Pan-United chief executive officer May Ng and executive director Ken Loh in front of a laboratory in the company's research facility. The company's future plans are less about geographical expansion and more about what they can offer customers.

PHOTO: PAN-UNITED CORPORATION

PAN-UNITED CORPORATION

Breaking new ground in concrete

Developing capabilities in specialised concrete is Pan-United's strategy for staying ahead. But its innovation efforts are not confined to product development. It has opened a centralised command centre which led to the development of a digital platform.

A GLIMMERING bench, speckled with light, was among the highlights of August 2018's Singapore Night Festival. Illuminated from within, it was made from translucent concrete – one of Pan-United Corporation's creations.

Since 1999, the concrete business has sought to stand out by coming up with its own versions of the ubiquitous construction material.

Back then, Singapore's building industry was not using the latest construction technology or high-specification concrete, recalls executive director Ken Loh. Many suppliers of ready-mixed concrete were happy to take a standard approach, which he characterises as such: "You give me the material, I just provide the labour and make the concrete for you."

Pan-United had a different philosophy. "We said, 'We need to develop our own recipe.'"

From a small testing laboratory in the early years, Pan-United now boasts an extensive research centre, set up when it moved to its current Kaki Bukit premises in 2012.

The centre's 20-odd staff – researchers, materials scientists, and engineers – conduct research on everything from the mineral composition of raw materials to the properties of the final product.

This has aided product development, particularly in the last decade when Pan-United began developing highly specialised products such as radiation-shielding concrete for hospitals. The company now offers some 300 different concrete products.

SPECIALISED PRODUCTS

"Every time when there is a new iconic project or a new special structure, we can help them develop concrete for it," says Mr Loh.

One of Pan-United's first major specialised products was used in 2001, for the MRT's Circle Line tunnels. The Portland blast furnace cement concrete is low-heat, which prevents cracking, and can also resist soil chemical conditions. This concrete was found so suitable that it is now used in all MRT tunnel projects.

The authorities tend to be "a bit careful about" the use of new types of concrete, due to concerns about whether such concrete can be manufactured in the required quality and quantity, says Mr Loh. By showing that this can be done, Pan-United has often paved the way for new concrete types to be approved for mass use.

For instance, The Sail @ Marina Bay was Singapore's first project using high-strength Grade 80 concrete. Following its successful construction, official standards were updated to allow for the use of such concrete by the industry.

Says Pan-United chief executive officer May Ng: "Through proving (it could be done) with a big project, we actually advanced the industry, such that they can use a better material."

Similarly, Pan-United piloted the extensive use of green concrete – made from recycled raw materials – in Tampines Concourse.

Developing capabilities in specialised concrete is Pan-United's strategy for staying ahead, says Ms Ng.

"We see that that's the way the market is going to develop," she says. "As the projects become bigger, more iconic, taller, deeper, all these will require different applications."

Although there are considerations such as unfamiliarity and cost, industry demand for such products is catching up, adds Mr Loh: "I think the industry is beginning to accept it, especially some of the big developers. It's easier, definitely, compared to 15 years ago."

Pan-United's products include lightweight concrete which allows a wider range of architectural designs, and coloured concrete which can be used instead of painted surfaces, thus lowering maintenance costs as there is no need for repainting.

Some of their products are particularly helpful during the construction process. Sprayable "shotcrete" makes it easier to construct MRT tunnel roofs and saves manpower, while underwater concrete eliminates the traditional need to drain an underwater area before constructing there.

FOUNDATIONS FOR THE FUTURE

Pan-United's innovation efforts are not confined to product development. In 2014, it opened a centralised command centre in its Kaki Bukit headquarters to replace its former decentralised operations.

This resulted in manpower savings of 45 per cent, with staff redeployed in roles such as customer engagement and quality assurance.

More than that, the command centre ushered in a new phase of Pan-United's operations, with the development of an accompanying digital platform.

The command centre tracks all movements of raw materials and products: the arrival of imported raw materials in Singapore; the transportation of these ingredients to silos, and from silos to the plants where concrete is made; and the transportation of concrete to worksites.

With 30 plants in 17 locations, an average of 7,000 trips a day, and 200 different concrete mix designs, there is a staggering amount of data.

Enter Pan-United's digital platform AiR, or "Artificial Intelligence for Ready-mixed concrete". This system optimises the use of plants, trucks, manpower and raw material, while collecting data and handling orders.

Some functions are already automated, such as assigning concrete plants for each worksite or assigning work duties for site technicians.

Pan-United is continuing to update the platform, adding more AI, data analytics and automated processes. Improvements that have been piloted include an automated fleet management system and electronic delivery documents.

Going digital instead of using six-ply delivery

dockets would save a massive amount of paperwork, notes Mr Loh. Since 2017, cement deliveries have moved to an electronic system where customers sign off on tablets. The hope is that this might eventually be done for concrete as well.

The benefits of AiR are not confined to Pan-United alone, notes Ms Ng. The digital platform helps with customer engagement too.

Without the platform, customers often have to manually compile information such as how much concrete is delivered and to which areas within a worksite, she observes.

"How do we help our customers save time? How do we help our customers have all the information they need when they need it? So these are things where we can actually add value." The AiR system gives customers a real-time overview of such data and collates it automatically.

AiR could transform the entire industry, she adds. If adopted by other concrete companies, it could mean a reduction in the number of plants in Singapore, saving land, manpower and truck journeys.

The platform could even be used by concrete companies abroad. In 2016, it was piloted in Ho Chi Minh city, where Pan-United has been present since 2009. The firm has recently started marketing AiR to other concrete companies in the region as a cloud-based software solution.

About a fifth of Pan-United's business is outside Singapore, mainly in Vietnam, where the company's new products have been well-received over the years. The firm has a small presence in Indonesia and Malaysia as well. Says Ms Ng: "We wanted to first focus on Vietnam so we don't dilute our resources."

At the moment, Pan-United's future plans are thus less about geographical expansion and more about what they can offer customers.

Ms Ng observes that consumers today use mobile applications that make life easier. "Why can't we offer that experience to our customers?"

That is the idea behind GoTruck!, a truck-hailing app which Pan-United is rolling out to external customers later in 2018. It matches the supply of heavy vehicles with demand, offers lower costs and provides real-time information on truck movements. Pan-United envisions it as useful for trucks carrying dry bulk materials.

Customer needs also drive product development. To aid the manpower-strapped building industry, for instance, Pan-United developed self-compacting concrete in 2016.

Regular concrete needs to be compacted once it is in place, to remove trapped air. This requires noisy, labour-intensive vibration.

Pan-United's self-compacting concrete does away with the need for vibration, saving manpower and reducing noise. Lower noise levels also mean less strict limitations on the hours during which construction work can be carried out.

Other products have been tailored to extremely specific needs, such as proton-shielding concrete, which was developed in 2017 for hospitals which use radiation to treat cancer.

Yet far from being merely reactive, Pan-United also takes the lead. In 2017, it developed translucent concrete, which is non-porous yet allows light to pass through – as demonstrated in its first application, the Night Festival bench. Pan-United is now in talks with developers about using the concrete, which is decorative yet fit for structural use.

"Ten, 15 years ago, they didn't know who we are," says Mr Loh. The industry is more receptive today – thanks to Pan-United's solid track record. "It took us many years to build."

"How do we help our customers save time? How do we help our customers have all the information they need when they need it? So these are things where we can actually add value," says Pan-United CEO May Ng. The AiR system gives customers a real-time overview of such data and collates it automatically. AiR could transform the entire industry, she adds. If adopted by other concrete companies, it could mean a reduction in the number of plants in Singapore, saving land, manpower and truck journeys.

Instead of mere data handling, as was the case in the past, Pan-United supervisor Puah Soon Chai, seen here at the command centre, now performs data analysis: identifying which are the peak hours for orders, for instance.

PHOTO: PAN-UNITED CORPORATION

Concrete improvements

CONCRETE has a shelf life of just two hours. Each day, Pan-United's trucks ply the roads between batching plants – where concrete is produced – and construction worksites, delivering the material just in time.

Taking orders from worksites and dispatching trucks accordingly were Puah Soon Chai's tasks when he joined the firm in 2007.

At the batching plant where he worked, he would climb the stairs to the small, dusty container office housing the plant's control room.

There, he would receive customer calls and faxed-in orders, then contact the drivers via walkie-talkie to tell them where to dispatch the concrete.

The work did not end after the last trucks were sent out. As Mr Puah recalls: "We did a lot of manual work at the end of the day." He had to tot up the orders received that day, accounting for all the material dispatched.

Pan-United's dispatch operations look very different today. Gone are the tiny on-site offices and walkie-talkies. Instead, the sleek, modern command centre in its Kaki Bukit headquarters boasts a wall of flatscreens and rows of headset-equipped operators.

Mr Puah, 31, had previously "never imagined" he would work in such a setting. He became a supervisor in 2012, overseeing areas such as staff productivity, truck locations, logistics, and trucking arrangements.

When Pan-United's centralised command centre was set up in 2014, he moved there instead.

At the start, only a few plants were handled by the command centre. Over the course of a year, more plants were added zone by zone, until the centre was handling all 30 of Pan-United's plants.

The centralised, paperless system makes a big difference, Mr Puah notes: "Now it's all computerised." Going paperless saves time and effort, with data on orders and deliveries collected automatically in the system.

Instead of mere data handling, as was the case in the past, Mr Puah now performs data analysis: identifying which are the peak hours for orders, for instance.

The giant screens at the command centre present useful information for operators and supervisors, from truck locations to order data.

Previously, monitoring drivers involved calling them up to ask where they were, Mr Puah recalls: "How is your situation, are you loading or unloading yet?" GPS tracking has now eliminated that need.

In the past, each plant also had to handle planning and scheduling based on rough estimates. Now, there is live hourly data on incoming orders and plant capacity, allowing for greater certainty about when a required quantity can be delivered.

"You can advise the customer on timing," says Mr Puah. "For the next six hours – you can know for sure."