



NEO TRANS CO., LTD



DXLINE



Shinbundang *DX*LINE

Driverless Train Operation System



Cutting edge technology,
driverless operation system



SYSTEM

The First HRT Driverless Operation System in Korea

It is the most advanced system optimized for on-time operation,
in which all situations are automatically remote-controlled by Operation Control Center

Central Operation Control System

✓ Automatic train operation system

- Automatic commencement of train initialization & operation, self-inspection based on designated programs

✓ Bi-directional communication

- Immediate communication by using the platform video phone & cabin interphone

✓ Real-time remote monitoring & control

- Trains, stations, depot
- Disaster prevention system

✓ Automatic Control or Detection of Facilities

- HVAC, Water Supply & Drainage, Electric power
- Elevator service, Fire

Driverless Operation System



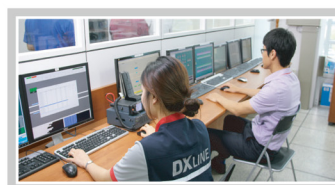
✓ RF-CBTC

By the bi-directional communication system

Management of train operation schedule

Assignment of operation route, automatic departure & stopping

Control of safety equipment for the railroad trackside & trains



Operation Control Center(OCC)

Vehicle Control Center (VCC)

Automatic Train Supervision (ATS)



- Vehicle Onboard Controller (VOBC)
- Train Control Monitoring System (TCMS)



- Platform Screen Doors(PSD)
- Train Doors



Based on the best technology and reliability,
we go forward to the world best railway system

GLOBAL



Introduction of driverless system and operation knowhow

Shinbundang DX Line is the first and only driverless heavy rail transit operation line in Korea.
DX Line is a leading Korean subway line by implementing the most advanced technology.

Current world driverless operation state of heavy rail transit

Country	City	Operation Company	Name of Line	Opening Year
Korea	Seoul, Gyeonggi	NEO TRANS	Shinbundang DX LINE	2011
Brazil	Sao Paulo	CCR S.A.	Line 4 (Yellow)	2010
Spain	Barcelona	TMB	L9, L10, L11	2009
Singapore	Singapore	SBS / SMRT	North-East Line / Circle Line	2003
France	Paris	RATP	Line 14	1998

※ Shinbundang DX Line : 5th driverless heavy rail transit line in the world,
2nd one in Asia (for public transportation)

※ NEO TRANS : 5th driverless HRT & LRT simultaneous operation company in the world
[DX Line(HRT) & Yongin EverLine(LRT)]



Advantages of driverless operation system

The cutting edge driverless operation system provides faster and safer services by securing punctuality and improving accuracy.

Human Factor

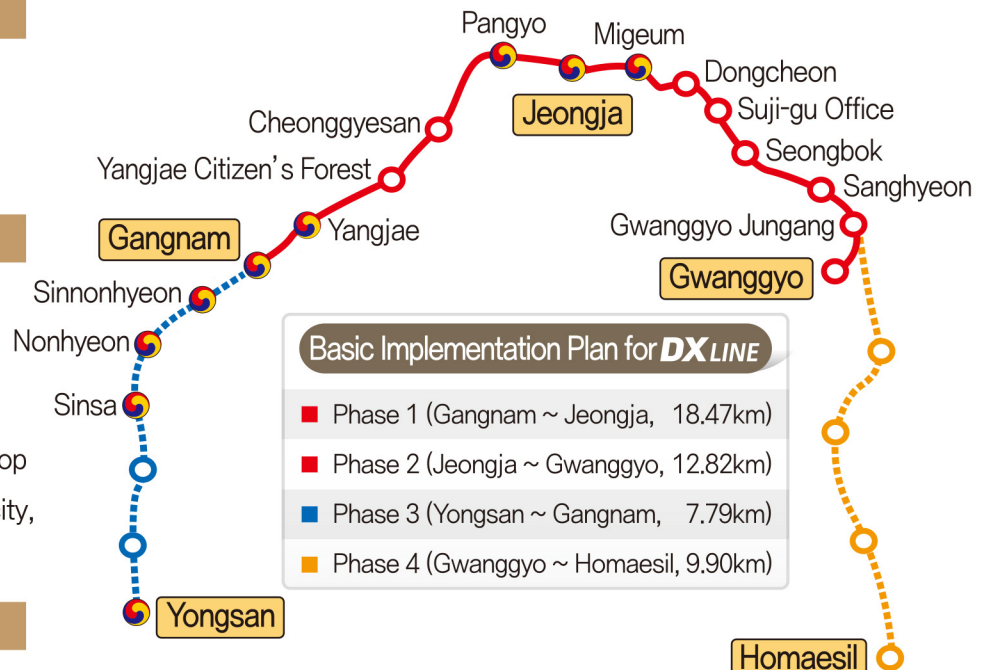
- ✓ Decrease of safety accidents by human errors
- ✓ Efficient personnel management

Technology & Facilities

- ✓ Observation of external view from both ends of a trainset
- ✓ Remote control and adjustment of bidirectional radio communication
- ✓ Easy on-time operation, precision stop
- ✓ Safety control for system of electricity, signal & communication, machinery

Train Operation

- ✓ Flexible train operation
- ✓ Maximization of train operation (Congestion reduction)



ADVANTAGE

The driverless operation system prevents safety accidents and enhances efficiency in management and operation





Train Safety and Convenience Facilities



✓ Emergency Exit Doors

Located at both ends of a trainset

- Remote control by OCC operation
- Safe evacuation for the transportation vulnerable (including wheelchair users)



✓ Driver's Cab

Absence of driver's cab due to driverless operation system

- Expansion of the front field sight & the sense of openness by integrating a cabin and a driver's cab
- Manual driving only in an emergency by opening a driver's cab



✓ Train Doors

Electric plug-in doors

- Excellent noise insulation (less than 80dB(A) at 90km/h in the tunnel)
- Blocking the wind coming into the cabin from outside



✓ CCTV

- Installation of 14 CCTVs for each trainset
- Remote monitoring of cabins / Auto focus
- 360° rotation



✓ Gangway

- Open type of a wide connection passage between cabins



✓ Emergency Interphone

- Mutual communication with OCC in case of an emergency

TRAIN

Construction of Public Transportation Infrastructure for Customer Convenience



We provide customers
with fast, accurate
and safe services

STATION

Station Safety and Convenience Facilities



✓ Evacuation Shelter

- Located in between Pangyo and Cheonggyesan Station (8.2km)
- Emergency escape from tunnel to ground



✓ Emergency Evacuation Stairs

- Emergency evacuation from station platform to the outside ground



✓ Video Interphone

- Check & actions of the site situation through platform video phones from the station office



✓ Emergency Escape Mask & Air Respirator

- Rescue in case of fire at the station



✓ Automated External Defibrillator (AED)

- Emergency rescue for patients having cardiac arrest



✓ Air Sterilizer

- Installed at the station restroom



Safety Enhancement Measure for Driverless Operation

A customer safety officer (CSO) with a train driver license is deployed on board in order to address safety in case of failure.

Enhancement of Safety / Relief of Customers' Anxiety



✓ Fail safe system for major equipment

- Recording of operation logs of on-board equipment & system
- Automatic control & recovery
- Self-diagnosis function



✓ Remote control from OCC

- Transmission of train status information through on-board equipment
- Automatic implementation such as train operation, turn-back, stabling



✓ Safety devices

- **Platform** : Screen door, video phone, transmission of operation information of the on-board equipment
- **Train** : Emergency evacuation doors, fire detector, CCTV
- Auto-detection of foreign object on the running track
- Auto-detection of derailment

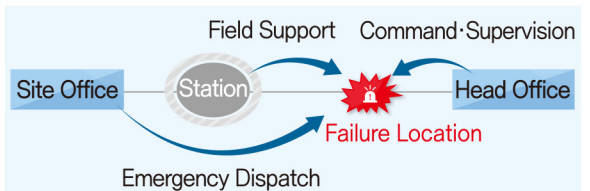


✓ A customer safety officer on-board (Driver license holder)

- Emergency action and manual operation in the event of train failure
- Performance of customer service in the cabin, prevention of accidents

Operation Failure Response

✓ Emergency Response Dispatch system



Establishment of Safe Operation Management System

ZERO Accident

Settlement of safety management system

Cultivation of capability for response, recovery (enhancing employee capability)

Establishment of maintenance management system

Improvement in the efficiency of maintenance



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