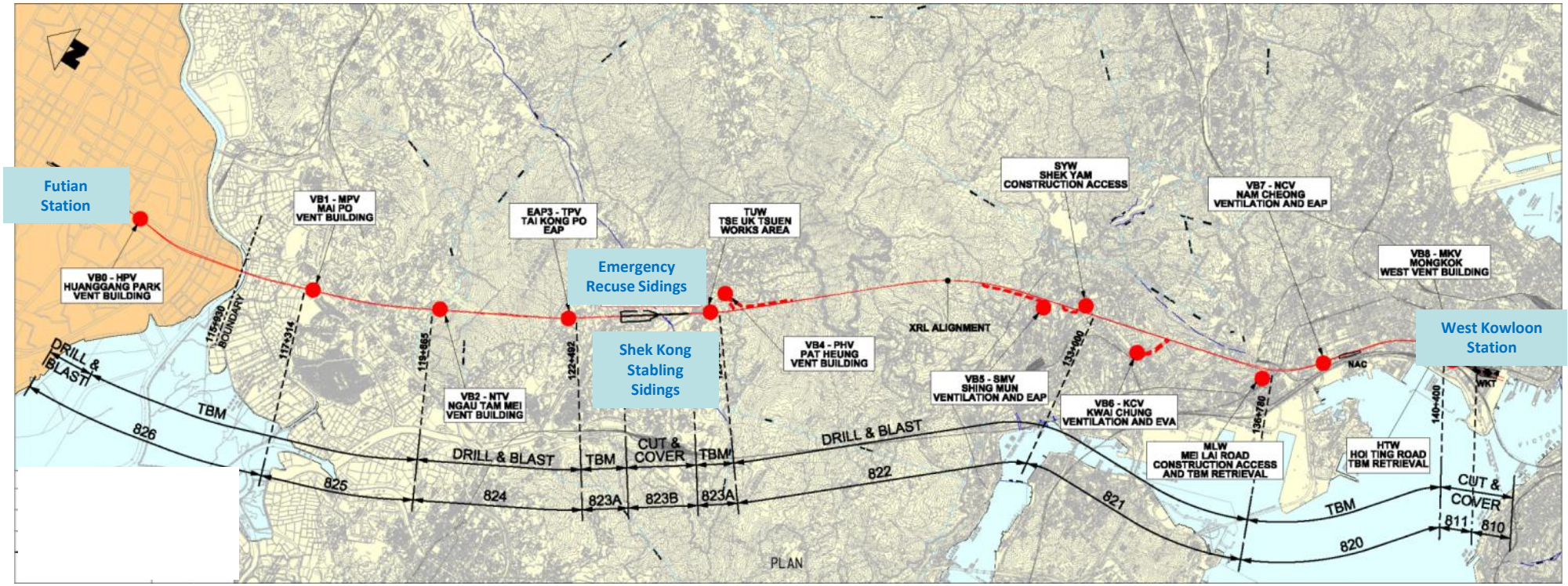
Express Rail Link (XRL)

Overhead Line System – A Step Forward

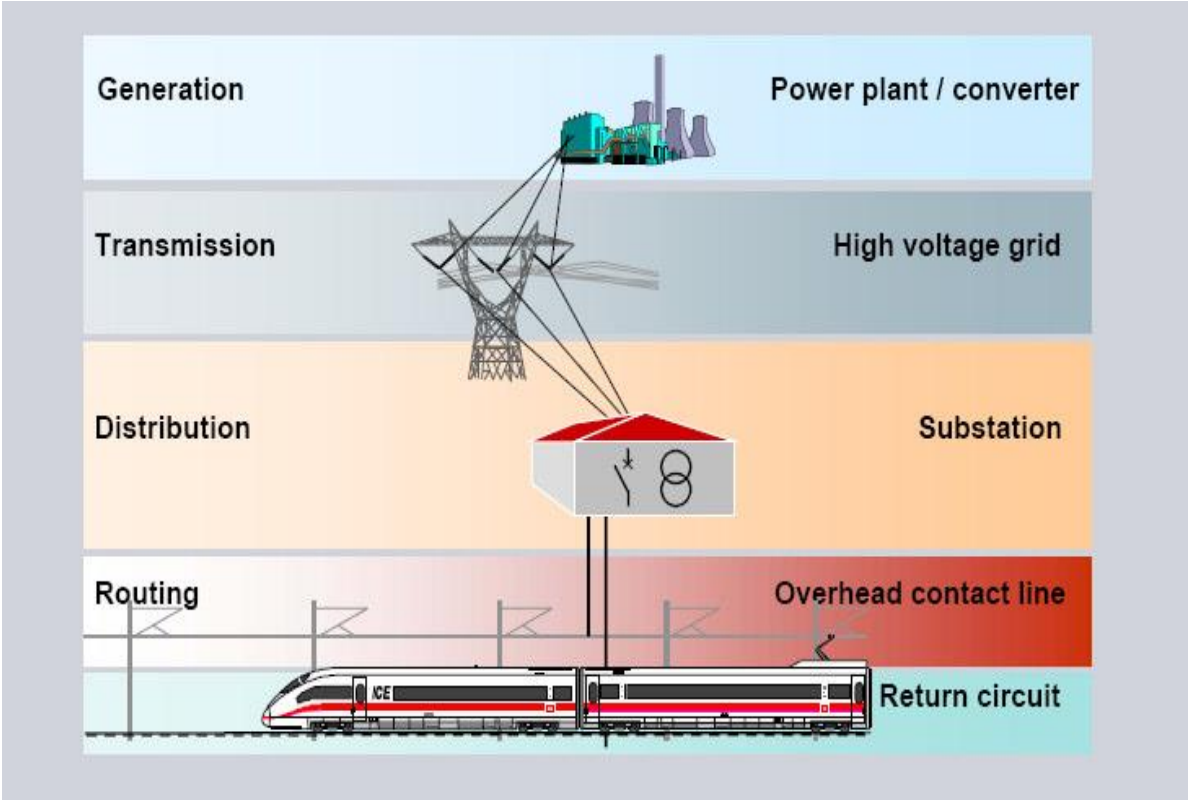
Presented by
YS Ho
Senior Construction Engineer

XRL Alignment



Route length ≈ 26km, both tracks along mainline tunnels & station
Open area at Emergency Rescue Siding (ERS) and Shek Kong Stabling Sidings (SSS)
Maximum operating speed = 200kph

Power Supply Feeding Arrangement



Generation from Local Power Company

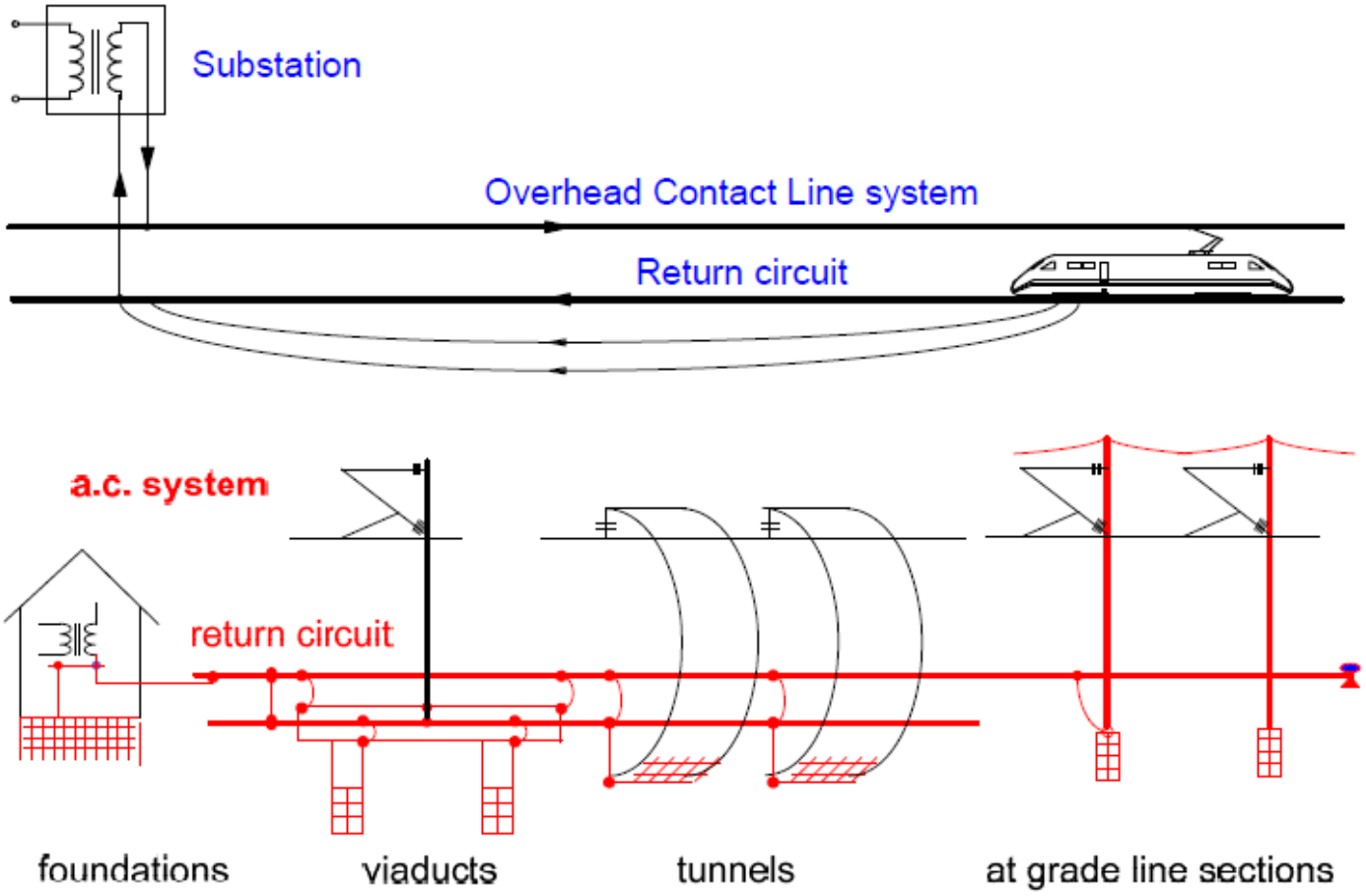
HV Transmission System - through OHL/Cables

District Primary/Zone Stations - Step down to 1-Ph 25kV Supply

Traction Power System- Via cables/OHL to XRL Trains

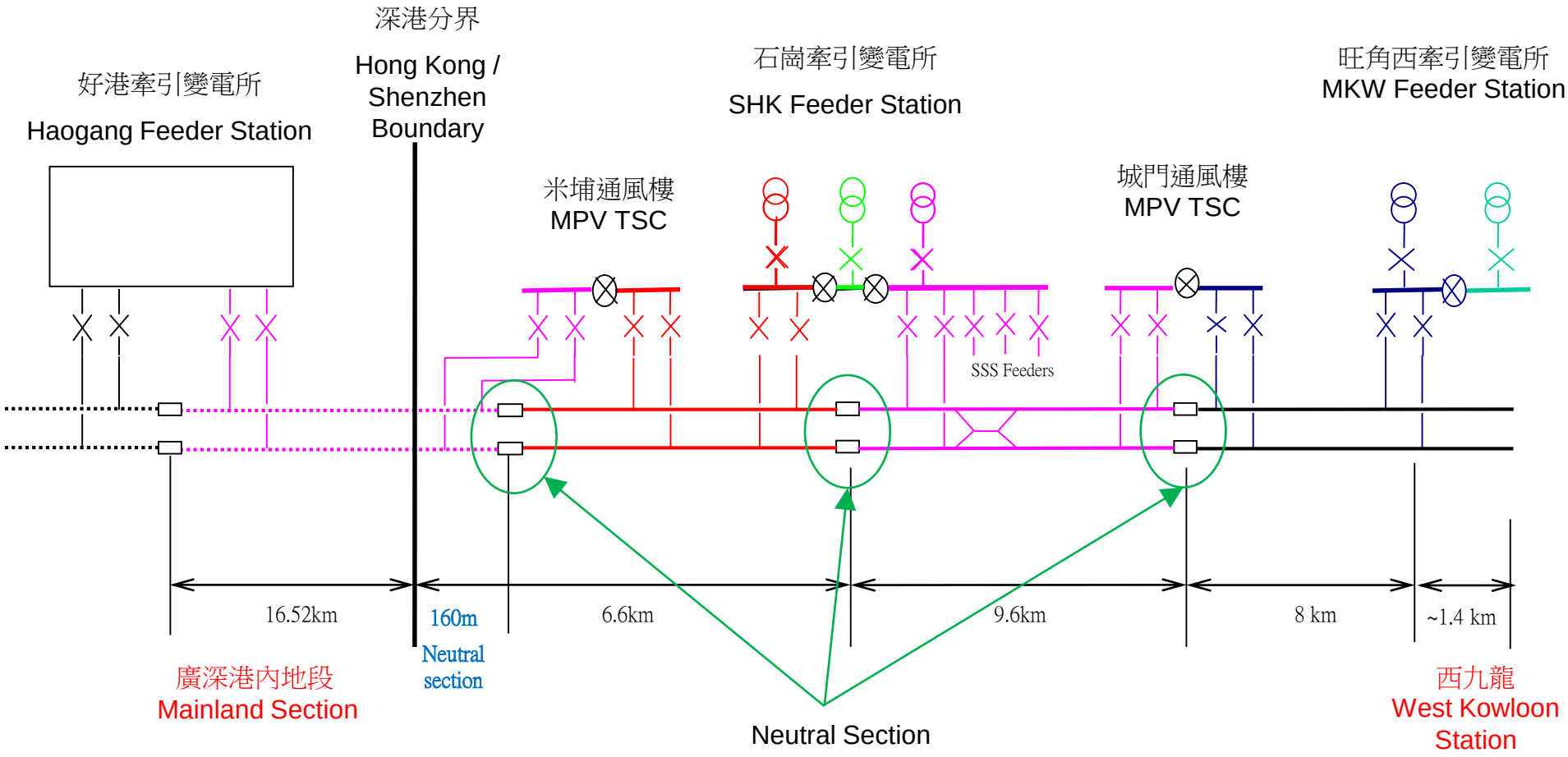
MTR

General 25kV Traction Power and Earth Systems

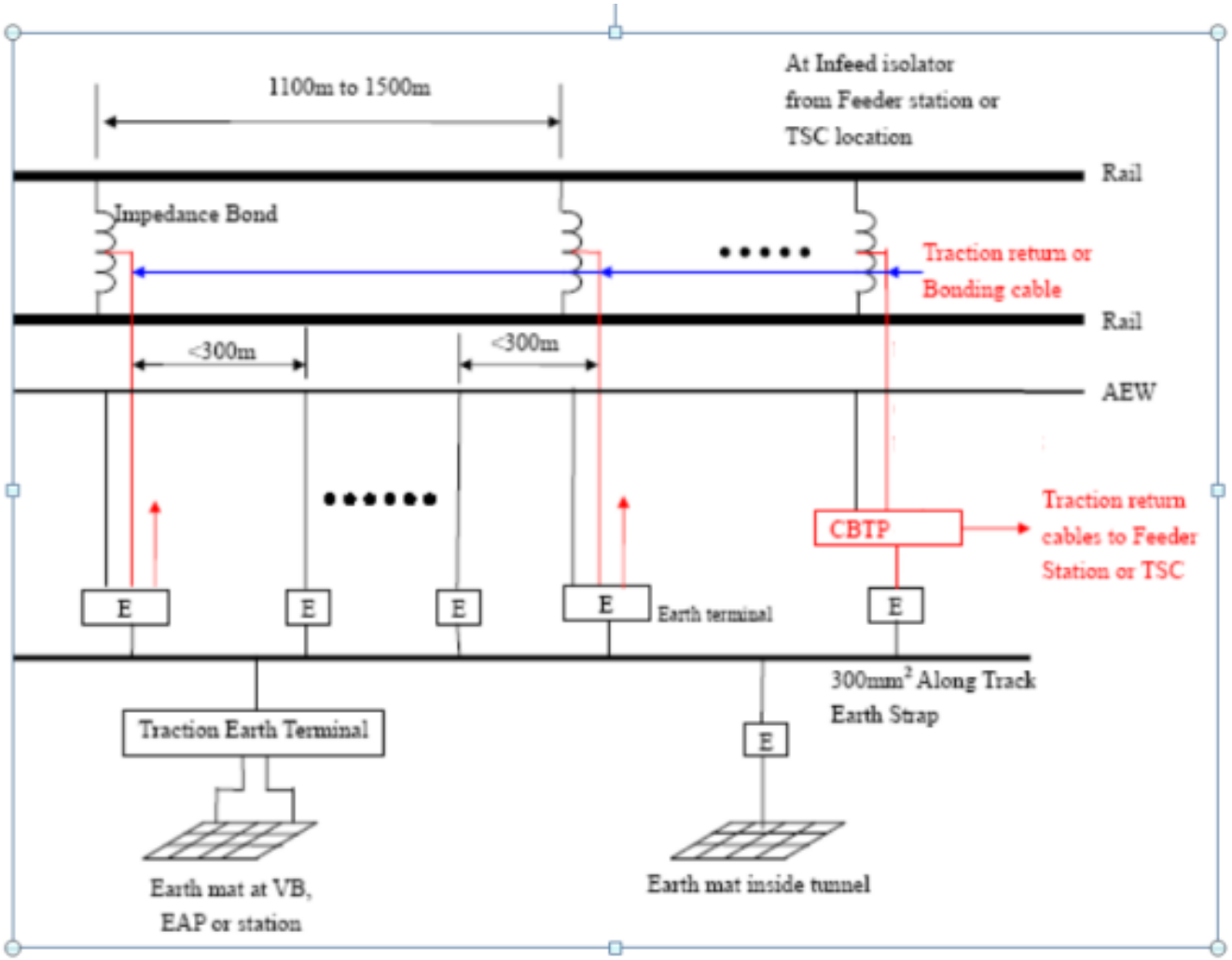


Interconnected return circuit forms Traction System Earth

XRL OHL and Traction Power Configuration



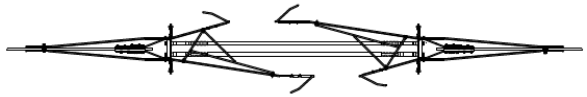
Typical Earthing and Bonding System



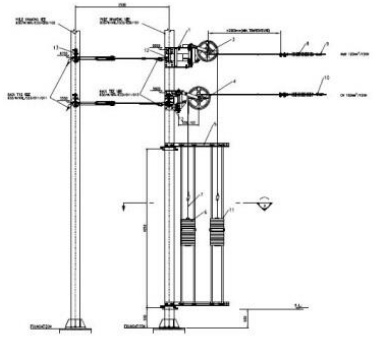
Basic OHL Equipment

Contact Wire (150mm^2, AgCu , grooved)

Cantilever (complete with aluminum tubes and porcelain insulators)



Section insulator (electrical sectionization)



Balance Weight Anchor (Auto-tension)

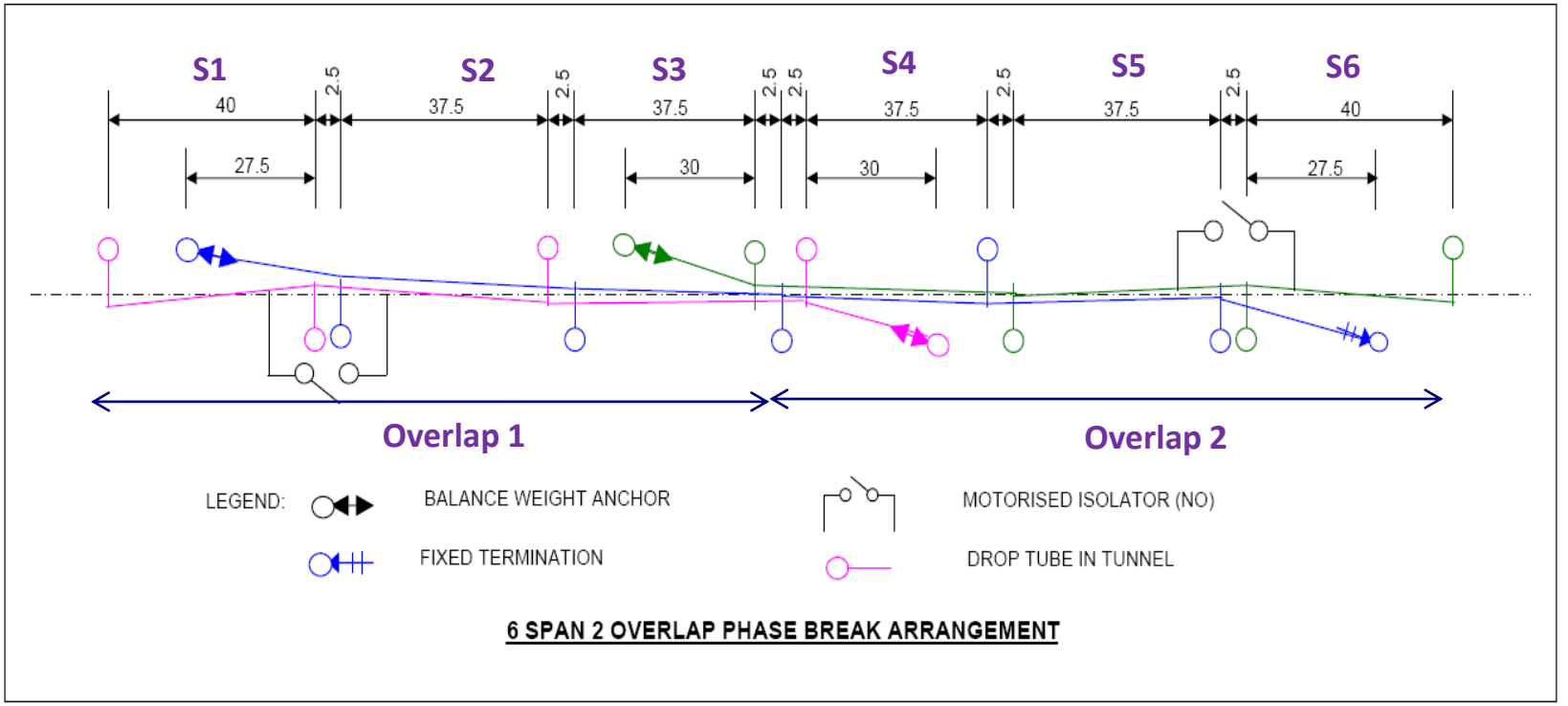
Special Design Features

25kV Simple Catenary System

- CW - 150 mm^2, AgCu
- MeW – 120 mm^2, BZII
- AEW – 185 mm^2, AL
- 20kN tension for Mainline
- 15kN tension for trolley wire system in SSS
- Sectionization by isolators and section insulators
- Neutral Section with 6 span 2 overlap arrangement

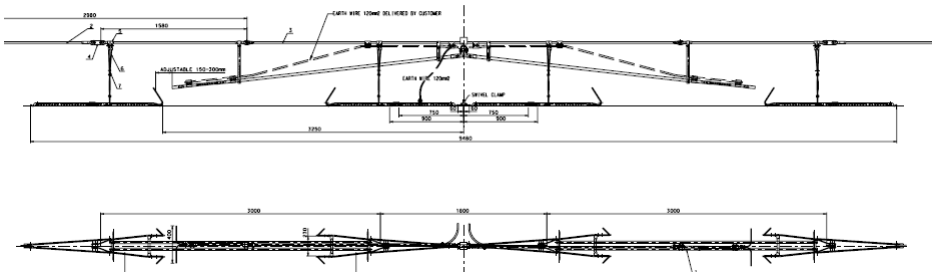
Neutral Section to isolate two different sources

6-Span 2-Overlap Arrangement



Conventional

Phase Break Assembly



OHL Construction Highlights

- 1st Fix Installation

  survey, anchor installation, pull-out tests, installation and cantilever installation
- 2nd Fix Installation

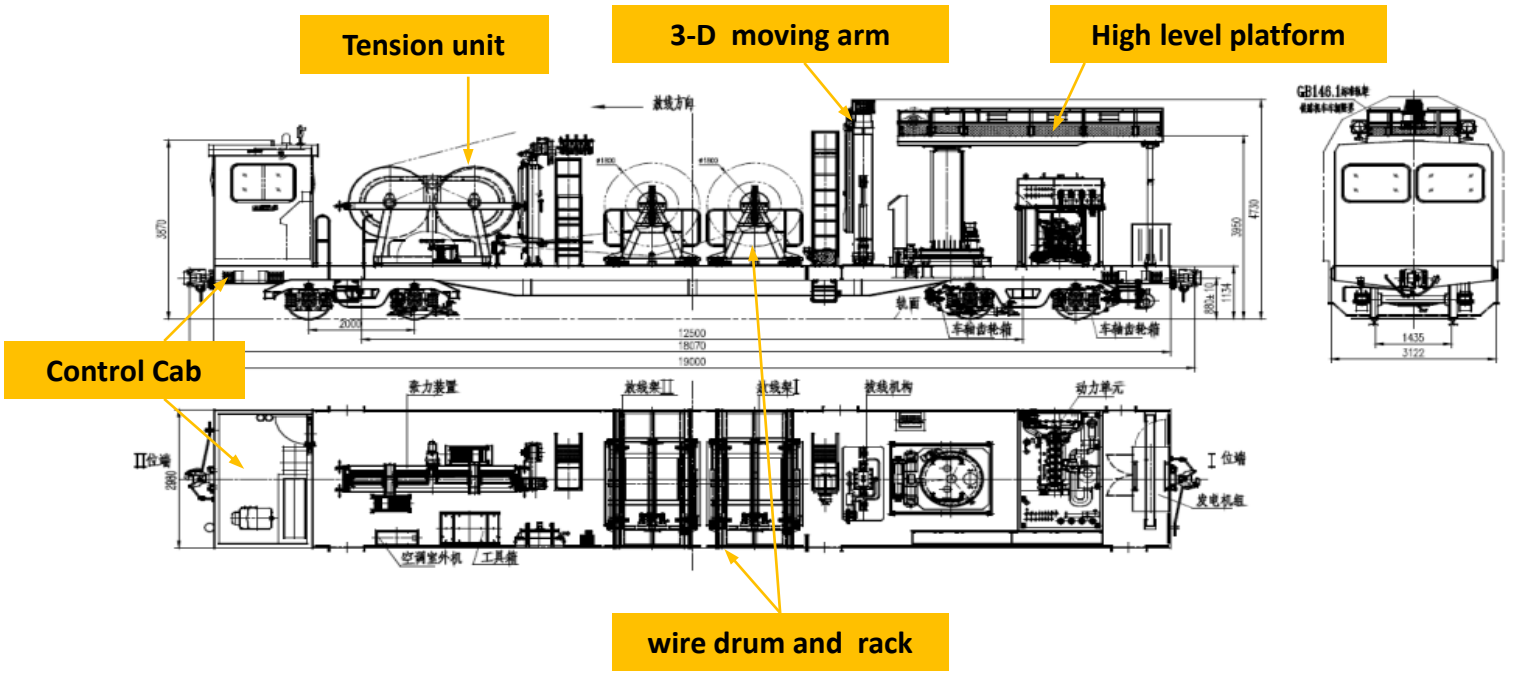
  wire stringing, isolator installation, cut-in BWA and insulators, registration
- T&C Work

  stagger and height, functional tests, cold running test and insulation test
- Commissioning Tests

  sectioning Proving tests and short circuit tests
- Dynamic T&C work – hot running tests upto 140 kph
- Integrated T&C work – dynamic tests upto 200kph

Special OHL Work train

Constant Tension Drum Carrier



Special OHL Work train

Breakthrough Features

1. Pre-set tension (6kN~30kN)

2. Computerized control for stringing speed and tension

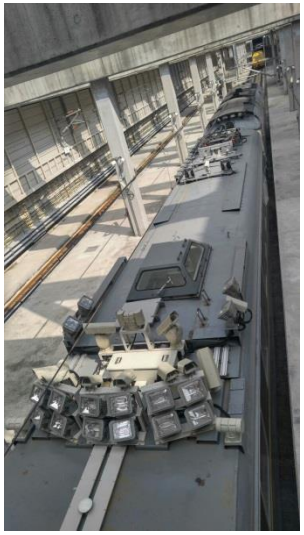
3. 3-Dimensional controllable direction

4. Automatic alarm systems

OHL Speed Verification Test

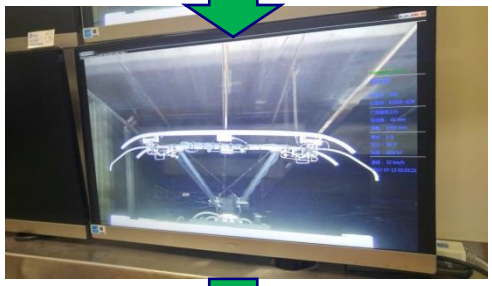
1st stage upto 140kph (DF11)

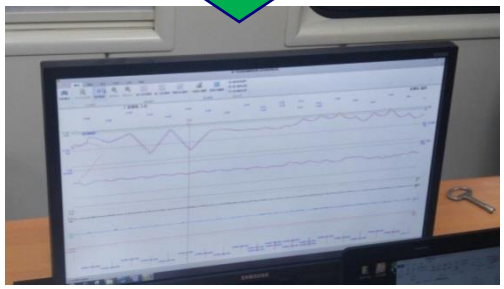
2nd stage upto 217kph (CIT)



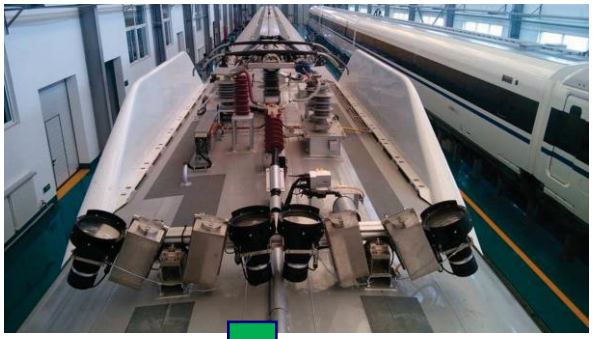
OHL Speed Verification Test

1st stage upto 140kph (DF11)



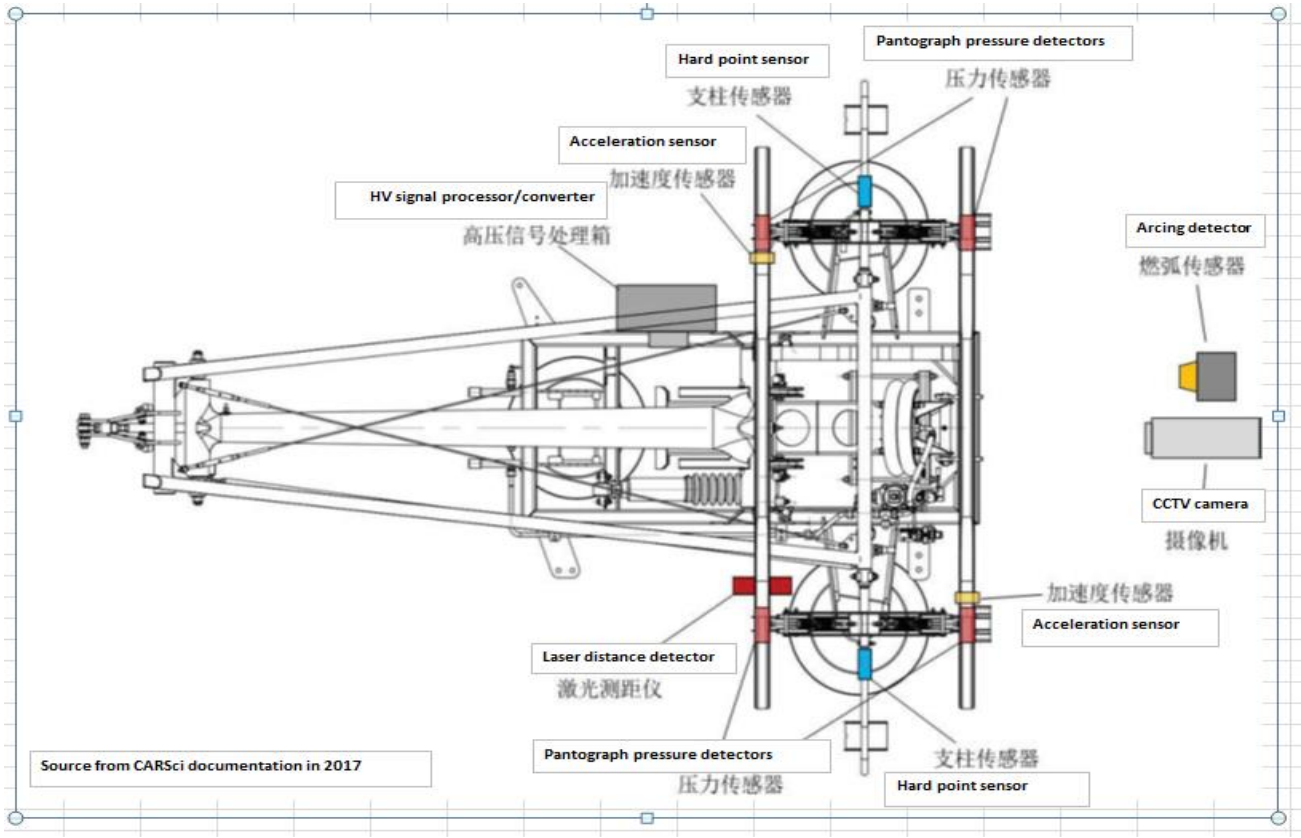


2nd stage upto 217kph (CIT)



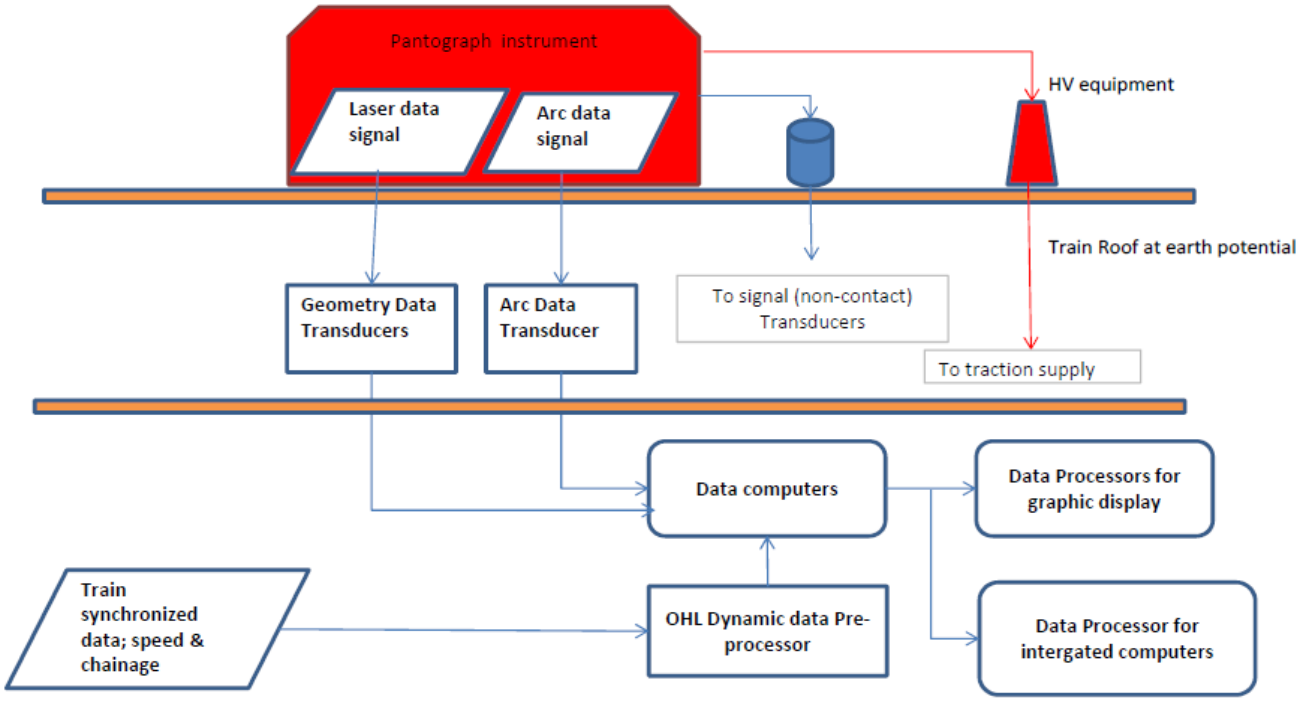
OHL Speed Verification Test

Train Roof-top measuring equipment



OHL Speed Verification Test

Data transfer schematic



OHL Speed Verification Test

Acceptance Criteria

- Mainland Standard TB10761-2013 and BSEN 50317

Performance Index (speed to 200kph):

Hard point <490 m/s^2 (measured vertical acceleration)

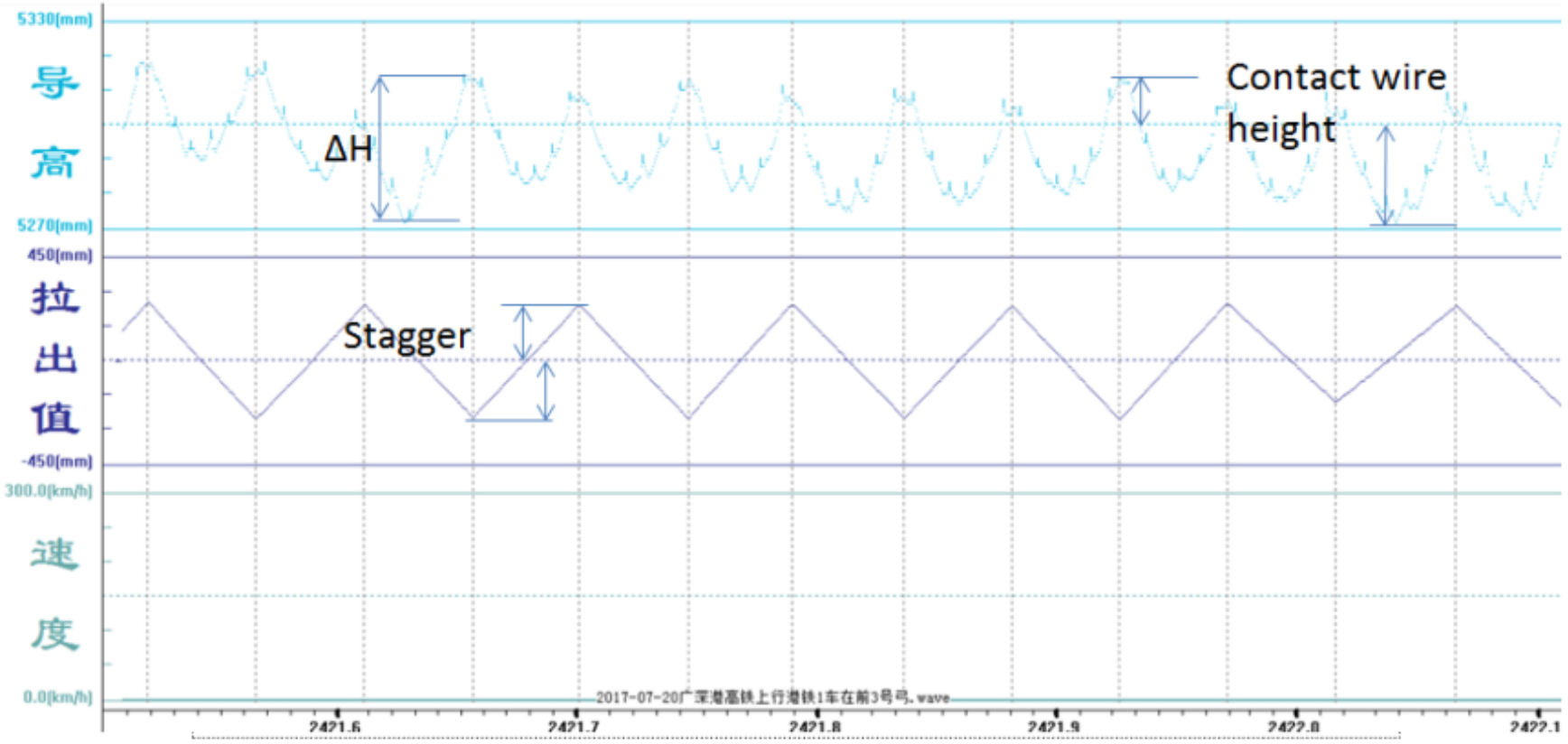
CW height <150 mm (height difference in successive supports)

Max. arcing time, Tmax <100ms

Arcing rate, μ<5%

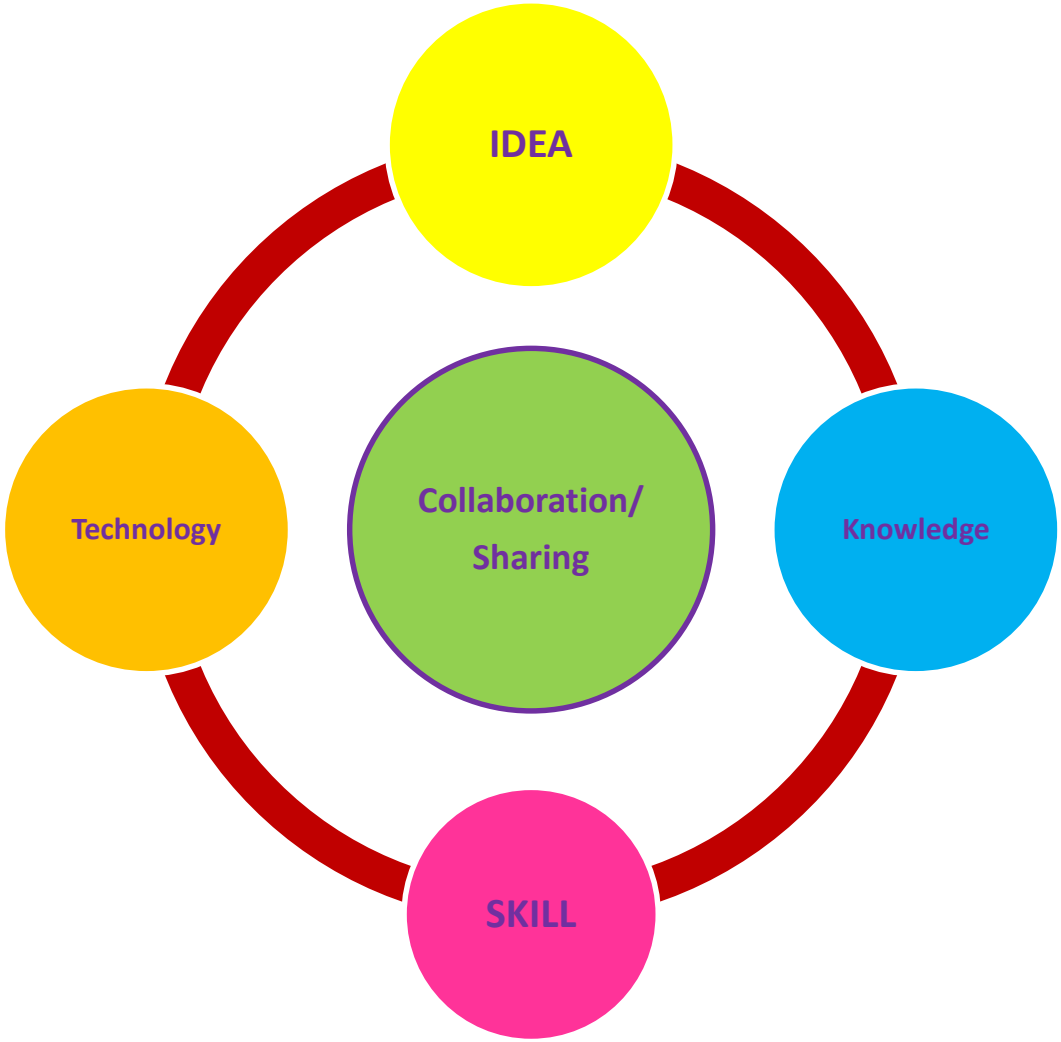
where $\mu=\frac{\sum Tarc}{total}X100\%$

Typical graphical display output



Acceptance criteria (200kph): a) ΔH = Hmax-Hmin (<150 mm)
b) Stagger (±30mm)
c) Contact wire height (±30mm)

Key success for future High Speed Railways




Q & A