

SISTEM PRACETAK UNTUK RUMAH SEDERHANA TAPAK MENUJU INDUSTRIALISASI KONSTRUKSI PERUMAHAN



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PELATIHAN PENGAWAS BETON PRACETAK

MALL BOTANI SQUARE – PERUMNAS DRAMAGA CIBUNGBULAN

30 JANUARI – 2 FEBRUARI 2018

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Pendahuluan

- Pemerintah Kabinet Kerja mempunyai program unggulan percepatan pembangunan infrastruktur dan perumahan
- Kualitas produk dan kecepatan delivery menjadi isu penting, mengingat dana program tersebut diambilkan dari pengalihan subsidi BBM.
- Industri pracetak dan prategang mempunyai karakteristik yang cocok untuk memenuhi kebutuhan tersebut .
- Renstra Kementerian Pekerjaan Umum dan Perumahan Rakyat 2014-2019 menargetkan konstruksi ini minimal mencapai pangsa pasar 30% industri konstruksi nasional
- Perum Perumnas sebagai Badan Usaha Milik Negara (BUMN) yang mengkhususkan diri pada Pembangunan Rumah Sederhana untuk Masyarakat Berpenghasilan Rendah (MBR), sejak tahun 2016 mulai untuk mengembangkan sistem pracetak untuk rumah sederhana tapak, yang diharapkan akan menjadi pelopor industrialisasi konstruksi Perumahan

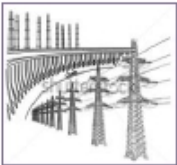
Program Sejuta Rumah



INFRASTRUKTUR YANG HARUS DIBANGUN 2015-2019 (2)



- Pembangunan **65 Waduk Baru** dan 33 PLTA
- Pembangunan/Peningkatan jaringan irigasi **1 Juta Ha**
- Rehabilitasi 3 Juta Ha Jaringan Irigasi



- Pembangunan **2 kilang** minyak 2x300 ribu barrel
- Pembangunan FSRU 5 lokasidi Jawa Barat/DKI Jakarta, Jawa Tengah, Jawa Timur, Sumatera Utara dan Lampung
- Jaringan gas kota sebesar 90 rb sambungan rumah
- Pembangunan **SPBG 75 unit**
- Rasio elektrifikasi menjadi 96,6 persen
- Pembangkit listrik sebesar 35 ribu MW
- Gas bumi untuk 600 ribu nelayan



- Jangkauan Pitalebar/broadbanddi 100% kab/kota
- Indeks e-government mencapai 3,4 (skala 4,0)
- Pengembangan e-pengadaan, e-kesehatan, e-pendidikan, dan e-logistik



- Pembangunan Rusanawa **5.257 Twinblok (515.711 rumah tangga)**
- Bantuan stimulan perumahan swadaya **5,5 Juta rumah tangga**
- Penanganan kawasan kumuh **37.407 Ha**
- Fasilitasi kredit perumahan untuk MBR **2,5 Juta rumah tangga**



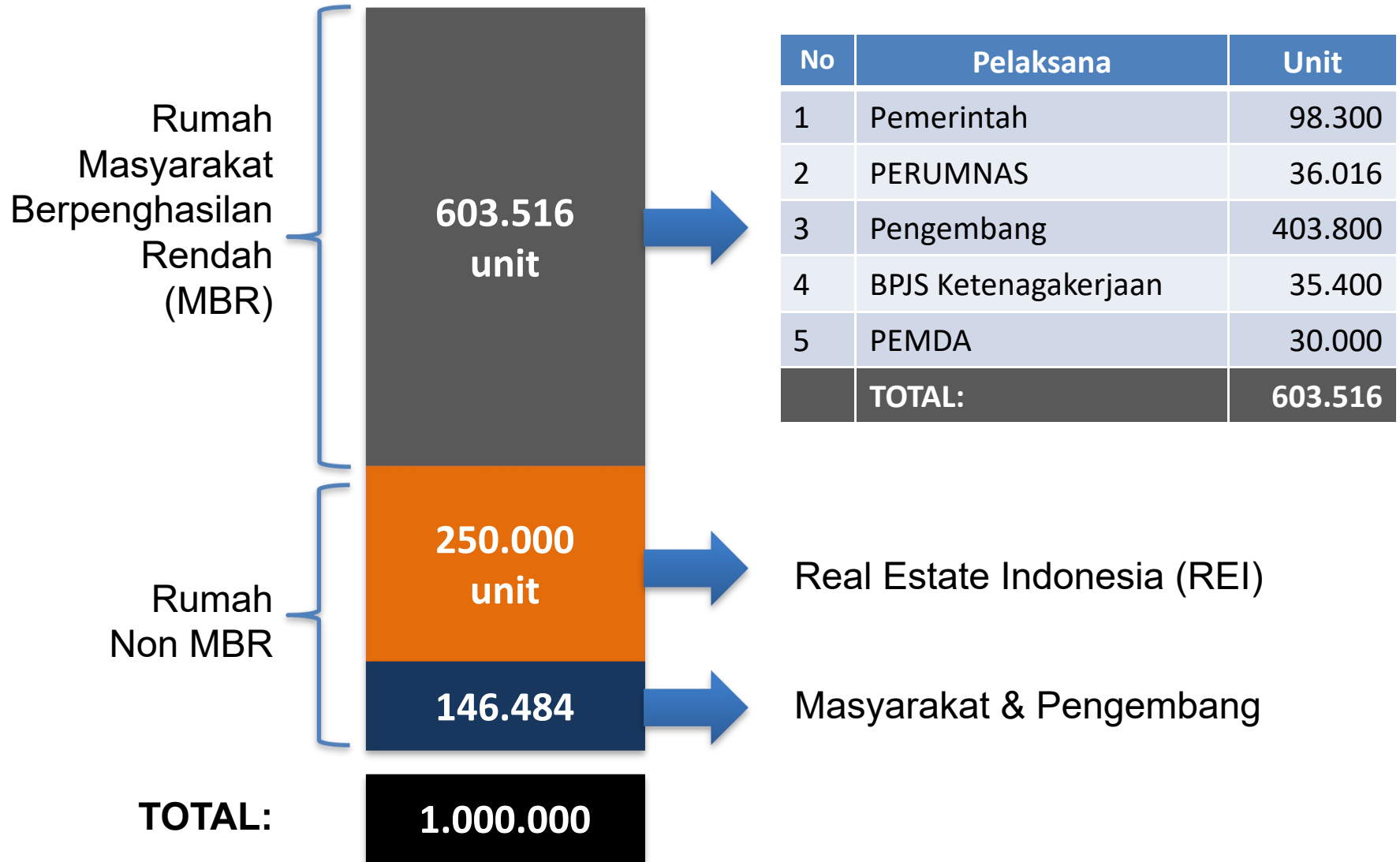
- Pembangunan SPAM di perkotaan 21,4 juta sambungan rumah (268.680 liter/detik)
- Pembangunan SPAM di perdesaan 11,1 juta sambungan rumah (22.647 desa)



- Pembangunan sistem air limbah komunal di 227 kota/kab dan terpusat di 430 kota/kab
- Pembangunan IPLT untuk pengelolaan lumpur tinja perkotaan di 409 kota/kab
- Pembangunan TPA sanitary landfill dan fasilitas 3R di 341 kota/kab dan fasilitas 3R terpusat & komunal di 294 kota/kab
- Pengurangan genangan seluas 22.500 Ha di kawasan permukiman



TARGET PROGRAM SEJUTA RUMAH



PROGRAM STRATEGIS TAHUN 2015-2019
BIDANG BINA KONSTRUKSI



**Peningkatan Sumber Daya
Pembangunan Infrastruktur**

125 BUJK

Peningkatan BUJK
ke Kualifikasi Besar

50.000 Orang

Jumlah insinyur baru
konstruksi bersertifikat

**200.000
Orang**

Jumlah teknisi bersertifikat

**500.000
Orang**

Jumlah tenaga terampil
bersertifikat

10.000 orang

Jumlah
instruktur/asesor
pelatihan konstruksi

10.000 Orang

Jumlah Tenaga
Ahli/Manajer Proyek
Terlatih

40.000 Orang

Jumlah

40%

Pekerjaan
konstruksi yang
menerapkan
manajemen mutu
dan tertib
penyelenggaraan
konstruksi

Rp.15 Triliun

Ekspor jasa
konstruksi ke luar
negeri

30%

Penggunaan
beton pracetak



KEMENTERIAN PEKERJAAN UMUM DAN PERUMAHAN RAKYAT

INDUSTRI PRACETAK DALAM PEMBANGUNAN RUMAH SUSUN

MATERI
DIREKTORAT JENDERAL PENYEDIAAN PERUMAHAN

Pada Acara

Konferensi Pracetak dan Prategang
Concrete Show SEA 2015



JIEXPO KEMAYORAN - JAKARTA, 29 - 30 OKTOBER 2015

Pengalaman Industrialisasi Perumahan di Manca Negara

ELEMAT 16

HANWHA: BISMAYAH NEW CITY, IRAQ

The 1st and the largest city development project ever in Iraq

Project	Bismayah New City	
Developer	National Investment Commission of Iraq (NIC)	
Design and Construction	Hanwha Engineering and Construction Co.	
Contract Amount	USD 7.75 Billion	
Location	10 km from Baghdad	
Project Detail	Land development works Housing construction work	
Work Period	7 years: 2 design, 5 execution	
Total No. of Population	600 000	
Target No. of Households	100 000	80-120m2
Area Size	1, 830 ha	



Pengalaman Industrialisasi Perumahan di Manca Negara

PRECAST CONCRETE ELEMENTS

Ehsew Anlagen- und Maschinenbau GmbH, 64628 Glanberg, Germany

One of Russia's largest construction groups modernises two precast plants at a cost of 12 million euros

SO-155 is one of Russia's largest construction groups and has a closed production cycle - from the production of the concrete to the handover of turnkey residential and industrial buildings to the Russian population. The company was established in 1954 as Stroyinvesttrust No. 3, which later became SO-155. The group is represented in over 40 cities in Russia with over 40 plants and has more than 40,000 employees.

ZAO KPSK KIn is a subsidiary of the group and operates one of these 40 plants in KIn, approx. 70 km northwest of Moscow. Ehsew Anlagen- und Maschinenbau GmbH from Eisenberg, Germany, was recently awarded the contract for the complete reconstruction of the existing plant facilities. The newly installed equipment is consisted for the

manufacture of sandwich walls, solid walls and floors. The production of the different types of element is accomplished by two circulation plants, which are supplemented by extensive reinforcement manufacturing equipment made by progress Maschinen & Automation, an affiliated company of Ehsew Anlagen- und Maschinenbau. Apart from the

System Evolution mesh welding machine, an ESA 5 12 automatic strip bending machine was also applied for cutting and manufacturing strips off the coil. Furthermore the plant was equipped with a ladder welding machine, a system for the processing of bars and a vertical manipulator for the welding of reinforcement cages.



Russia's largest construction group arches entire skyline of high-rise apartment buildings with the precast concrete elements produced.



SO-155 is also involved in the social sector with facilities such as kindergartens and schools.



Commissioning of the concrete distributor in KIn - a completely new precast plant is being erected here for the production of sandwich walls as well as solid wall and floor elements.



Ehsew Precast Engineering equipped the Domodedovo works of the SO-155 construction group with a production plant for prestressed hollow core slabs.

PRECAST CONCRETE ELEMENTS



Concreting of the first solid wall elements in Kemerovo



The leveling beam is used to tow up the freshly discharged concrete.

concreting of the first elements for the construction of a kindergarten were delivered and assembled.

Further Progress Group projects on the territory of the former Soviet Union

The existing plant facility was reconstructed at OOO "Kemerovskiy DSK", based in Kemerovo. The company belongs to the "Siberian Business Union", the largest Siberian conglomerate in Russia. The parent company has existed since 2004 and owns not only an airport, but also over 200 companies from the most diverse sectors - mining and mechanical engineering, agriculture and the construction industry as well as sports and public health facilities. A circulation plant from Ehsew Anlagen- und Maschinenbau was applied, in which specially designed pressing rollers circulate in addition to conventional rollers for the production of sandwich walls with thermal insulation. Solid floor elements are manufactured on the pressing rollers; these are used especially for larger apartments on account of their higher load-bearing capacity.

Incocem, an affiliated company of Ehsew Anlagen- und Maschinenbau, additionally applied a battery mould with 6 chambers for 30 elements for the production of ventilation shafts. This solution produces a higher output and requires less space. The further scope of delivery includes 2 cast moulds with compaction and heating system as well as three battery moulds with 20 chambers each for the production of inner walls.

The reinforcement machines were supplied by progress Maschinen & Automation: a ladder welding machine, an automatic strip bending machine and a straightening/cutting machine.

A new plant with the most diverse equipment is being built in the city of Ulyanovsk, which extends over both sides of the Kuybyshev Reservoir on the Volga. The turnkey company OOO T2.Kontrol wishes to use the investment in future to manufacture sandwich walls with integrated insulation as well as solid partition walls, floor elements and prestressed hollow core

slabs. The building project is being financed through the first Export Ehsew Anlagen- und Maschinenbau is acting here as the general contractor and, apart from a circulation plant and the above control system, is also supplying equipment from the entire Progress Group: a plant for the production of prestressed hollow core slabs from Ehsew Precast Engineering, various moulds for three-dimensional elements from Incocem as well as extensive equipment for the production of reinforcements from progress Maschinen & Automation. This includes an In-System Evolution mesh welding machine, an automatic strip bending machine, a ladder welding machine and a plant for the manufacture of reinforcement cages. In order to increase the degree of automation, the plant was equipped with a robot system consisting of a storage robot and a shunting robot with dismantling function.

Ehsew Anlagen- und Maschinenbau is also cooperating with other subcontractors on the project. Wigger, for example, is installing a new mixing plant and Kibitz a new bucket truck system.



In the new workshop of OOO "EMERCONOMISHY" in Novosibirsk, a production plant is being built consisting of two production plants, reinforcement production with a mesh welding machine, a new bucket truck and a mixing/recycling plant.

Pengalaman Industrialisasi Perumahan di Manca Negara

MATEC Web of Conferences

MATEC Web of Conferences 10, 01002 (2014)
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Industrialised Building System in Malaysia: A Review

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Abstract. The construction industry in Malaysia is experiencing a migration from conventional methods to a more systematic and mechanised method known as the Industrialised Building System (IBS). Each state in Malaysia is currently examining the developments of the IBS and its potential to overcome the shortages of housing accommodations in this country. The Malaysian government, involved through its agency, the Construction Industry Development Board (CIDB) has been persistently pushing the construction industry to utilise the IBS method of construction since the year 2003. It is a part of an incorporated endeavour to further improve the aptitude, potential, effectiveness and competitiveness of the industry as well as to diminish the industry's dependence on foreign labour. This is also an attempt in the Malaysian construction industry to encourage positive inroads in matters associated to construction-site safety with regards to a working environment which is cleaner, more convenient and more organized.

1 Introduction

In Malaysia, the IBS was initiated since the 1960s, when the Ministry of Housing and Local Government made visits to several European municipalities with the objective of assessing their housing development plans. After a successful tour run in 1964, the Malaysian government launched a project to put to the test the efficiency of the IBS. This is to gauge its potential as a system that could be deployed as an alternative to the conventional system which already had a strong foothold in Malaysia [1]. The key objectives looking to be fulfilled include the acceleration as well as the increase of affordable housing of substantial quality here in Malaysia [2]. The IBS proved to be a success. Not only was it efficient in accelerating the construction of housing projects, it also improved the quality and affordability of the projects in which the IBS was deployed. Based on different reference materials accepted by authorities in the construction fraternity, we have several ways of defining the IBS [3]. Despite the IBS being well-known and accepted by most construction firms due to its theoretical advantage in terms of speed, safety and quality, wet construction method is still widely regarded in Malaysia as a conventional and safe option despite incurring higher costs and slower production rates.

Returning to the definition of the IBS, it is simply regarded as a construction technique in which components are manufactured in a controlled environment either on or off-site [4]. These are transported, positioned and assembled into a structure with the least of additional site work. The components of the IBS are materials that are produced in factories where quality control is not compromised on. This also minimises activities at the site of construction

The system can only be used for buildings with simple and easy designs. The use of the IBS in construction is getting better by the day. As reported, there are at least 21 different manufacturers and suppliers that are promoting their components in Malaysia. An IBS Centre has also been established in Jalan Chan Sow Lin, Cheras, Kuala Lumpur. These are the authorities who are responsible for implementing strategies and introducing breakthroughs in the IBS technology to improve its performance and quality in the construction industry as well as to reduce dependencies on foreign labour, avoiding the flooding of the local construction market with a foreign workforce.



Figure 4. Jalan Pekeliling Flat, Kuala Lumpur

3 Classification of the IBS

There are generally five types of Industrialised Building System (IBS). These are:

3.1 Precast concrete system (Walls, Slabs, Columns, 3D Components)

Precast concrete system is the group that is most widely used in the IBS. It includes precast concrete columns, beams, slabs, walls, "3-D" components (e.g.: balconies, staircases (Figure 5), toilets, lift chambers, refuse chambers), lightweight precast concrete, as well as permanent concrete formworks.



Figure 5. Precast Staircase

Pengalaman Industrialisasi Perumahan di Manca Negara

housing-projects

singapore

HDB widens adoption of prefab to boost productivity



Artist impression of Valley Spring @ Yishun BTO Project. In March this year, the PPVC method was used for the first time to construct 824 BTO units at Valley Spring @ Yishun. Illustration: Housing & Development Board

By 2019, bathrooms of all newly launched HDB flats will be assembled off-site



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BY WONG PEI TING

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SINGAPORE — Prefabrication will play a bigger role in the Housing and Development Board's (HDB) efforts to boost construction productivity, which is on track to improve 25 per cent by 2020 from 2010 levels.

ADVERTISING

Learn more

SONY



Productivity levels at HDB construction sites last year, defined as the amount of floor area completed per worker per day, was 12.3 per cent higher than in 2010, said the public housing authority.

Persyaratan Teknis Rumah Tapak



MENTERI PERUMKIMAN DAN PRASARANA WILAYAH
REPUBLIK INDONESIA

KEPUTUSAN MENTERI PERUMKIMAN DAN PRASARANA WILAYAH
NOMOR: 403/KPTS/M/2002

TENTANG PEDOMAN TEKNIS PEMBANGUNAN RUMAH SEDERHANA SEHAT (RS SEHAT)

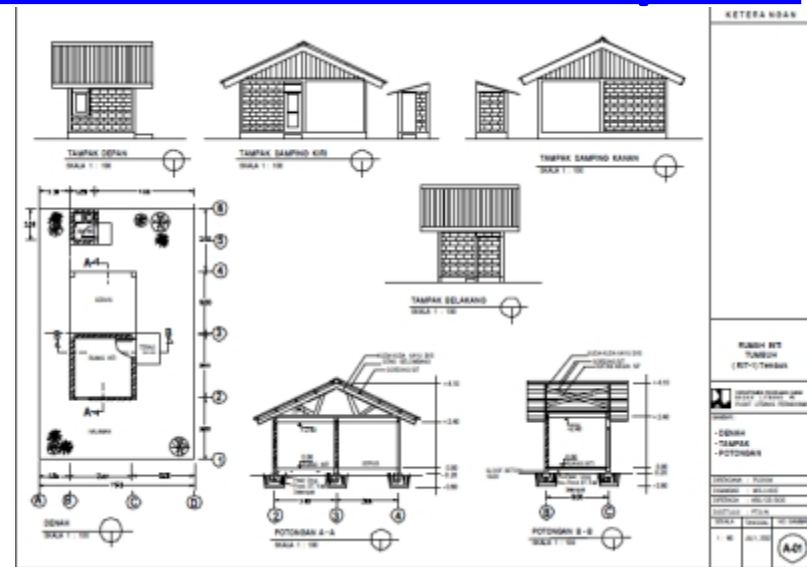
MENTERI PERUMKIMAN DAN PRASARANA WILAYAH,

Merimbang :

- bahwa rumah adalah merupakan salah satu kebutuhan dasar manusia dan merupakan faktor penting dalam peningkatan harkat dan martabat manusia, maka perlu diciptakan kondisi yang dapat mendorong pembangunan perumahan untuk menjaga kelangsungan penyediaan perumahan bagi seluruh lapisan masyarakat
- bahwa kemampuan masyarakat khususnya yang berpenghasilan rendah masih terbatas untuk membeli rumah yang layak, sehat, aman, serasi, dan teratur, maka perlu pembangunan rumah yang dapat dilakukan secara bertahap.
- bahwa beragamnya potensi bahan bangunan dan budaya di Indonesia menuntut suatu penanganan perumahan yang berbeda-beda pada setiap daerah sesuai dengan potensi lokal, agar biaya pembangunan rumah dapat dijangkau oleh masyarakat berpenghasilan rendah
- bahwa di samping pedoman teknik pembangunan perumahan sederhana tidak bersusun, pedoman teknik pembangunan kaping siap bangun dan pedoman teknik pembangunan perumahan sangat sederhana, maka untuk meningkatkan penyediaan perumahan yang mengakomodasi potensi bahan bangunan, budaya dan aspirasi lokal perlu dilengkapi dengan menyempurnakan pedoman teknik yang sudah ada
- bahwa untuk maksud tersebut huruf a, b, c, dan d perlu pengaturan dan penetapan pedoman teknis pembangunan rumah sederhana sehat berbasis pada potensi lokal yang perlu ditetapkan dengan Surat Keputusan Menteri Perumahan dan Prasarana Wilayah

Mengingat :

- Undang Undang Nomor 4 Tahun 1992 tentang Perumahan dan Permukiman (Lembaran Negara Tahun 1992 Nomor 23, Tambahan Lembaran Negara Nomor 3469)
- Undang Undang Nomor 22 Tahun 1999 tentang Pemerintahan Daerah (Lembaran Negara Republik Indonesia Tahun 1999 Nomor 60, Tambahan Lembaran Negara Republik Indonesia Nomor 3839)
- Peraturan Pemerintah Nomor 80 Tahun 1999 tentang Kawasan Siap Bangun dan Lingkungan Siap Bangun Berdiri Sendiri (Lembaran Negara Tahun 1999 Nomor 171, Tambahan Lembaran Negara Nomor 3892).

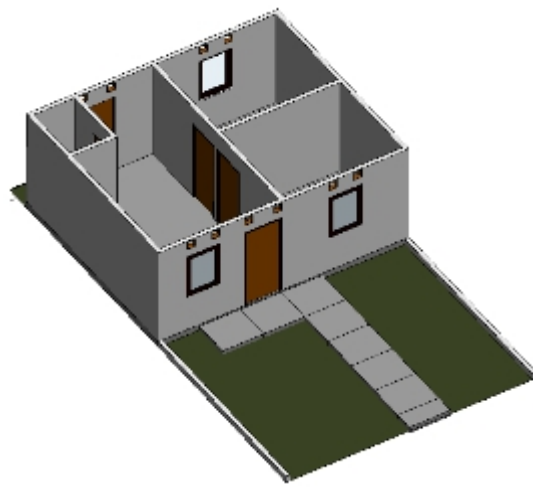


Kondisi Penyediaan Perumahan secara Konvensional

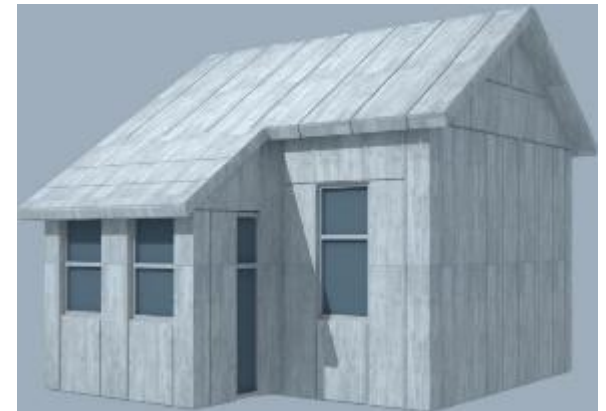
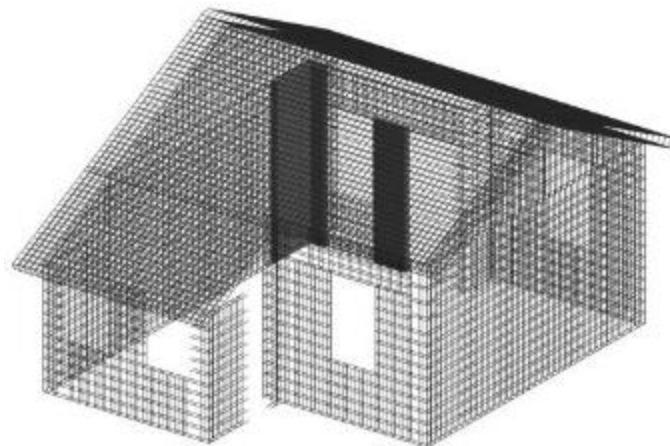
- Para pelakunya terjebak dalam kondisi yang menghasilkan produk yang tidak optimal
 - Para pelaku konstruksi yang berkompeten sudah sangat menurun karena kondisi yang tidak kondusif sudah berlangsung sangat lama
 - Kontrol kualitas teknis oleh para pelaku (pemilik, pengembang, pelaksana, Pemda) baik dari proses perencanaan dan pelaksanaan sangat minim
 - Pada sektor formal: biaya non teknis “tinggi”, pengembang punya target keuntungan, sedangkan affordabilitas masyarakat terbatas --→ kualitas terkorbankan
- Masyarakat tidak punya pilihan selain menerima produk yang tidak optimal tersebut. Pada kondisi ekstrem di daerah rawan gempa, rumah rubuh dan menimbulkan korban jiwa
- [Pengamatan IAPPI](#)
- [Pengamatan Kemen PU PR](#)

Sejarah Perkembangan Sistem Prefab untuk Rumah Tapak





PENGEMBANGAN SISTEM PRACETAK PERUMNAS 2016-2017



PERENCANAAN SISTEM RUMAH
SEDERHANA TAPAK PERUMNAS
DRAMAGA CIBUNGBULAN

EVALUASI PELAKSANAAN SISTEM
RUMAH SEDERHANA TAPAK
PERUMNAS DRAMAGA
CIBUNGBULAN

Perumnas Dramaga Cibungbulan



Perumnas Dramaga Cibungbulan



INDUSTRIALISASI :
SISTEM PRODUKSI MASSAL
KOMPONEN DINDING RUMAH :
TILTING TABLE DAN BATTERY SYSTEM

PENUTUP

- Program Percepatan Pembangunan Perumahan 'Sejuta Rumah' 2015-2019 memerlukan teknologi terobosan untuk mendapatkan kualitas yang baik dan waktu delivery yang cepat
- Industri pracetak dan prategang adalah industri yang cocok dengan kebutuhan tersebut, dan saat ini didorong Kementerian Pekerjaan Umum dan Perumahan Rakyat untuk dapat diterapkan minimal 30% pangsa pasar konstruksi nasional
- Perum Perumnas telah memulai sistem produksi pracetak dengan sistem bearing wall join plate embedded, yang mendapatkan sambutan yang baik dari masyarakat. Pengalaman dari sistem produksi di Perumnas Dermaga Cibungbulan masih perlu disempurnakan, dan nantinya akan dishare ke daerah lain di Indonesia
- Studi lebih lanjut dengan sistem-sistem lain dapat dicobakan di Cibungbulan,
- Sistem produksi untuk melangkah ke otomatisasi produksi perlu dipelajari untuk peningkatan kualitas dan kecepatan