

The Central Kowloon Bypass (Yau Ma Tei Section)

Overcoming Challenges Together • Harvesting Fruitful Results through Innovation



Contract No.	HY/2019/13
Contract Title	Central Kowloon Route - Buildings, Electrical and Mechanical Works
Contract Sum	6.695B HKD
Project Office	Highways Department Project Manager/Major Works
Consultant	Arup – Mott MacDonald Joint Venture
Contractor	Gammon Construction Limited
Contract Mode	NEC3 Engineering and Construction Contract (Option C)

The Central Kowloon Bypass – Yau Ma Tei Section (previously named as Central Kowloon Route) is a new 4.7 km expressway that navigates through the heart of Kowloon linking the Yau Ma Tei Interchange in West Kowloon and the Kai Tak Development Area in East Kowloon. It routes across multiple existing MTR lines, and passes underneath the traditional cultural core of Yau Ma Tei district, where old buildings are densely packed.

With NEC's spirit of mutual trust and co-operation, the project team has tackled numerous challenges since the commencement of the construction works in end 2017, and moving to the stage to achieve readiness for road commissioning as scheduled by the end of 2025. The following story shares how the project team overcame a major challenge to speed up and streamline the Fire Services Inspection (FSI) of tunnel near the final stage of construction.

Warning Bells Raised • No Time to Lose

In late December 2024, with less than a year left before the scheduled road commissioning time, a risk reduction meeting was held amongst HY (Highways Department, the Employer), Guidance (the project's consultant and Project Manager's Representative), and Ah Build (the Contractor). The atmosphere was tense in the meeting room of the shared site office.

Guidance frowned as he reported, "Bad news! On the last 200-metre section of the tunnel we've encountered a higher rock strata than expected. Structural works there are now only expected to finish by the end of January next year. After that, we still have to install a lot of tunnel E&M systems and equipment. Among these, the final stretch of about 15 km of linear heat detection cable is, by design, not allowed to have any joints. It has to be installed in one continuous run along the tunnel crown, and we can only start doing that after the structural works on the last tunnel section are complete."

After analysing the situation, Ah Build sighed and said, "Yes, the fire services installation (FSI) inspection that were originally planned to start in May next year will probably have to be pushed back by two months. Adding the roughly four to five months required for testing and handover, plus the trial-run period needed for the tunnel operator and bus companies before opening, we estimate that the road commissioning will only be ready in the first quarter of 2026. It seems there's really nothing we can do this time—the project ultimately won't be completed on schedule!"

At that moment, HY thought of the project team's original aspiration: to complete the new trunk road on time and shorten the peak-hour journey from Yau Ma Tei to Kowloon Bay from 30 minutes to 5 minutes, bringing huge economic benefits to society every day. Feeling he had to boost morale, he countered, "Since the works began, we've already gone through many challenges—like the outbreak of COVID-19, the strict construction constraints within the protective zone of the MTR tunnels, and the complicated underground conditions. Along the way, have we ever given up? Are we really willing to give up only at the final stage of the project?"

Plan Ahead • Stay Ahead

Guidance replied pessimistically, "This time really is different. If we want to finish on time, even if we all do our best to compress the installation period for the E&M systems, we still need some way of shortening the FSI inspection period. Everyone knows that as the gatekeeper, the Fire Services Department (FSD) is especially focused on system performance; construction progress is not their primary concern!"

Ah Build chimed in, "HY, you and I are bound by an NEC contract, and under NEC3 ECC clause 10.1 we're required to act in a spirit of mutual trust and co-operation. But the FSD has no contractual relationship with our team at all. It'll be very hard to get them to agree to shorten the FSI inspection period."

However, HY did not agree with Guidance and Ah Build. He argued, "In the past, when we discussed the design approvals for the fire service installations with the FSD, although they were rigorous, they were also reasonable. It's not that there was no room for discussion. Think about it—does the mutual trust and co-operation between us depend only on what the contract says, or is it driven by our mindset? I don't believe the FSD is an immovable wall. I'll try to persuade them, and at the same time I hope you can help by thinking of ways to shorten the E&M installation period. Can you do that?"

"We can!" Guidance and Ah Build replied in unison.

United in Effort • Moving Forward Together



In early January 2025, at a specially arranged risk reduction meeting, Guidance said to HY, "After discussing with Ah Build, we believe that technically we can split the linear heat detection cable at the tunnel crown into three sections for installation. This would allow us to start installing part of it earlier, without having to wait for the last 200m tunnel section's structural works to finish before installing everything in one go. However, this change differs from the design that was previously approved by the FSD, so we must obtain their consent." HY responded happily, "That's great! I'll contact the FSD as soon as possible to discuss this new proposal."

Soon after, HY held a meeting with the FSD, explaining in detail the difficulties faced in the tunnel works and the solutions proposed by the project team. During the meeting, the FSD accepted the team's new proposal and responded positively, saying, "Nowadays, as civil servants, we have to be people-oriented. Apart from playing our role as "gatekeepers", the FSD must also act as a facilitator, speeding up and improving the efficiency of the FSI Inspection process. The Central Kowloon Bypass (Yau Ma Tei Section) is an important transport infrastructure project. We all hope it can be completed as early as possible for the benefit of society. Rest assured, we'll deploy extra manpower as we can to smooth out the inspection process!"

Innovating for Progress • Uniting for Shared Success



However, the FSD raised a key point, "The smoke extraction system in the new trunk road tunnel has nearly 800 smoke dampers. During inspection, we have to measure the air speed at multiple points at each damper and visually check whether they are opened and closed smoothly. In most tunnels, the smoke dampers are installed horizontally, and we can use a piece of equipment commonly known as a 'horizontal hood' to measure air speed across the damper face, saving a lot of time. But in this tunnel, over 100 of the smoke dampers are installed vertically. Since there is currently no equipment on the market that can measure air speed on vertical dampers, we have to carry out the measurements manually, which is very time-consuming and requires a lot of manpower."

HY thought to himself, "We must solve this key issue to make sure the inspection can be completed on time. Since there's no suitable equipment on the market, the project team may try to develop it ourselves!" So he asked the FSD, "What would you think if we developed our own 'vertical hood' to measure air speed?" The FSD replied, "Since you have such determination and innovation, we will certainly give you our full support and co-operation! During the development process, we can provide comments and help with on-site measurements and verification of the data, so that the inspection process will go even more smoothly in the future."

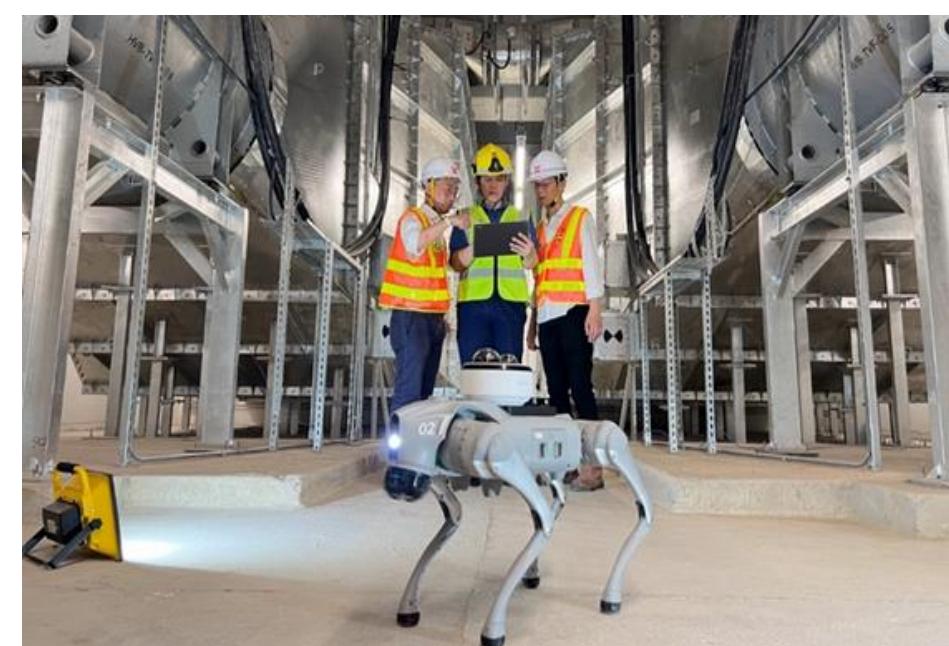
The FSD even proactively suggested, "Because some of the tunnel ducts are more than 12m high, an additional hot smoke test will be required after all the other acceptance tests have been completed. This is to ensure that if a fire occurs, the smoke in the tunnel can be extracted quickly enough to give drivers sufficient time to escape. This test involves setting fires inside the tunnel, so colleagues from other divisions of the FSD have to take part. Normally, planning has to start 10 to 14 days in advance, and the liaison and coordination involved can be quite complicated. How about this: we'll handle all the liaison and coordination ourselves, so that the whole process can run more smoothly!"

In closing, HY said happily, "Today's meeting has been very fruitful. Thank you as well for the FSD's proactive support and co-operation. Over the coming months, we'll stay in close contact to make sure all the related work is completed smoothly!" The FSD replied, "You're welcome. We're all here to serve the public with a results-oriented approach."

Back in the shared site office, HY could not wait to tell Guidance and Ah Build the outcome of the meeting with the FSD, and everyone felt greatly encouraged. Guidance, excited, patted Ah Build on the shoulder and said, "Now that the direction is clear, let's all push ahead with full effort. I'll send you the relevant design changes tomorrow!"

Full Speed Ahead • Goal in Sight

From January to April 2025, the project team sprinted to complete all the installation works required before the FSI inspection. After facing different difficulties and failures, their self-developed "vertical hood" finally obtained approval from the FSD. The FSD said to HY, "Congratulations! You've finally succeeded in developing this 'vertical hood'. It can also be used in the inspection of similar tunnel projects in the future! We've also got more good news for you: FSD is always the pioneer when it comes to using innovative technology. We've recently procured a 'robotic dog' from an innovation and technology company in the Mainland China. During inspection, it can replace manual labour in inspecting the opening and closing of all the smoke dampers in the smoke extraction system, further speeding up and improving the efficiency of the inspection process."



Gratefully, HY said, "Thank you! With the help of the 'robotic dog', I'm sure the time needed for FSI inspection will be greatly reduced. We're now even more confident that the Central Kowloon Bypass (Yau Ma Tei Section) can be completed on schedule by the end of 2025. By then, this new trunk road tunnel will be the first in Hong Kong to use innovative 'vertical hoods' and 'robotic dogs' to assist in the acceptance of its fire service installations."

In early July 2025, after about two months of FSI inspection being proceeded through joint effort, the final day had arrived. Near the tunnel exit at Yau Ma Tei, bright red flames were burning as the hot smoke test was underway. The project team waited nervously for the result. At last, the FSD announced loudly, "The test is a success!" The entire project team instinctively raised their arms and cheered, "We've finally done it!" and they shook hands and congratulated one another.



Thanks to the hard work of the project team and the proactive support of the FSD, the FSI inspection was completed over a month earlier than originally planned, laying a solid foundation for the timely commissioning of **the Central Kowloon Bypass (Yau Ma Tei Section) by the end of 2025**.