



Above: Engineer Tan Yoong Heng from Arup, who oversaw a project on the Downtown Line with his colleague. The project saw the temporary diversion of the Singapore River to ensure smooth tunnel boring works of the Downtown line from Chinatown to Fort Canning stations.  
Left: Engineer Lai Huen Poh, who oversaw the Changi Airport Terminal 4 project, at the departure hall which features a wide, open space without obstructive pillars. He bagged top honours at the Building and Construction Authority Design and Engineering Safety Excellence Awards. ST PHOTOS: NG SOR LUAN

# Engineers lauded for cutting-edge solutions

**Pillar-free hall at Changi T4, Downtown Line tunnel works among award-winning projects**

**Derek Wong**

Step into the departure hall of Changi Airport Terminal 4 and a large, wide space greets you. The absence of obstructive pillars is made possible by a huge steel framework overhead extending across 60m. It is one of the features that helped engineer Lai Huen Poh bag top honours at the Building and Construction Authority (BCA) Design and Engineering Safety Excellence Awards this year. He is one of six winners, with four others receiving merit honours, said BCA yesterday. The 10 individuals will receive their awards on May 22. Mr Lai, senior managing director at RSP Architects Planners and Engineers, will attest that such building

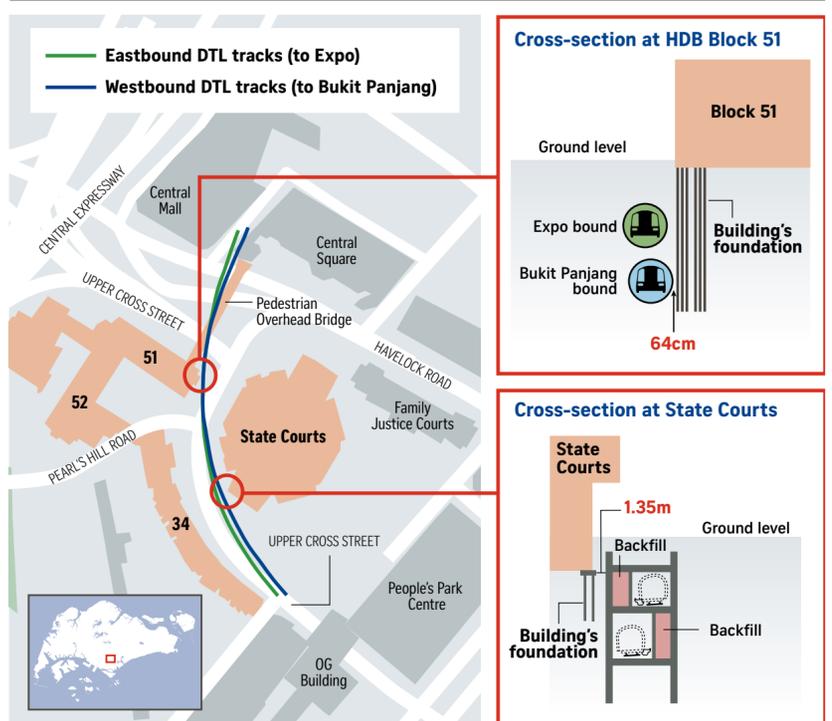
feats do not come easy – and they have even modified his own “roof”. “Each project (gives) me a patch of white hair,” quipped the 63-year-old. His other projects include Republic Plaza and Wheelock Place. Given 30 months to complete the airport terminal, which opened last October, Mr Lai and his team used prefabrication methods to manufacture most of the structure off-site before assembling it on-site. A unique “hat first” technique – where, after the completion of the roof, construction starts from the centre and proceeds outwards – made sure other works could start quickly. This included an early installation of the baggage handling system, designed to handle the check-in luggage of about 16 million travellers a year. The sophisticated

system takes up almost a floor’s worth of space beneath the departure hall on level 2, said Mr Lai, and is “a labyrinth of conveyor belts... like spaghetti”. Other construction features included a “magic carpet” – a mobile hanging platform girded along the roof used to install glass panels on the ceiling for natural light. Another winning project saw the temporary diversion of the Singapore River to ensure smooth tunnel boring works of the Downtown Line from Chinatown to Fort Canning stations, which were opened last year. This was to clear obstructions such as existing river wall piles used for embankment works, and debris such as timber, steel and concrete below the river bed, said engineer Tan Yoong Heng, who oversaw the project with Ms Cheryl Lee. Both of them, from engineering consultant company Arup, won the BCA Design and Engineering Safety Excellence Awards as well. The construction’s proximity to historical buildings such as the National Museum, as well as building under and over operational MRT lines, posed challenges too. The underground line also had to be built along a narrow strip in Upper Cross Street between the State Courts and Housing Board blocks. The impact on the blocks had to be meticulously studied, said Mr Tan. At one point, the MRT tunnel is a mere 64cm away from the foundations of an HDB block – only slightly longer than the length of a copy of The Straits Times. Engineering may be hard and long work, said RSP’s Mr Lai, but he makes it a point to get in tune: “It is like conducting an orchestra and presenting a Mozart piece.”

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## Making a way downtown

Engineers from Arup won BCA awards for their precision in building underground Downtown Line (DTL) tracks along a narrow portion of Upper Cross Street, among other things. The tunnels are 64cm away from a Housing Board block at one point – only slightly longer than the length of a copy of The Straits Times.



Source: ARUP STRAITS TIMES GRAPHICS

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