BCA AWARDS 2016
Recognising Excellence in the Built Environment

Building and Construction Authority
We shape a safe, high quality, sustainable and friendly built environment.
The **Construction Productivity Awards (CPA)** recognise outstanding industry firms for going the extra mile to achieve construction productivity improvements and promote higher productivity in the industry.

**The CPA – Projects** is awarded to project teams that have demonstrated productivity in their projects from the design to the end of construction. The award aims to:

- Encourage designers to come up with labour-efficient designs;
- Encourage the adoption of labour-efficient construction methods; and
- Recognise project teams for their excellent project planning and coordination in enhancing productivity.

The award has nine sub-categories:

- Residential Landed Buildings
- Residential Non-landed Buildings (for projects with Gross Floor Area of less than 25,000m²)
- Residential Non-landed Buildings (for projects with Gross Floor Area of more than or equal to 25,000m²)
- Commercial and Office Buildings
- Institutional Buildings
- Industrial Buildings
- Mixed Development Buildings
- Additions & Alterations / Upgrading Buildings
- Civil Engineering Projects
76 Shenton
(Residential Non-Landed Buildings Category < 25,000 m²)

CONSTRUCTION PRODUCTIVITY AWARD – Projects

KEY FEATURES

- Standardisation of precast elements that were delivered to site for Just-In-Time (JIT) installation, thereby reducing inventory costs and cycle time greatly.
- Adoption of double-tier precast columns and walls doubled the crane efficiency.
- Use of unitized window-wall façade which is lighter than a full curtain wall system improved the constructability.
- Installation of jet fan system for the car park ventilation was a cost and time effective alternative over conventional complex ducted mechanical system. Overall building load was reduced, alleviating structural stress hence achieving a better total building performance.
- RCS CB 240 Self Climbing System with VARIO GT 24 girders used for the core walls greatly reduced lead time which conventional system would need for dismantling and erection for use in the next construction level. This helped to achieve productivity improvement.
- Concrete placing boom was used for the project. This machinery had a small space requirement and moved upwards together with the structure, improving constructability and hastening construction work.
- PERI SRC circular formwork adopted eased the assembling of the rigid circular formwork at high-void area which saved time and manpower as compared to the adoption of conventional system.
- Assembly of the PERI GRIDFLEX aluminium formwork was easy and fast.
- GRIDFLEX’s unique Early Striking Beam feature had allowed for early dismantling unlike traditional system. This allowed for subsequent architectural and M&E works to commence early.
- RCS climbing protection panels were used at the perimeter to provide gap-free enclosure and safety barriers against falling from height. Being crane-independent, the tower crane could be maximized for other lifting activities and this helped to improve productivity.
- Building Information Modelling (BIM) adopted reduced uncertainties like clashes and conflicts before construction thus preventing abortive or rectification works later and enhancing productivity.

Developer | Hong Leong House Pte Ltd
Architectural Consultant | DP Architects Pte Ltd
Structural Consultant | TY. Lin International Pte. Ltd.
M&E Consultant | Belmacs Pte Ltd
Design and Build Contractor | Kimly Construction Pte Ltd

PLATINUM
CapitaGreen
(Commercial Buildings Category)

CONSTRUCTION PRODUCTIVITY AWARD – Projects

KEY FEATURES

- Extensive use of precast elements such as columns and beams helped the project to achieve high construction productivity.
- Structural steel system was adopted which improved speed of construction.
- Application of dry fire proofing system to the steel beams allowed overlapping work with other trades to be done to reduce construction time.
- Extensive use of off-site prefabrication and pre-assembling such as curtain wall, glass partition and balustrade helped to achieve optimum site efficiency.
- For the construction of the basement, a top down method was adopted to overcome limited construction space and allowed basement and superstructural works to be carried out concurrently. Large diameter bored piles of 3.5m were also used to reduce total number of piles needed hence increasing efficiency in the installation work.
- Use of PERI formwork system allowed crane independent climbing as and when necessary to save costs on expensive crane operations.
- Efficient methods were adopted such as lotus joint for precast component installation, Tatekata Ace for steel column installation and Pitakai for faster installation of precast columns and beams to enhance productivity on site.
- Adoption of G100 and G80 high strength concrete helped to shorten the construction cycle time.
- Huge and high speed temporary lift from Japan to transport big machineries and equipment instead of relying on tower cranes saved time and improved productivity.

Developer
CapitaLand, CapitaLand Commercial Trust and Mitsubishi Estate Asia

Architectural Consultant
RSP Architects Planners & Engineers (Pte) Ltd

Structural Consultant
RSP Architects Planners & Engineers (Pte) Ltd

M&E Consultant
Squire Mech Pte Ltd

Design and Build Contractor
Takenaka Corporation
# Acacia Breeze @ Yishun
(Residential Non-Landed Buildings Category > 25,000 m2)

**CONSTRUCTION PRODUCTIVITY AWARD – Projects**

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<th>Developer</th>
<th>Housing &amp; Development Board</th>
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<td>Architectural Consultant</td>
<td>Surbana Jurong Consultants Private Limited</td>
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<td>M&amp;E Consultant</td>
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**KEY FEATURES**

- Extensive use of precast components such as double tier precast columns cut down construction time as compared to cast in-situ method.
- High repetition of precast components adopted help to maximize the mould usage and facilitate ease of construction. This high repetition was further aided by block configurations that were replicated in the development for consistency in design.
- Form of the residential block was decidedly simple with clean lines hence it was simple to construct the buildings as there were no major protrusions, tills, bends and twists.
- Machineries like scissors lift, boom lift, bobcat skid steer loader were widely use to boost work productivity.
- Adoption of innovative products such as the double tier column ladder for ease of rigging and unrigging the 2-tier precast columns enhanced safety and work efficiency.
- Use of a movable safety screen integrated with working platform significantly improved labour efficiency and safety.
Punggol East C38 (Waterway Woodcress) (Residential Non-Landed Buildings Category > 25,000 m2)

CONSTRUCTION PRODUCTIVITY AWARD – Projects

KEY FEATURES

- Extensive use of standardised precast and prefabricated components which helped to reduce formwork type, increase fabrication efficiency and enhance productivity.
- Adoption of prefabricated steel structures for linkway and drop-off porch which offered better strength and flexibility in erection as compared to concrete, thus saving time and labour.
- Stone column method used for soil improvement yielded higher productivity and reduced cost as compared to conventional method of using jet grouting, vibro-compaction or soil mixing.
- Identical unit and façade layout design minimised the number of moulds required for the casing of precast facades and components which increased site productivity.
- Form liner was used to form timber strip pattern on precast façade and balcony wall which allowed painting to be carried out immediately, thus achieving the required pattern finishes effectively.
- Integration of water harvesting tank and E-deck landscaping irrigation reduced manpower for water pipes installation and usage of PUB water for irrigation.
- Implementation of splice sleeve mechanical connection system for precast column/wall and the precast “skin wall” for external side of precast components helped to improve site productivity.
- Building Information Modelling (BIM) was adopted to coordinate structural, architectural and M&E works and helped to reduce the risk of undetected clashing of M&E services. This helped to prevent abortive works.

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<td>M&amp;E Consultant</td>
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<td>Rich Construction Company Pte Ltd</td>
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Yishun Riverwalk  
(Residential Non-Landed Buildings Category > 25,000 m²)

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**KEY FEATURES**

- Prevalent usage of precast elements for superstructure works helped to accelerate the speed of superstructure construction and eliminated logistics problems, thereby increasing productivity.
- Full coverage of the external precast facade eliminated the use of external scaffold and reduced the amount of formwork needed.
- Repetitive unit designs and identical floor plans enabled the repeated use of formwork and precast moulds which saved time and manpower.
- 80% of the internal walls were precast panels and these were easy to transport, install and carry out finishing works.
- Prefabricated welded mesh was used which reduced the tasks of rebar positioning and tying work, hence improving productivity.
- Most of the linkways were designed using steel structures of identical sizes. Prefab steel columns together with a raft slab cum footing were used to expedite the linkway construction.
- Simple flat plate design concept at the first floor helped to reduce the time and manpower needed to construct the ground beams.
### Galaxis
(Commercial Buildings Category)

**CONSTRUCTION PRODUCTIVITY AWARD – Projects**

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<td>M&amp;E Consultant</td>
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**KEY FEATURES**

- Self-compacting concrete was adopted and this drastically improved productivity through eliminating the need for vibration compaction.
- The construction of the high volume space using ST100 helped to increase productivity and enhance safety at the same time.
- Table formwork for horizontal components and jump form for lift core and staircase core walls were adopted which improved safety, saved time and increased productivity.
- Semi-precast concrete components were adopted to simplify on-site construction process.
- Building Information Modelling (BIM) adopted allowed better visualization of the development even before construction and was able to highlight clashes and conflicts at an earlier stage, hence preventing abortive or rectification works. This helped to ensure that non-value added works were abolished thus achieving higher productivity and constructability.
- Use of flat plate with perimeter beams, post-tensioned beam and slab system, precast planters and staircase flights as well as prefabricated steel cage for columns increased the constructability of the project.
Aperia
(Mixed Development Buildings Category)

CONSTRUCTION PRODUCTIVITY AWARD – Projects

GOLD

KEY FEATURES

• The structural design of the project was based on flat slab with drop panels. For slabs with larger spans, post tensioning of the slab was adopted to reduce the slab thickness and the overall load on the columns and foundations.

• Standardisation of column sizes was adopted for efficient fabrication and construction.

• Extensive use of precast components such as staircases, concrete walls, concrete parapet in the carpark and concrete fins reduced labour on site and maximised productivity.

• Large diameter bored piles were used as much as possible to reduce the quantity of the bored piles needed hence improving efficiency in the installation work.

• The extensive use of aluminium-glass curtain wall and aluminium composite cladding together with use of precast wall and parapet reduced labour required for in-situ works and these improved the productivity for the architectural works.

• System toilet cubic partition, dry wall partition and lightweight hollow core precast concrete wall which were fast to erect were adopted to provide huge labour saving and increase the speed of construction.

Developer
Ascendas Real Estate Investment Trust

Architectural Consultant
ADDP Architects LLP

Structural Consultant
T C Sin Consultants Pte. Ltd.

M&E Consultant
Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

Design and Build Contractor
Soil-Build (Pte) Ltd
### 73 Ayer Rajah Crescent
(Industrial Buildings Category)

**CONSTRUCTION PRODUCTIVITY AWARD – Projects**

#### KEY FEATURES

- Using a raft foundation with a relatively light steel frame superstructure reduced the overall dead load of the building and eliminated the need for piling. The ground floor raft slab was able to be constructed with minimal excavation thus saving time and cost.

- The steel frame structural system adopted resulted in ease of construction at site.

- Regular grid was introduced which allowed a modular structural and architectural layout and elevation finish, thus ensuring all materials could be prefabricated to a tighter tolerance and achieving economies of scale. This helped to save time during fabrication and installation.

- Windows and external aluminium cladding were standardised to a single module for all tenancies, allowing rapid off-site fabrication which reduced wastage and fabrication time.

- Steel frame drywalls which can be erected easily were used for all tenancies, corridors and the external elevation to shorten the overall construction time.

- A simple platform lift that did not require a dedicated lift shaft, extensive lift pits or machine rooms was adopted to save installation cost and labour.

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<td>Tan + Tsakonas Architects</td>
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<td>Structural Consultant</td>
<td>Harvest Consulting Engineers LLP</td>
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<td>M&amp;E Consultant</td>
<td>Unipac Consulting Engineers LLP</td>
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<td>Design and Build Contractor</td>
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Nanyang Primary School
(Institutional Buildings Category)

CONSTRUCTION PRODUCTIVITY AWARD – Projects

KEY FEATURES

• Extensive use of precast elements such as staircase and precast slabs throughout the whole project reduced manpower usage on site.

• All the steel reinforcements were prefabricated off site and delivered to the worksite for installation. This reduced wastage of rebars and improved cycle time greatly.

• Standardisation of unit door and window sizes as well as repetitions of grids and floor heights resulted in efficient fabrication with better quality and less wastage in production.

• Dry partition wall system was used to divide the classrooms, resulting in fast erection thus saving time.

• Use of mast climbing platform and self-climbing perimeter scaffold reduced time and labour and resulted in improved productivity on the facade works as compared to the use of traditional scaffoldings.

• Use of system formwork in-lieu of metal scaffolding helped to achieve higher productivity.

• Concreting operation using hydraulic pump truck resulted in faster rate of casting thus reducing cold joints issue and saved man-hours and machinery time.

• Timber floor directly laid over structural floor omitted the need for screeding thus saving time and cost.

• For surfaces such as ceiling soffit and columns, spray painting was used to achieve more consistent finish and higher productivity.

Developer | Nanyang Primary School
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Architectural Consultant | LT&T AVID Architects Pte. Ltd.
Structural Consultant | ECAS-EJ Consultants Pte Ltd
M&E Consultant | William Ng Consultants Pte Ltd
Design and Build Contractor | Guan Ho Construction Co (Pte) Ltd