The BCA Construction Productivity Awards (CPA) recognise built environment professionals, consultants and builders for their achievements in improving productivity at project level and at firm level. The CPA also aim to encourage more firms in the industry to strive for higher construction productivity in their course of work.

There are two award categories:
CPA – Advocates
CPA – Projects
CPA – Advocates

CPA – Advocates is awarded to organisations in different categories, namely developers, consultants, builders and specialist contractors. Each category is assessed separately according to the firm’s efforts in initiating high productivity solutions in design, construction methods, processes and/or technologies adopted. These efforts should have translated into significant productivity improvements in their projects.

Assessment Criteria

Entries will be assessed on:

1. Buildable design score
2. Constructability score
3. Physical productivity
4. DfMA adoption and best practices
As Singapore’s lead government agency responsible for the planning and development of industrial infrastructure, JTC continually pushes boundaries in sustainability, innovation and construction productivity. This allows the organisation to respond quickly to evolving industry needs and overcome challenges such as manpower and resource constraints in today’s fast-changing built environment.

JTC ensures that developments are designed, built and managed sustainably. The organisation also adopts productive construction technologies, materials and processes to achieve high construction productivity in its projects. These initiatives include Design for Manufacturing and Assembly (DfMA) such as Prefabricated Prefinished Volumetric Construction (PPVC) used at the dormitory of JTC Poultry Processing Hub and the hybrid steel-concrete system for construction of the Inland Container Depot (ICD) at JTC Logistics Hub @ Gul.

Key Productivity Initiatives

- The dormitory at Poultry Processing Hub was constructed using Prefabricated Prefinished Volumetric Construction (PPVC) method. Dormitory modules are manufactured overseas and delivered in “flat-pack” panels, which are then assembled and installed with architectural finishes and Mechanical, Electrical and Plumbing (MEP) services in Singapore.

- This resulted in time savings, better quality and cleaner work site as compared to conventional method of construction.
Key Productivity Initiatives

• JTC Logistics Hub @ Gul adopted hybrid steel-concrete system for construction of the Inland Container Depot (ICD). The hybrid system consists of Form-Prefabricated Steel Reinforced Concrete (F-PSRC) columns and Thin Steel-plate Composite (TSC) Beams, and is suitable for heavy floor loading with long spanning beams and high headroom requirements.

• Site productivity and quality is improved as compared to conventional cast-in-situ concrete construction with the following benefits:
  a. Off-site fabrication
  b. Minimal on-site welding
  c. Minimal use of formwork
  d. No temporary propping or shoring required
  e. Lighter compared to precast concrete columns and beams
MOH HOLDINGS PTE LTD
Advocates (Developer)

CONSTRUCTION PRODUCTIVITY AWARD – ADVOCATES | GOLD

MOH Holdings (MOHH) is the holding company of Singapore’s public healthcare clusters comprising the National University Health System, National Healthcare Group and Singapore Health Services. To meet the rising demand for healthcare services, MOHH developed a construction productivity roadmap that aims to deliver these much needed healthcare facilities safely, with higher productivity, on time, within budget and of high quality finish.

Key Productivity Initiatives

- MOHH has adopted a continuum of Design for Manufacturing and Assembly (DFMA) technologies in public healthcare projects. The technologies included PPVC at Senja Polyclinic / Nursing Home and structural steel construction at Outram Community Hospital. Use of DFMA technologies speeds up on-site construction and reduces disamenities such as noise and dust to the surroundings.

- To regulate the implementation of productive technologies and maintain quality of works, MOHH created and implemented the Design Review Management Plan (DRMP) framework. DRMP is a progressive and structured review tool. It is a platform with base information and checklists catered to different project stages that facilitate consultants to conform and qualify deviations at various checkpoints. This tool allows more opportunity for project exploration, innovation and improves overall project efficiency.
City Developments Limited (CDL) is committed to raising construction productivity standards, and has consistently outperformed the industry’s minimum regulatory requirements in buildability. Through the pioneering adoption of sustainable building materials and innovative construction such as prefabricated construction technology, CDL has achieved both productivity gains and created value for the built industry.

Key Productivity Initiatives

- The Singapore Sustainability Academy (SSA) was the first development in Singapore to be built with Cross Laminated Timber (CLT) and Glued Laminated Timber (Glulam). The Mass Engineered Timber (MET) was obtained from sustainable sources.
- Prefabricating the timber components off-site has increased overall productivity, including efficacy in assembly and manpower reduction.
- The zero-energy SSA is also a Green Mark Platinum building, in recognition of its various energy-efficient design and features.
In line with BCA’s initiative to promote productivity in the construction industry, TW-Asia has been actively embracing DfMA approach and good practices by improving designs to enhance construction productivity.

**Key Productivity Initiatives**

- TW-Asia has pioneered the design and research of the PPVC technology using RC Composite Shear Wall System (patented). The consultant has collaborated with local University to conduct research and testing on the composite shear wall panels.

- Through research, testing and continual development, the RC Composite Shear Wall System was adopted in several projects, namely, The Clement Canopy, Lake Grande and Whistler Grand.

- Working in tandem with builders, TW-Asia has developed various connection details which improve productivity for on-site installation of the PPVC modules.
Established in Singapore in 1973, Meinhardt (Singapore) is one of the largest engineering consultancy firms in Singapore, and is a strong advocate for construction productivity, demonstrated in the many large-scale and complex projects undertaken through the years.

Key Productivity Initiatives

- For SMU-X project, Meinhardt (Singapore) worked with the Architect to develop the MET-steel hybrid structural system, with considerations for modular MEP system and prefabricated façade panels.
  - The use of Cross Laminated Timber (CLT) slabs extends from 2nd to 5th storey, and the timbers are procured from sustainable sources.
  - Structural steel columns and beams uses bolted connections. Thus, reducing the need for on-site welding works. Composite steel is also adopted for roof truss and link bridge.
  - The MEP modules come with passive displacement ventilation, which help to enhanced the efficiency of cooling the building.
  - Façade panels are prefabricated to improve productivity and to reduce manpower on site.

- Meinhardt has been championing construction productivity through innovating, formulating, and execution of safe, practical, and cost-effective construction methods such as top-down construction for basement works, the use of Mass Engineered Timber, extensive Structural Steel works, PPVC, and Advanced Precast Concrete System.
ECAS CONSULTANTS PTE LTD
Consultant

CONSTRUCTION PRODUCTIVITY AWARD – ADVOCATES | MERIT

ECAS Consultants Pte Ltd is a multi-disciplinary engineering firm offering Design Consultancy, Construction Supervision, Assessment and Inspection, Project Management and Accredited Checking services to clients of the private and public sector. Drawing on more than 20 years of experience and expertise, it has completed several key landmark projects in Singapore.

Since the inception of DfMA technologies, ECAS has been actively involved in exploring, promoting and adopting such technologies in their projects.

Key Productivity Initiatives

- For Pei Hwa Secondary School project, ECAS pioneered the use of single-piece timber curve rafter with continuous span of 24m without joints. This enhanced the speed of installation on site.

- ECAS proposed to use a single piece, 3-tier glued laminated timber (glulam) column for the 4-storey building at Yu Neng Primary School. The consultant also designed bolted connections for the timber columns and beams. The connections were supported by steel corbels which acted as temporary supports during placement of the beam. The innovative designs has improved site productivity and reduced material wastage.
Tiong Seng successfully completed JTC Space @ Tuas with its Lithe™ PPVC technology.

Tiong Seng invested in heavy lifting cranes to compliment the installation of PPVC modules.

Tiong Seng Prefab Hub is the first-of-its-kind precast automated production facility in Singapore.

With an established track record of 60 years, Tiong Seng is one of the leading building construction and civil engineering contractors in Singapore. It is by far the only construction company in Singapore that clinched the prestigious Singapore Quality Award (SQA), and further distinguishes itself with the Singapore Innovation Class and People Developer niche certifications, and numerous local and overseas awards.

As a forerunner in construction innovation, Tiong Seng is always looking at ways to build new capabilities and improve productivity.

Key Productivity Initiatives

- Being an early adopter of Design for Manufacturing and Assembly (DfMA), Tiong Seng applies this methodology to enhance its capabilities in precast and prefabrication. It develops its Lithe™ Solutions which comprise Prefabricated Bathroom Units (PBUs) and Prefabricated Prefinished Volumetric Construction (PPVC) technologies, producing robust and slick modules using Ultra-High Performance ductile Concrete (UHPdC).

- Having conceptualised and developed Singapore’s first automated precast hub in 2012, the Tiong Seng Prefab Hub redefines precast by embracing automation to enhance production, safety and quality. Similarly, when Tiong Seng commissioned the production of PPVC in 2016, the deployment of automated multi-profile cutting and robotic welding machines brought new insights to the industry as modules are fabricated in a productive and scalable manner.
Key Productivity Initiatives

• Tiong Seng actively pursues construction excellence through its digital capabilities, specifically in the area of Building Information Modelling (BIM). Tiong Seng is well recognised locally and internationally for its BIM capabilities. In Singapore, it was awarded BCA’s BIM (Organisation Category) Platinum Award along with numerous BCA BIM Awards for its projects.

• In 2016, Tiong Seng won the coveted buildingSMART International (bSI) Award and the buildingSMART Hong Kong BIM Award for its innovative construction using Open BIM. Recently, Tiong Seng received the ‘Most Scalable Collaboration’ award at the 2018 Singapore International Chamber of Commerce (SICC) Awards for developing an innovative workflow to procure steel reinforcement bars in the BIM environment.

• BIM has streamlined the company’s construction process by integrating the entire value-chain. Tiong Seng’s Integrated Digital Delivery (IDD) approach improves overall productivity.
Kimly Construction Pte Ltd has embarked on its productivity journey since the year 2000.

As a forward-looking organization, Kimly constantly seeks higher productivity improvements through an orderly technical approach, encompassing not only work processes but also innovative technologies and materials.

**Key Productivity Initiatives**

- Kimly has adopted Mass Engineered Timber (MET) construction in one of the current projects – Eunoia Junior College (EJC). Kimly Construction has collaborated with timber specialist, CREE GmbH, to propose CREE Hybrid Slab Panel and CLT Façade in lieu of precast hollow core slab (PHCS) and precast façade wall respectively.

- The adoption of MET has brought about advantages and benefits, such as smoother and more productive installation with enhanced safety and quality.
Key Productivity Initiatives

- Kimly is listed as a PPVC manufacturer that has met performance requirement of the DfMA system. It has received PPVC system In-Principle Acceptance (IPA), which was assessed by BCA Building Innovation Panel (BIP) to implement PPVC for upcoming and future projects.

- For the Hillview Project by Kimly, the extensive use of PPVC with substantial layout modularization resulted in an overall percentage of PPVC coverage of 70%, which is higher than the industry standard of 65%.

- Kimly has procured the Mobile Battery Mould (MBM), which is the world’s first vertical battery mould with mobility for ease of relocation on site. The MBM alleviated space and logistical constraints on site and facilitated the setting up of an on-site precast and storage yard.
Dredging International Asia Pacific Pte Ltd
Builder (Civil Engineering Work)

CONSTRUCTION PRODUCTIVITY AWARD – ADVOCATES | PLATINUM

Dredging International Asia Pacific (DIAP) is Dredging International’s Singapore-incorporated, privately held regional subsidiary. DIAP primarily represents the DEME interest, and undertakes Group activities, in the region.

DIAP makes state-of-the-art Belgian hydraulic engineering techniques available to clients in Asia, who increasingly demand total solutions for today’s complex, challenging projects.

Key Productivity Initiatives

- DIAP designed and built a specialized multi-purpose pontoon, known as the Temarock for the Tuas Terminal Phase 1 (TTP1) project in Singapore.
- Temarock aims to remove the need for diving, significantly reduce hazards by elimination and safety through design and reduce the number of vessels and personnel used for construction, while significantly increasing productivity and reduce material losses through extensive automation.
Key Productivity Initiatives

- Temarock is fitted with its own fall pipe system and automated rock feeder, which allows, in combination with the fully automated onboard dynamic positioning system, to place rock very accurately.

- The Temarock, with its fully automated multi-purpose vessel abilities is able to do the following activities on its own: rock installation, rock tamping, rock trimming, levelling and bathymetric survey.

- This effectively reduces the need for 3 different vessel/plants as all their activity is combined into a single vessel. The deployment of multiple vessels requires more manpower and a larger seaspace in the critical path for quay wall construction, delaying the subsequent caisson installation activity.

- In addition, the deployment of multiple vessels creates additional interfaces between activities, creating potential delays in between activities and increases the possibility of vessel collision.
HWA SENG BUILDER PTE LTD
Builder (Civil Engineering Work)

CONSTRUCTION PRODUCTIVITY AWARD – ADVOCATES | GOLD PLUS

Hwa Seng Builder Pte Ltd has involved in constructing a number of civil engineering projects in Singapore for many years. Hwa Seng Builder was awarded contract ER397 - Expansion of KPE/TPE Interchange including the Link Road to Punggol Central.

Key Productivity Initiatives

- The initial proposal for the ER397 project, was to adopt the conventional cast-in-situ method across the waterway. Out of the 5 proposed bridges to be constructed under this project, MCL02, was selected to explore DfMA adoption to the existing construction method. Hwa Seng re-designed the process to adopt more DfMA technologies such as using precast structural elements and incorporating all structural connections.

- As the installation process would be executed using marine barge above a live waterway, 4D BIM including construction sequences, details of the actual site constraints, barge parking position and crane lifting movement areas were drafted.
Key Productivity Initiatives

- In addition, design changes for the bridge included:
  a) Converting all vehicular cast in-situ columns, crosshead, and girder into advanced prefabrication components using 3D BIM software to ensure accuracy of connections between columns and piles.
  b) Replacing conventional deck slab soffit formwork with a self-supporting formwork which forms part of the deck slab after construction. Thus, eliminating the need for formwork dismantling.
  c) Replacing shoring system with improvised cantilever brackets for vehicular deck slab.

- BIM enabled the generation of components in 3D to detect unforeseen clashes during the manufacturing/fabrication stage of the construction and Virtual Design and Construction (VDC) assisted in integrating all the components in virtual sequence of construction. The 2 approaches are newly adopted to this construction of bridge by Hwa Seng with the goal of achieving better quality of works and improvement towards productivity. This embodied the objective which is to build twice, first in virtual, then in reality.
Mod Prefab Private Limited, established in 2016, is a joint venture between Woh Hup and Keppel Fels. Mod Prefab specialises in the designing, manufacturing and supplying of Prefabricated Prefinished Volumetric Construction (PPVC) modules to projects in Singapore.

Mod Prefab is one of the first few manufacturers which had been granted the Building Innovation Panel (BIP) In Principle Acceptance (IPA) for both the concrete and steel PPVC system. In addition, Mod Prefab is accredited under the Singapore Concrete Institute (SCI) PPVC Manufacturer Accreditation Scheme (MAS) for concrete PPVC system.

Mod Prefab projects include The Tapestry, Woh Hup Tech Hub, Whistler Grand and Rivière.

Key Productivity Initiatives
- Innovative connections which includes the C-channel design for shear wall and the use of reverse interpolation sleeve grouting method for gable-end wall.
- Change in module fabrication from 2D to 3D monolithic casting, reducing cycle time and improving quality.
- Implemented Integrated Digital Delivery (IDD) into design, fabrication and management for all projects.
- Productivity monitoring and review using digital technologies.
Established in 1981, T T J Design and Engineering Pte Ltd (T T J) is one of the largest structural steel fabricators in Singapore.

T T J has built up substantial experience and expertise which have equipped it to deliver highly sophisticated structural steel solutions used in a wide array of industries as well as in iconic landmarks such as the The Helix at Marina Bay, the SuperTrees and OCBC Skyway at Gardens by the Bay, Henderson Waves, Linkbridges for Pinnacle@Duxton, National Art Gallery, the Supreme Court and Changi Airport Terminals 2 and 3, amongst others.

T T J has also received Building Innovation Panel (BIP) In Principle Acceptance (IPA) for the supply of steel Prefabricated Prefinished Volumetric Construction (PPVC) systems and has obtained the Provisional Certification for PPVC Manufacturer Accreditation Scheme (MAS).

Key Productivity Initiatives

• T T J is capable to fabricate bigger structures off site to eliminate massive site work.

• T T J designs, plans and coordinates all aspects of the PPVC Construction from Fabrication and installation of Structural Works, Architectural Works and MEP installation. All fabrication and fitting up of modules are done in T T J Factories in Singapore and Malaysia.

• T T J uses BIM to detect clashes and to co-ordinate the MEP routing prior to assembly.