Recently, the shield machine for the left line of the Jiaoxin Station-Fengxiang Road Station section on the north extension of the Guangzhou Metro Line 8 project, undertaken by the Sixth Engineering (Xiamen) Co., Ltd. of CCCC Third Harbor Engineering Co., Ltd., was successfully launched. This marks the official entry of this section into the "dual-line tunneling" phase.

The total length of the left line of the Jiao-Feng section is approximately 1,770 meters. The shield machine starts from Fengxiang Road Station and needs to pass laterally by multiple major risk sources along the way, including factories, high-voltage transmission towers, the Beijing-Guangzhou High-Speed Railway, dense residential areas, main traffic arteries, and the Liuxi River, before finally arriving at Jiaoxin Station to complete the tunneling task.

The project faces significant geological challenges. The Jiao-Feng section obliquely intersects with the F5 Jiangxia Fault Zone. The stratum consists of approximately 20% upper sand and lower hard layers, with strongly and weakly weathered rock layers combined accounting for 56%. The uneven soft-hard rock-soil interface is highly prone to causing tool breakage, asymmetric wear, and mud cake formation on the cutterhead. Furthermore, the karst cave development area along the section has a cavity encounter rate as high as 40%, further increasing the risks of water inflow and settlement.

To address the aforementioned challenges, the project team has developed a systematic solution. To tackle the issues of uneven soil hardness and mud cake formation, the team innovatively adopted a dual-mode shield machine with a dual-channel design of "direct slurry discharge + screw conveyor muck removal", allowing flexible mode switching to adapt to the strata. Simultaneously, to solve the problem of the multi-karst cave area, the team combined "geophysical prospecting + drilling exploration" and applied the "double-liquid grouting edge sealing + grouting filling" process for pre-treatment. Integrating HSP prediction, tunneling parameters, and real-time surface monitoring data provides comprehensive protection for the shield tunneling process.

To strengthen risk control for the dual-line shield tunneling construction, the project team established a "surface-underground linkage" mechanism and implemented two core measures. On one hand, 24-hour continuous monitoring of the surrounding tunneling area is conducted, with dedicated personnel stationed on the ground, building a real-time early warning system. On the other hand, expert demonstrations were organized in advance, and road occupation and enclosure were completed. Accompanying emergency vehicles equipped with generators, grouting equipment, and emergency materials are also deployed to ensure a rapid response in case of emergencies such as settlement, minimizing safety risks.

Regarding green construction, in addition to being equipped with a fully automated slurry separation system, achieving the recycling and compliant discharge of slurry, the project team has also fully implemented comprehensive measures on-site, including high-standard enclosed fencing and intelligent spray dust reduction. These measures control dust and slurry discharge to the minimum level, achievinga harmonious unity between engineering construction and environmental protection.

While the left line shield machine of the project's Jiao-Feng section was launched, the right line shield machine is also advancing steadily.

Earlier this month, the right line shield machine successfully passed through the first section of the upper-soft-lower-hard stratum in the limestone area. The project team, collaborating with the shield equipment manufacturer, fully leveraged the technical advantages of the dual-mode shield. By modifying the stone collection box, they avoided pressure fluctuations leading to blockages. Simultaneously, the team dynamically adjusted the tunneling parameters, controlling surface settlement within 20 millimeters, while simultaneously implementing ground emergency enclosures and pipeline protection measures to comprehensively ensure tunneling safety.

During the tunneling through this upper-soft-lower-hard stratum in the limestone area, the project team achieved a breakthrough average monthly progress of 90 meters, surpassing the previous rate of 60-80 meters per month. This set a new record of "zero accidents, zero settlement, high efficiency" for shield tunneling in this type of stratum, accumulating valuable technical and management experience for subsequent similar projects.

The project team will take this milestone as an opportunity to strictly control safety and quality,

optimize shield tunneling parameters, and fully overcome construction difficulties such as complex geology and sensitive surrounding environment, ensuring the steady progress of the project. They aim to practically implement the "All Transportation" and "All City" development strategies through concrete actions.