Building and Construction Authority

MEDIA RELEASE

NEW MEASURES FOR DEVELOPERS TO DRIVE CONSTRUCTION PRODUCTIVITY IMPROVEMENTS

- Firms with good productivity track records will have greater advantage when tendering for government construction projects

10 March 2014 – As the key driver of building projects at the top of the construction value chain, developers have a greater role to play in driving construction productivity by setting the direction in adopting productive technologies. Therefore, new measures such as requiring the use of productive technologies for selected Government Land Sales (GLS) sites are aimed at getting more developers to adopt new technologies and lead the demand for such technologies.

2. From the second half of this year, the use of Prefabricated Bathroom Units (PBUs) will be mandated for all residential GLS sites, to drive greater adoption of the technology which is able to reap manpower savings of about 60%. More than 14,000 of such bathrooms, which are fully fitted out in factories before being assembled on site, have been adopted in more than 20 private residential projects since 2005. The adoption of new productive technologies such as Prefabricated Prefinished Volumetric Construction (PPVC) and Cross Laminated Timber (CLT) will also be required for some suitable GLS sites (please refer to Annex A).

3. In addition, a minimum percentage of prefabrication level will be set for Industrial Government Land Sale projects starting from the second half of this year.

4. To encourage private developers to adopt new productive technologies, incentives will be given to those on non-GLS projects and those who are going beyond the requirements for GLS projects. More details will be announced later.

5. To further boost productivity and promote easier-to-build building designs and labour-efficient construction methods, certain types of new projects will also be required to adopt a range of pre-determined standardised floor heights and building components such as precast staircases, precast refuse chutes and doors from September this year. All residential non-landed developments will have to use drywall for internal partitions except for wet areas such as bathroom and kitchen areas. Requirements on buildable designs and use of labour-efficient construction methods will also be raised progressively to achieve greater productivity improvements (refer to Annex B).

6. "Buildings can be completed faster with the use of these productive technologies. When pushing for the adoption of productive technologies such as drywalls, PBUs, PPVC and CLT, we look beyond just labour efficiency. We also consider if they can help to reduce dis-amenities to residents living near the construction site. As these technologies involve a large extent of off-site production before they are assembled on site, we can expect less noise and dust during construction," said Dr John Keung, CEO of the Building and Construction Authority (BCA).

7. To ensure that developers take greater ownership in implementing buildable design and use of labour-efficient construction methods, appropriate enforcement action may be taken against developers whose projects deviate from the approved plan (refer to Annex B).

8. The Government will also be taking the lead in driving productivity. Key Government Procurement Entities (GPEs) will be formulating their own productivity roadmaps and adopting the national productivity target of 2% to 3% productivity improvement per year.

9 The tender evaluation for consultancy and construction of government projects will also further recognise progressive firms with good track records in adopting productive construction designs and methods. A higher productivity weightage will be accorded under the tender evaluation framework. More details will be announced later.

Issued by the Building and Construction Authority on 10 March 2014

About BCA

The Building and Construction Authority (BCA) of Singapore champions the development of an excellent built environment for Singapore. BCA's mission is to shape a safe, high quality, sustainable and friendly built environment, as these are four key elements where BCA has a significant influence. In doing so, it aims to differentiate Singapore's built environment from those of other cities and contribute to a better quality of life for everyone in Singapore. Hence, its vision is to have "a future-ready built environment for Singapore". Together with its education arm, the BCA Academy of the Built Environment, BCA works closely with its industry partners to develop skills and expertise that help shape a future-ready built environment for Singapore. For more information, visit www.bca.gov.sg.

Annex A

FACTSHEET ON PRODUCTIVE TECHNOLOGIES

Cross Laminated Timber (CLT)

About Cross Laminated Timber (CLT)

CLT is manufactured from wood harvested from sustainably managed forests and fabricated by binding layers of timber at 90 degrees with structural adhesives to produce a solid timber panel. Unlike sawn timber, CLT can support heavier loads and be applied for structural and non-structural components in buildings. Also, as it is flexible and light (about 500 kg/m3, compared to 2,400 kg/m3 for reinforced concrete), it is usually used for the construction of walls, lift shafts and floors.

Depending on the dimensions of the building elements, the CLT panels can comprise more than three layers of timber and be manufactured in varying sizes, with a maximum length of 18 metres and thickness of 0.5 metres. The CLT panels are also cut in factories for window and door openings before they are assembled on-site.

Installation of CLT on site

Annex A

CLT Overseas

The Forte (designed and built by Lend Lease in Melbourne, Australia) is 10 storeys high and is currently the tallest residential timber building in the world (for more information: www.forteliving.com.au)

Besides residential and hotel projects, CLT construction has also been used in other development types overseas, such as healthcare, sports halls and other institutional projects.

Sports hall

Annex A

Healthcare


Instituitional

Benefits of using CLT for construction

- Reduction of waste onsite and positive impact on the surrounding community (via reduced construction noise, truck movements and reduced concrete / general dust emission).
- Faster construction and fewer labour needed on site, compared to conventional construction methods
- Sustainability benefits throughout a building's lifecycle: timber has the lowest energy and water consumption of any building material and it is a renewable structural building material. Even at time of demolition, CLT is recyclable and can be reused.
- CLT also provides a higher level of thermal performance, reducing heating and cooling costs for occupiers.

CLT in Singapore

In terms of regulatory clearance, CLT has already obtained In-Principle Acceptance from all the technical agencies for use in Singapore. However, its use is subject to certain conditions, such as the building height (generally up to 24 metres, or up 12 metres for healthcare projects) and

fire safety design requirements (building to be fully protected by an automatic sprinkler system in accordance to the Code of Practice for automatic fire sprinkler system requirements).

There are currently two builders who can use CLT (one evaluated and one pending approval from the Building Innovation Panel) and we understand that there are other builders such as Woh Hup and JV Zheng Keng-Santarli who may be keen to use CLT.

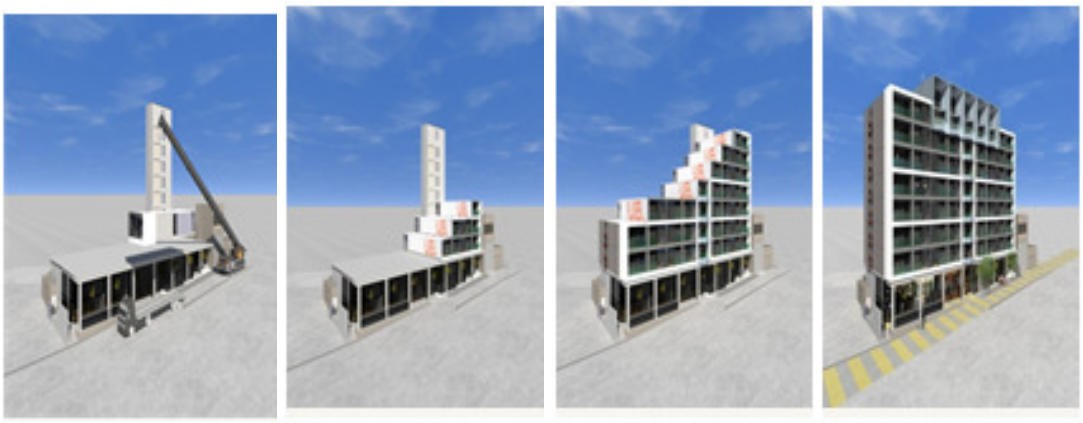
With benefits such as a reduction in construction duration, developers can consider the adoption of CLT for their upcoming projects. In Singapore, the Nanyang Technological University (NTU) has committed to adopt CLT for their upcoming sports hall.

Annex A

Prefabricated Prefinished Volumetric Construction

About Prefabricated Prefinished Volumetric Construction

For Prefabricated Prefinished Volumetric Construction (PPVC), complete flats or modules made of multiple units complete with internal finishes, fixtures and fittings are manufactured in factories, and are then transported to site for installation in a lego-like manner.



PPVC Overseas

PPVC is more suited for projects which have a regular layout, such as residential projects, hotels, nursing homes, schools etc. For buildings that have a large span, such a shopping centres or factories, this technology might not be suitable as the modules would be too big to be transported to the construction site.

PPVC can be used for high-rise construction. A 32-storey development is currently being constructed in New York and will be the world's tallest PPVC building when completed. This project takes only 20 months to build as compared to 30 months using the conventional construction method.

Benefits of PPVC

- PPVC can help to significantly speed up construction. It can potentially achieve a productivity improvement of 30-50% in terms of manpower and time savings, depending on the complexity of the projects.
- Furthermore, dust and noise pollution can be minimised as more activities are done off-site.

Annex A

- With the bulk of the installation activities and manpower moved off-site to a factory controlled environment, site safety will also improve.

PPVC in Singapore

In terms of regulatory clearance, PPVC has already obtained In-Principle Acceptance from all the technical agencies for use in Singapore.

There are currently four suppliers (Swee Hong/UB Australia, Moderna Homes, Sembcorp EOSM and UB RUSH) for PPVC in Singapore which have been assessed by the Building Innovation Panel.

Also, Nanyang Technological University had called a tender to construct their upcoming student hostel project using PPVC. The tender submissions are currently being evaluated by NTU. MOH, on the other hand is looking to PPVC in a nursing home project to improve construction productivity in health care projects

One-stop Building Innovation Panel (BIP)

New construction technologies or methods often take a longer time to obtain approvals by the various regulatory agencies. Such a process might deter potential innovative products or methods which help to boost construction productivity to be introduced in Singapore. In May 2011, the inter-agency BIP was established to facilitate expedient multiple agency evaluation and approval of innovative construction products and methods that help improve construction productivity by at least 20%.

Led by MND and BCA, the panel includes other agencies such as HDB, JTC, NEA, LTA, URA, SCDF, PUB and MOM.

For applications that have been approved by the Panel, the regulatory agencies issue an in-principle acceptance (IPA) letter for the innovative product or method. For subsequent project submission involving the products or methods issued with IPA, the submission will be accorded fast-track status. Through the BIP, new productive technologies such as PPVC and CLT can now be used in Singapore.

Annex B

Factsheet on Buildability

Legislation on Buildability

The legislation on Buildability was introduced by the Building and Construction Authority (BCA) in 2001 under the Building Control Act to promote buildable design through greater adoption of prefabricated, modular and standardised building components.

Under the legislation, building designs are required to comply with a minimum buildable design score. Good buildable designs require the adoption of labour-efficient technologies and methods to improve productivity at the construction stage.

Over the years, the Buildability framework has been strengthened to require designers to deliver more buildable designs upstream, and builders to adopt more labour-saving construction methods / technologies downstream.

Since July 2011, builders have to comply with a minimum constructability score which encourages the use of construction technologies, methods and processes to reduce the industry's reliance on foreign workers.

About Buildable Design Score

The buildable design score computes the extent of standardisation, simplicity and integrated elements applied to projects at the design stage. It measures the potential impact of a building's design on labour usage.

The maximum points for a building's design is 100 points, of which 45 points are allocated to structural systems, 45 points to wall systems and 10 points for use of other buildable features. The higher the buildable design score obtained by a project, the easier it is to construct.

About Constructability Score

The constructability score measures the level of adoption of labour-efficient construction methods and construction processes such as system formwork and climbable scaffolding. Higher constructability scores would translate to savings in manpower cost and shorter construction time.

Annex B

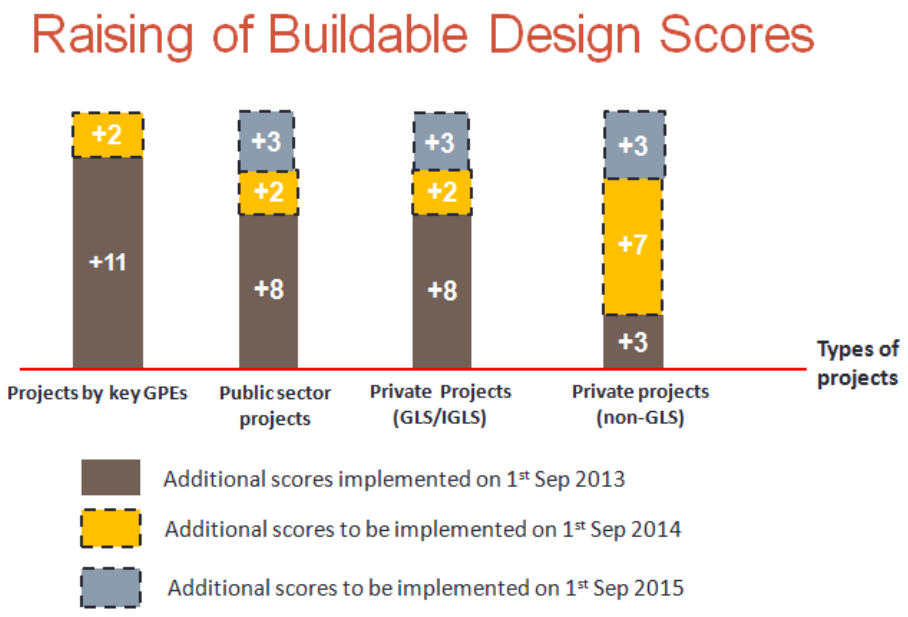
Raising the Minimum Buildable Design Scores and Constructability Scores

Currently, the minimum Buildable Design Score (B-score) and Constructability Score (C-score) for new private projects that are outside of the Government Land Sales (GLS) programme are lower than those projects under the GLS and industrial-GLS programme.

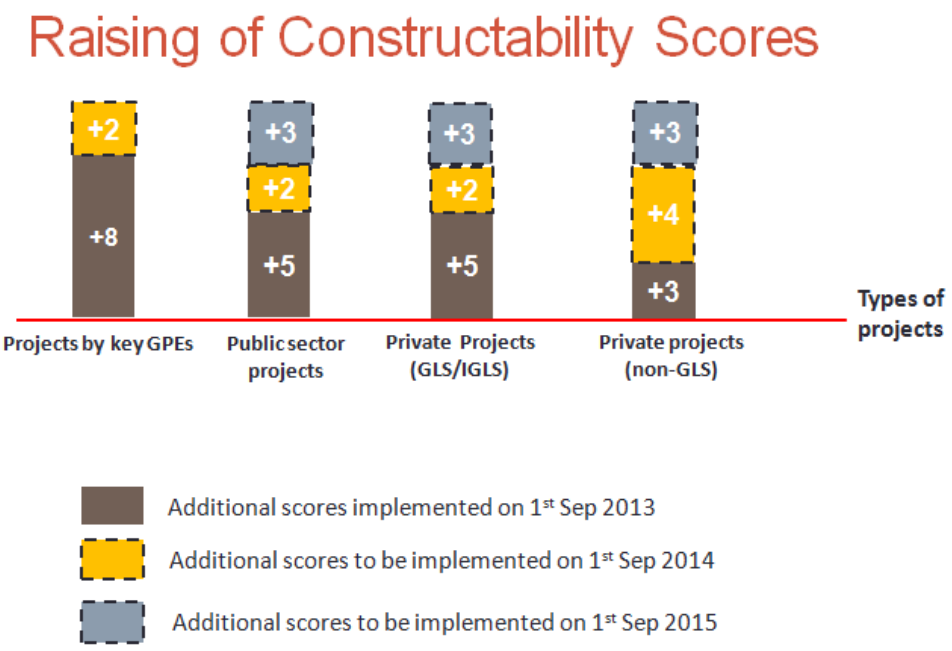
In September this year, besides raising the minimum B-scores and C-scores by another 2 points, BCA will also be raising the minimum scores for private projects that are outside of the GLS programme to match the same higher B-score and C-score standards as those under the land sales programme. Specifically, the minimum B-score for these projects will be raised by a total of 7 points. For the C-score, it will be raised by 4 points for private projects on non-GLS sites.

Beyond 2014, BCA will further raise the standards for all public and private sector projects to achieve the same minimum scores imposed for projects by the key Government Procurement Entities (GPEs) to drive greater productivity improvements for the entire industry. By doing so, all projects will have the same buildability standards from September 2015.

Also, by raising the B-score by 13 points by September 2015, projects could potentially achieve between 16-22% in manpower savings, depending on the scale and complexity of the project as well as other factors such as site conditions, project management etc.



Annex B



Stronger Buildability Enforcement

To ensure compliance to the buildability requirements, BCA currently checks the B-score submitted by designers and C-score by builders for new projects. BCA also conducts site inspections to ensure that all the productivity proposals identified and committed by the designers and the builders are implemented on site. Currently, it is an offence not to comply with the Buildability Regulations and this offence may attract a fine of up to $10,000. However, BCA may also withhold the Temporary Occupation Permit (TOP) of the affected projects should there be any non-compliance to the Buildability Regulations.

To ensure that developers take greater ownership in implementing buildable design and use of labour-efficient construction methods, BCA will take stronger enforcement measures such as issuing stop work orders if the declared buildable systems or technologies are not implemented at site.