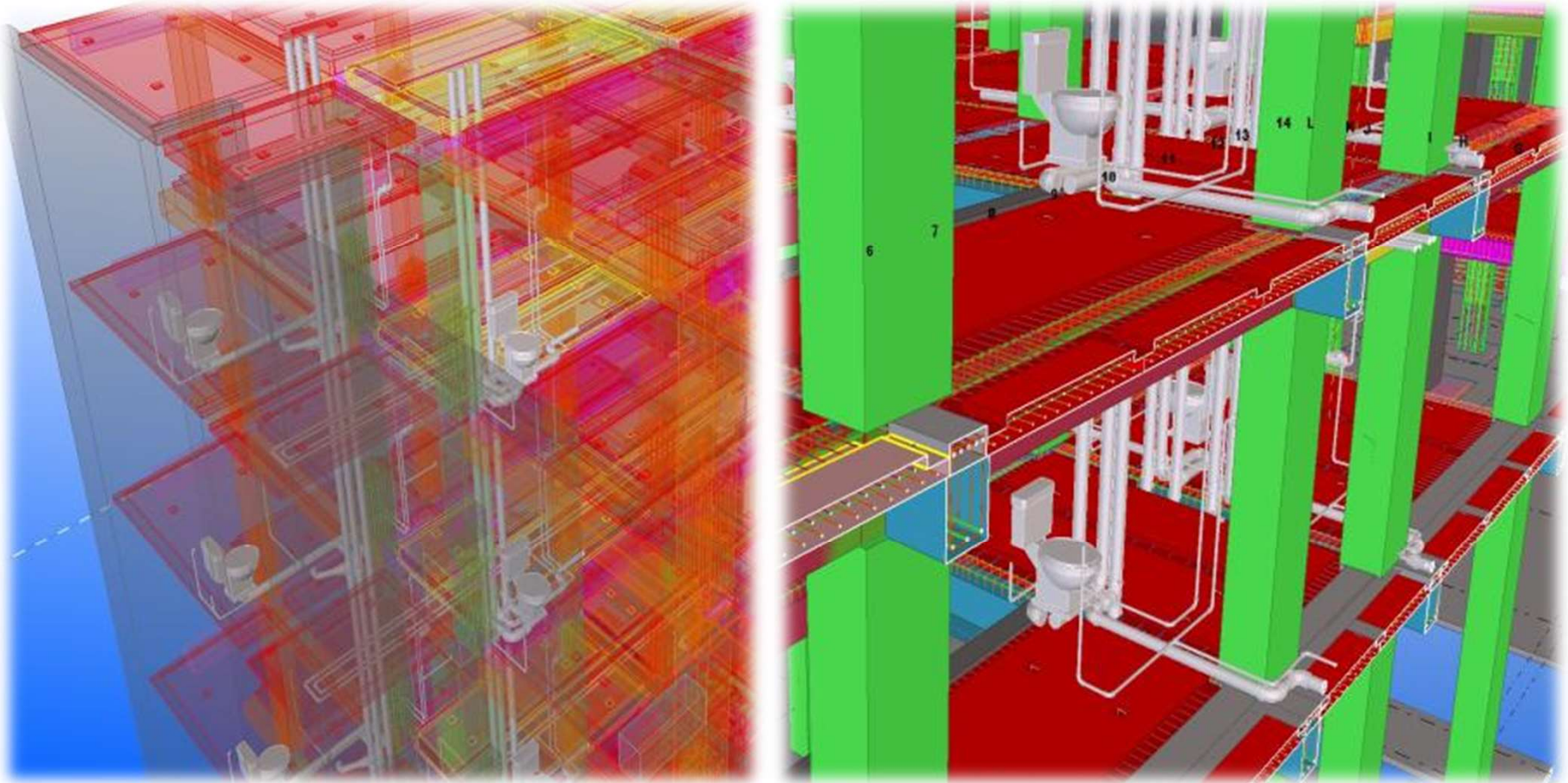
- Penerapan di Indonesia mulai di Industri
 - PT JHS
 - PT Mextron
 - PT Margusta
 - PT Wijaya Karya Beton
 - PT Pembangunan Perumahan

PROJECT APPLICATION



•Tekla Struktur

PROJECT APPLICATION



•Revit MEP

Trial Licence Period

- Integrated Building Design and Construction



Open by Minister of Public Works at 9 October 2014



PROJECT APPLICATION

- Precast Structure Building

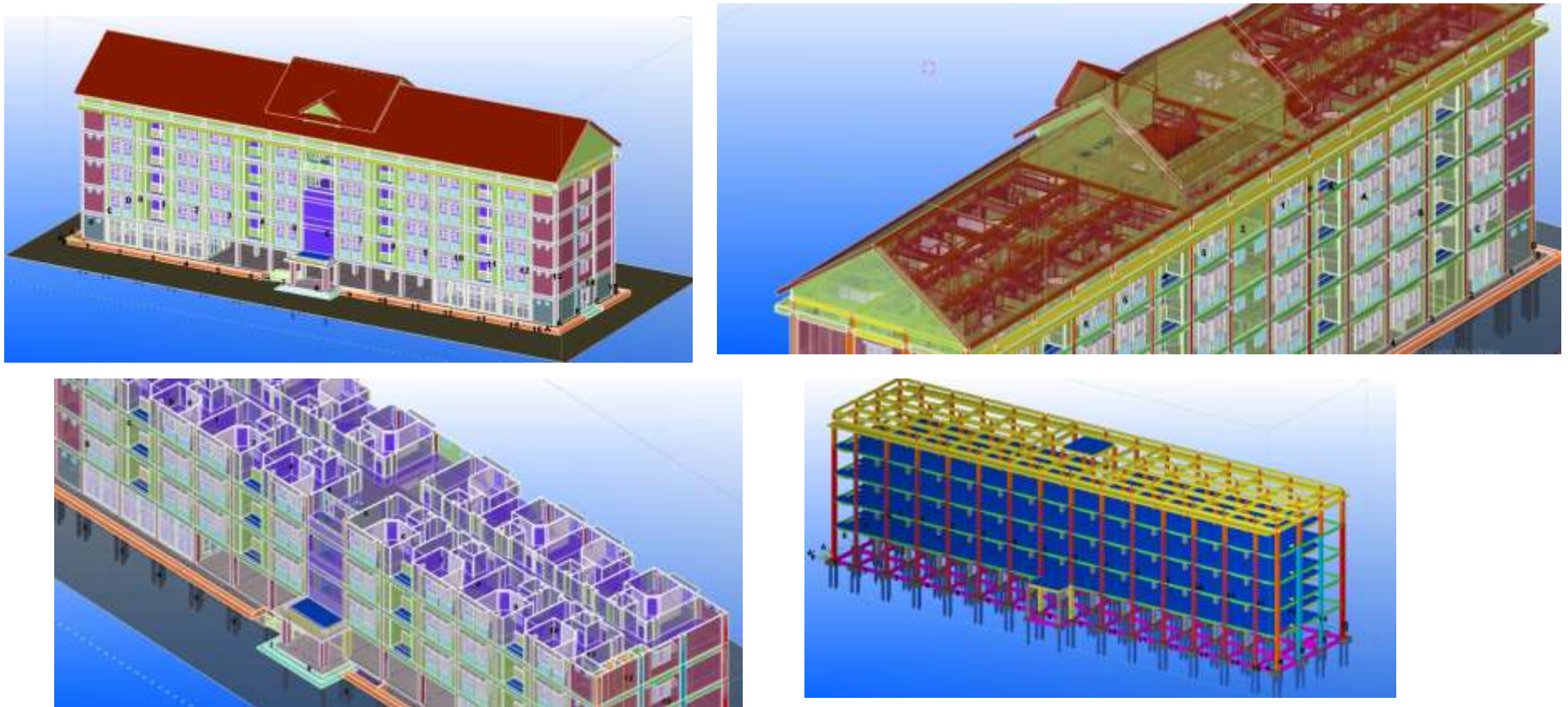


Fig. 9: BIM Application in Precast Concrete Detailer in Low Cost Housing of Ministry of Public Works 1

Trial Licence Period

- Precast Structure Building



Fig. 9: BIM Application in Precast Concrete Detailer in Low Cost Housing of Ministry of Public Works 1 (Putra,2012)

PROJECT APPLICATION

Contoh Implementasi di Pembangunan Rusun Sewa Pekerja Semarang 2015



Minggu 10



Minggu 11



Minggu 12



Minggu 14

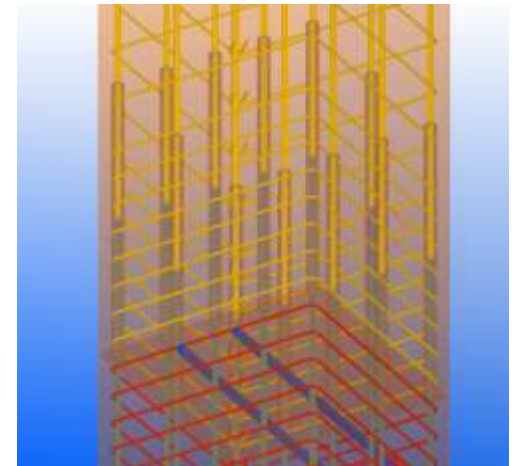
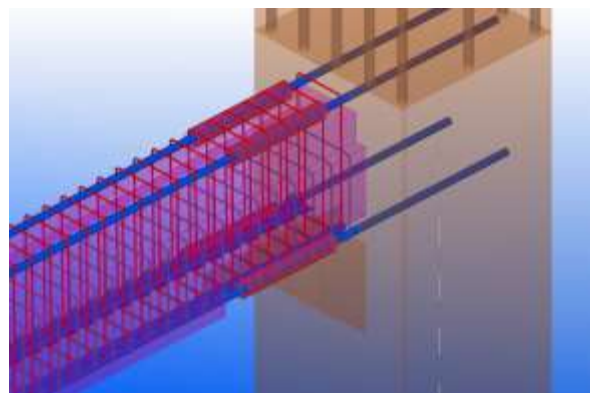
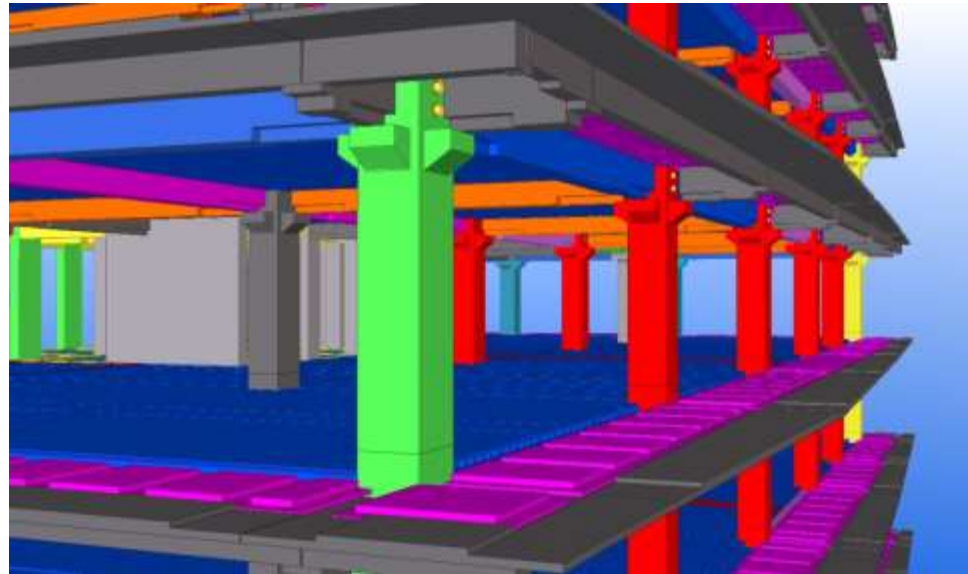
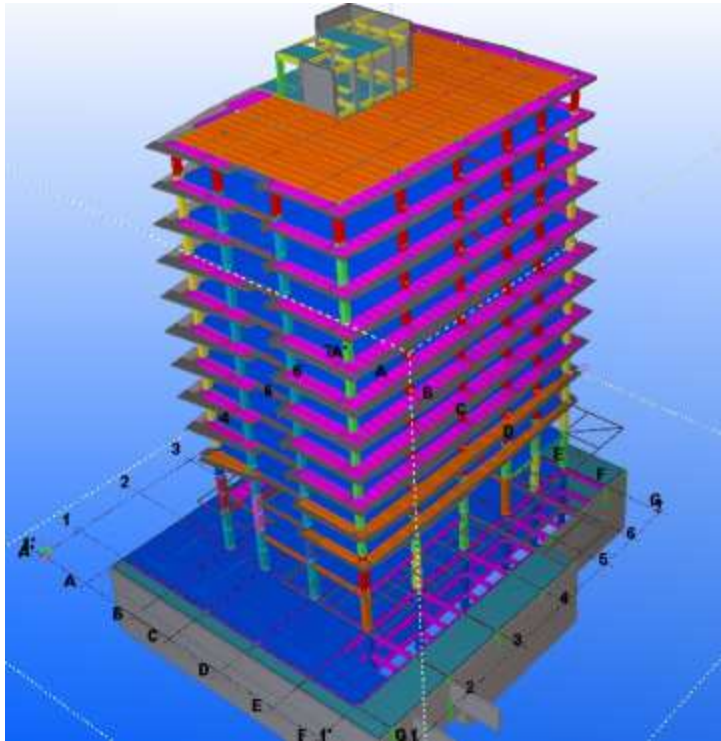


Minggu 18



Minggu 22

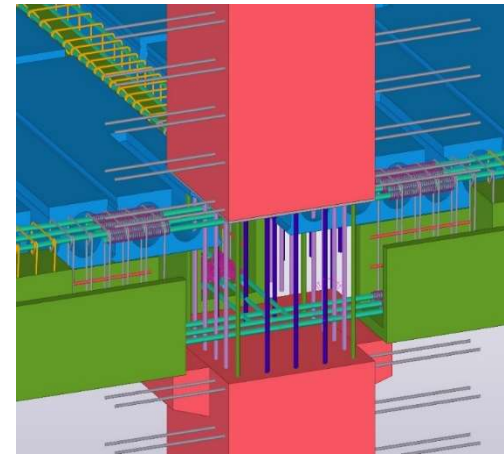
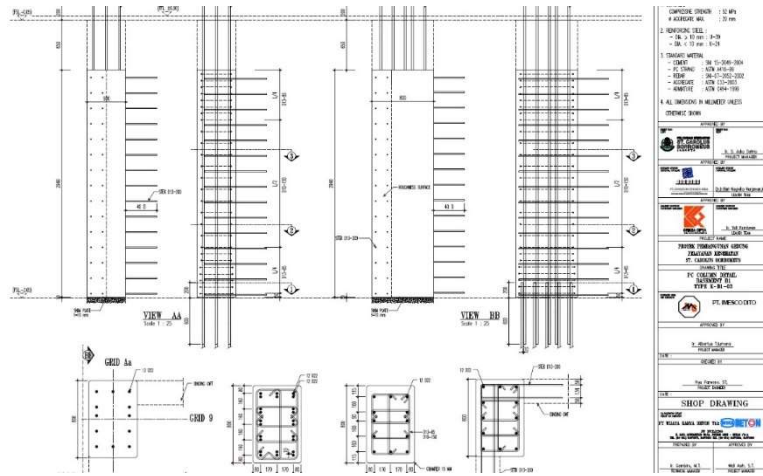
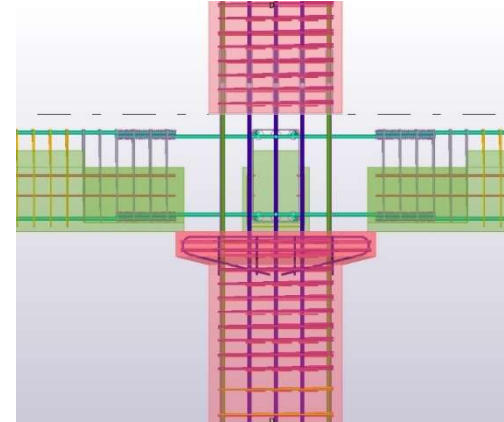
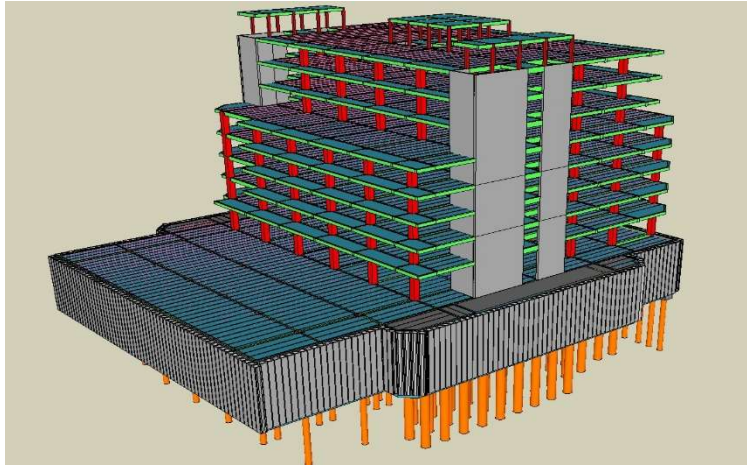
PROJECT APPLICATION

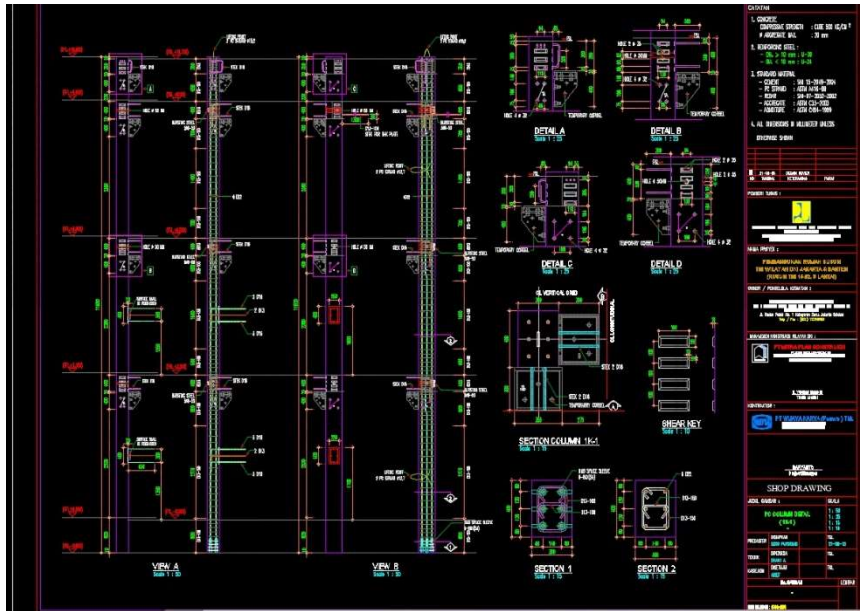


1.1 ERECTION KOLOM



PRECAST CAROLUS





PRESS SYSTEM



4. Application

Hospital 2017



Carolus Hospital 2017

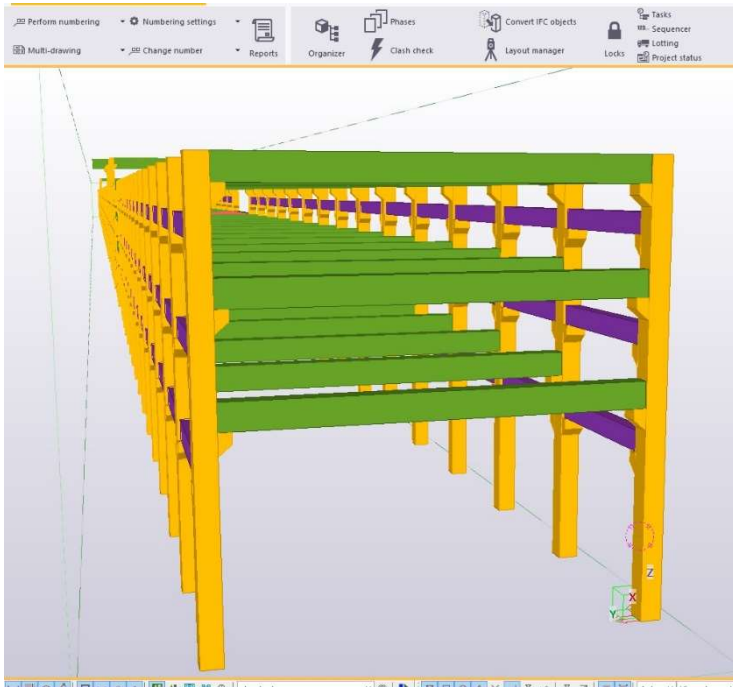


4. Application

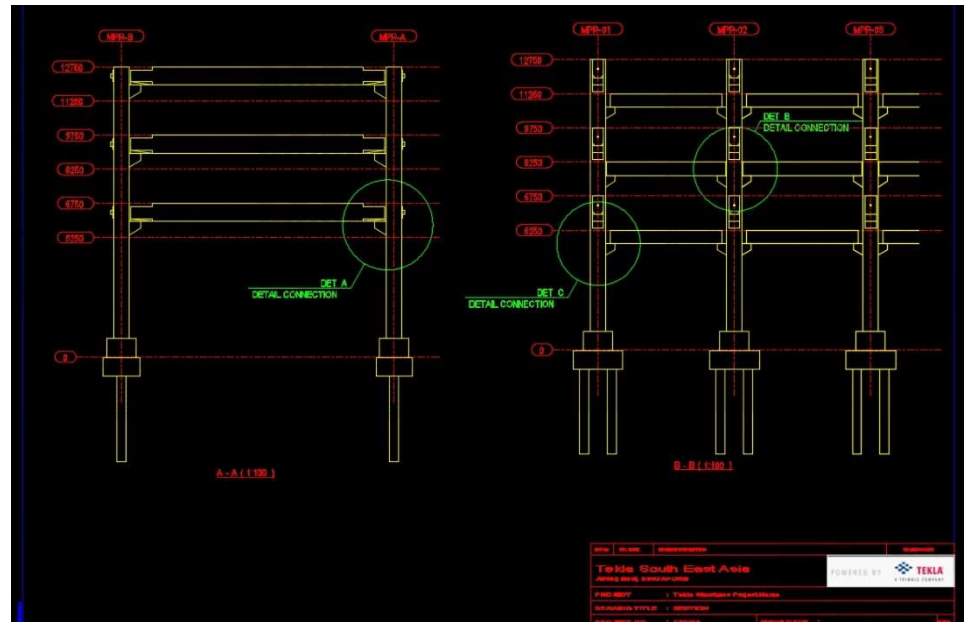
Ruko 2016

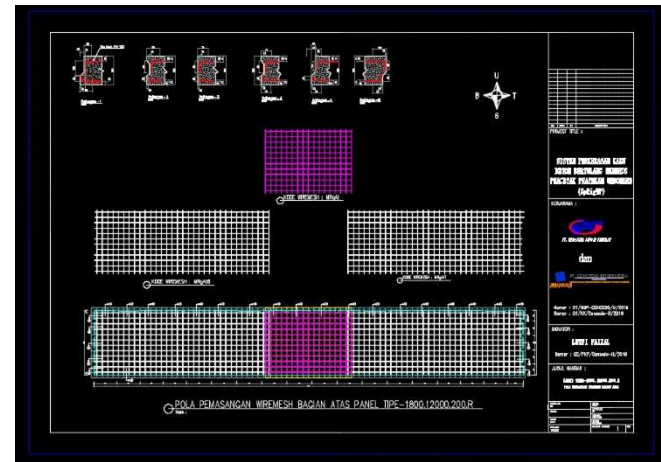
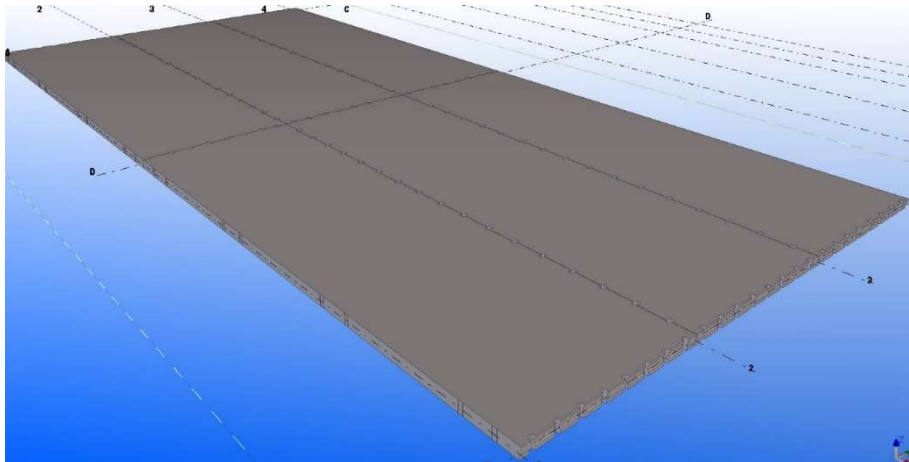


Cikopo, Purwakarta, Jawa Barat

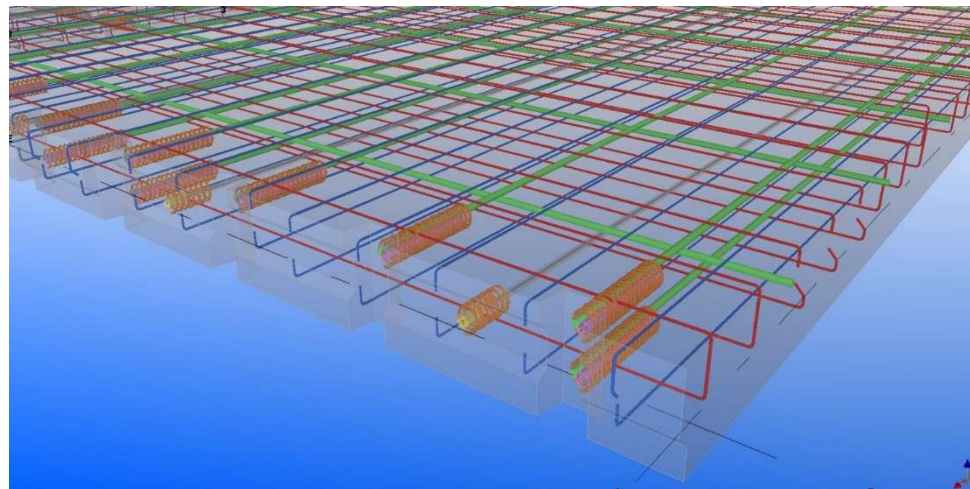


PRECAST PIPERACK



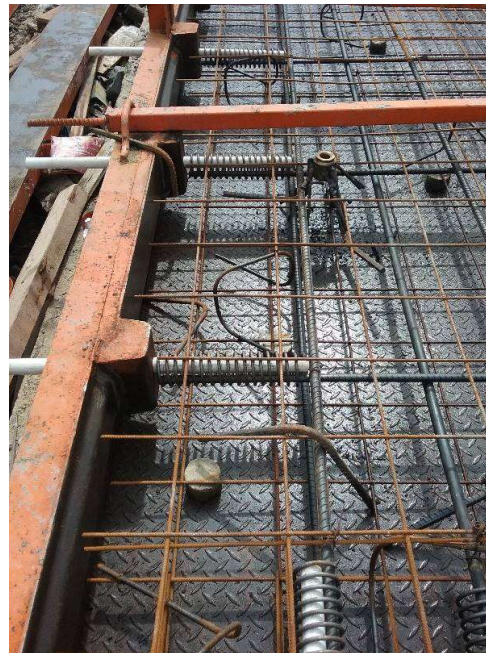


PRECAST JALAN



Advance PRECAST PAVEMENT DI INDONESIA

- Slab beton prategang : perkuatan paska tarik unbonded dan sambungan dissipater



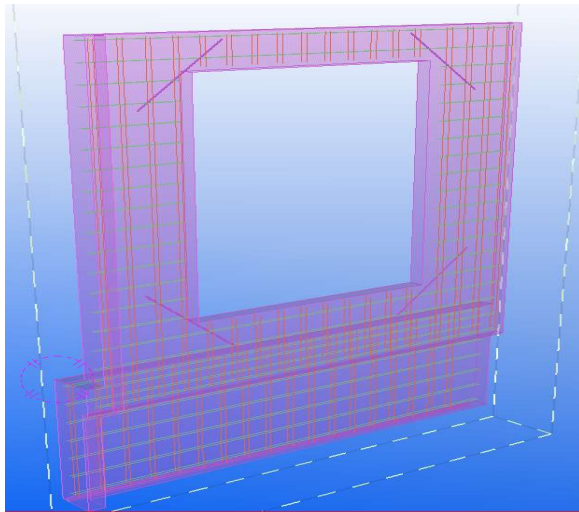
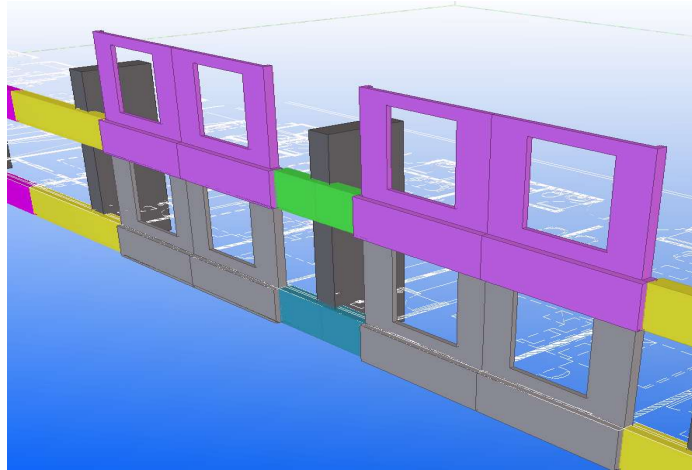
[Jalan Pracetak di Klaten](#)

Advance PRECAST PAVEMENT DI INDONESIA

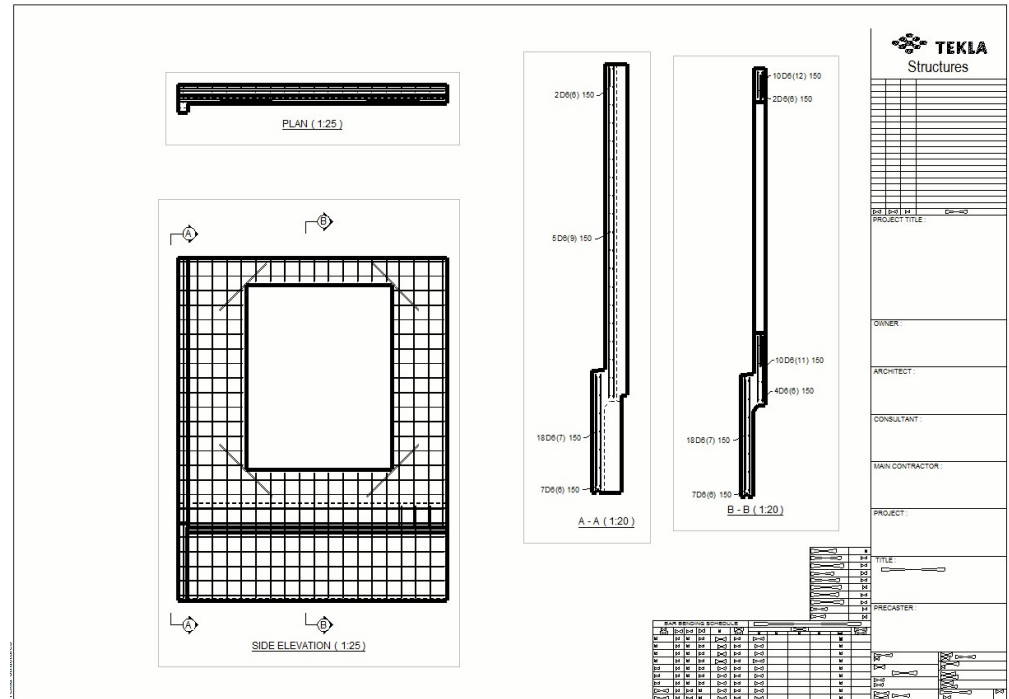
- Slab beton prategang : perkuatan paska tarik unbonded dan sambungan dissipater



Jalan Pracetak di Banjarnegara



PRECAST FACADE



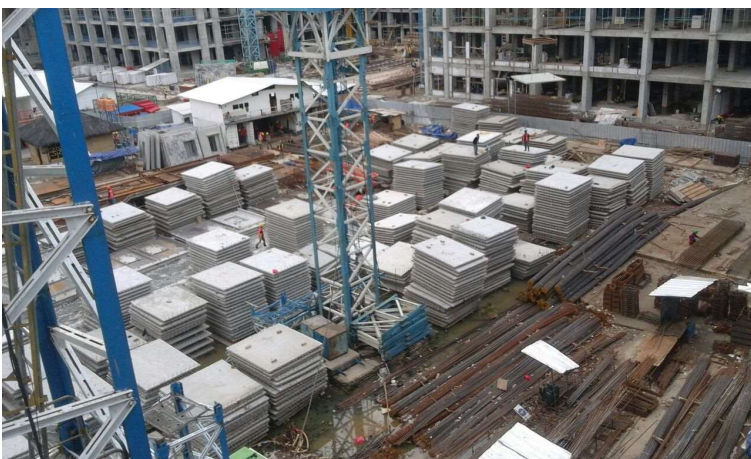
IV. INOVASI PENGENDALIAN MUTU, SKEDUL, BIAYA



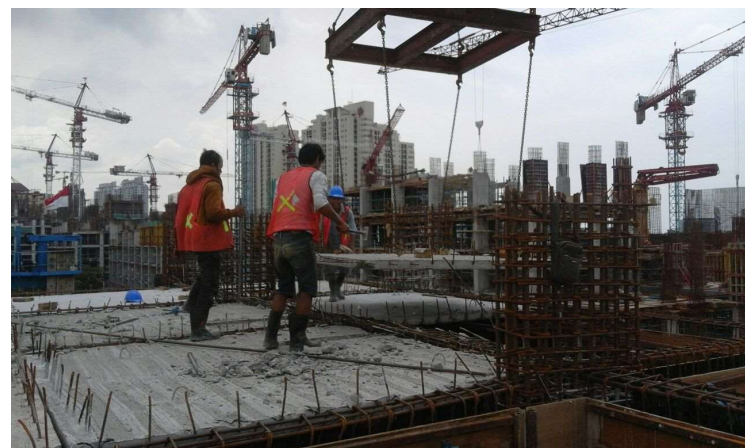
R/C slab, fabrikasi di lapangan,



PC Preslab produksi pabrik



Stok Half/Pre slab,



Erection slab precast

IV. INOVASI PENGENDALIAN MUTU, SKEDUL, BIAYA



Dinding dalam



Dinding facade



Kamar mandi

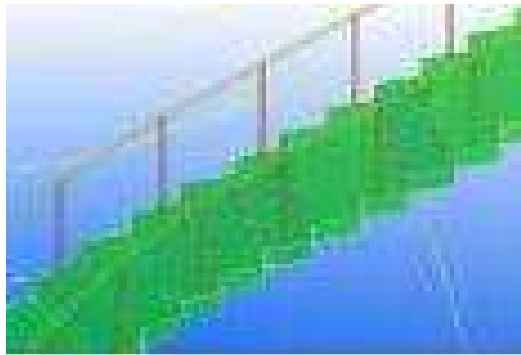
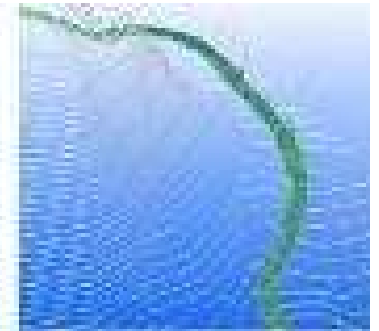
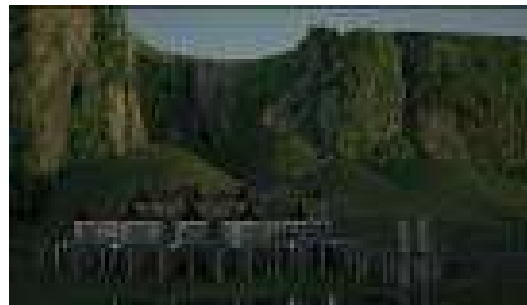
FOTO RUSUN KEMAYORAN



Blok D 10

PROJECT APPLICATION

- Intermediate Training () for 12 participant
- Application in some projects



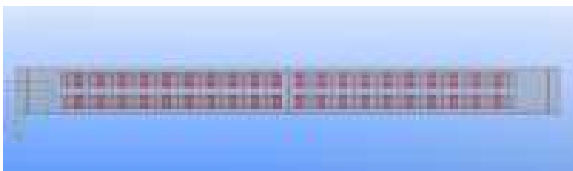
Stairs in extreme contour condition

Trial Licence Period

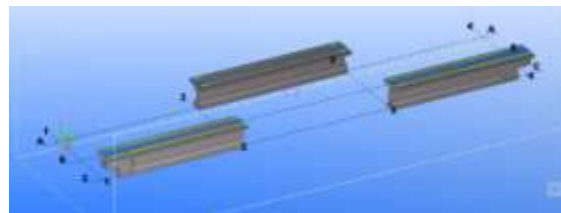
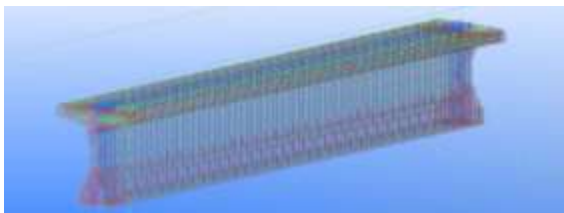
- Prefabrication Product



PC Pile



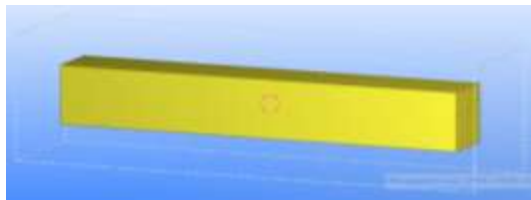
Hollow Core Slab



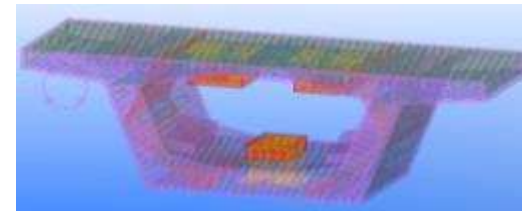
PC Segmental Girder

Trial Licence Period

- Prefabrication Product



PC Post Tension Girder



PC Post Segmental Box Girder

➤ **PRODUCT SERIES** *PRECAST for BRIDGE & FLYOVER*

BOX GIRDER

*1.000 segmens,
produced within
200 working days*



Trial Licence Period

- New Innovative Precast Structure

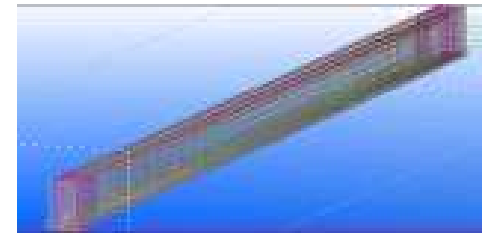
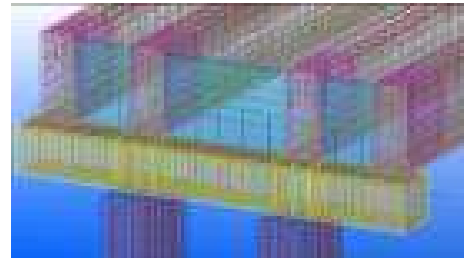
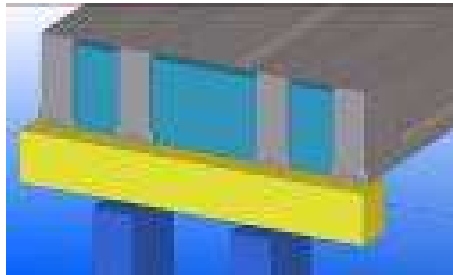
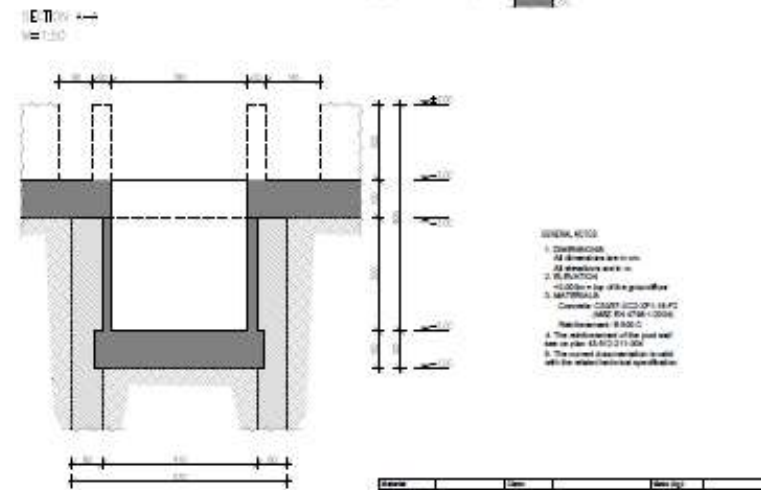
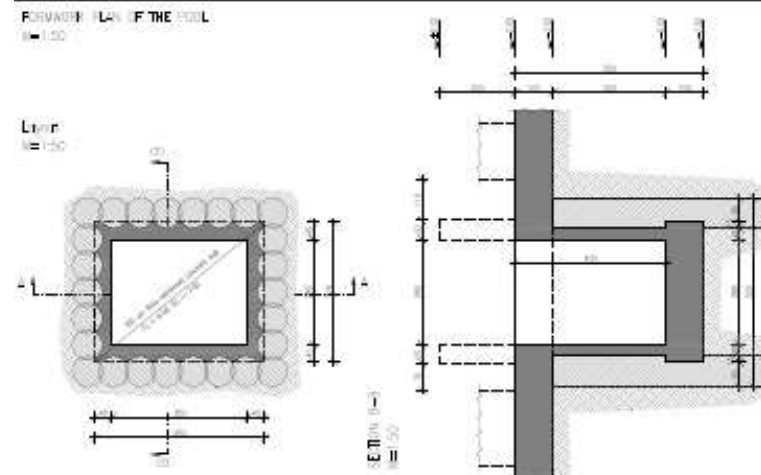
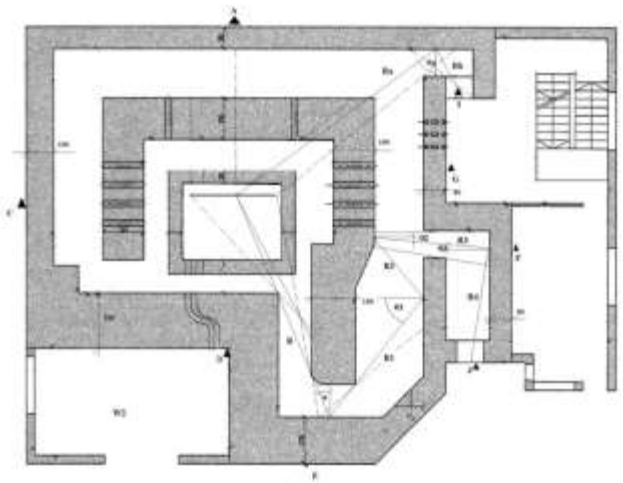


Fig. 8: BIM Application on the Design of Precast Structure in Pipe Rack of Petrochemical Industry (PT Petro Jordan Abadi,2012)

PROJECT APPLICATION



- GENERAL NOTES**
1. DIMENSIONS: All dimensions are in m.
 2. FINISHES: All structural work is to be finished with 1:2:4 concrete.
 3. CONCRETE: Concrete shall be of grade C25/30.
 4. The reinforcement of the pool wall see on plan 15.01.21.001.
 5. The correct dimensions shall be for structural specification.

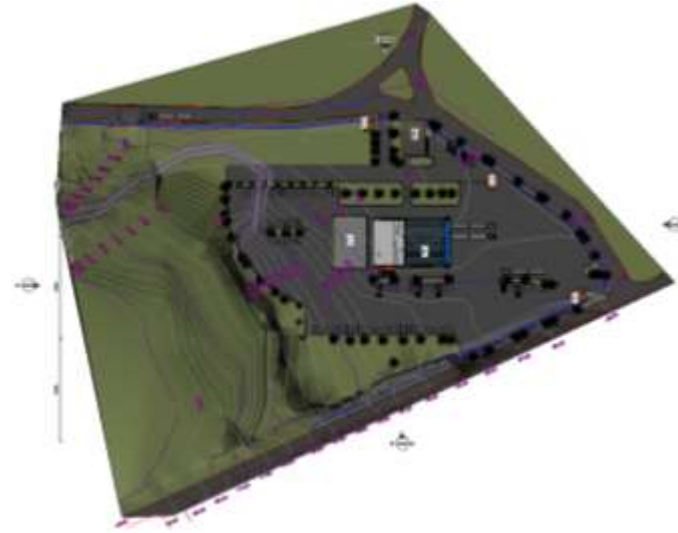
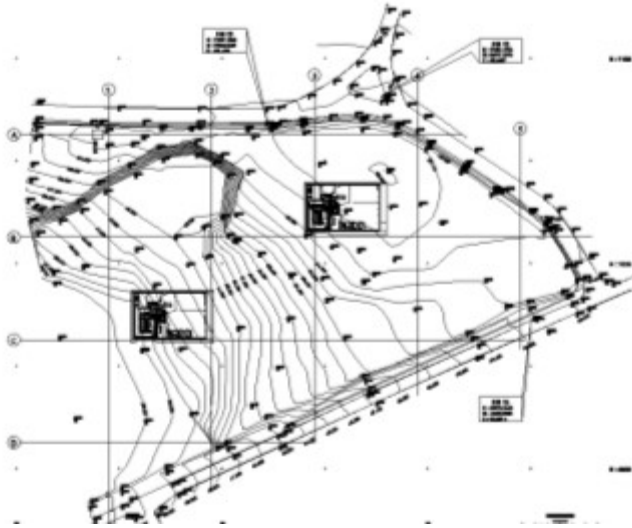


Rev.	Date	By	Check
1	15/01/2021

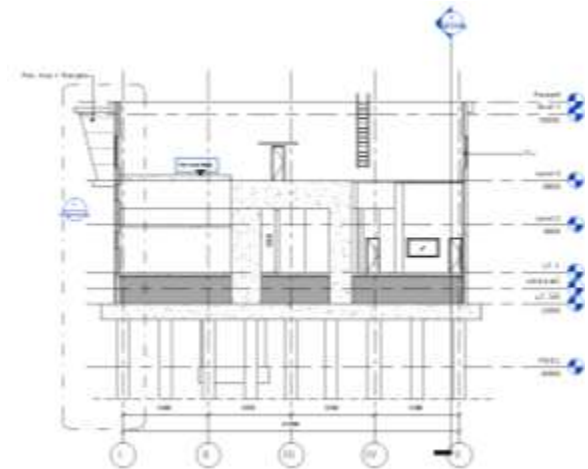
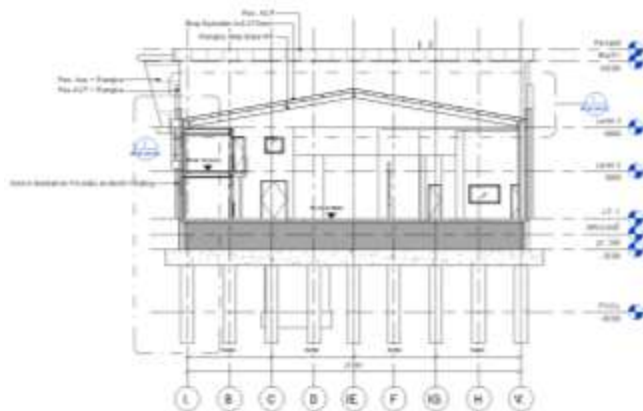
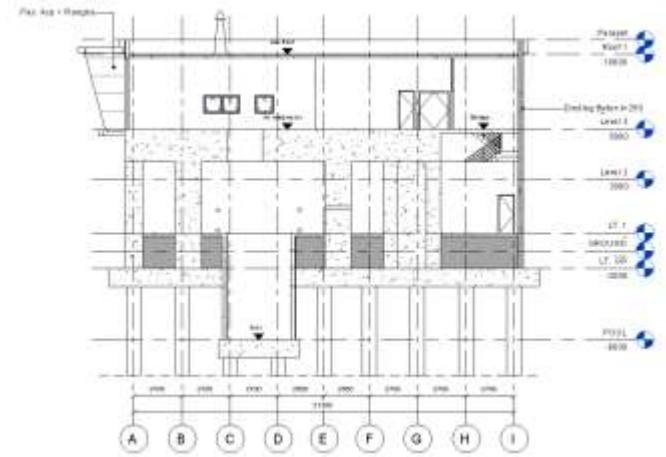
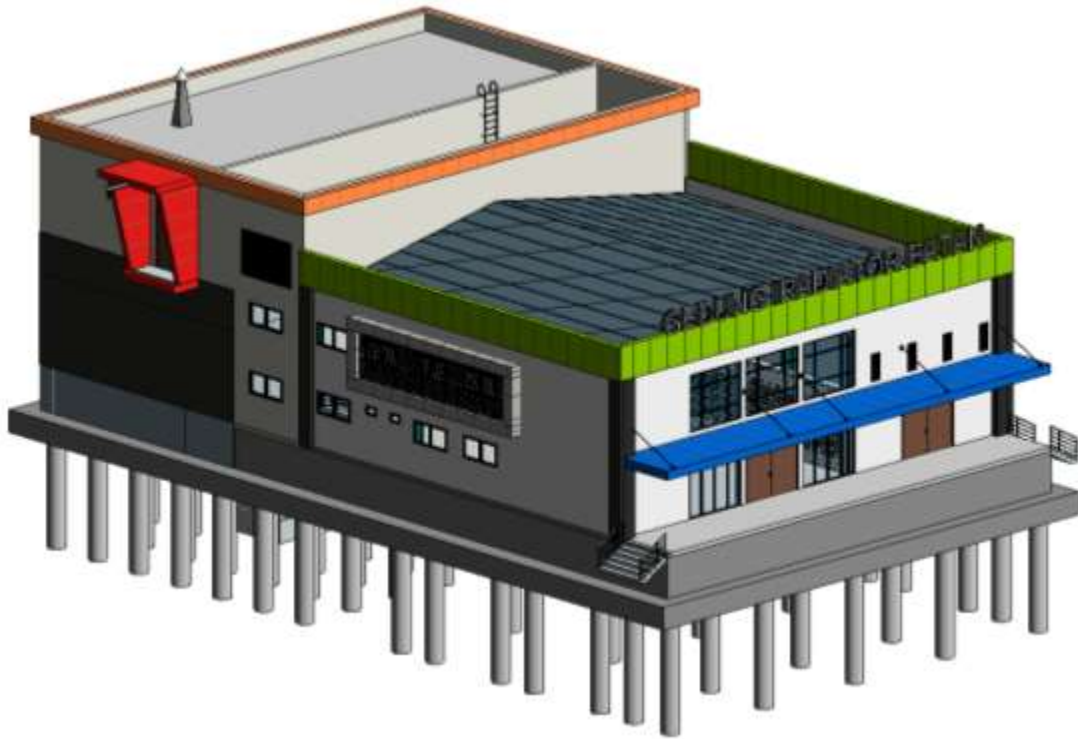
Project Name	Foundation - Framework drawing of the pool
Project No.	15.01.21.001
Scale	1:100
Sheet No.	15.01.21.001
Sheet Total	1

Client	SENVO - Multipurpose Auditor
Project Manager	...
Design Engineer	...
Check Engineer	...
Scale	1:100
Sheet No.	15.01.21.001
Sheet Total	1

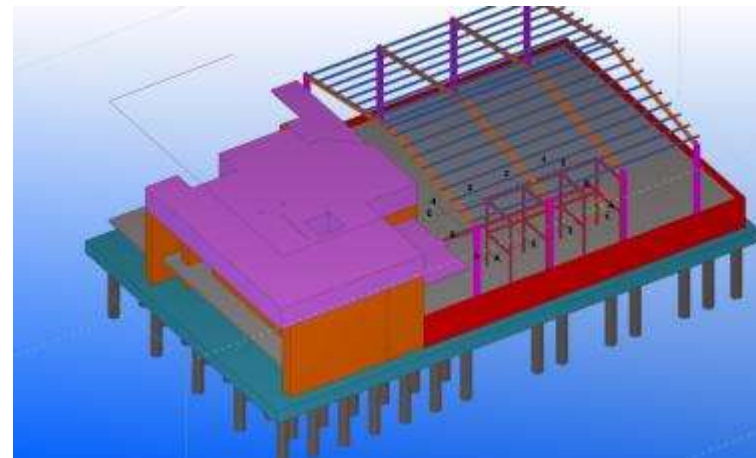
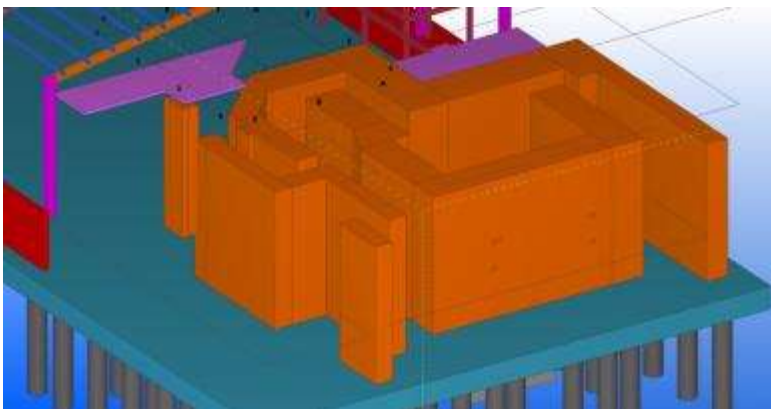
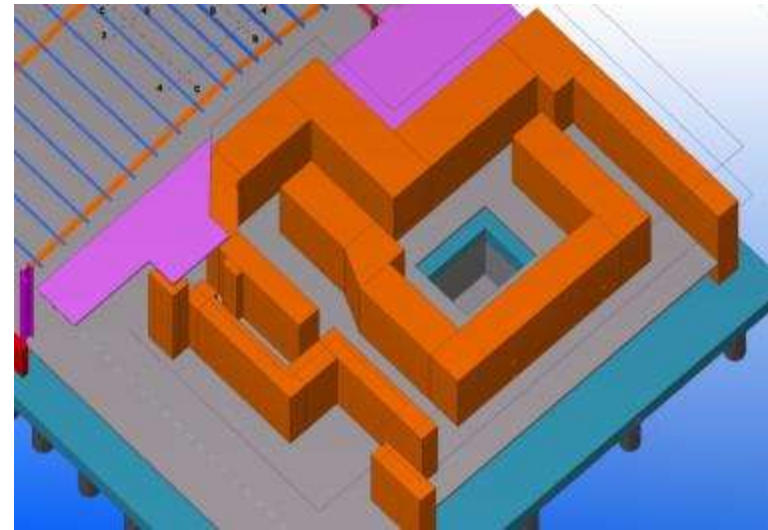
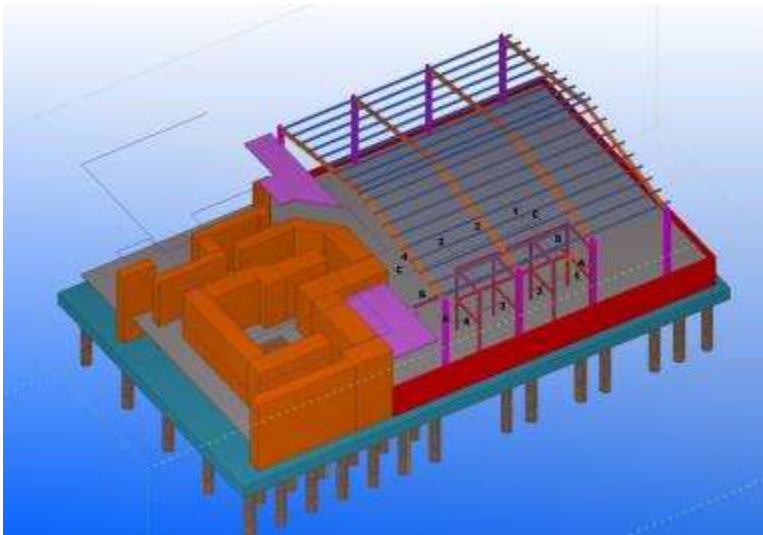
PROJECT APPLICATION



PROJECT APPLICATION



PROJECT APPLICATION



PROJECT APPLICATION



PROJECT APPLICATION

KETERANGAN :

A.DINDING PANEL HOLLOWCORE
(600 X 2200mm)

B.KOLOM PRECAST
(150X150X2400mm)

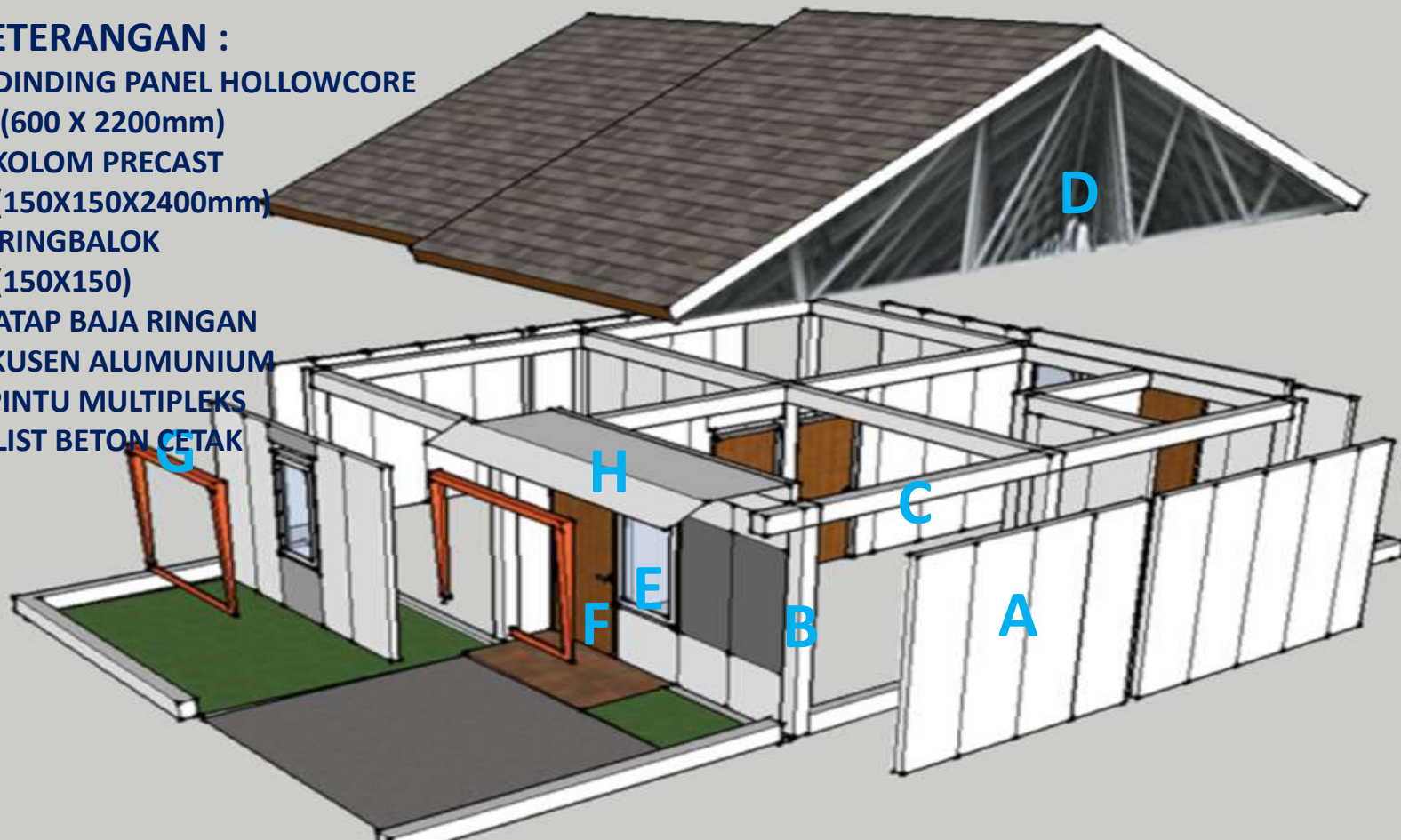
C. RINGBALOK
(150X150)

D.ATAP BAJA RINGAN

E.KUSEN ALUMUNIUUM

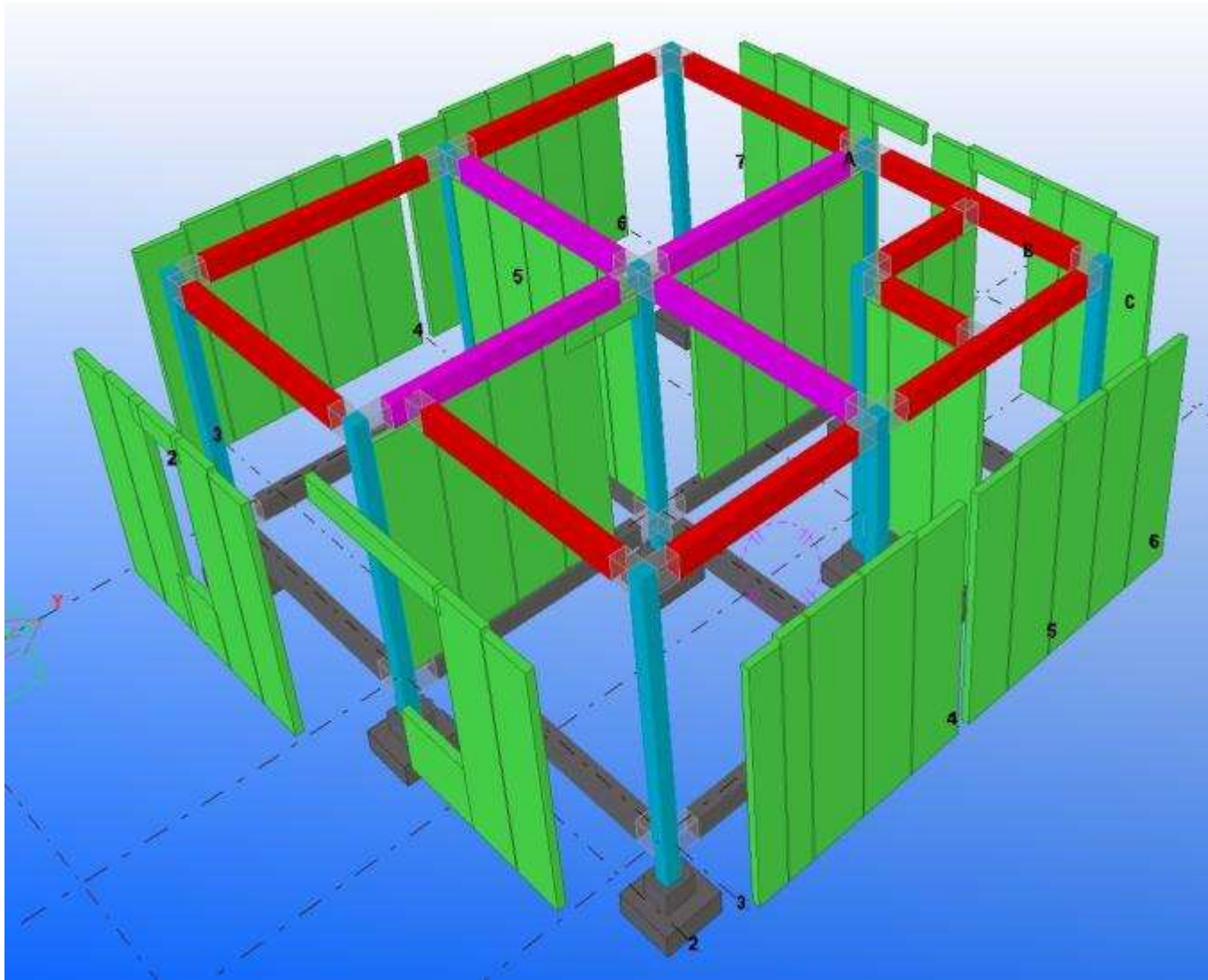
F.PINTU MULTIPLEKS

G.LIST BETON CETAK



RUMAH INSTANT

PROJECT APPLICATION



RUMAH INSTANT

PROJECT APPLICATION



Pengarahan oleh Dirjen Penyediaan Perumahan Kemen PU PR, komponen dinding ringan, erection ring balok, atap baja ringan, dan panel dinding ringan



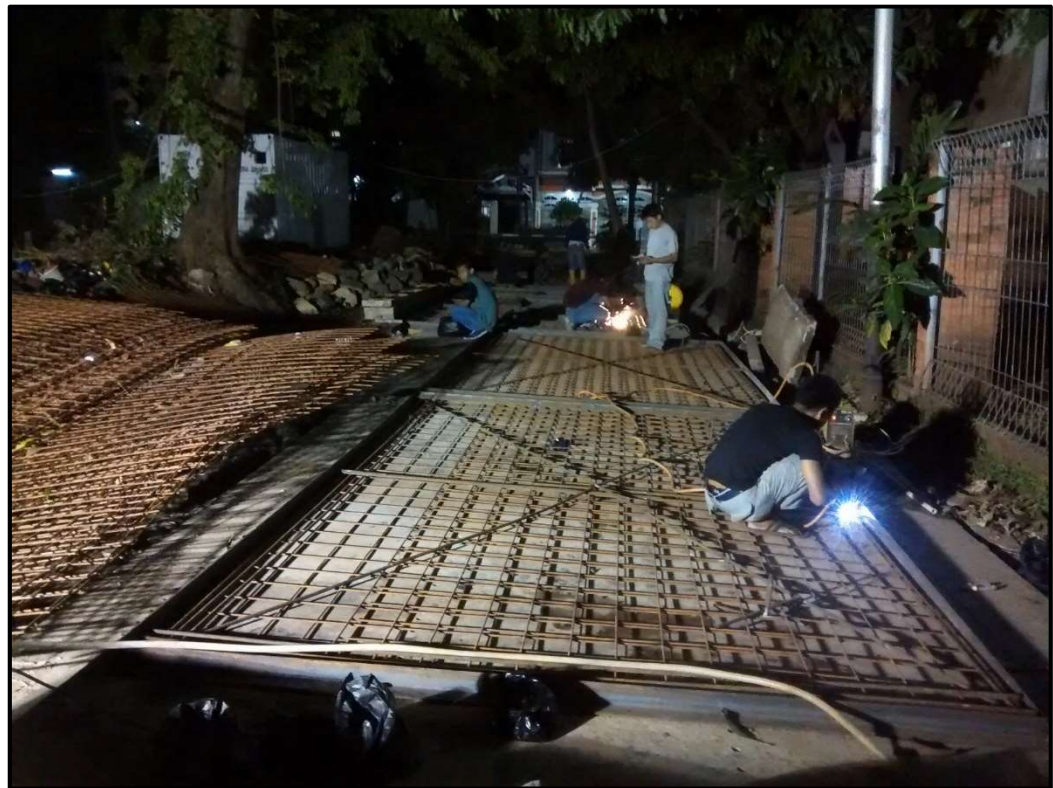
Rumah instan tipe 36, peresmian oleh Dirjen Bina Marga Kemen PU PR



Rumah Rp 22 juta Tipe 21 untuk MBR affordability Rp 500.000/bulan Perumnas



PEMASANGAN TULANGAN WIREMESH





PENGECORAN DINDING BETON PRECAST



Sistem Produksi menggunakan Pola Produksi Fasad Bangunan Tinggi Cetakan Baja cukup mahal sehingga akan ada jumlah unit yang cukup besar agar biaya cetakan dapat tertutup.

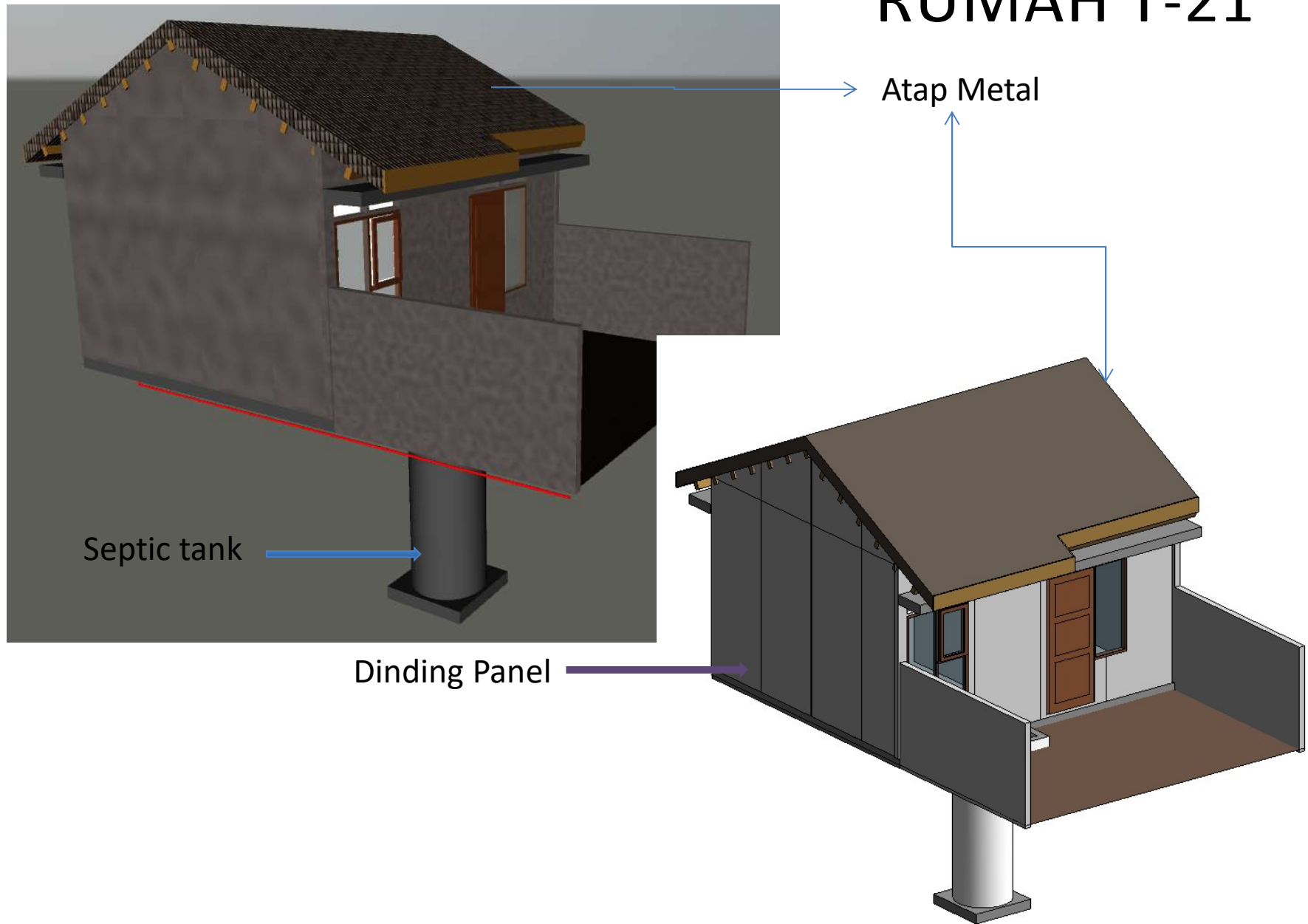


PENGANGKATAN PANEL DINDING

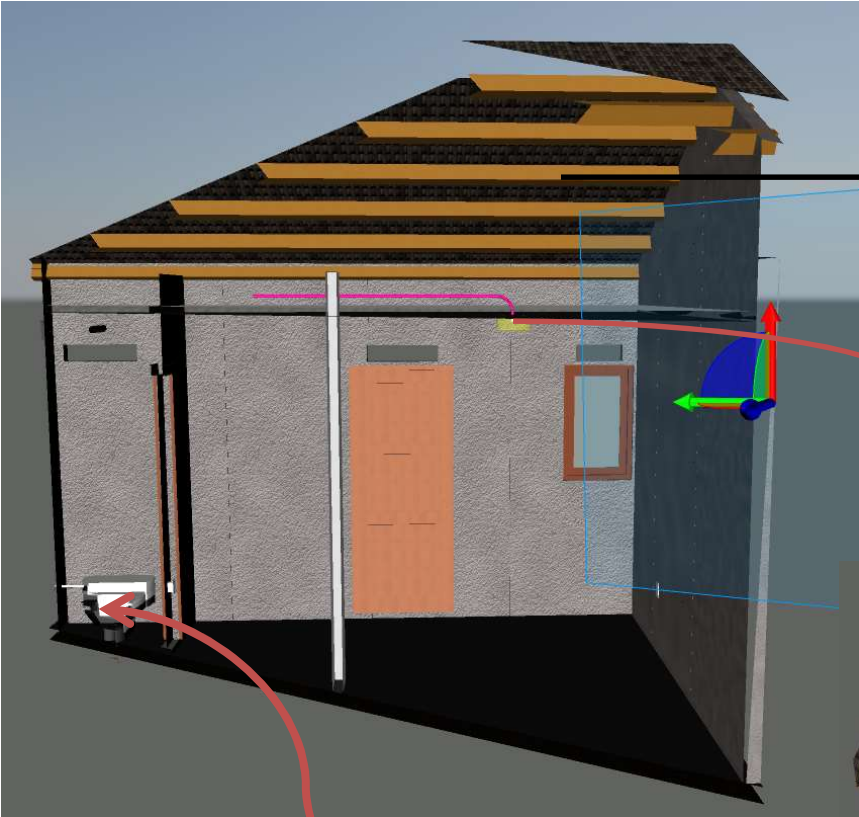


Penggunaan beton massif membuat komponen cukup berat sehingga memerlukan crane untuk pemasangan. Hal ini menyebabkan di perlukan jumlah unit yang cukup banyak agar biaya crane tertutup.

RUMAH T-21

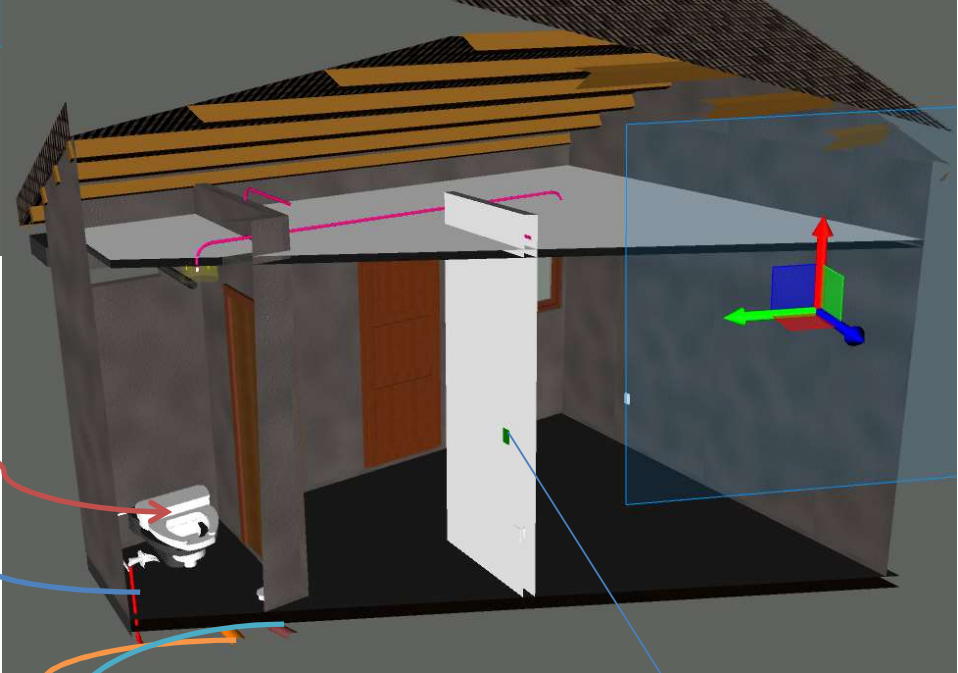


MEP RUMAH T-21



Rangka Atap

Lampu dan Instalasi



Closed

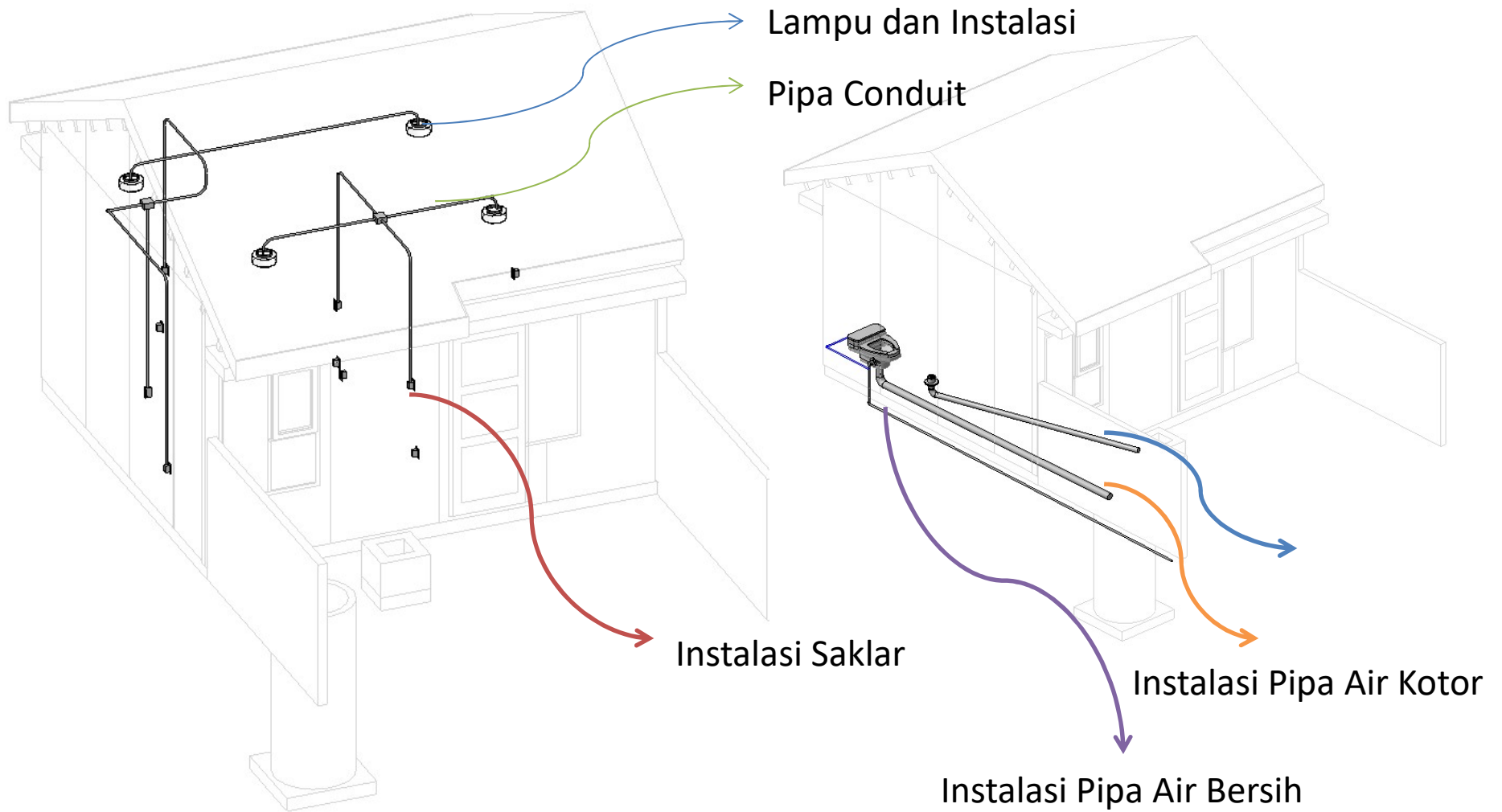
Instalasi Pipa Air Bersih

Instalasi Air Kotor

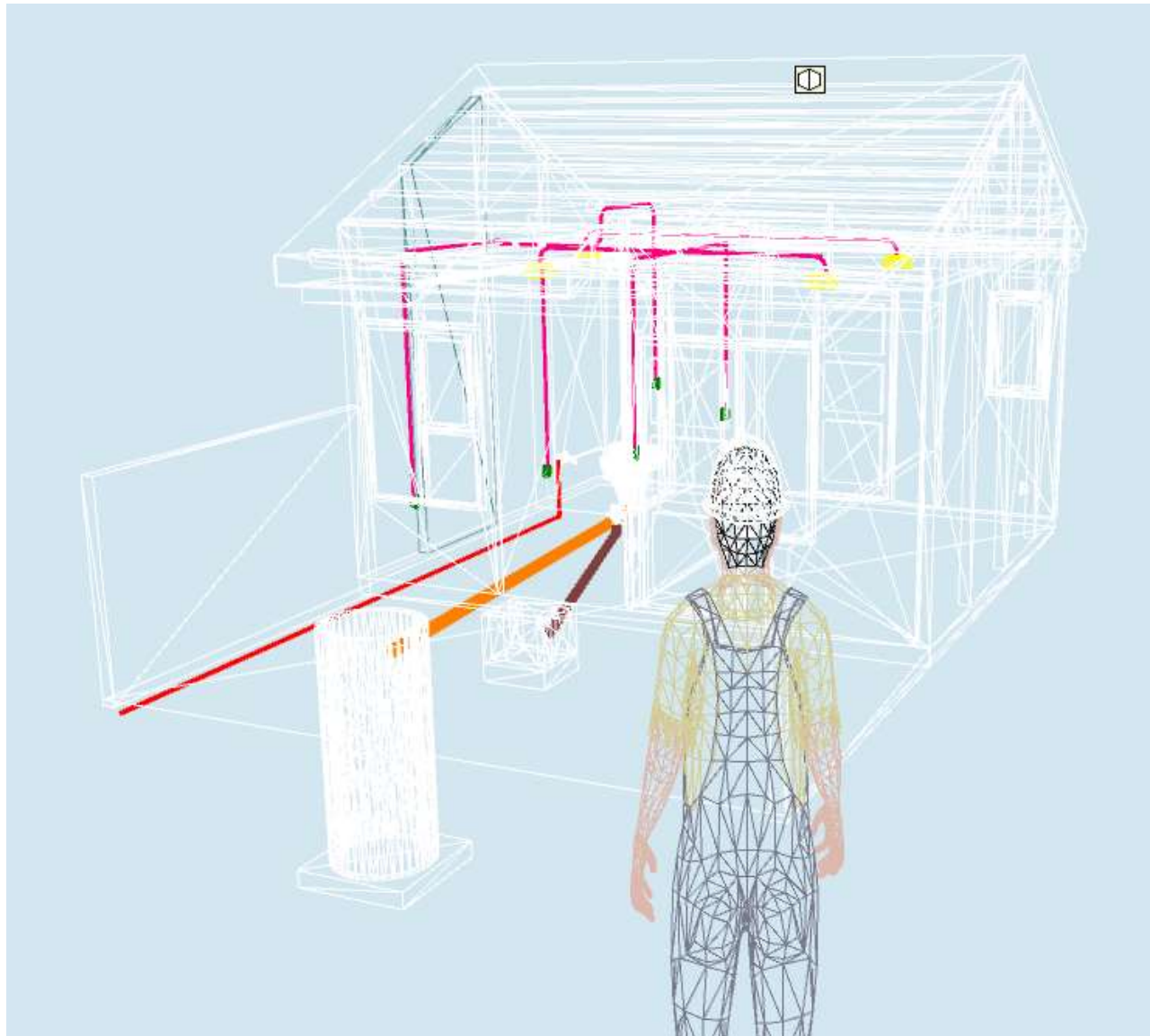
Instalasi Air Kotor

Saklar

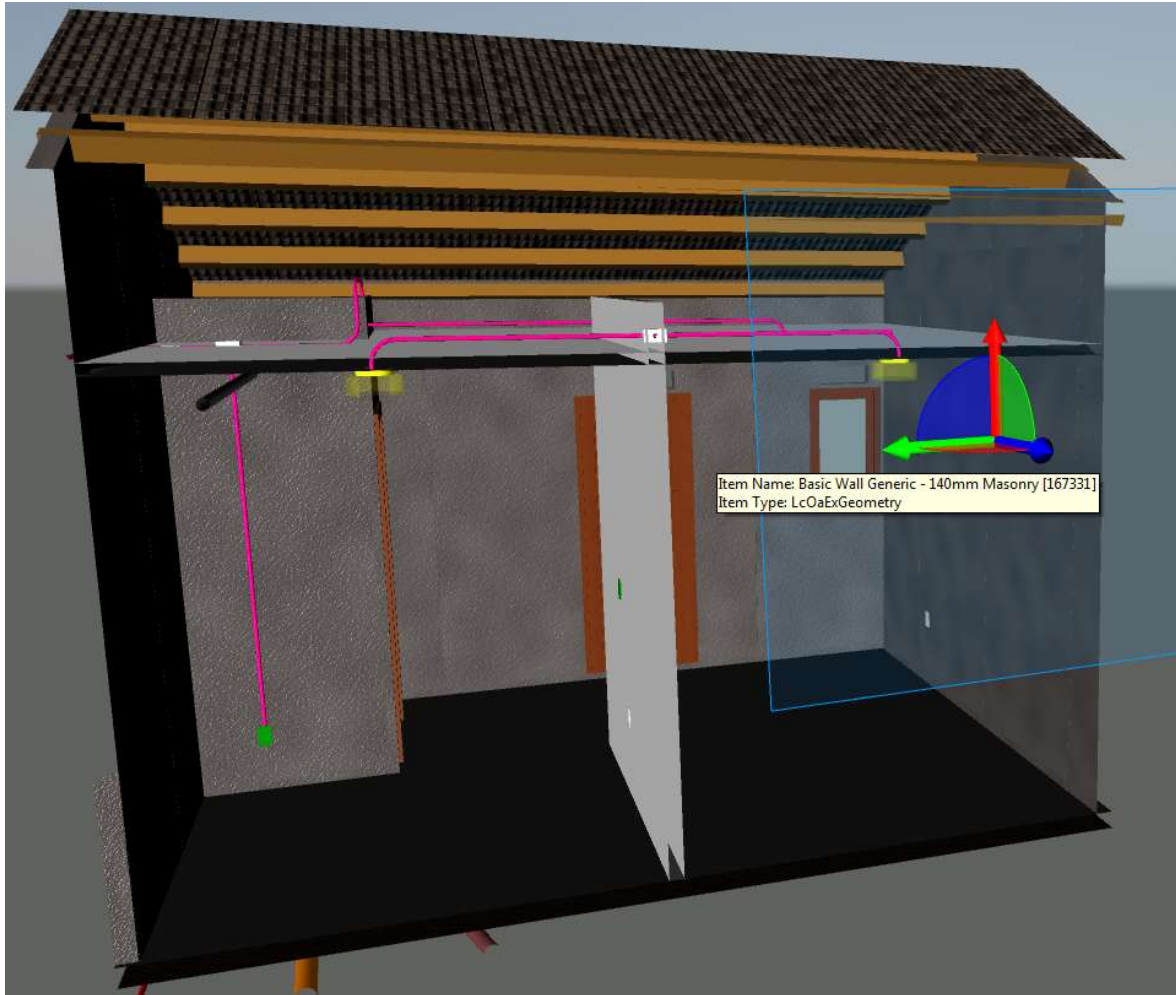
INSTALASI MEP RUMAH T-21



MEP RUMAH T-21



MEP RUMAH T-21



KETERANGAN :

A.DINDING PANEL HOLLOWCORE

(600 X 2200mm)

B.KOLOM PRECAST (300X400mm)

C. RINGBALOK (300X400mm)

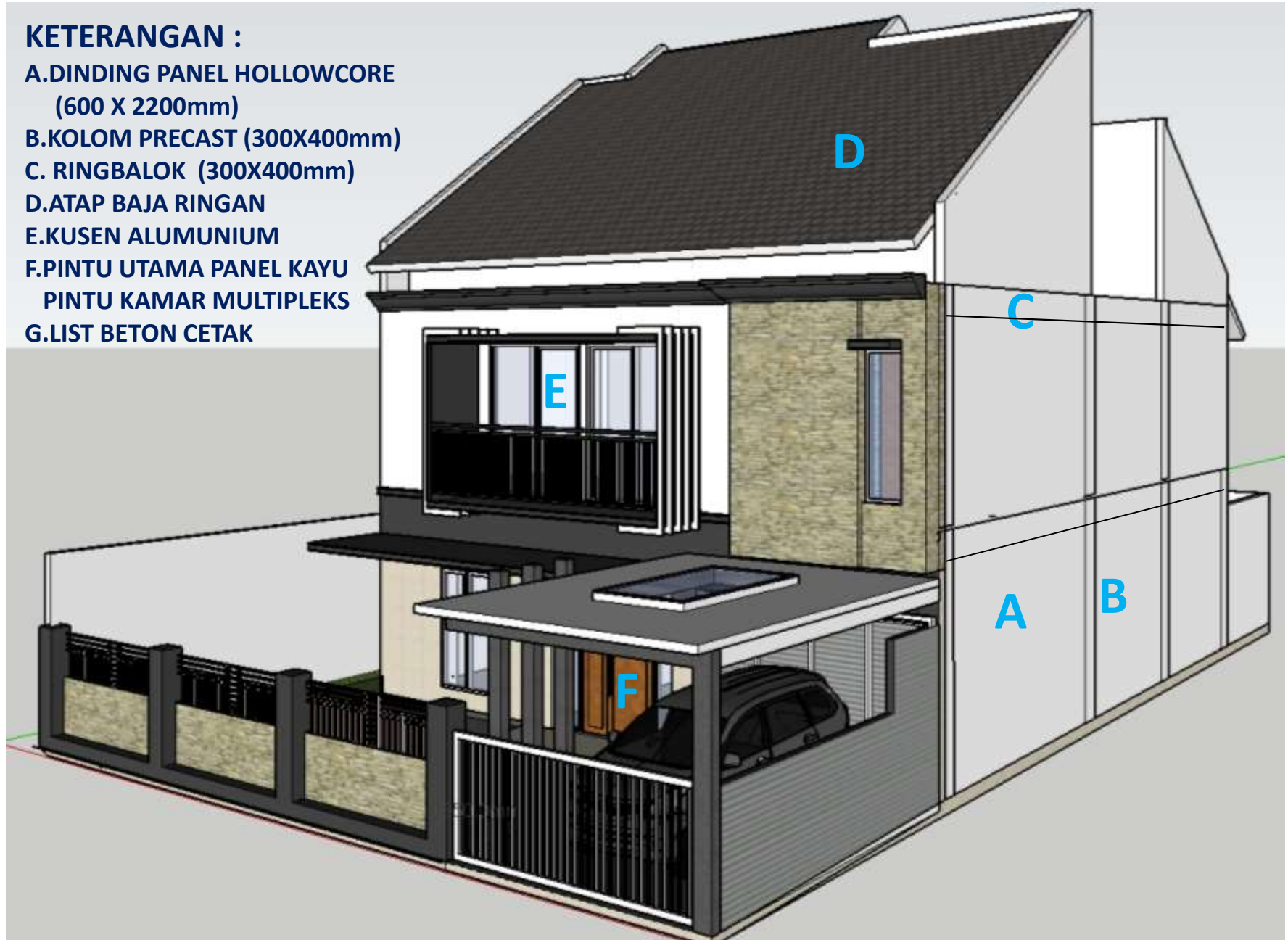
D.ATAP BAJA RINGAN

E.KUSEN ALUMUNIUM

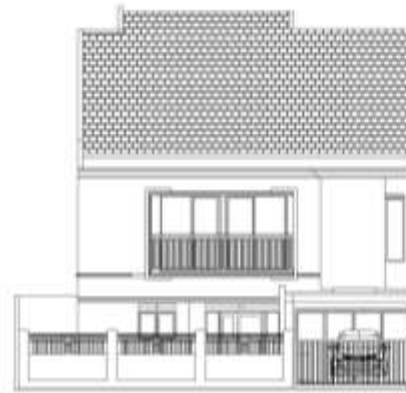
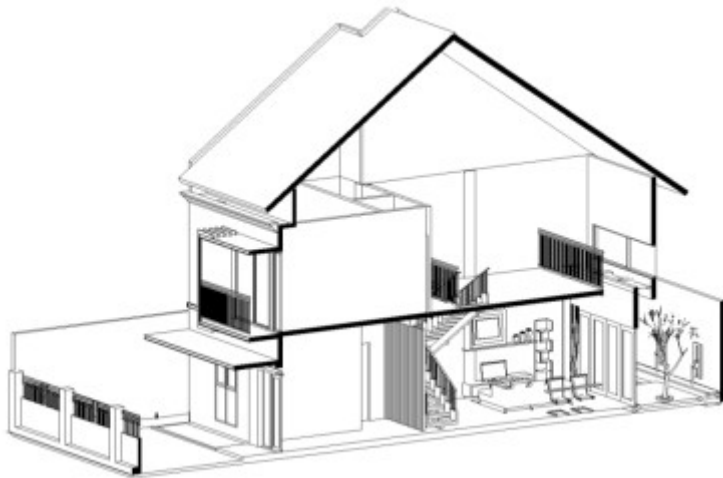
F.PINTU UTAMA PANEL KAYU

PINTU KAMAR MULTIPLEKS

G.LIST BETON CETAK



PROJECT APPLICATION

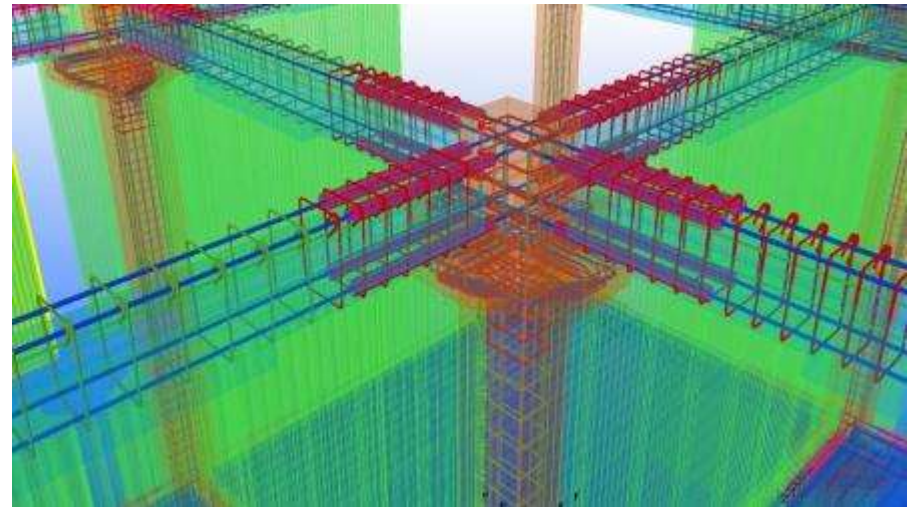
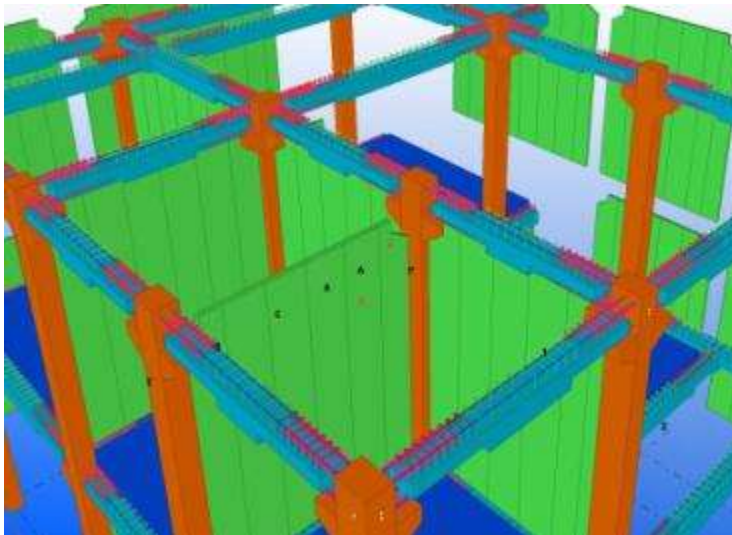
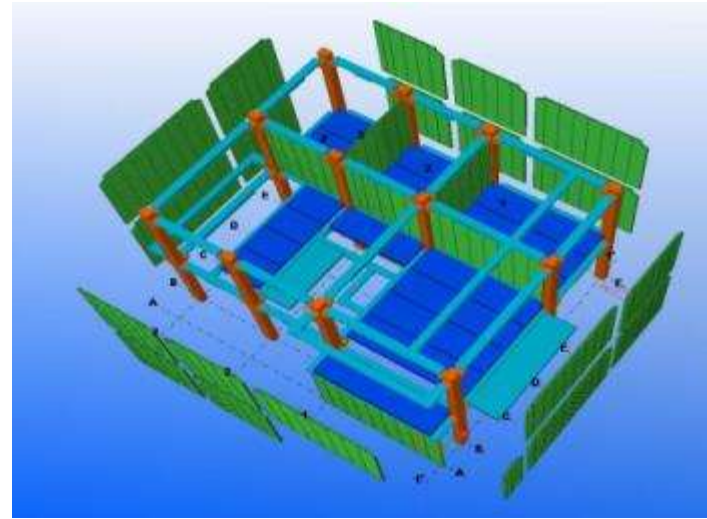
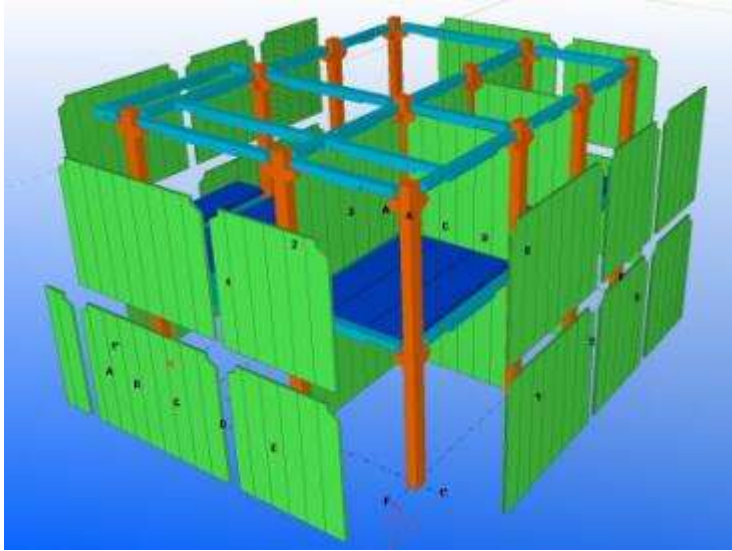


TAMPAK DEPAN



TAMPAK BELAHANG

PROJECT APPLICATION



PROJECT APPLICATION



PEMERINTAH PROVINSI DKI JAKARTA
BADAN PELAYANAN TERPADU SATU PINTU

NOMOR / TGL IMB	: 158/8.1/31.75.07.000/-1.785.51/2015
LOKASI	: JL. VILLA TAMAN DUREN SAWIT KAV.15 RT.005 RW.016 NO.15
JENIS KEGIATAN	: MENDIRIKAN BANGUNAN BARU
PENGUNAAN	: RUMAH TINGGAL
JUMLAH LANTAI	: 2 LANTAI ...BS; 2 LT;...MZ;...RA
PERENCANAAN	: ARSITEKTUR :
BANGUNAN	: NO. TELP :

BERSATU PADU MEMBANGUN
JAKARTA YANG TERTIB



PROJECT APPLICATION



PROJECT APPLICATION



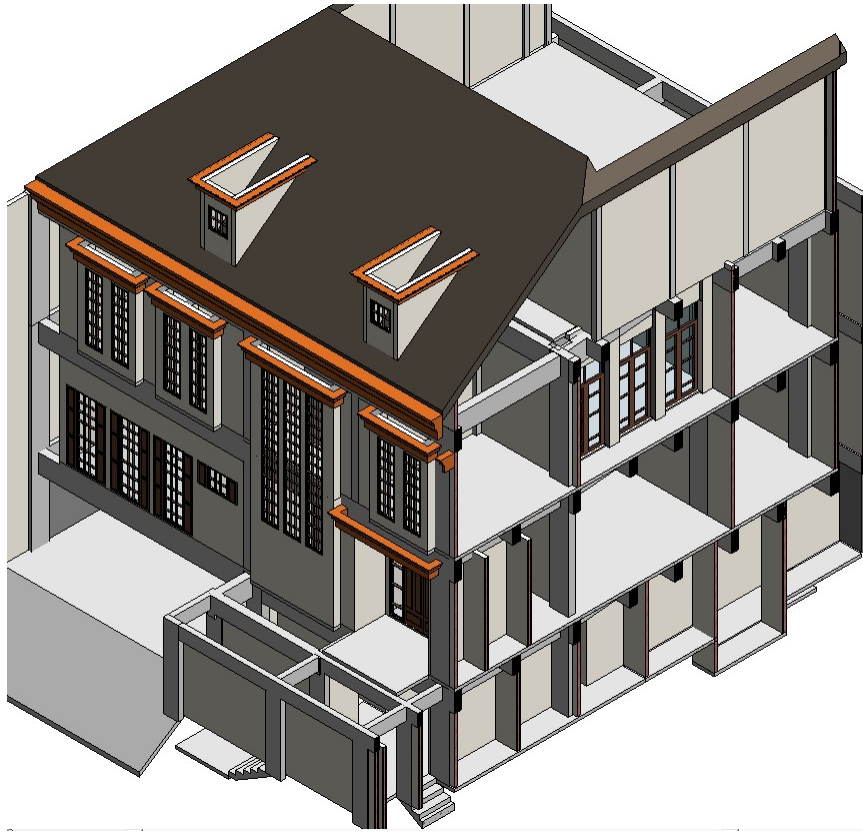
PRECAST HOUSE PANTAI MUTIARA



PROJECT APPLICATION



PROJECT APPLICATION



RUMAH DONNA



PROJECT APPLICATION



NEXT FUTURE WAY OF DESIGN AND CONSTRUCTION

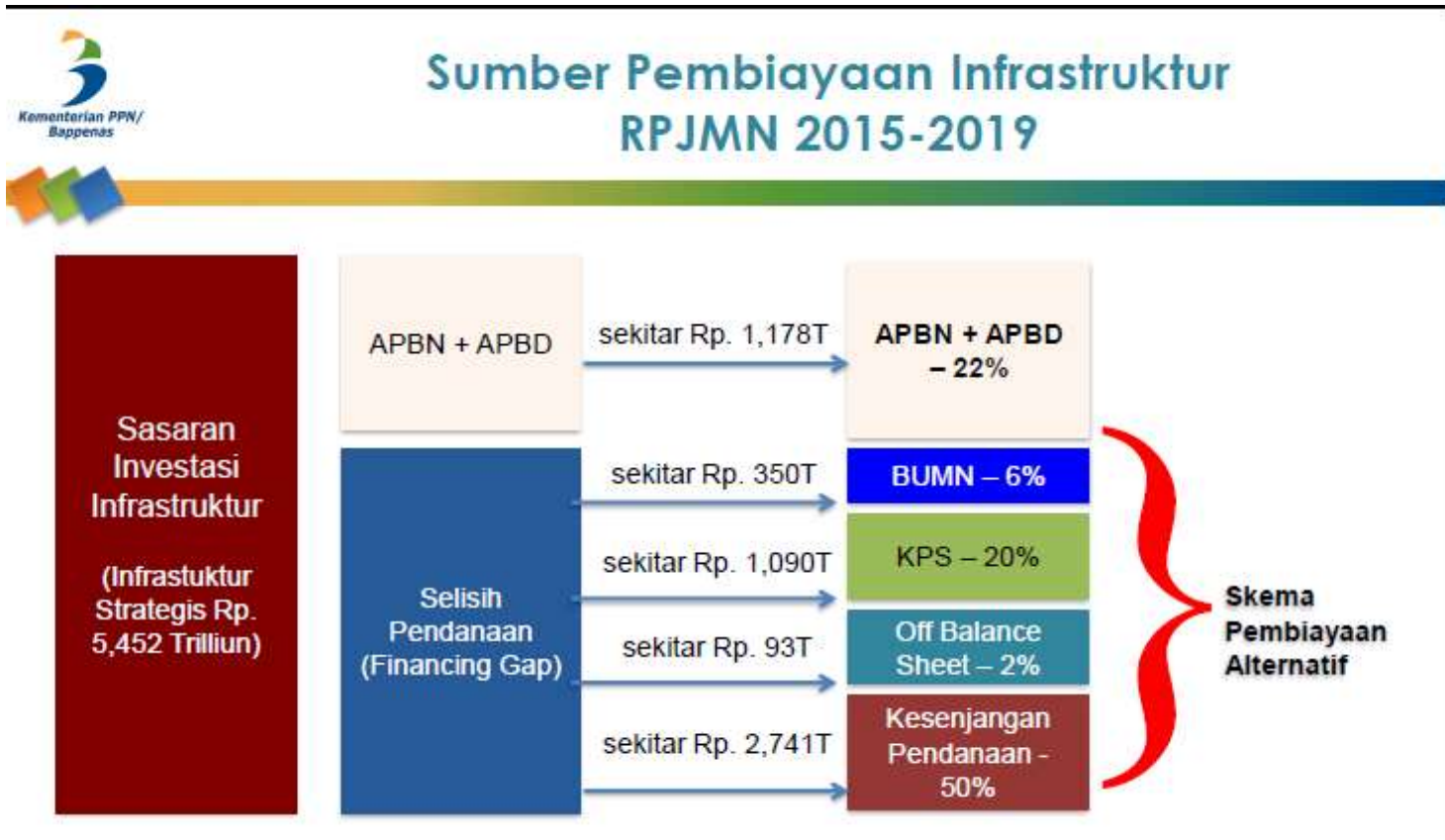


POSSIBLE ?

DIFFICULT....BUT MAKE IT POSSIBLE



NEXT FUTURE WAY



30% Gov Budget : 70% PPP

Pemerintah saat ini mempersiapkan industri konstruksi nasional.....

Perlu tanggapan yang responsive....

Jika tidak.....silakan gigit jari di negeri sendiri.....

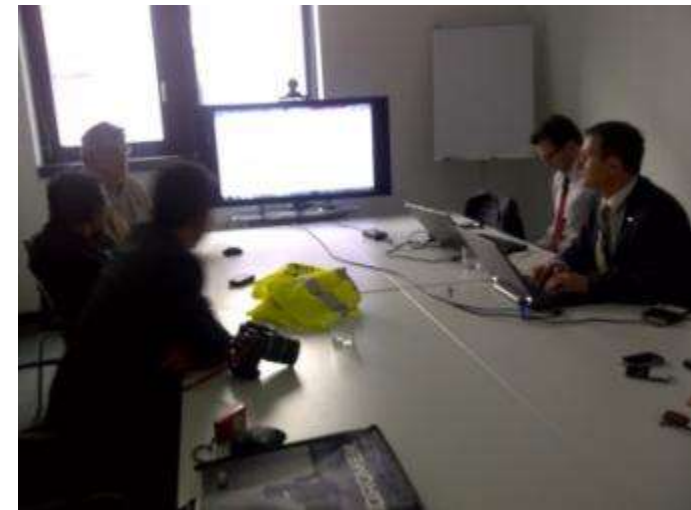
BAUMA 2013



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Matchmaking with Tekla Germany



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Mobil: 0172 8484856
Telefax: 06196-4730840

Tekla GmbH
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69760 Eschborn, Deutschland

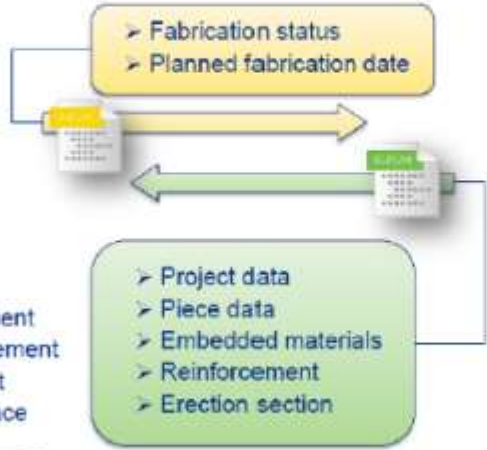


German manufacture industry supply
precast machinery production to all over
the world

Ready to aid Indonesia to implement BIM
in precast industry

Precast Automation

> Elematic integration schema



- > Estimating
- > Production Management
- > Storage Yard Management
- > Material Management
- > Machinery Maintenance Management
- > Costing
- > Quality Control

- > Parametric 3D Building Modeling
- > Accurate detailing
- > Adaptive reinforcement & connections
- > 4D Visualization



Solution to manage and optimize fabricators whole value creating process



**Conceptual Design
Sales & tendering**

**Design & detailing,
output data for
production and site**

**Production planning
& Management**

**Storage handling,
delivery and
coordination**

**Installation planning,
management and
coordination**

- Accurate tendering quantities and BOM
- Study alternative solutions for optimal precast concept
- Review constructability
- Sales model and powerful visualizations to clearly present your concept

- Interoperability and collaboration
- Accurate, multi-material detailing tools
- Error free, up to date data and documents
- Customizable to company and project specific needs
- Change management
- RFI & Issue control

- Data for production planning
- Accurate, organized purchase quantities
- Data for production machinery
- Integration to planning & manufacturing software
- Status management
- RFI & visualizations

- Geometry data for stockyard planning
- Accurate and organized data for lotting and delivery planning
- Status management and co-ordination with manufacturing and site

- Data and visualization for Installation planning
- Quantity and element data for scheduling
- Status management and co-ordination with stockyard and factory
- Progress documentation
- Visualizations & RFI

DESIGN

FABRICATE

BUILD

BIM IN CONSTRUCTION



Fig. 2: Iconic and complex building which was elaborated by BIM Technology (Heino,2012)

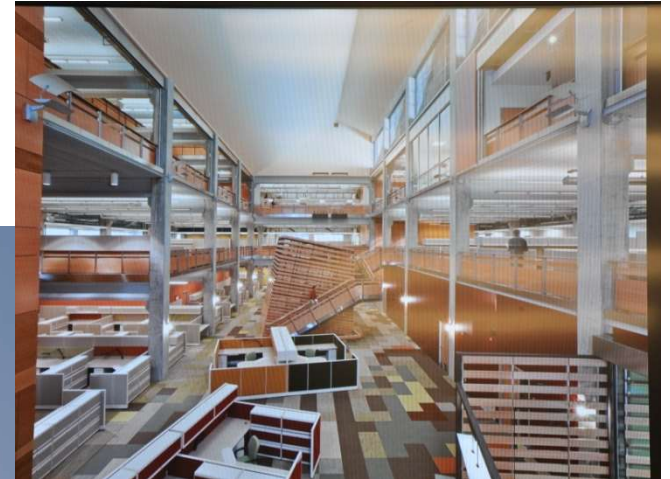
BIM IN CONSTRUCTION



Fig. 3: Precast/Prestressed Building using BIM Technology (Heino,2012)

US Trimble buy Tekla !

- Impression for site visit
 - Iconic project Apple Headquarter using precast by Clark Pacific



A flying saucer form of 710.000 m² area in Cupertino which use precast system because the excellency in quality and fast construction

**From Building Information Modelling to Automation
Production, The Next Future For Indonesia
Precast/Prestressed Construction Industry to The
Ultimate Solutions for Infrastructure and Housing**





If design approve then we just push the button...



We Are Precaster can provide fast and precise design with aid of BIM

Don't give up for Indonesian.....We are in the same boat



TEKLA



Revit
Architecture

DON'T BE TOO LATE



NEXT FUTURE

- THE FIRST TAKE A MEASURE RISK....TO MAKE IT POSSIBLE.....
- WILL TAKE ADVANTAGE THAT DIFFICULT TO FOLLOW.....