



## Surmounting a rail challenge

Embracing innovation enabled STEC to deliver a technically difficult MRT project on time

THIS year, Shanghai Tunnel Engineering Co (Singapore), or STEC, won its sixth Building and Construction Authority (BCA) Construction Excellence Award (CEA).

This was for the construction of the aboveground Gul Circle MRT station (opened last June) and viaducts for the Tuas West Extension on the East West line.

The project was especially challenging, as the westbound and eastbound platforms are located on two separate levels, unlike other viaduct MRT stations. With four tracks, the station is also planned to serve as an interchange in the future.

In addition, the structure is about 10 storeys high — the highest for an MRT station with a viaduct. It is located above the Ayer Rajah Expressway and the Pan-Island Expressway.

### **Huge time-savers**

To make an extra lane for vehicles, STEC decided to introduce an additional cantilever working platform for the formwork system rather than a conventional scaffolding platform, attached to a column.

STEC's project director Yoon Suk Il says: "By doing so, we could omit the fourth stage of traffic diversion, which saved a lot of time."

The project also required 2km-long sheet piles to be driven into the hard ground for the foundation of the structure. Instead of the traditional two-step process — preboring the ground with piling plants then installing the sheet piles with a vibro

hammer — STEC adopted the crusher piler method that could do the job in a single operation.

This increased productivity by 50 per cent and cut manpower by 30 per cent, says Mr Yoon. Another example of the company's innovation was when a crucial 30m-long steel roof truss (originally three spans) had to be installed into the upper platform of the station.

STEC redesigned this into two spans, which reduced by half the number of temporary supports required during installation.

### **Teamwork and groundwork**

To ensure that the project ran smoothly, Mr Yoon met the department heads daily to forecast the challenges ahead.

The respective parties then planned and conducted detailed engineering studies to overcome any potential challenges effectively. This helped the team to focus on their roles and collaborate harmoniously.

After setting the stage for teamwork, laying the groundwork was key. For the overhead structure of the MRT station, STEC decided to go for the tie system at strategic locations instead of the conventional bulky and time-consuming falsework system.

"This significantly reduced the construction time by 70 per cent," says Mr Yoon.

By harnessing computer-aided design (CAD) technology such as 3D CAD modelling, STEC managed to overcome the challenge of lifting and installing various beam types within a limited manoeuvring space.

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