



# **STABILISING MATERIALS SUPPLY CHAIN AS A KEY TO SUPPORTING INFRASTRUCTURAL DEVELOPMENTS**

### By Ambrose Linn, FCILT

Positive signs of steady progress towards recovery of local economy and various hard-hit industries can be seen over the past few months. Related construction associations and trade bodies have exerted every effort to achieve key success cornerstones, including professionalism; innovation; automation; digital transformation; environmental sustainability; safety; and revitalisation of the materials industry.

Infrastructural development projects taking place in sites such as Lantau, Kau Yi Chau Artificial Islands (KYCAI) and North Metropolis are critical for a robust economic future of Hong Kong. One of the keys to prosperous development amidst impending

formidable challenges is the stabilisation of aggregate materials supply chain, which encompasses ready-mixed concrete, ground granulated blast-furnace slag (GGBS), reinforcing steel bar and fill materials catered for various projects in the city.

#### **READY-MIXED CONCRETE**

In Hong Kong, ready-mixed concrete is one of the most fundamental and extensively used materials. A steady and sustainable supply chain of concrete is critical as it contributes to timely completion of public and private housing developments as well as major infrastructure projects. Metaphorically speaking, how can one possibly produce enough bread if the supply of flour as the fundamental raw ingredient is not adequate?





Concrete supply may become tight from 2024 onwards



More land is required for building concrete batching plants to maintain concrete supply

## A steady and sustainable supply chain of concrete is critical as it contributes to timely completion of public and private housing developments as well as major infrastructure projects.

We are surmising that the concrete supply chain will become deficient from early 2024 due to inadequate concrete batching plants (CBPs) and suitable land for building production facilities, be it in urban or rural areas, pending future developments. In light of the phenomenally tight concrete supply and formidable challenges faced by suppliers in handling clients' orders and fulfilment, our materials industry key stakeholders are now actively liaising with the Government to bolster suitable land supply for CBP in key strategic districts all over Hong Kong. We need to get the facilities and resources fully geared up to align with the Government's public housing policy; grandiose infrastructure planning in North Metropolis; and measures outlined in the Policy Address 2022 to enhance quantity, speed, efficiency and liveability.

On the other hand, concrete suppliers are now more willing to

use eco-friendly materials in order to produce low carbon concrete for pursuing carbon neutrality. Developers also tend to choose construction materials that now have lower carbon emissions as a result of technological innovation in production processes (such as concrete, reinforcing steel bar, cement and natural sand). Based on BEAM Plus Green construction materials guideline, the plot ratio of a project can be slightly relaxed if the low carbon materials adopted attain prescribed standards.

In order to boost concrete production for the construction industry and the incremental piling projects, concrete suppliers are expanding their mixing truck fleets and increasing the logistics capacity. For instance, they have reduced the number of truck turnaround trips per day to increase efficiency, which considerably relieves road traffic load.

#### **GROUND GRANULATED BLAST-**FURNACE SLAG (GGBS)

GGBS, also known as slag concrete, is empirically proven as a workable substitute to cement and pulverised fuel ash (PFA) for producing greener low carbon slag concrete. That means the adoption of GGBS can significantly reduce carbon footprint in concrete production. Hence, the Development Bureau and the Civil Engineering and Development Department are actively encouraging concrete suppliers to promulgate wider use of GGBS as substitute to PFA, with appropriately adjusted cement usage. A holistic objective is to ensure the industry's concerted and consistent efforts in pursuing low carbon footprint and achieving carbon neutrality deliverables along the way.

This eco-friendly raw material is actually a by-product of steel manufacturing, mainly from steel mills for generating electricity. In fact, GGBS is not at all a new or innovative material as it has been used in China, Australia and Europe for over 20 years. We are also lagging far behind other Asian countries like Singapore and Japan when it comes to GGBS usage.

GGBS is cheaper than PFA (another by-product from coal burning for electricity supply). As electricity companies are gradually switching from traditional coal to natural gas, PFA supply chain is likely to come to end in the next two to three years. Hence, local electricity suppliers Hongkong Electric Company and CLP Power will be using 70 per cent of natural gas and 30 per cent of coal.

#### **REINFORCING STEEL BAR**

Prefabricated steel reinforcing bars (rebars) are green bars with lower carbon footprint. The use of prefabricated rebar products, such as cut and bent rebars, reinforcement cages and threaded/coupled rebars, produced in highly automated off-site rebar prefabrication yards, has been

industry overseas. It is disappointing that Hong Kong is lagging behind Singapore for almost 20 years in adopting prefabricated rebar products

Although the Government has placed emphasis on off-site cut and bend rebar prefabrication facilities in previous Policy Address years ago, the industry still needs to pay tremendous efforts and time to catch up with other countries, particularly with the Government's steadfast support through public works pilot schemes, mandatory usage as well as increased incentives for contractors and developers.

FILL MATERIALS Fill materials comprising marine sand, manufactured sand and construction



Rebar cut and bend facilities

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widely practiced in the construction



Reinforcing steel bars for structural reinforcement

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waste are now under study for applying in major reclamation projects, such as the formation of artificial islands in the Central Waters under Lantau Tomorrow Vision and nearshore sites at Lung Kwu Tan and Ma Liu Shui. For example, it is estimated that around 300 million tons of fill materials will be required primarily for the formation of artificial islands at Kau Yi Chau in the Central Waters. As per initial planning, the first speck of sand will be dropped into the reclamation site in 2025. Undoubtedly, adequate and timely supply is rudimentary and crucial for such large-scale projects.

By making reference to past proven track record, the Government had successfully transferred excavated rocks from the Tseung Kwan O Tunnel project to Tai Shan Guangdong province for its smalltown development, thanks to the Government's efforts in rock storage. The development is well established in good shape at the moment. Another example is the Three-Runway System of the Hong Kong International Airport. We had reclaimed approximately 600 hectares within two years using a total quantity of 100 million tons of fill materials, with the deployment of the first pioneered deep cement mixing (DCM) technology.

In order to tie in with these major infrastructural projects within the planned timeframe, it is the right timing to start sourcing the best suitable fill materials locally, or from the Mainland and other Asian countries.

#### ADOPTION OF MODULAR INTEGRATED CONSTRUCTION IN FULL SWING

In recent years, tackling the housing problem is a top priority of the Government and one of its main initiatives is to accelerate the supply of public housing or subsidised housing through the favourably acclaimed



More MiC projects will be launched in Hong Kong



The Government aims to accelerate public housing supply through the adoption of MiC

modular integrated construction (MiC) precast technology. As planned, approximately 30,000 units can be provided in the next four years.

In principle, I support the initiative. It is pleasing to see that MiC technology is becoming more mature and various technical barriers, such as wind load and height limitation, have been resolved. More MiC pilot projects will be implemented from 2022 onwards. The Government has been pushing aggressively with achievable plans to accelerate public housing supply and, hopefully, curtail public housing waiting time from six years to four and a half.

The majority of MiC units are assembled in the Mainland and then shipped to Hong Kong. Although road and marine transport constraints still exist, I have proposed to ship steel cases to Hong Kong to carry out electrical and mechanical installations as well as necessary fittings locally.

#### SETTING UP MATERIALS HUBS

As the materials industry is constantly baffled by a shortage of land for production, the Government should consider setting up materials hubs alongside the proposed innovation and construction districts within the Northern Metropolis area, where CBPs and rebar cut and bend prefabrication facilities can be established to maintain materials supply for major development projects.

Besides, factors such as productivity; sustainability; environmental, social and governance (ESG); carbon neutrality; innovation; and safety are always uppermost in our industrywide agenda that could never be undermined or compromised. Among the numerous safety guidelines, the Hong Kong Construction Materials Association Limited has released the **Concrete Truck Operational Safety** Guidelines for the construction sector recently, with more than 10 concrete suppliers signing the safety charter to pledge their commitment to promote safe concrete truck operations. Effectively implementing safety measures is the cornerstone for the long-term success of the materials industry and the construction sector in Hong Kong. 🖸



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Ambrose serves as the representative for the construction materials industry to liaise with relevant government bureaux and works departments in Hong Kong. To prepare for the challenging times ahead, he has fortified closer collaboration among members and diversified HKCMA's membership base to comprise other building services and materials stakeholders.

Ambrose has been thriving in the logistics industry for over 20 years with wellrounded and seasoned experiences in integrated demand; supply and value chain management; multimodal distribution; and freight forwarding express linked services that cover Hong Kong, Greater China and Asia-Pacific region.

He is the honorary Program Advisor for Hong Kong Vocational Training Council VTC and a member of its advisory board on logistics and supply chain. Since 2008, he has been officially appointed as a member of the Government's Logistics Development Council. Ambrose is also a Fellow of Chartered Institute of Logistics and Transport (FCILT) with industry-wide favourable acclaim and recognition for express linked logistics, supply chain and global multi modal freight forwarding.