

MEDIA RELEASE

RAISING CONSTRUCTION PRODUCTIVITY THROUGH TECHNOLOGY ADOPTION AND WORKFORCE UPGRADING

- BCA's new multi-skilling scheme as an alternative upgrading pathway for construction workforce

5 March 2012 (Monday) - The Building and Construction Authority will be introducing a new Multi-skilling Scheme to provide an alternative pathway for the industry to upgrade their workers. This means that multi-skilled workers will be competent in multiple construction trades and are able to carry out more than one type of work tasks on-site. Employers will have greater flexibility in deploying such multi-skilled workers on-site, hence reducing the downtime and improving their productivity (*see Annex A for examples of multi-skilling*). BCA will start to register construction workers who meet the following stipulated criteria from 1 July 2012:-

- a. 4 years of construction experience in Singapore; and
- b. 2 acceptable certifications (see Annex B for more details).

Briefing sessions on the Multi-skilling scheme will be conducted for industry firms from March 2012 onwards.

2. The industry has shown support to BCA's move to introduce the Multi-skilling Scheme. Dr Ho Nyok Yong, President of Singapore Contractors Association Limited (SCAL) said, "Contractors with multi-skilled workers will find it easier to deploy them according to the projects' manpower needs, as they can perform 2 to 3 different types of work throughout the construction process. This can help us to reduce time required to mobilise workers, which would otherwise result in time loss to projects. This recognition also provides an avenue for workers to attain the "Higher Skilled" status apart from Coretrade."

3. The Multi-skilling Scheme complements the BCA's Construction Registration of Tradesmen or CoreTrade Scheme which caters to workers specialised in key

construction trades. On 1 July last year, BCA/MND implemented a construction skills framework to encourage construction firms to retain and up-skill their workers. Under the framework, better qualified workers with minimum four years of local construction experience and acceptable qualifications are allowed to qualify for “Higher Skilled” category and the lower foreign worker levy. Currently, majority of the workers qualify through the CoreTrade skills route (*see Annex B*).

4. This move to enhance the quality of the construction workforce through the retention of skilled and experienced workers is part of the overall Construction Productivity Roadmap launched by MND/BCA last year (*see Annex C*). In line with the Government’s push for productivity-driven economic growth, the roadmap charts the transformation of the construction industry and aims to realise the vision of **a highly integrated and technologically advanced construction sector led by progressive firms and supported by a skilled and competent workforce in 2020**.

5. The industry has responded well to the roadmap initiatives to adopt more technology to reduce labour reliance, as well as upgrade their existing workforce through training and upskilling. The take-up rate for the \$250 million Construction Productivity & Capability Fund (CPCF) administered by BCA has been growing steadily, with more than \$40 million committed to more than 1,100 individual firms since June 2010.

6. The bulk of the funding support goes towards technology adoption, in terms of mechanising site operations, implementing productivity improvement projects and applying Building Information Modelling (BIM) to aid integration in the construction value chain. Unison Construction, an SME, is one such firm who has incorporated technology into its construction processes and reaped improvements (*see Annex D on Unison Construction*).

7. BCA will continue to work with the industry to review existing initiatives and come up with new, innovative solutions to help the construction industry to better

integrate technology in their processes and build up a highly skilled and productive workforce to boost productivity efforts.

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Annex A Examples of Multi-skilling

Annex B Construction Skills Framework

Annex C Construction Productivity Roadmap

Annex D Profile of Unison Construction

Annex A – Examples of Multi-skilling

Feature 1

Mr Chen Bing Nan, a 47 years old Singaporean, is a certified and experienced hydraulic excavator operator and a skilled craftsman in waterproofing. He has been working in Hup Soon Construction Co Ltd, a local main building contractor specializing in residential projects, for more than 19 years. As Mr Chen has been performing well in the company, he was recently promoted to a trade foreman supervising waterproofing works. The company supports workers, like Mr Chen, to be upgraded as this enables their workers to be more versatile in different trades and can undertake different roles at the worksite thereby increasing work productivity.

Feature 2

Positive Engineering is a firm that does design, supply, fabrication and installation of architectural exterior facades such as cladding works, curtain walls, windows and louvres for the building industry. The firm encourages their workers to be equipped with more than one skill so that they are more productive and deployable. With the greater flexibility in deploying the multi-skilled workers to do various tasks, the firm can deliver a more prompt and competitive quality services to their clients.

Mr Bunny Than Aye, skilled in curtainwall installation and cladding installation, has been working with the company for more than 10 years. Another long-time employee, Mr Chan Keng Hoong, age 42, is also skilled in both cladding and curtain wall installation. Armed with these two skills, Mr Chan is much valued by the company and has contributed to the construction of facades of prominent building projects as such Changi Airport Terminal 3 and Biopolis Phase II & III which were completed by his company.

Feature 3

Wing Tuck Engineering Pte Ltd is a local firm specialising in civil & structural engineering works, which requires steel works involving steel piping and steel storage tanks. Due to its lean workforce, Wing Tuck Engineering seeks every opportunity to equip their workers with more than one trade skills. This is in line with the company's commitment to provide high standards of workmanship and improve the productivity.

Mr Lee Wee Chai, who has been working for more than 25 years in construction industry, is skilled in plastering and timber formwork. He is able to undertake different tasks at the worksite. Mr Phangsaen Anusorn, an experienced Thai worker

who has been working in the construction industry for more than 14 years, is also versatile in both welding and structural steel works. “These workers with multiple skills are more flexible to be deployed in on site. This helps us to meet the tight project schedule.” Said Mr Sacca Chong, Executive Director of Wing Tuck Engineering.

Annex B – Construction Skills Framework

Skills classification effective 1 July 2011

1. In July 2011, MND/BCA and MOM jointly implemented a new skills framework for the construction sector to differentiate the levies of work permit holders (WPHs) based on their skills and experience levels. Under this new framework, “Unskilled” workers have been phased out and “Skilled” workers are classified:-

- a. “Basic Skilled” (R2): Workers possessing BCA’s Skills Evaluation Certification; or
- b. “Higher Skilled” (R1). Workers possessing minimum 4 years of construction experience in Singapore and acceptable qualifications including registration under BCA’s Construction Registration of Tradesmen (CoreTrade) scheme; or any of the recognised supervisory skill certifications issued by BCA Academy.

Skills Evaluation Certificate (knowledge) or SEC(K) framework

2. The Skill Evaluation Certificate or SEC(K) framework was implemented by the Building and Construction Authority (BCA) to facilitate the recruitment of foreign construction workers in various source countries through skills testing and certification. Since 2005, it is a mandatory requirement for all foreign workers who enter the Singapore construction workforce to be skill certified to ensure they possess the adequate skill level and skill set in the various construction trades. Currently, there are 26 overseas testing centres (OTCs) in various source countries, including PRC, India, Bangladesh, Thailand and Myanmar offering a total of 27 skills qualifications.

Construction Registration of Tradesmen (CoreTrade) Scheme

3. The Construction Registration of Tradesmen, or CoreTrade in short, is a registration scheme for skilled and experienced construction personnel, both locals and longer-staying work permit holders, in key construction trades. It provides a clearer progression path for construction personnel to move up from a general worker, to a registered Construction Tradesman specializing in specific trades, to a registered Construction Trade Foreman and eventually become a registered Construction Supervisor. Through this, CoreTrade helps to build up a core group of tradesmen, foremen and supervisors in key construction trades to anchor and lead the construction workforce, thereby raising construction quality and productivity. As of Jan 2012, CoreTrade has registered more than 10,000 construction personnel specialising in various trades under the scheme.

Qualifying criteria for Multi-skilling Scheme

4. To qualify for registration under the Multi-skilling scheme, apart from the 4 years' local experience requirement, construction workers must also possess 2 acceptable certifications. The first certification can be a Skills Evaluation Certificate (SEC) or SEC(K) conducted by BCA or Sijil Pelajaran Malaysia (SPM) certification, for Malaysian work permit holders. The second certificate must be a SEC(K) in a different trade from the first certification.

Annex C - Background of the Construction Productivity Roadmap

In support of the Economic Strategies Committee's (ESC) recommendation to raise productivity for sustained economic growth, MND/BCA has formulated a holistic Construction Productivity Roadmap to transform the construction industry and raise its productivity.

2 The Construction Productivity Roadmap aims to realise ***the vision of a highly integrated and technologically advanced construction sector led by progressive firms and supported by a skilled and competent workforce in 2020***, through a four-thrust strategic approach:-

- a. Strategic Thrust 1. Introducing regulatory requirements and setting minimum mandatory standards to drive widespread adoption of labour-saving technology;
- b. Strategic Thrust 2. Providing incentives to encourage manpower development, technology adoption and capability building;
- c. Strategic Thrust 3. Regulating the demand and supply of low cost, foreign workforce; and
- d. Strategic Thrust 4. Enhancing the quality of the construction workforce.

3 The four-thrust approach is complemented by a horizontal strategy involving extensive outreach efforts.

How each of the 4 Strategic Thrusts contributes to the overall vision

4 Strategic Thrust 1. BCA has enhanced the Buildability¹ framework to require architects and engineers to adopt "easier-to-construct" building designs. A new component, Constructability¹ was introduced in July last year, requiring contractors to also adopt more labour-efficient construction methods and technology, thus reducing their labour reliance. Also, BCA is strongly promoting the adoption of Building Information Modelling (BIM)² which will help improve overall coordination of the construction value chain, and reduce the amount of reworking required. BCA will be mandating BIM electronic submission of architectural, structural and mechanical & engineering (M&E) plans for building works for regulatory approval by 2015.

5 Strategic Thrust 2. To help construction firms cope with rising manpower costs and lower the cost of technology adoption, BCA has provided financial incentives in the form of the \$250 million Construction Productivity and Capability Fund (CPCF). The fund encourages firms to go beyond mandatory requirements in manpower development, technology adoption and capability building.

6 Strategic Thrust 3. The supply of low-cost foreign workers is regulated by progressively tightening the Man-Year Entitlement (MYE)³ quota, tightening access to MYE-waiver workers³, and higher levies.

7 Strategic Thrust 4. To address the transient nature of construction workforce, schemes like CoreTrade⁴ and Workforce Training and Upgrading (WTU)⁵ are in place to facilitate the retention of experienced workers and skills upgrading to bring about productivity and safety improvements. In addition, a new tiered-levy framework was introduced in July 2011 to distinguish “Higher Skilled” foreign workers from the “Basic Skilled” ones (see Annex B on the new skills framework).

Notes:

¹ The Buildability framework requires designers to deliver more buildable designs upstream, and builders to adopt more labour-saving construction methods / technologies downstream. Builders will have to comply with a minimum Constructability Score downstream which encourages the use of construction technologies, methods and processes that reduce the industry's reliance on foreign workers.

² Building Information Modelling (BIM) is a new three-dimensional modelling tool to improve productivity in building design and construction. It allows building professionals across the value chain to explore the building digitally before it is built and in the process improve on the design and avoid abortive work.

³ The Man-Year Entitlement (MYE) Allocation System is a Work Permit allocation system for foreign workers in general. Foreign workers under the Man-Year Entitlement-waiver route will be subject to higher levies to encourage firms to reduce their reliance on foreign workforce and adopt technologies in place of labour where possible.

⁴ **Construction Registration of Tradesmen (CoreTrade)** is a registration scheme for skilled and experienced construction personnel in the various key construction trades. CoreTrade provides a platform to retain the better and more experienced workers by providing a clear career progression path and giving them due recognition.

⁵ The Workforce Training and Upgrading (WTU) Scheme co-funds the costs of selected skills assessment and training courses to upgrade the skills of workforce in the built environment.

Annex D – Profile of Unison Construction Pte Ltd

UNISON CONSTRUCTION PTE LTD

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Unison Construction Private Limited was founded by a group of like-minded construction practitioners who have a strong passion for pursuing excellence in the construction business. The former colleagues who decided to form their own set-up, incorporated the company in Singapore on 2 July 2009. Although the company was set up barely 3 years ago, its key personnel - Managing Director Mr Tan Soon Kian, Contracts Director Mr Goh Boo Kui and Project Director Mr Tan Thiam Huat –have more than 20 years of building and construction experience each. Their wealth of experience, coupled with the array of projects they have managed, such as condominiums, HDB flats, landed properties and industrial projects, have allowed them to gain a foothold in this competitive industry. The company has made significant achievements over the few years and has received several accolades including ISO 9001, ISO 14001, WSH bizSAFE Star and BCA Green and Gracious Builder award.

The small and medium enterprise (SME) firm recognised that in addition to having a team of experienced and capable staff, they have to adopt more productive methods of construction to give them a competitive edge over the more established competitors.

TECHNOLOGY ADOPTION

However, Unison did not have a large capital to give them the head-start. Rising manpower cost is always a major challenge for them as construction works are often labour intensive. When BCA introduced the Construction Productivity and Capability Fund in 2010, the company was quick to tap on one of the schemes called MechC to purchase their first reflectorless total station. The equipment uses laser technology to carry out surveying on site, thus allowing greater accuracy and distance in measurement. More significantly, the technology also eliminates the need for an additional worker to carry a prism, thus helping them to achieve significant productivity improvement. The management recognised that ***mechanising work processes is the quickest way to see a real difference in productivity on site***. Subsequently, the company decided to invest in another reflectorless total station, three builders' hoist and two scissor lifts. The MechC scheme co-funded the purchase of their much needed equipment which helped them to reduce the costs and manpower required to perform the works on site.

The company has also looked into other ways to improve their productivity.

The company participated in a BCA-led Productivity Improvement Project (PIP) which looks into the benchmarking of project and trade levels productivity. Part of the project involves the use of the biometric authentication system to monitor the manpower and measure the productivity on site. With the implementation of a new facial recognition system at one of their projects, the company can now accurately capture the manpower deployment on site,

prevent unauthorised access and monitor their productivity. The company is looking into extending the use of biometric authentication system to their other projects.

Unison has also set an ambitious aim to train their coordinators and draughtsmen to be trained in the Building Information Modelling (BIM) technology ready by 2012. The BIM fund assisted the company to defray the cost of training the staff and the purchase of BIM software.

IMPACT

The company has been very receptive towards adopting the latest technologies that could help improve their safety, productivity and quality. With the financial assistance from the various CPCF schemes, the company is able to make quantum leaps in their productivity (see table below). The company even shared their productivity experiences and actively encourage their subcontractors to attend seminars and talks (e.g. Smart Builders Leadership Series organised by BCA) to learn more about the ways they could improve their productivity and reduce costs.

The company aspires to be one of the leading innovative and productive contractors in Singapore. Mr Tan advocates all contractors to invest in productivity now and reap the rewards that come with the improvements. He strongly feels that businesses should set their sights on long-term productivity and naturally, they can become more effective and efficient. This in turn translates to a better bottom-line for the companies.

Table showing improvements in productivity

Equipment bought with MechC support	Conventional Method	How equipment helps with productivity	Estimated productivity improvement
Builders' hoist – materials handling equipment	<ul style="list-style-type: none"> Materials are transported manually to upper floors, particularly in low rise construction Laborious; requires considerable manpower 	<ul style="list-style-type: none"> Used for transporting materials from lower floors to upper floors, instead of manual means Overall reduction in manpower (from 6 to 2) and time spent on transportation of materials 	<p>Before: <i>Requires 6 workers to transport 52500kg of materials over 6 days.</i></p> <p>After: <i>Requires 2 workers to transport 52500kg of materials over 6 days.</i></p> <p>Result: <i>200% productivity improvement.</i></p>
2 units of Reflectorless total station – surveying equipment	<ul style="list-style-type: none"> A theodolite system is used during site surveys, with at least 2 workers, and with one carrying a reflector prism Time consuming, especially for large sites and for many intermediate survey points 	<ul style="list-style-type: none"> The total station uses laser technology to carry out surveying on site; allows greater accuracy and distance in measurement Reduction in number of workers on site (from 3 to 2), by eliminating the need for a worker to carry the reflector prism 	<p>Before: <i>Requires 3 workers to survey 490 points at site over 20 days.</i></p> <p>After: <i>Requires 2 workers to survey 660 points at site over 20 days.</i></p> <p>Result: <i>100% productivity improvement.</i></p>
2 units of scissor lift – aerial platform	<ul style="list-style-type: none"> Scaffoldings and staging are used to carry out demolition works at height Erection of scaffoldings is laborious and requires considerable manpower 	<ul style="list-style-type: none"> Used for accessing ceiling and works at height, to carry out architectural works like painting and plastering. Eliminates the need for scaffoldings Available in different sizes; can be manoeuvred around the site easily Overall reduction in number of workers (from 5 to 2) for scaffolding installation; manpower and time savings 	<p>Before: <i>Requires 5 workers to erect scaffoldings for skimming & plastering of 50m² of walls over 1 day.</i></p> <p>After: <i>Requires 2 workers to operate scissoring lift for skimming & plastering of 50m² of walls over 1 day.</i></p> <p>Result: <i>150% productivity improvement.</i></p>

Pictures from Unison Construction Pte Ltd



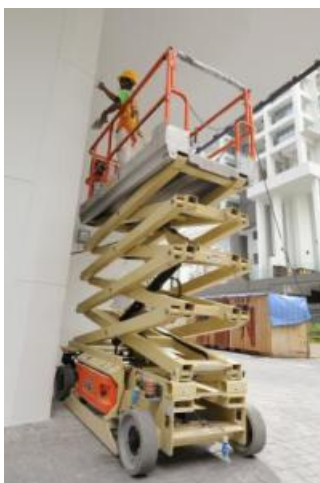
From left: Mr Goh Boo Kui (Contracts Director), Mr Tan Soon Kian (Managing Director) and Mr Tan Thiam Huat (Project Director).

Builders' Hoist



A simple equipment like the builders' hoist requires little storage area and yet helps to improve the productivity of transporting materials from lower floors to upper floors. It reduces the reliance on cranes and can be operated easily with one worker.

Scissor Lift



The scissor lift may not be a new machine but it helps to increase productivity and safety on site by eliminating the need to erect scaffoldings to carry out architectural works like painting, plastering. It can be manoeuvred easily around the site and requires only one worker to operate.

Reflectorless Total Station



The reflectorless total station has the ability to measure greater distance and eliminates the need for an additional worker to carry a prism. Only one surveyor is required to operate the equipment from a stationary point.