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

bizSAFE Partner

GREEN AND GRACIOUS BUILDER Star

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

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COMPANY INTRODUCTION

Company Introduction

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

- 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, Land Transport Authority and Building Construction Authority;




Tunnel Track Records In Singapore

2009
C902

2016
T310

2011
C923a

2018
Funan

2025
N109A

2024
CR112

2014
T225

2019
TEL 316

2024
CR108

Projects Introduction

上海隧道工程股份(新加坡)有限公司
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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
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WSH ACHIEVEMENTS

WSH Achievements

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Industry Recognition of 21 WSH Awards Won in 2025:

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TUNNEL WSH CHALLENGES

1. Industry Trends, Demands & Higher Quality Control Requirements

Larger Tunnel Diameter

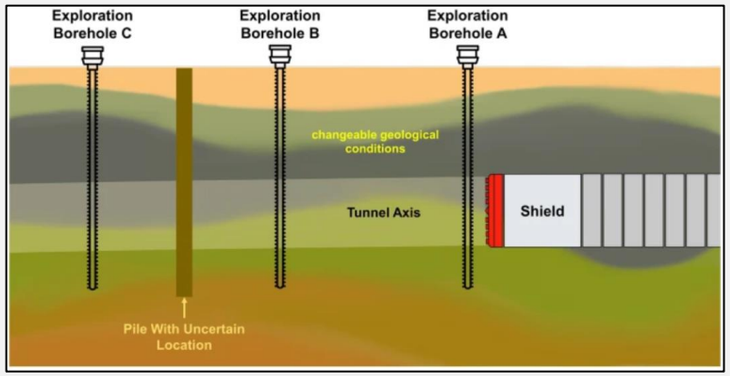
Deeper Shafts

Undercrossing Structures

2. Enhancing Safety Risk Controls & Resources

Tunnel WSH Challenges

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.

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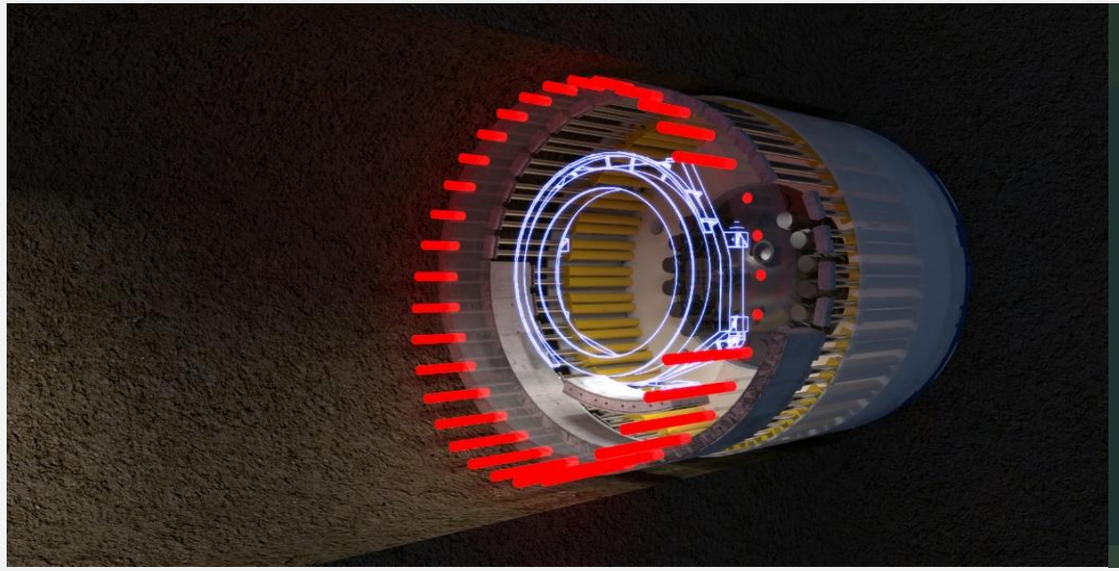
WSH TECHNOLOGIES

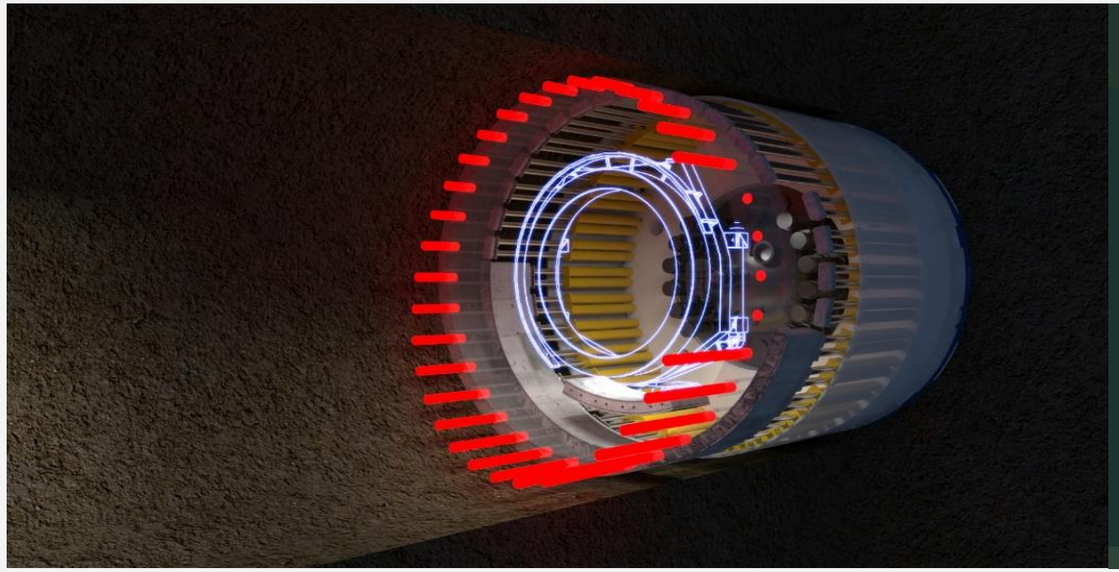
1. Intelligent Tunnelling Technology

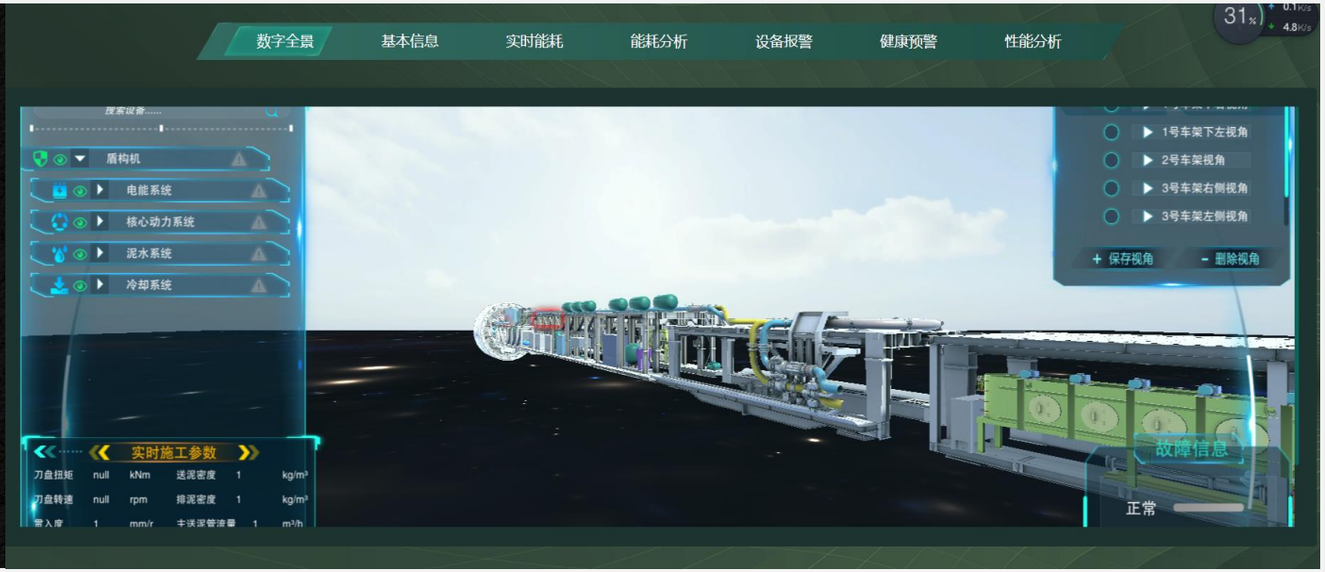
- Intelligence Cutter Technology
- Active Control Technology of Thrust (ACTT)
- Semi-Automatic Segment Transportation & Erection System
- TBM Fault Self-Diagnosis System
- Equipment Intelligent Diagnosis And Fault Early Warning Technology



1. Intelligent Tunnelling Technology

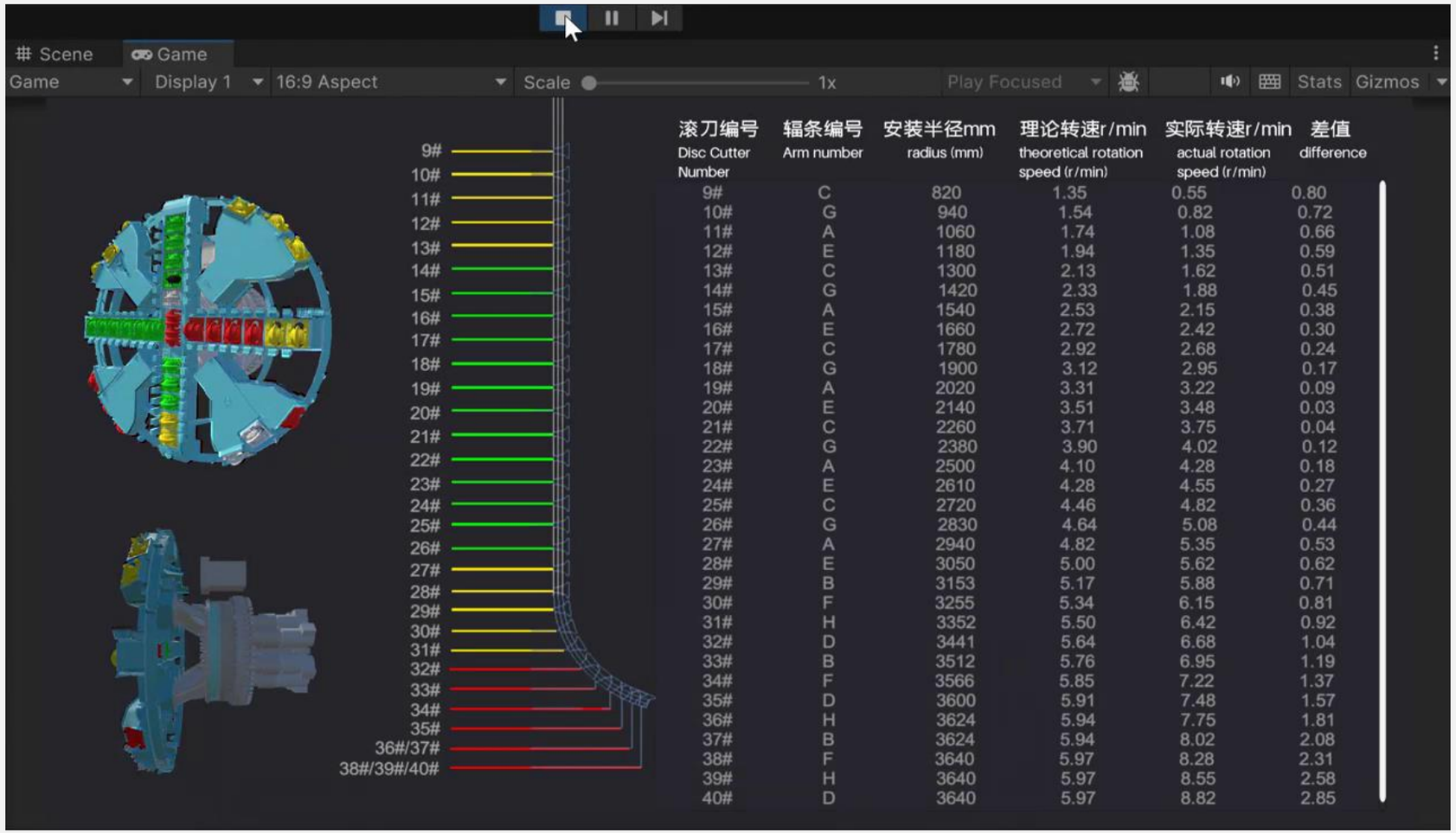
- Advantages:
  - Improve Operation Safety
  - Increase Working Efficiency
  - Reduction In Manpower





➢ Intelligent Cutter Technology

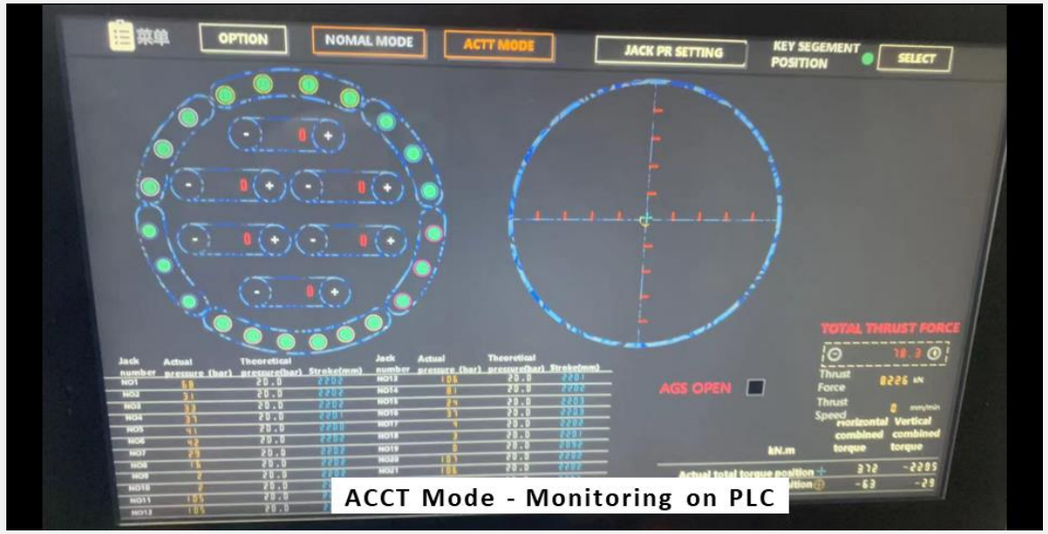
- Real-time Detection of Rotation
- Evaluate Condition of Cutterhead
- Evaluate Cutter Tools Performance
- Proper Planning of Cutter Tools Management

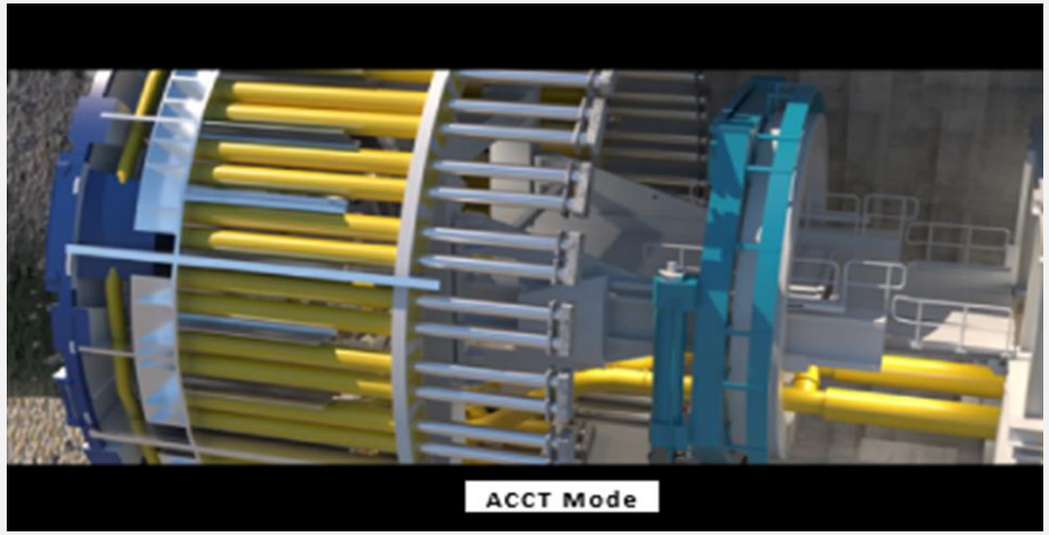


滚刀编号 Disc Cutter Number	辐条编号 Arm number	安装半径mm radius (mm)	理论转速r/min theoretical rotation speed (r/min)	实际转速r/min actual rotation speed (r/min)	差值 difference
9#	C	820	1.35	0.55	0.80
10#	G	940	1.54	0.82	0.72
11#	A	1060	1.74	1.08	0.66
12#	E	1180	1.94	1.35	0.59
13#	C	1300	2.13	1.62	0.51
14#	G	1420	2.33	1.88	0.45
15#	A	1540	2.53	2.15	0.38
16#	E	1660	2.72	2.42	0.30
17#	C	1780	2.92	2.68	0.24
18#	G	1900	3.12	2.95	0.17
19#	A	2020	3.31	3.22	0.09
20#	E	2140	3.51	3.48	0.03
21#	C	2260	3.71	3.75	0.04
22#	G	2380	3.90	4.02	0.12
23#	A	2500	4.10	4.28	0.18
24#	E	2610	4.28	4.55	0.27
25#	C	2720	4.46	4.82	0.36
26#	G	2830	4.64	5.08	0.44
27#	A	2940	4.82	5.35	0.53
28#	E	3050	5.00	5.62	0.62
29#	B	3153	5.17	5.88	0.71
30#	F	3255	5.34	6.15	0.81
31#	H	3352	5.50	6.42	0.92
32#	D	3441	5.64	6.68	1.04
33#	B	3512	5.76	6.95	1.19
34#	F	3566	5.85	7.22	1.37
35#	D	3600	5.91	7.48	1.57
36#	H	3624	5.94	7.75	1.81
37#	B	3624	5.94	8.02	2.08
38#	F	3640	5.97	8.28	2.31
39#	H	3640	5.97	8.55	2.58
40#	D	3640	5.97	8.82	2.85

➢ Active Control Technology of Thrust (ACTT)

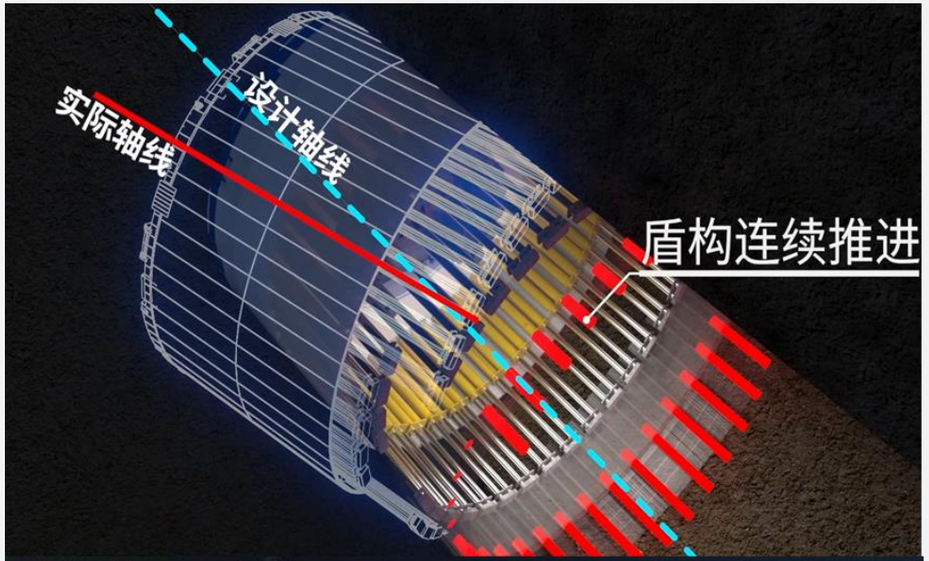
- Continuous Excavation & Segment Erection
- Better Excavation Control
- Improvement - Cycle Time Efficiency
- Able to switch back to normal mode



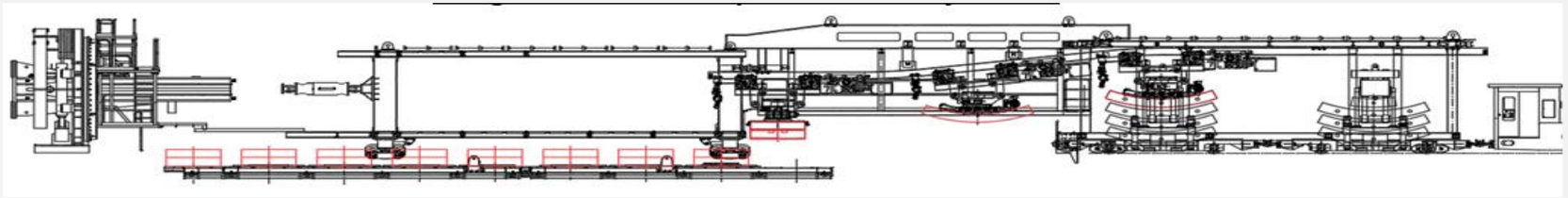


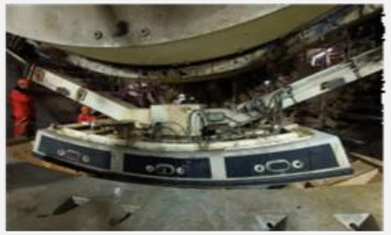
➢ Axis Self-Adaptive Method – Alignment Control

- 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





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

(b) Automatic Turning of Segment

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

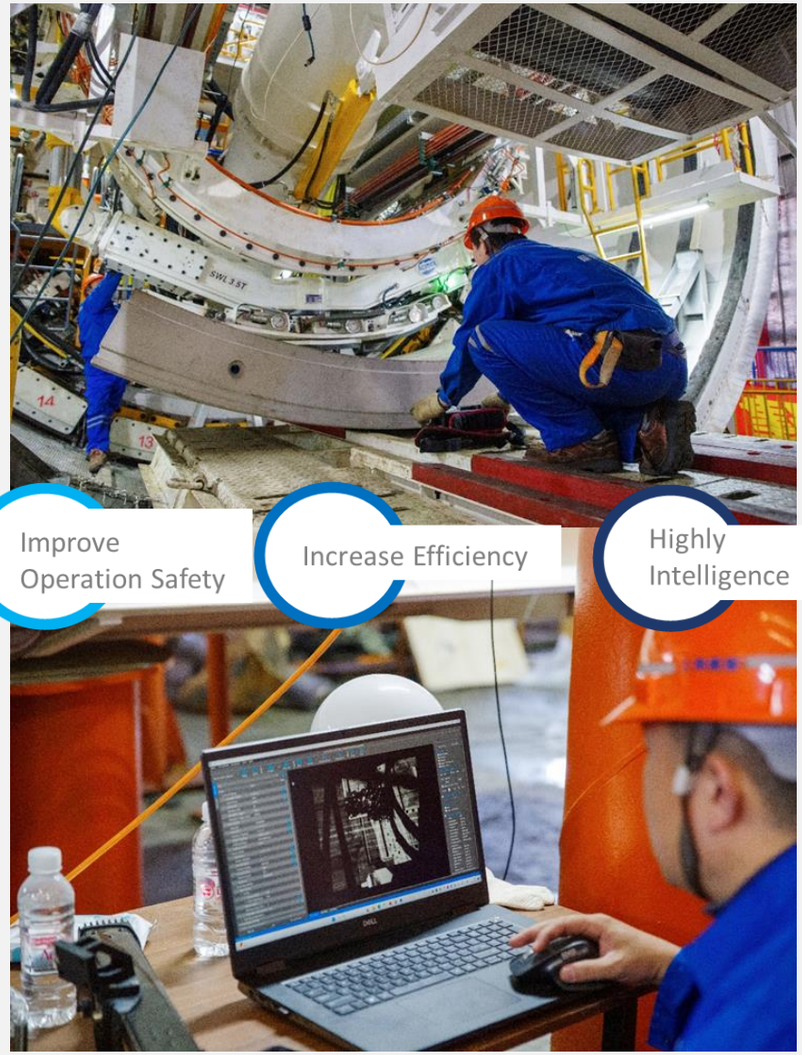
(d) Manually Erection of Segment

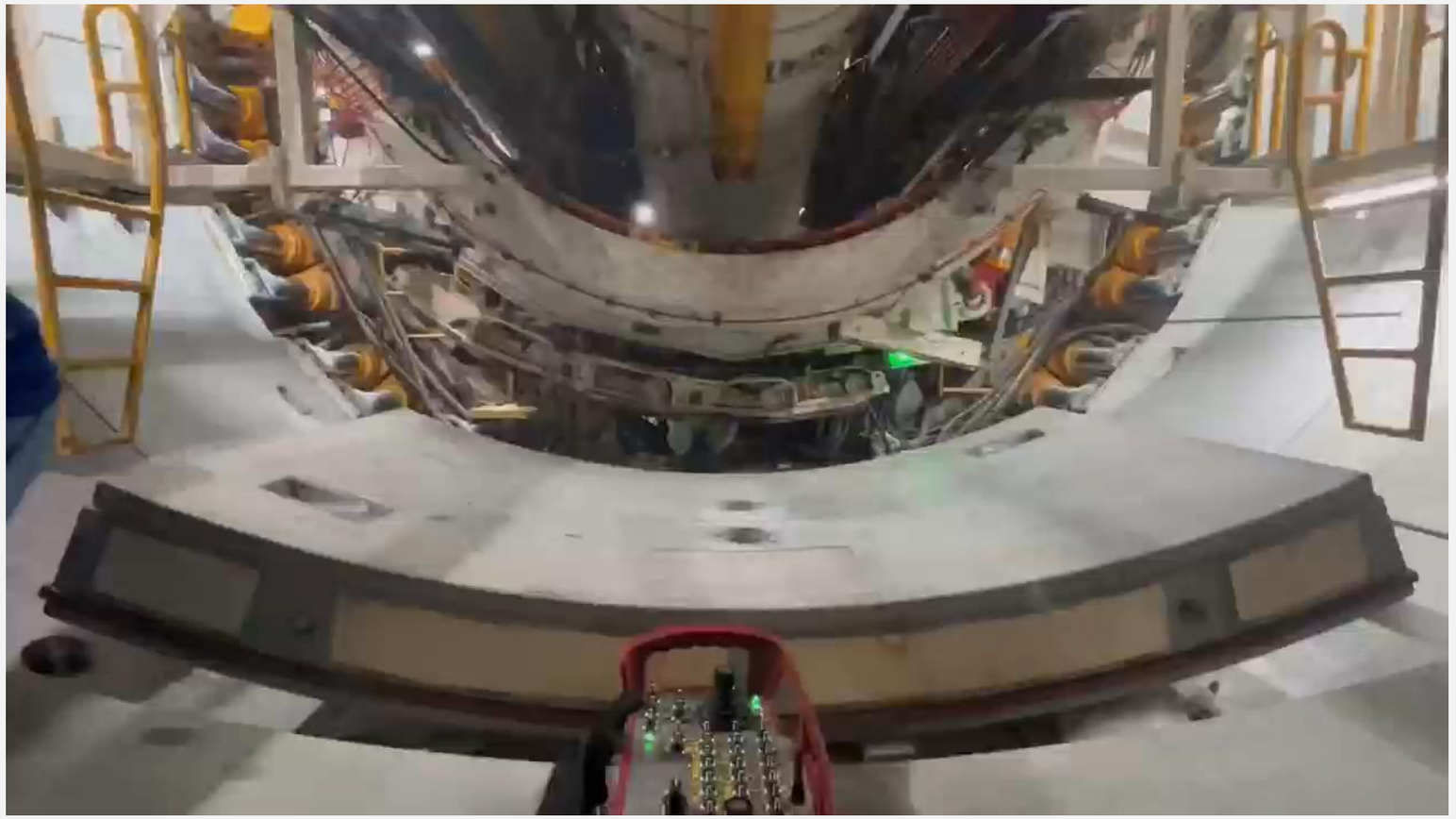
Improve Operation Safety

Increase Efficiency

Highly Intelligence

➢ Intelligent-Segment Erector



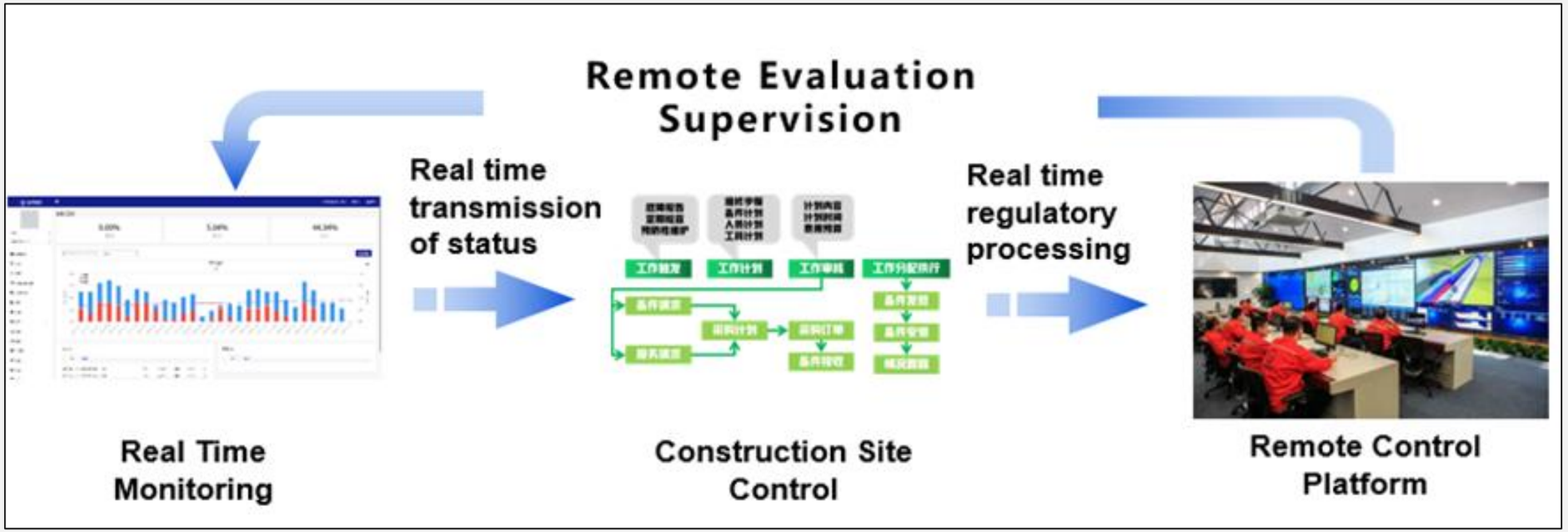


➢ TBM Self-Diagnosis System

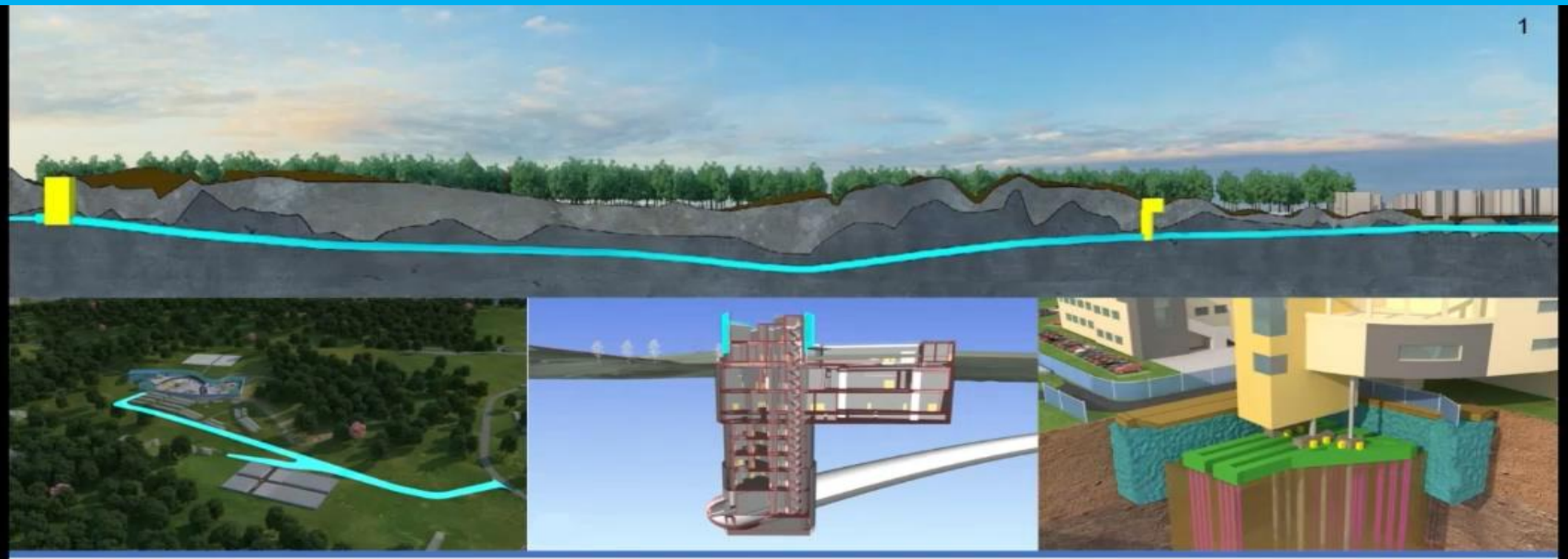
- Real-time Monitoring for:
- Main Drive System
- Hydraulic System
- Electrical System
- Overall TBM Status Evaluation

➢ 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



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

CR202 – Innovations

Developer:	Main Contractor:	Maincon Design Consultant:	CR202 Design and Construction of Bored Tunnel Between Fairways Drive and Sin Ming Walk and Associated Works
Land Transport Authority	OBAYASHI-STECS CR202 JOINT VENTURE	AECOM	

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

Engineering A Safer Tomorrow Through Smart Tunnel Technology

Thank

You