



上海隧道工程股份(新加坡)有限公司
SHANGHAI TUNNEL ENGINEERING CO (SINGAPORE) PTE LTD



BCAA - IOSH WSH CONFERENCE 2025



*Shaping The Future Of Underground Construction Safety:
Shanghai Tunnel's Technology Driven Approach*

Speaker:
Henry Ho Sze Beng
(Regional WSH Director)

15 September 2025

CONTENTS

1

Company & Projects Introduction

2

WSH Achievements

3

Tunnel WSH Challenges

4

Tunnel WSH Technologies

5

Conclusion





上海隧道工程股份(新加坡)有限公司
SHANGHAI TUNNEL ENGINEERING CO (SINGAPORE) PTE LTD



1

COMPANY INTRODUCTION





Company Introduction



Shanghai Tunnel
Engineering Co. (S) Pte Ltd
(STEC)

- ❖ Established **since 1996**, BCA registered **A1 Civil Engineering Contractor** with more than **25 years of tunnelling expertise**;
- ❖ One of the leading Civil Contractor in Singapore, having safely bored through more than **75km of tunnels** and completed **14 underground & 4 elevated MRT stations**;
- ❖ Won **Over 150 Safety Accolades**, including recognitions from Workplace Safety and Health Council, Ministry of Manpower (MOM), Building Construction Authority (BCA), Land Transport Authority (LTA), Public Utilities Board (PUB) and Changi Airport Group (CAG)



Tunnel Track Records In Singapore



2009
C902



2016
T310



2011
C923a



2018
Funan
2025
N109A



2024
CR112



2014
T225



2019
TEL 316



2024
CR108

JRL J102



NSC 109A



CR102



CR202



CR203



TSL T316



T2C



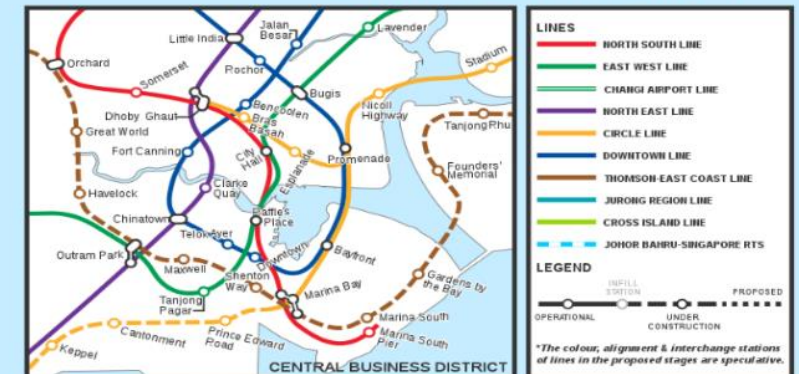
TWRPPL-C1



DTSS T11



SINGAPORE MRT NETWORK





上海隧道工程股份(新加坡)有限公司
SHANGHAI TUNNEL ENGINEERING CO (SINGAPORE) PTE LTD



2

WSH ACHIEVEMENTS





Industry Recognition of 21 WSH Awards Won in 2025:





上海隧道工程股份(新加坡)有限公司
SHANGHAI TUNNEL ENGINEERING CO (SINGAPORE) PTE LTD



3

TUNNEL WSH CHALLENGES





1. Industry Trends, Demands & Higher Quality Control Requirements

Larger Tunnel Diameter



Deeper Shafts



Undercrossing Structures





2. Enhancing Safety Risk Controls & Resources



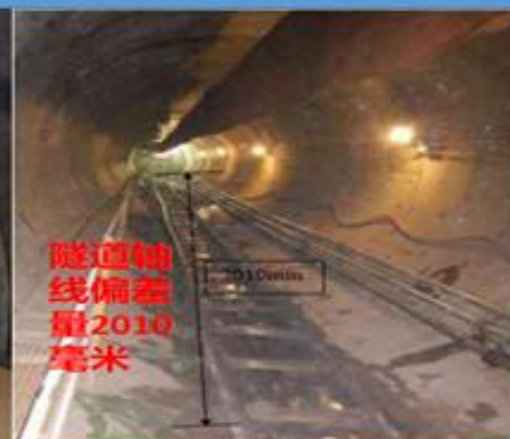
掘进姿态错误控制引起的危害



正面土体失压：
路面坍塌造成环境破坏



掘进状态失稳：
盾尾密封损坏导致隧道产生漏水风险

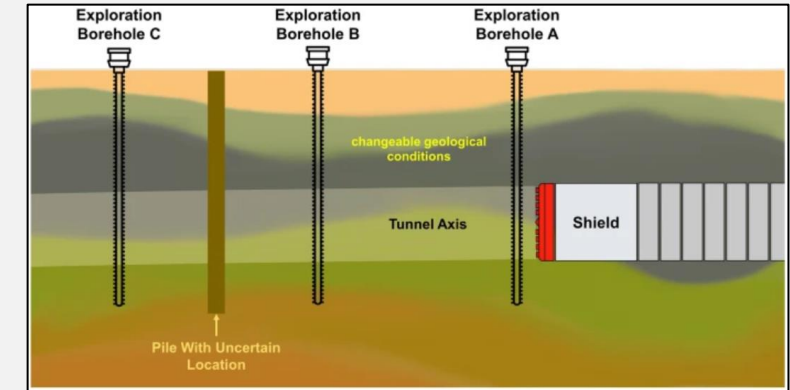


姿态控制失准：
隧道与规划轴线产生严重偏差



1. Geological Uncertainty

- Limited borehole coverage makes it hard to predict exact ground conditions.
- Sudden transitions (hard → soft ground), boulders, cavities, or fault zones increase risk.



2. Groundwater & Water Ingress

- High water table or water-bearing strata can cause inflow during excavation and cutterhead intervention (maintenance).



3. Ground Stability & Settlement Control

- Risk of surface/subsurface settlement leading to damage of nearby utilities, roads, or buildings.

4. Safety Risks in Confined Space

- Tunnelling involves pressurised environments, potential gas hazards, fire risk, and limited escape routes.
- Emergency preparedness is essential.





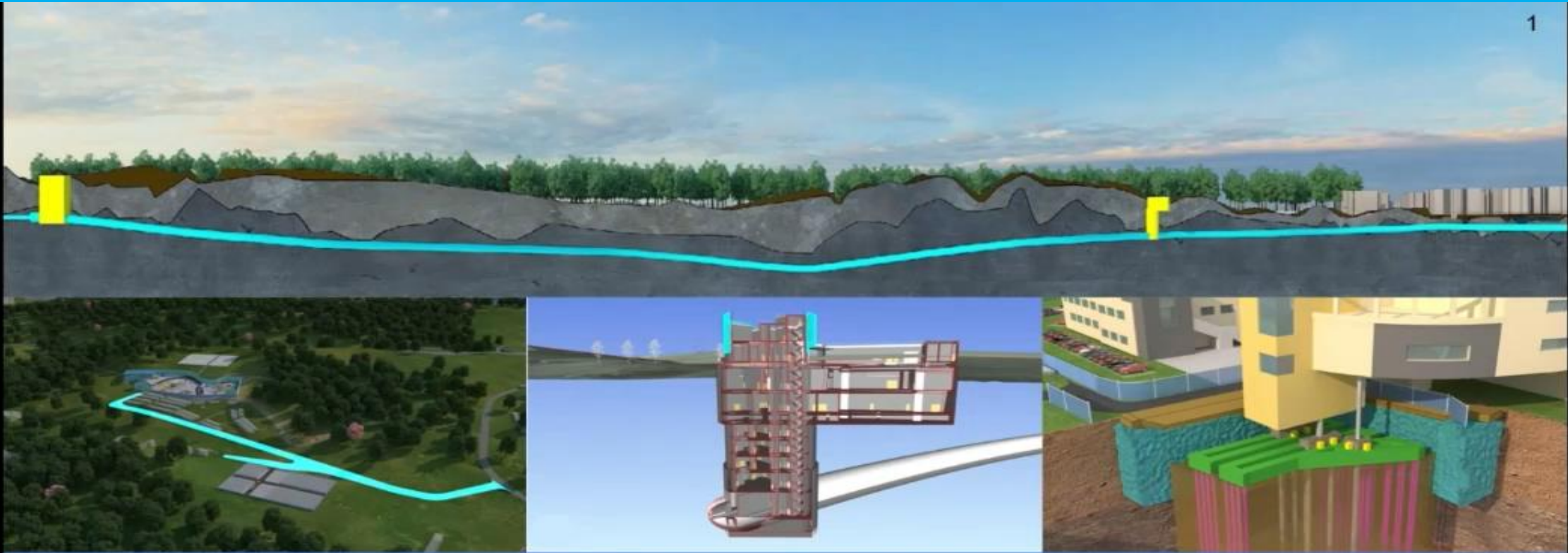
上海隧道工程股份(新加坡)有限公司
SHANGHAI TUNNEL ENGINEERING CO (SINGAPORE) PTE LTD



4

WSH TECHNOLOGIES





DESIGN AND CONSTRUCTION OF BORED TUNNEL BETWEEN FAIRWAYS DRIVE AND SING MING WALK AND ASSOCIATED WORKS

CR202 – Innovations

Developer:



Main Contractor:



Maincon Design Consultant:

AECOM

CR202 Design and Construction of Bored Tunnel Between Fairways Drive and Sin Ming Walk and Associated Works



1. Intelligent Tunnelling Technology

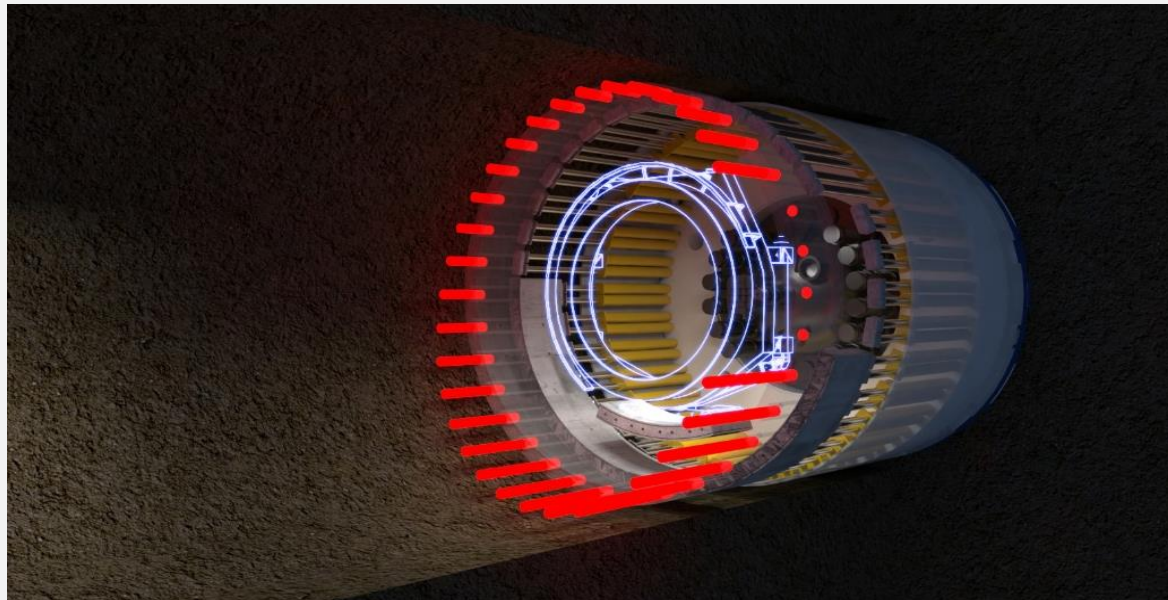
- Intelligence Cutter Technology
- Active Control Technology of Thrust (ACTT)
- Semi-Automatic Segment Transportation & Erection System
- TBM Fault Self-Diagnosis System
- Equipment Intelligent Diagnosis And Fault Early Warning Technology



1. Intelligent Tunnelling Technology

➤ Advantages:

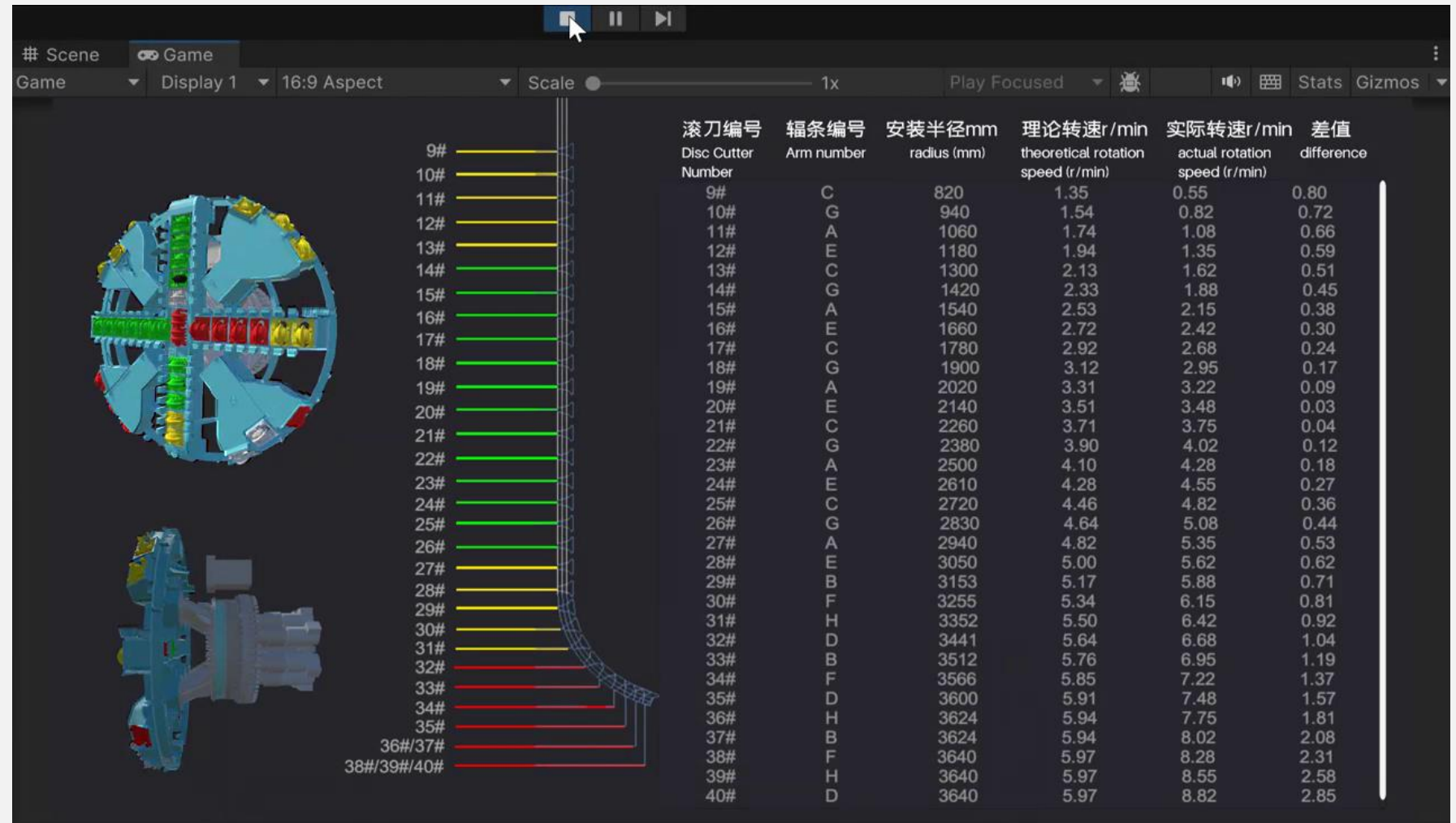
- Improve Operation Safety
- Increase Working Efficiency
- Reduction In Manpower





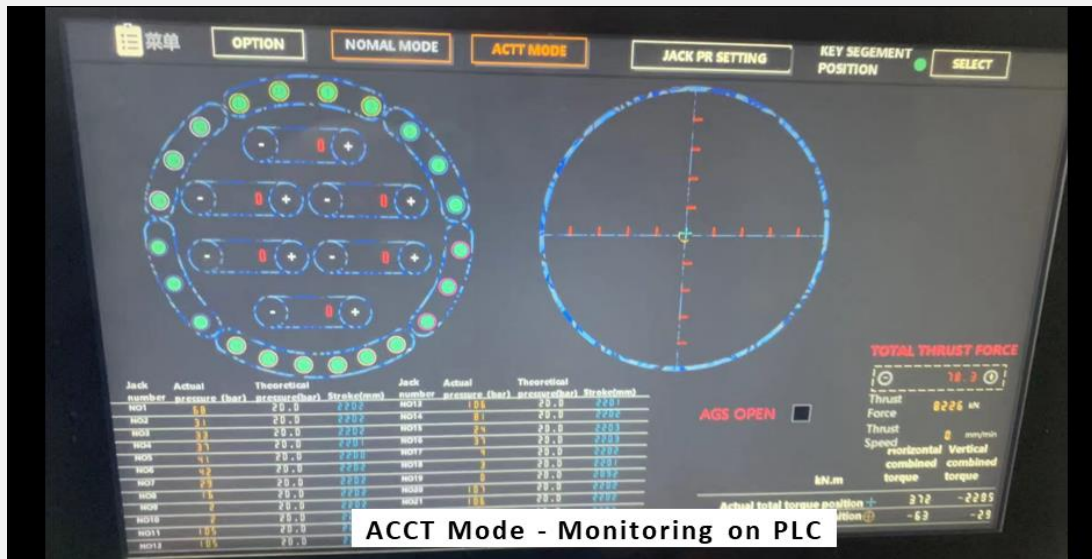
➤ Intelligent Cutter Technology

- Real-time Detection of Rotation
- Evaluate Condition of Cutterhead
- Evaluate Cutter Tools Performance
- Proper Planning of Cutter Tools Management

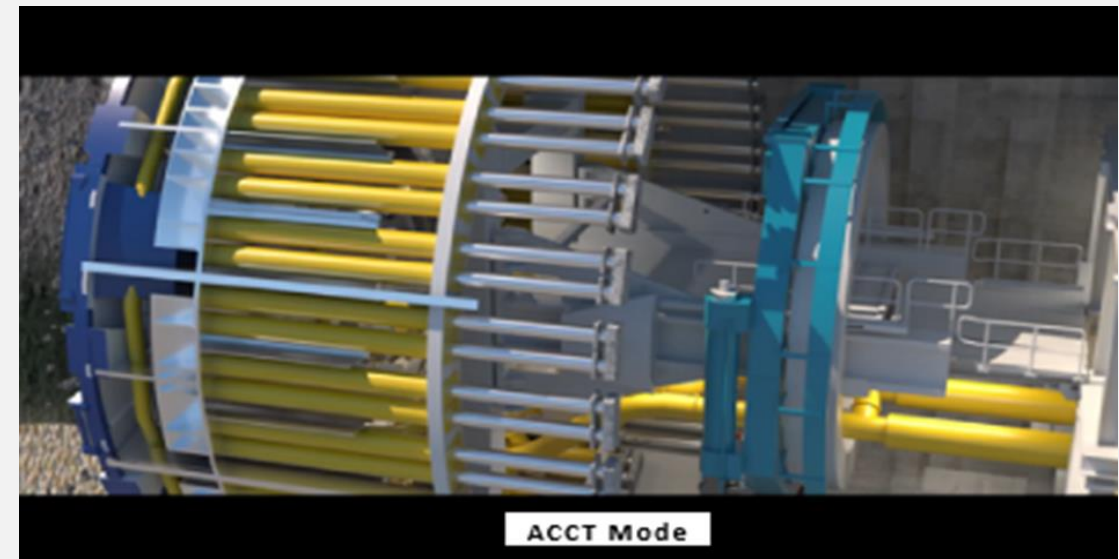


➤ Active Control Technology of Thrust (ACTT)

- Continuous Excavation & Segment Erection
- Better Excavation Control
- Improvement - Cycle Time Efficiency
- Able to switch back to normal mode



ACCT Mode - Monitoring on PLC

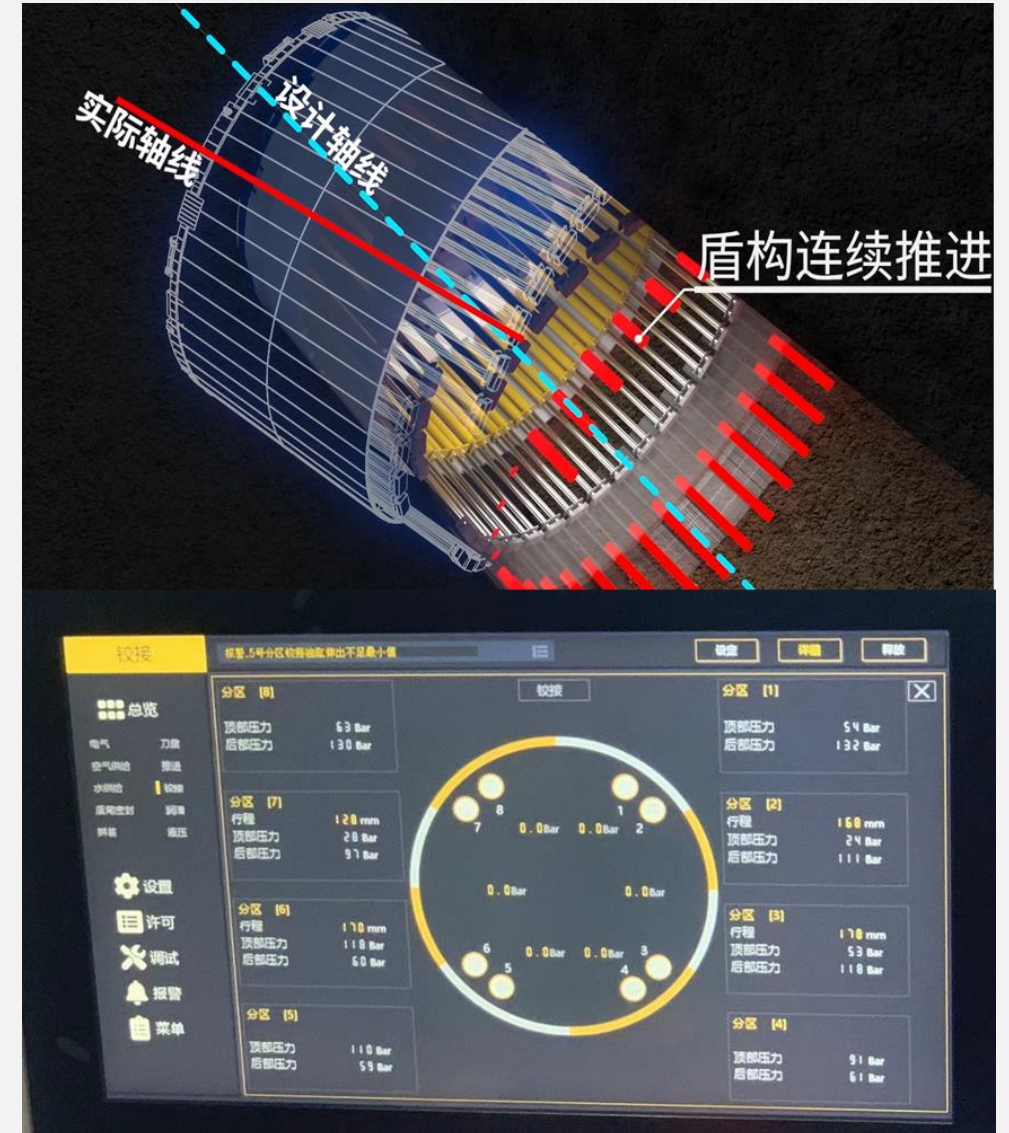


ACCT Mode



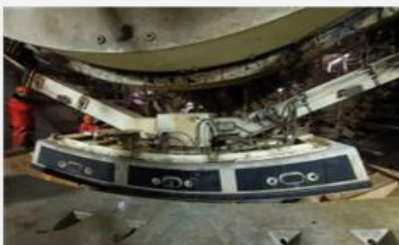
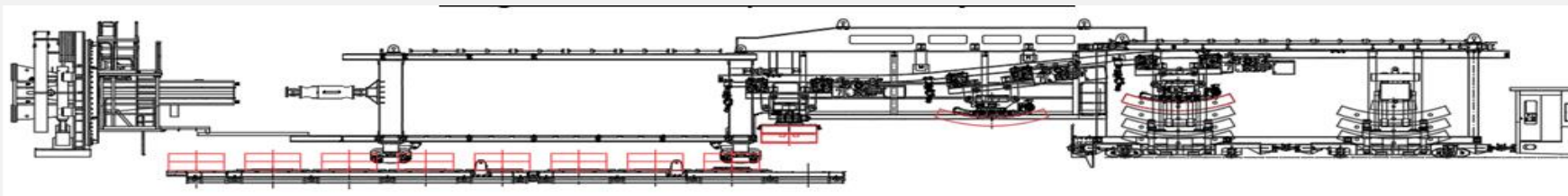
➤ Axis Self-Adaptive Method – Alignment Control

- Real-time Monitoring
- Real-time Predication & Calculation
- Real-time Correction - Able to automatic “bring back” the TBM to the original alignment if there is any misalignment
- Able to switch back to normal mode





➤ Semi-Auto Segment Transportation & Erection System



(d) Manually
Erection of
Segment



(c)
Automatic Placement
of Segment in the
designated location at
the Segment Feeder



(b)
Automatic
Turning of
Segment



(a)
Automatic
Hoisting of
Segment once it is
in position from
Quick Unloader

Improve
Operation Safety

Increase Efficiency

Highly Intelligence

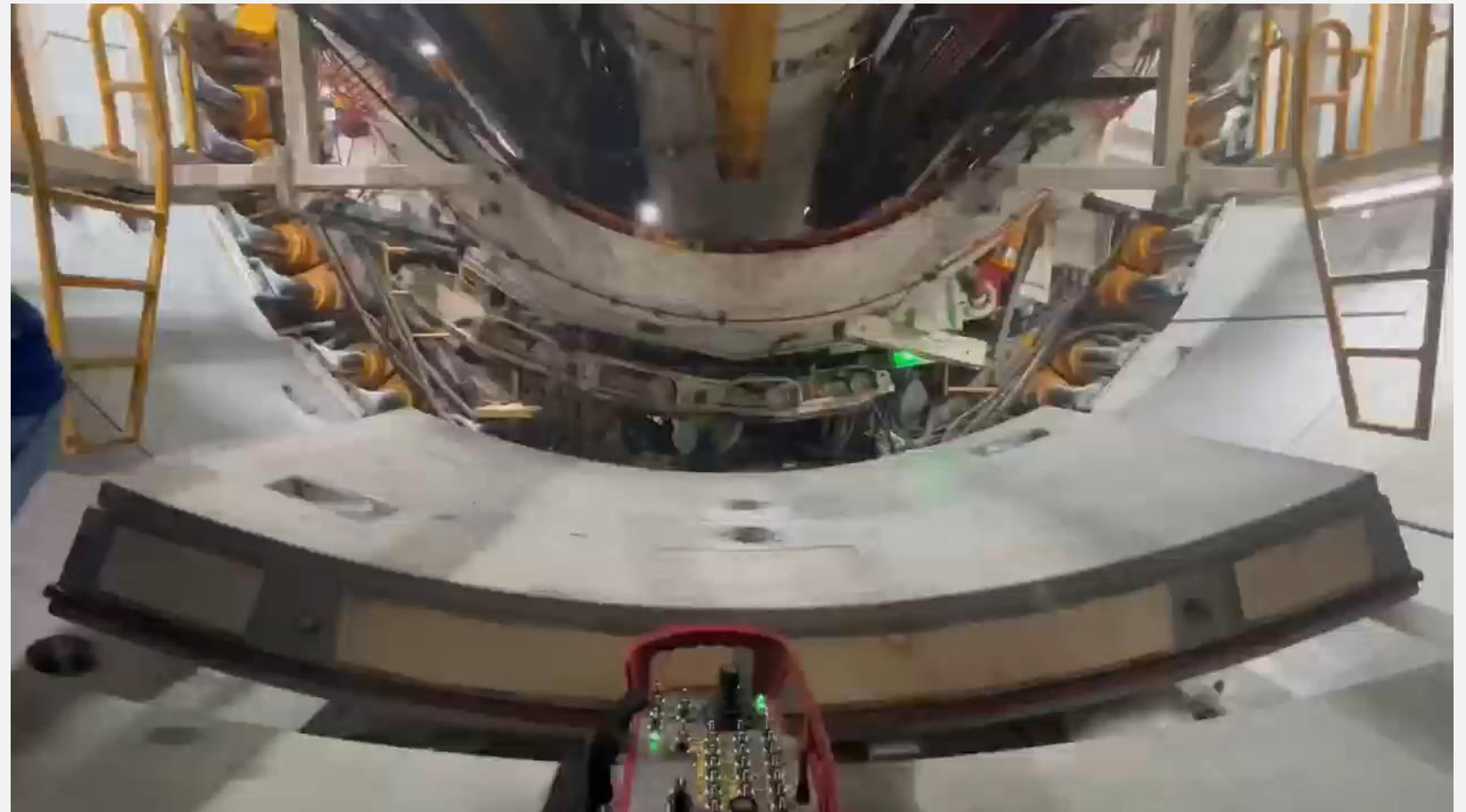
➤ Intelligent-Segment Erector



Improve
Operation Safety

Increase Efficiency

Highly
Intelligence





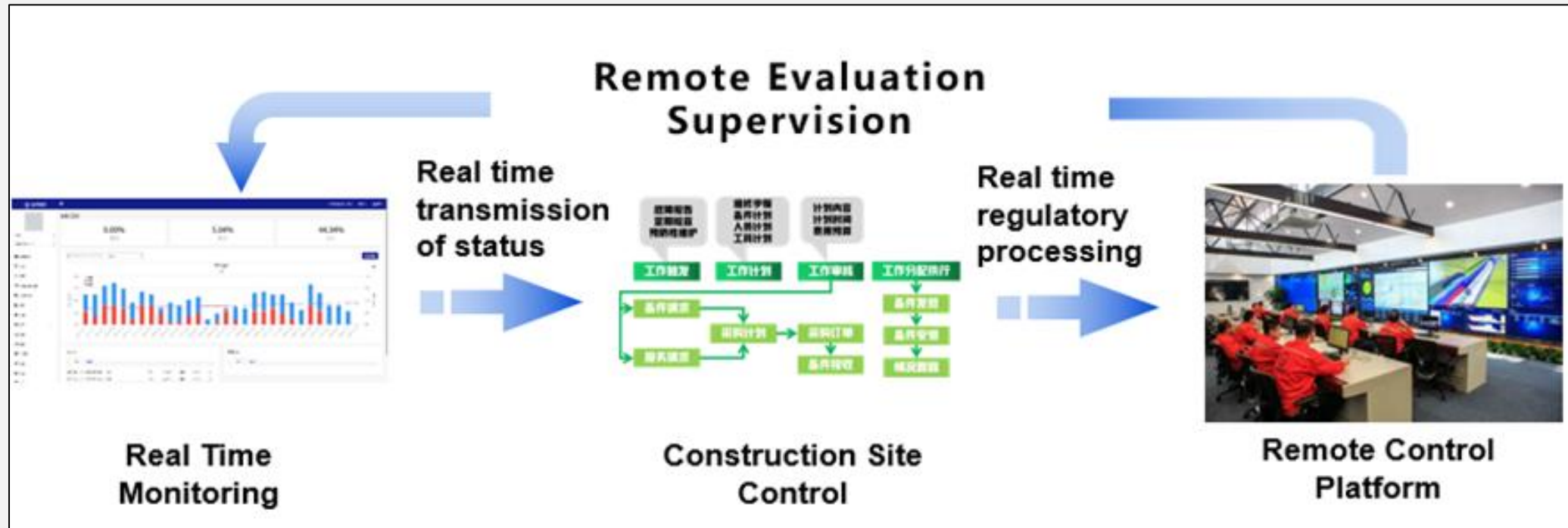
➤ TBM Self-Diagnosis System

- Real-time Monitoring for:
 - Main Drive System
 - Hydraulic System
 - Electrical System
 - Overall TBM Status Evaluation



➤ Equipment Intelligent Diagnosis And Fault Early Warning Technology

- Real-time monitoring system
- Advance warning alarms and able to carry out timely rectification/troubleshooting works



2. VR Emergency Response Training





上海隧道工程股份(新加坡)有限公司
SHANGHAI TUNNEL ENGINEERING CO (SINGAPORE) PTE LTD



5

CONCLUSION





Looking Ahead



上海隧道工程股份(新加坡)有限公司
SHANGHAI TUNNEL ENGINEERING CO (SINGAPORE) PTE LTD



上海隧道工程股份(新加坡)有限公司

SHANGHAI TUNNEL ENGINEERING CO (SINGAPORE) PTE LTD

**Engineering A Safer Tomorrow Through
Smart Tunnel Technology**

**Thank
You**