



Prof. Weibin Zhu, Recipient of Special Government Allowances of the State Council, Outstanding Talent of Guangzhou City, and **the founder of the internationally advanced tunnel construction method "Composite Strata Shield Construction Technology System"**; for nearly 40 years, he has been engaged in geological research, subway construction, tunneling technology research, engineering risk prevention, and subway construction management. He has proposed and defined **a series of new concepts, viewpoints, and methods for composite strata shield construction technology, such as "composite strata", "mud cake", "surge", "retention and drainage" etc.** He has also made innovative proposals regarding tunneling methods.

30 principles of technical management for tunnel construction according to mining law: clear understanding of geological conditions, proactive management; strict control of grouting, minimized excavation length; optimized drilling and blasting, intelligent equipment usage; robust support system, diligent monitoring; early closure, deformation control.

15 principles of technical management for shield tunneling: geology as the foundation, equipment as the key, and people (management) as the fundamental. Always problem-oriented, using the construction site as a laboratory, integrating innovation, and leading the solution to numerous global challenges. Published over 100 professional papers on geology, shield tunneling technology, etc., obtained more than 20 patents, published over 20 books, and led the compilation of multiple national industry standards. Received multiple national and provincial-level scientific and technological progress awards (first prize, as the first author).

During the construction period of Guangzhou Metro Line 1 from 1995 to 1997, participated as a Chinese employee of Sofretu, a French company, in the on-site supervision work.

Since 1998, he has been assisting HERRENKNECHT, a German company, in establishing a manufacturing plant in Guangzhou and promoting the adoption of HERRENKNECHT's advanced technology, localization of shield tunneling machines, and technological innovation.

Zhu Weibin was awarded the Model Worker by the Ministry of Construction in 1999, the National Professor-level Senior Engineer in 2004, the National Model Worker in 2010, and was granted the Special Government Allowances of the State Council Expert in 2014. In 2017, he was recognized as the first "Exemplar of Craftsmanship" by the China Urban Rail Transit Association.

PROJECT MANAGEMENT, GRANTS OR FUNDING RECEIVED:

1. Urban Underground Space Key Facilities Equipment Fault Diagnosis and Information Management Platform ("13th Five-Year" National Key R&D Program), funded by the government and enterprise's own funds.
2. Research on Risk Prevention and Emergency Techniques for Karst Development Area in the Northern Extension Section of Guangzhou Metro Line 8, funded by the enterprise's own funds.
3. Experimental Research on a New Auxiliary Material for Shield Construction Water Control, Slag Discharge, and Reinforcement, funded by the enterprise's own funds.
4. Key Technology Research on Large Diameter Slurry Shield Construction in Complex Strata in Nansha District, Southern Extension Section of Guangzhou Metro Line 4, funded by the enterprise's own funds.
5. Application Research of New Auxiliary Materials for Water Control, Slag Discharge, and Reinforcement in Shield Construction, funded by the Ministry of Housing and Urban-Rural Development.
6. Research and Application of Environmentally Friendly Blasting New Technology for Hidden Rock Masses in Shield Tunnels in Composite Strata, funded by the Ministry of Housing and Urban-Rural Development.

HONORS AND AWARDS

Through the validation of the construction completed and opened before the Guangzhou Asian Games, which covered over 200 kilometers, the series of achievements mentioned above were compiled into the book "Application and Innovation of Construction Methods in

Guangzhou Metro Civil Engineering" (China Communication Press Co., Ltd., 1st edition in December 2014, 2nd edition in November 2022). This book has provided scientific guidance for the large-scale construction of Guangzhou Metro since 2010. By 2019, Guangzhou Metro had successfully completed 531 kilometers of subway lines with high quality and on schedule. The comprehensive cost per kilometer was less than 500 million RMB, and the construction contract change rate was only about 5%. These achievements have laid a solid foundation for Guangzhou Metro to be repeatedly recognized by the CoMET as a leader in safety and reliability, not only accelerating the development of Guangzhou city but also saving a significant amount of funds compared to other cities (because saving is the greenest approach). In recognition of this, the Party and the country have bestowed upon the Guangzhou Metro construction team and Zhu Weibin the following honorable titles:

The construction team was honored with the National Worker Pioneer Award, the Advanced Collective of Guangdong Province, and the May 1st Labor Certificate in 2009. In 2019, the Guangzhou Metro Line 2 and Line 8 Extension Project received the 17th China Civil Engineering Zhan Tianyou Award.

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FULL PUBLICATIONS LIST:

MAJOR PUBLICATIONS:

1. "Shield Tunneling Construction Technology in Composite Strata" (2006 edition)
2. "Supervision Guide for Shield Tunneling Construction"
3. "Research on Construction Technology of Shield Tunneling in Guangzhou Metro Line 3"
4. "Study on Risk Sources and Typical Accidents in Shield Tunneling Construction for Metro"
5. "Application and Innovation of Construction Methods in Guangzhou Metro Civil Engineering"
6. "New Technology of Environmentally Friendly Blasting for Shield Tunneling in Composite Strata"
7. "Hengshield Mud-assisted Shield Tunneling Construction Technology"
8. "Risk Prevention and Control Technology for Metro Civil Engineering in Karst Areas"

9. "Shield Tunneling Construction Technology in Composite Strata" (New edition)
10. "Research on Key Technologies for Shield Tunneling in Composite Strata with Ultra-Large Diameter in Shantou Bay Tunnel"
11. English edition: "Shield Tunneling Construction Technology in Composite Strata" (New edition)

NORMS/STANDARDS:

1. "Code for Geotechnical Investigation of Urban Rail Transit" - National Standard of the People's Republic of China
2. "Technical Specification for Shield Method Tunnelling and Hyperbaric Operation" - Industry Standard of the People's Republic of China
3. "Technical Specification for Freeze Method in Interconnecting Passage of Urban Rail Transit Engineering" - Provincial Standard of Guangdong Province
4. "Technical Specification for Shield Method Tunnel Construction" - Local Standard of Guangxi Province

PATENT:

Patents: Ranked First

1. Construction Method for Backfilling Soil Bin Operation in Earth Pressure Balance Shield Tunneling
2. Device for Emergency Dewatering in Basement Excavation Construction
3. Continuous Mixing Equipment for Equilibrium Shield Mud in Shield Tunneling
4. Construction Method for Equilibrium Shield Mud Pressure Release and Wall Protection in Shield Tunneling
5. Emergency Sealing Rubber Sleeve for Water Breakthrough in Underground Spaces - Utility Model
6. Pre-blasting Treatment Method for Shield Seal Chamber Mud Cake
7. Integrated Construction Method for Blasting, Hole Sealing, and Grouting
8. Device for Guiding and Controlling Underwater Blasting Mud in Shield Tunneling
9. Multi-mode Shield Tunneling Machine
10. Construction Method for Double-door Jacking Pipe
11. Method for Preventing and Treating Liquefaction of Sand Layers around Subway Tunnel Structures
12. Anti-blocking and Drainage Device for Atmospheric Pressure Disc Cutter and Atmospheric Pressure Disc Cutter Shield Tunneling Machine

13. Emergency Sealing Rubber Sleeve for Water Breakthrough in Underground Spaces - Invention