

# Electric system of Shinkansen (High Speed Railway in Japan)

JRRT

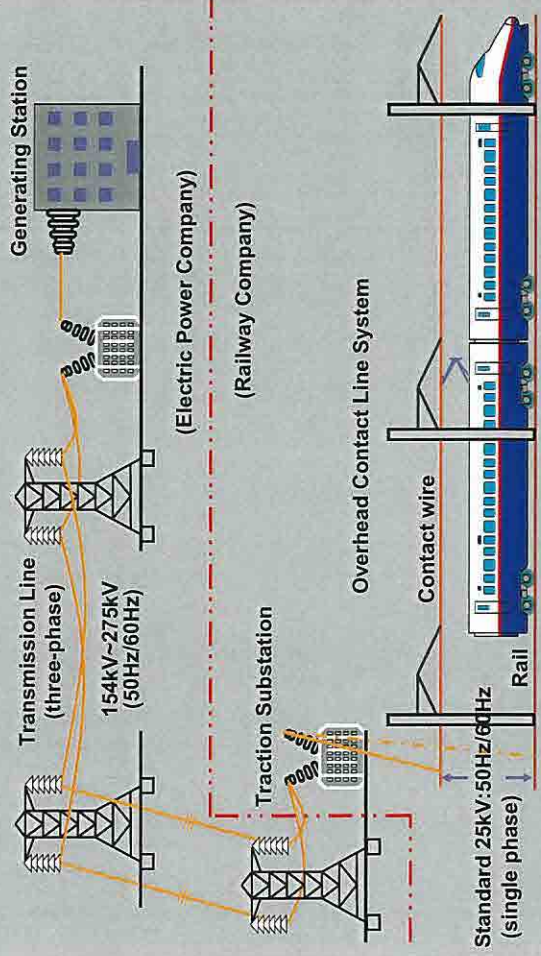
(Japan Railway Construction, Transport and Technology Agency)

# Power Supply System

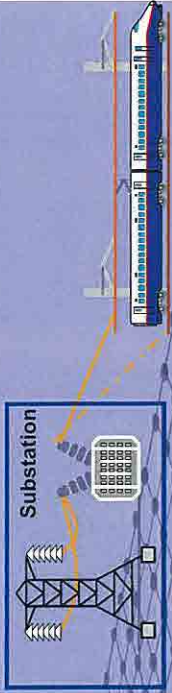
## Outline

- Power Supply System
- Power Supply System (Overhead Contact Line System)
- Wayside Electrical System
- Radio Communication System
- Disaster Warning System
- Signaling System
- Signaling & Traffic control System

## Power Supply system

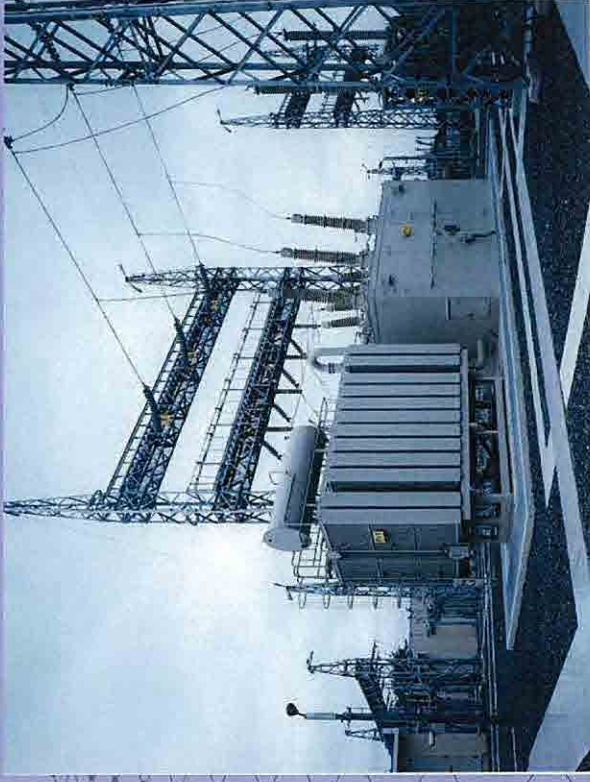






Receiving Volt.	Three-phase AC:154kV~(50Hz/60Hz)
Transmission Volt.	Single-phase AC:25kV(50Hz/60Hz)
Feeding	Auto-Transformer feeding
Substation distance	Average 50km
AT distance	Average 10km

# Main Transformer



# Substation



# Auto Transformer



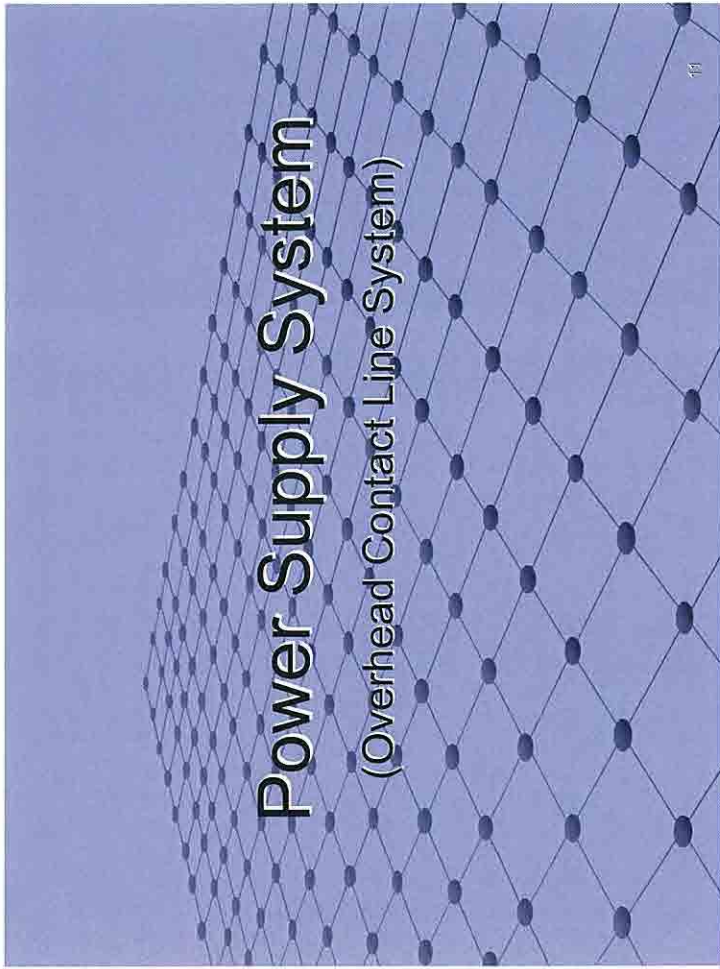


Power Supply system

# Power Control Center



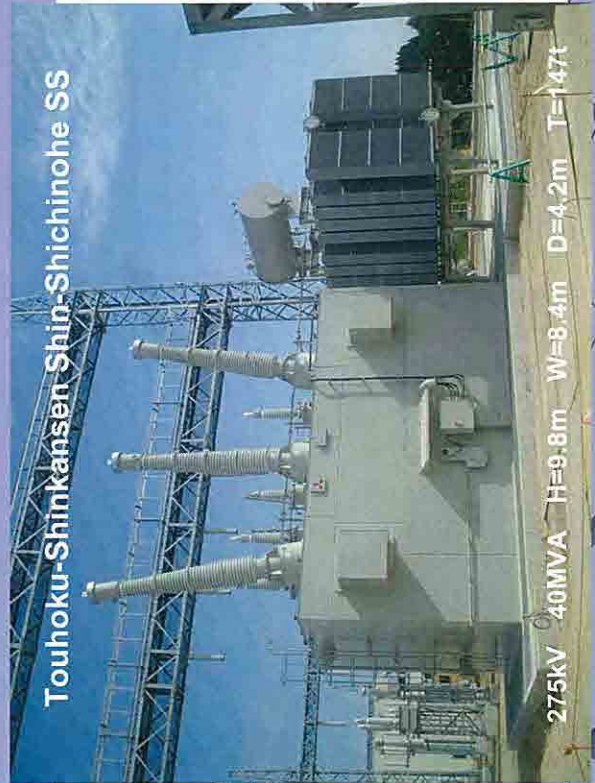
# Power Supply System (Overhead Contact Line System)



Power Supply system

# New Technology in Japan

Touhoku-Shinkansen Shin-Shichinohe SS

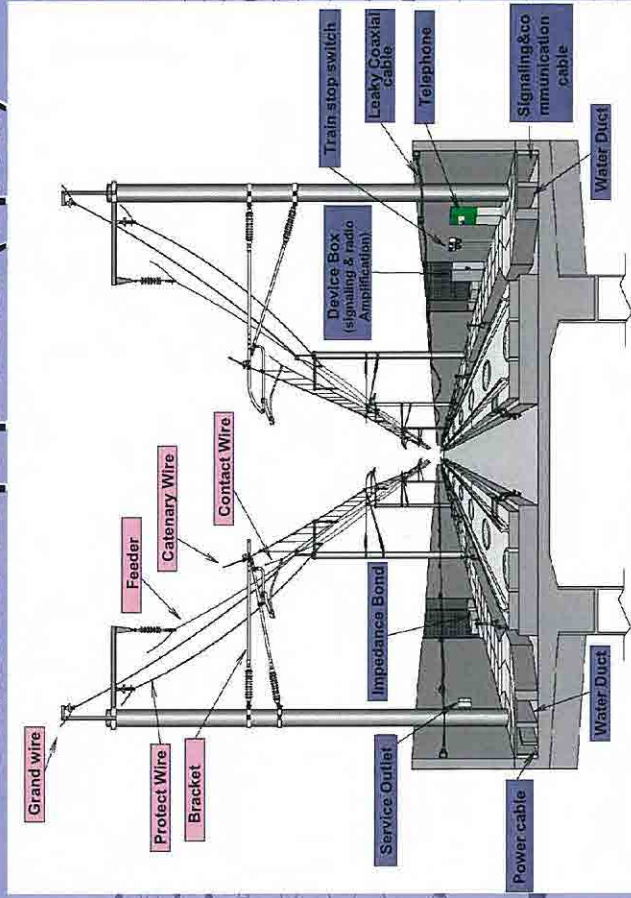


275kV 40MVA H=9.8m W=8.4m D=4.2m T=147t

Electrical  
communication  
transmission

Overhead Contact Line

# Electrical Equipment (open)





Overhead Contact Line

Overview (tunnel)



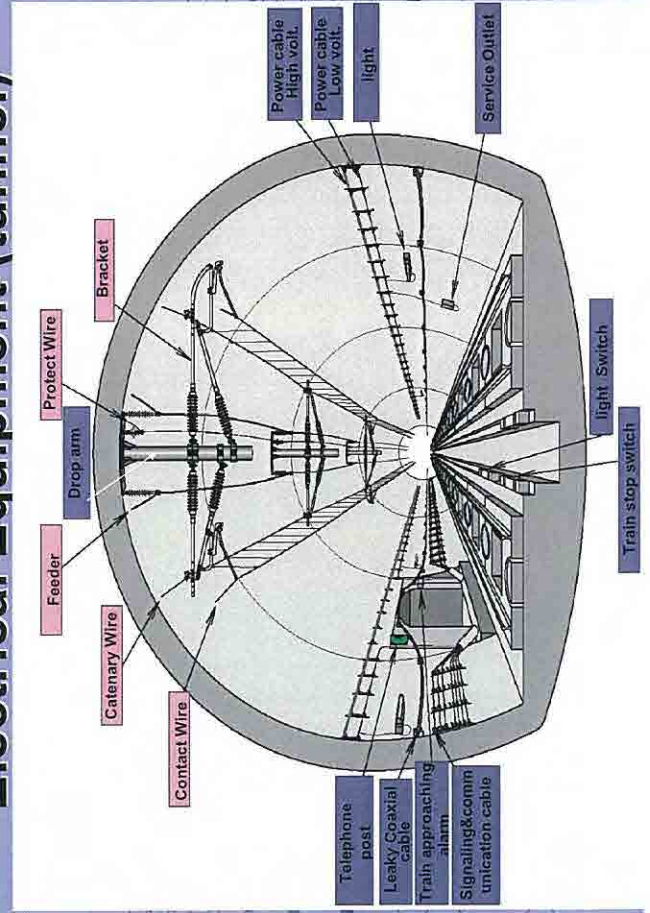
Overhead Contact Line

Overview (open)

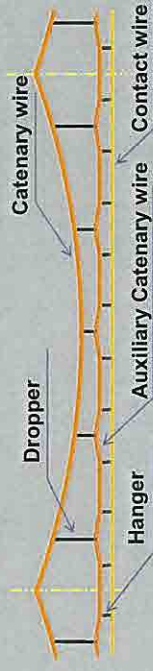


Overhead Contact Line

### Electrical Equipment (tunnel)



### • Heavy Compound Catenary



### • High-tension Simple Catenary





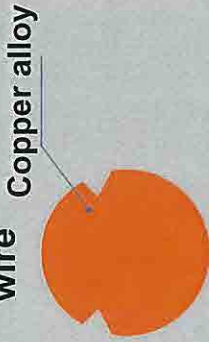
### Contact Wire for High Speed Railway

CS contact wire



Copper clad steel

PHC contact wire



Precipitation-Hardened copper alloy

High speed

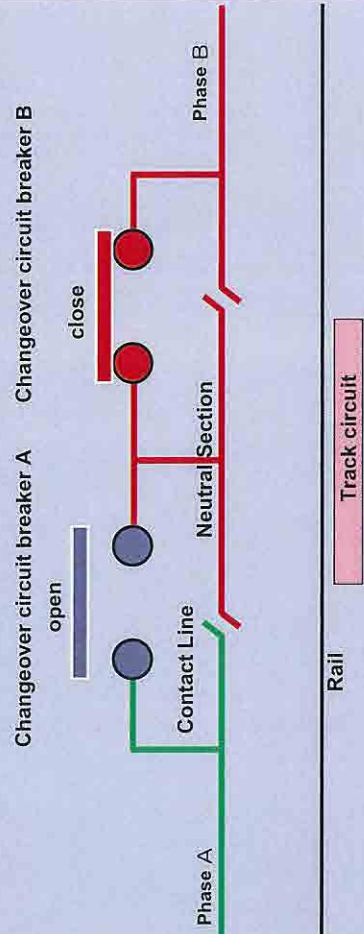


Pantograph bounce

Improvement of "wave propagation speed"  
(= Decrease bounce)

### Technologies of Electrification in Japan

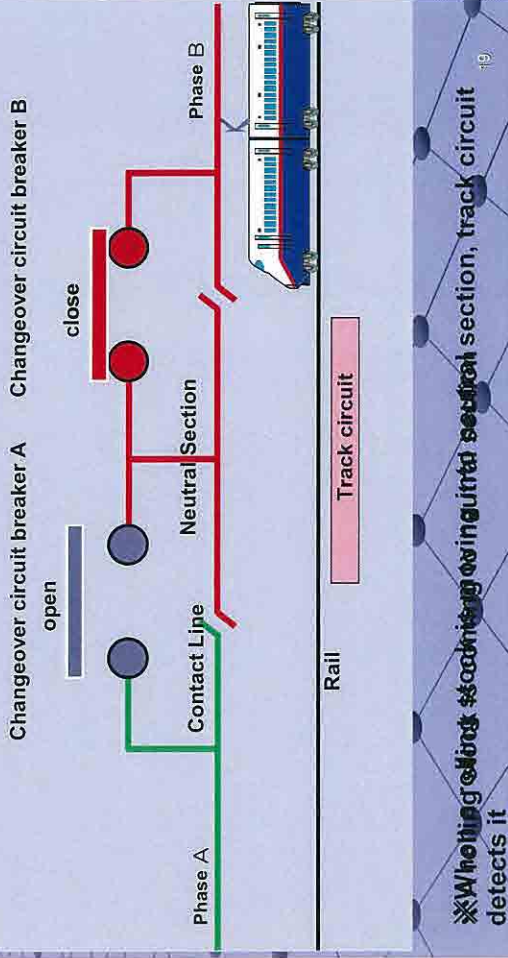
#### ● Changeover sectioning system-Shinkansen



※Condition of no train

### Technologies of Electrification in Japan

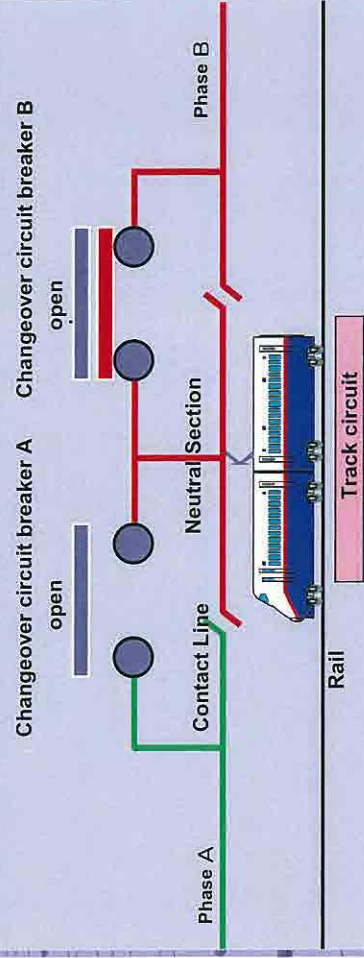
#### ● Changeover sectioning system-Shinkansen



※When getting a fault in a section, track circuit detects it

### Technologies of Electrification in Japan

#### ● Changeover sectioning system-Shinkansen

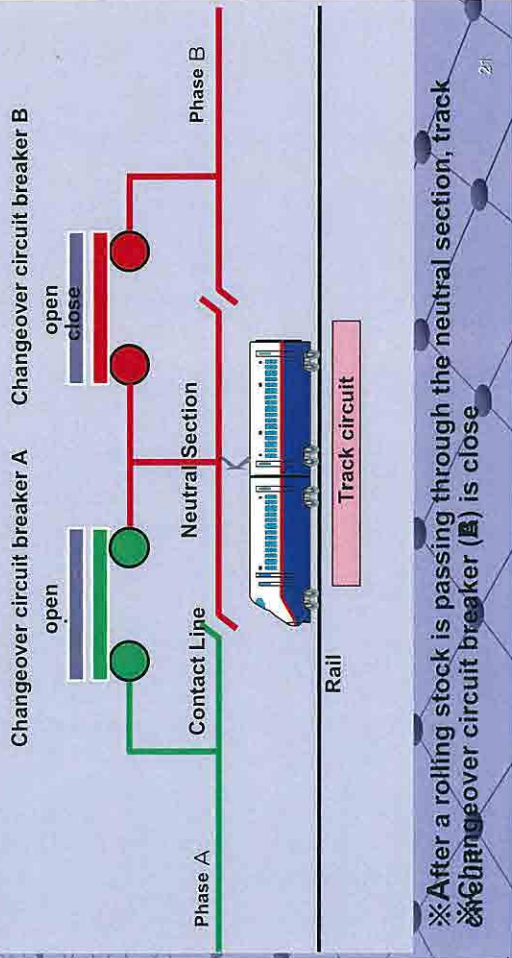


※Changeover circuit breaker (B) is open



## Technologies of Electrification in Japan

### ● Changeover-sectioning system-Shinkansen



A3-22

## Wayside electrical system

### Power Distribution system

Lighting equipment

Wayside equipment

### Emergency power supply

## Wayside electrical system

### Power Distribution system

Lighting equipment

Wayside equipment

### Emergency power supply

## Wayside Electrical System

A3-22



Wayside electrical system

## Lighting equipment on station



25

Wayside electrical system

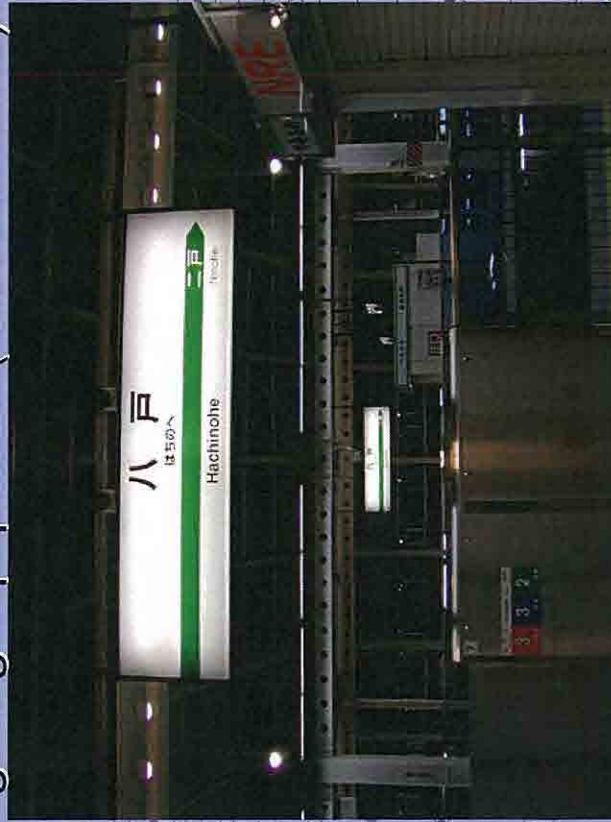
## Lighting equipment (Station home)



27

Wayside electrical system

## Lighting equipment (Station name)



26

Wayside electrical system

## Lighting equipment (Guide)



28



# Power Distribution system

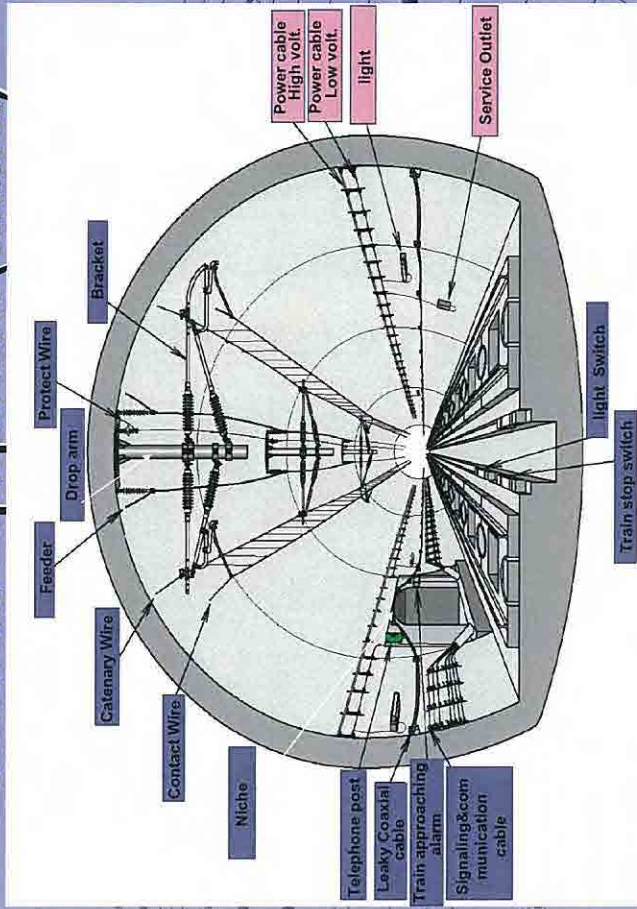
Lighting equipment

Wayside equipment

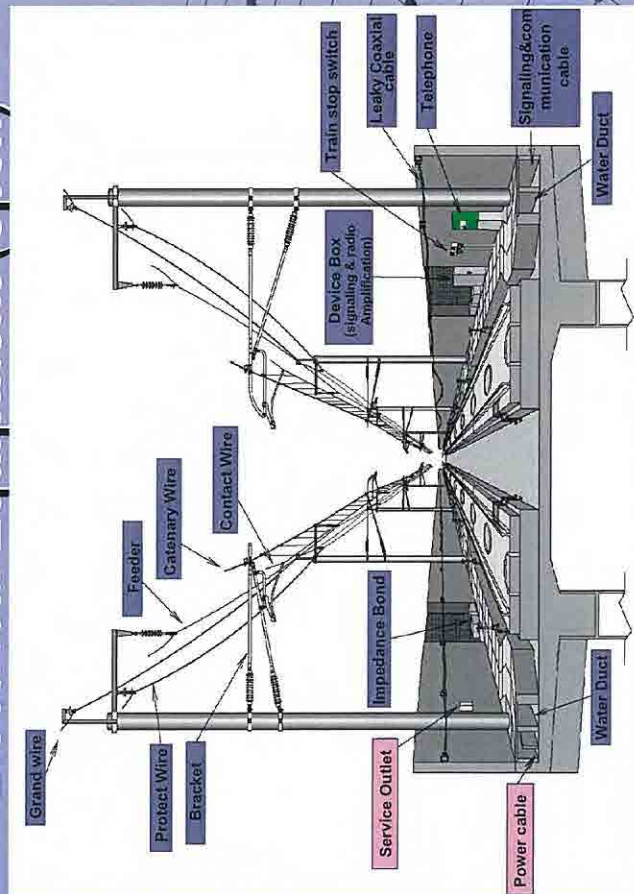
Emergency power supply



# Electrical Equipment (tunnel)



# Electrical Equipment (open)



# Wayside equipment (tunnel)





Power Distribution system

Lighting equipment

Wayside equipment

Emergency power supply



# Outline

- Outline of Shinkansen in Japan
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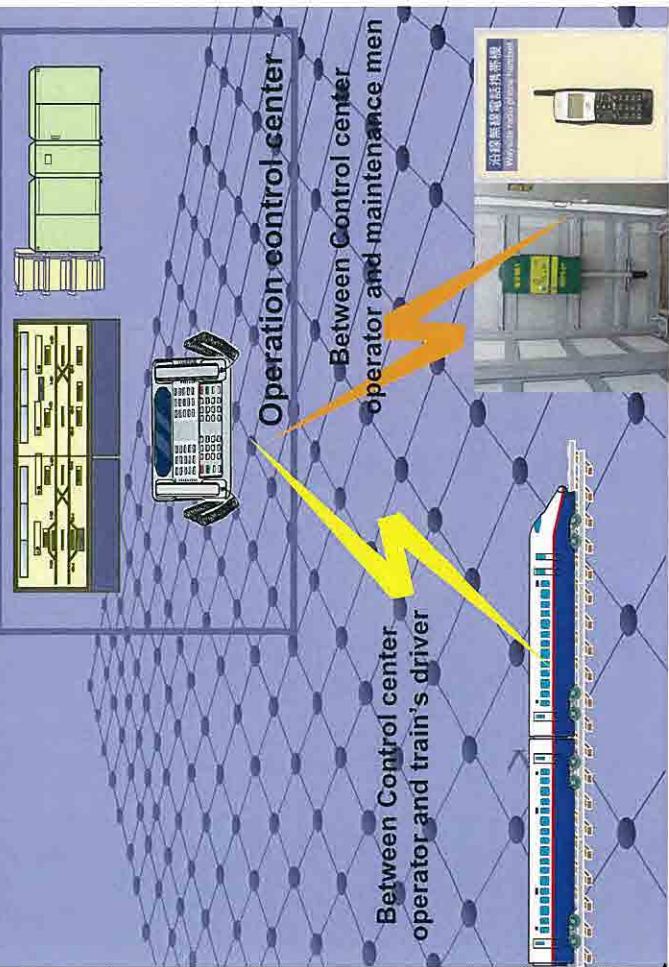
Emergency power supply (Gas turbine)



# Radio communication System

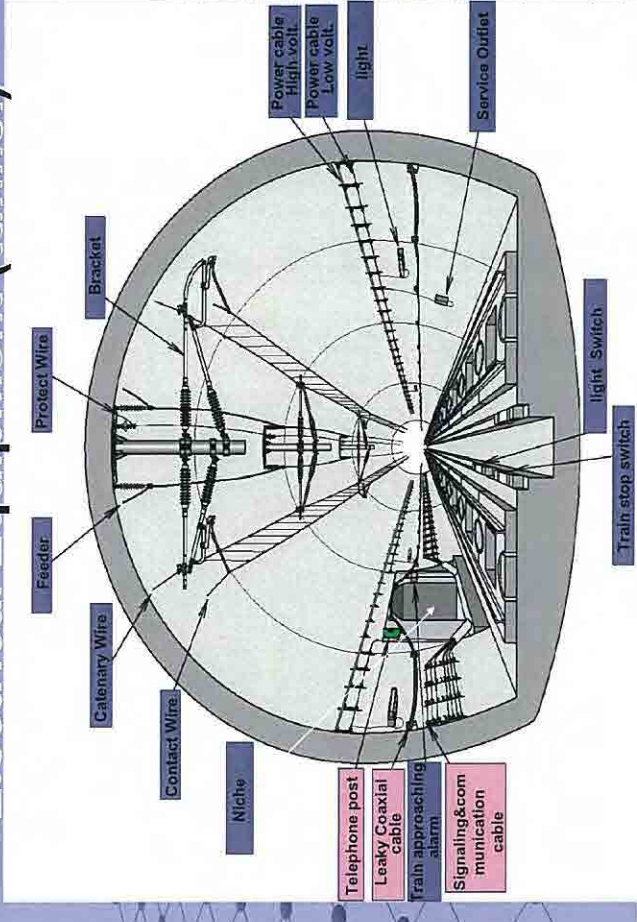


Radio communication system



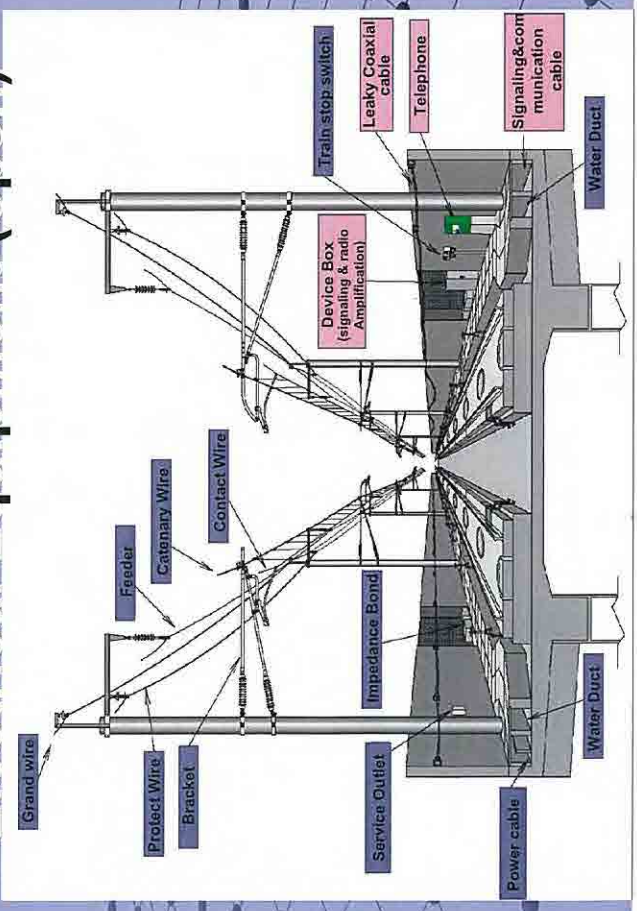
Radio communication system

# Electrical Equipment (tunnel)



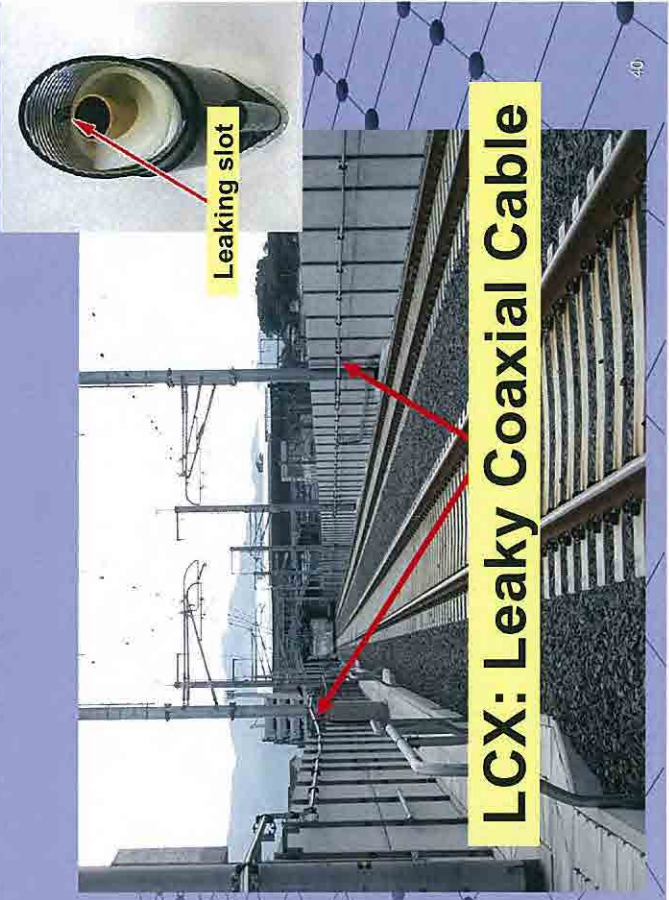
Radio communication system

# Electrical Equipment (open)



Radio communication system

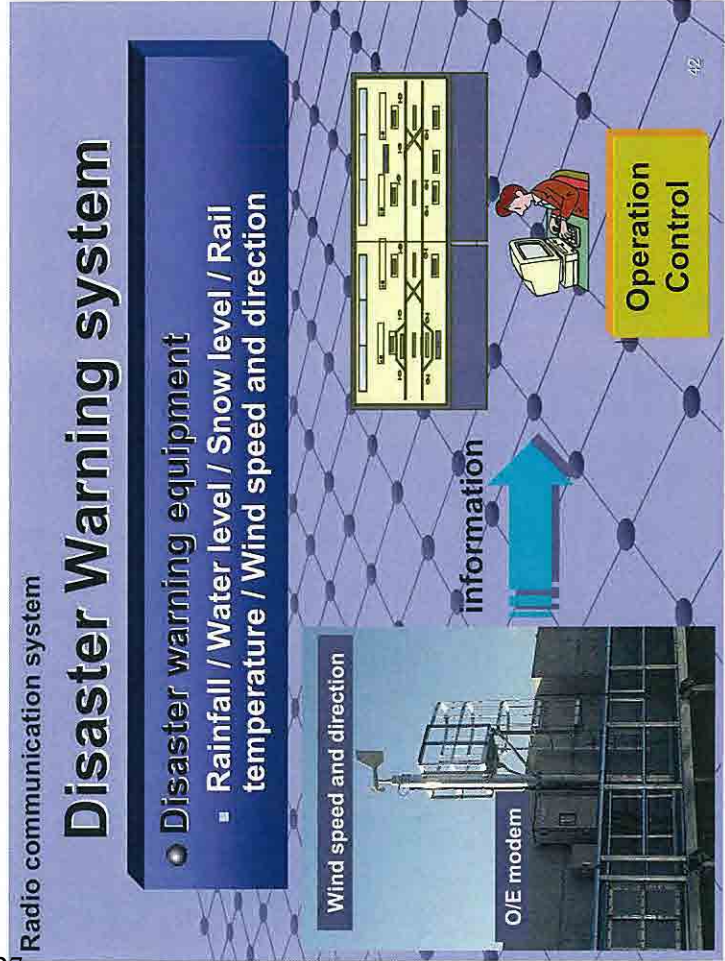
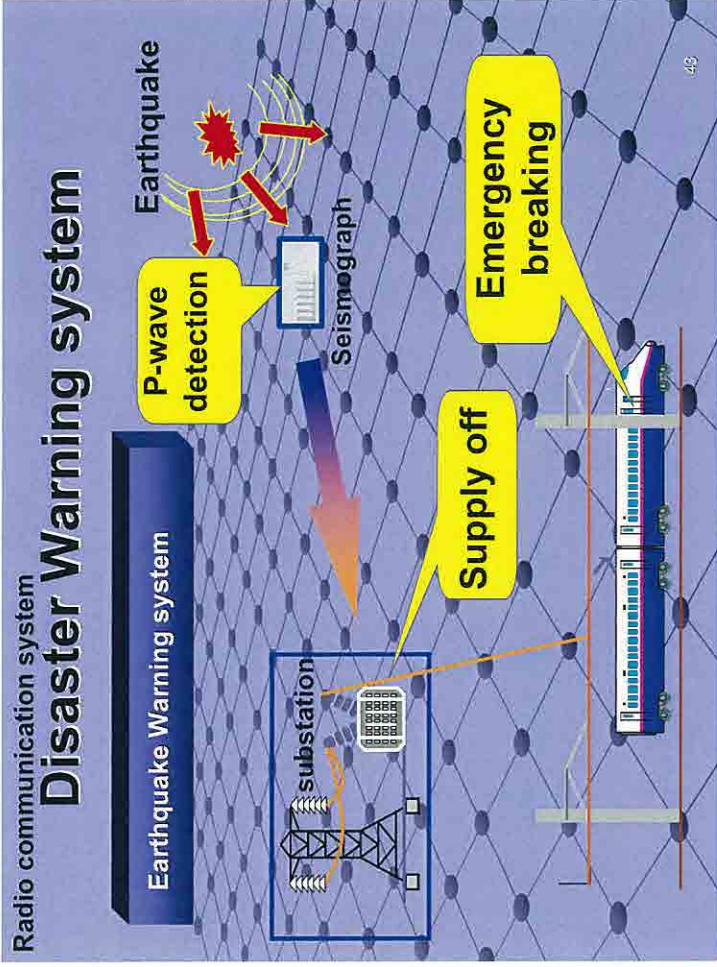
# LCX: Leaky Coaxial Cable





# Disaster Warning System

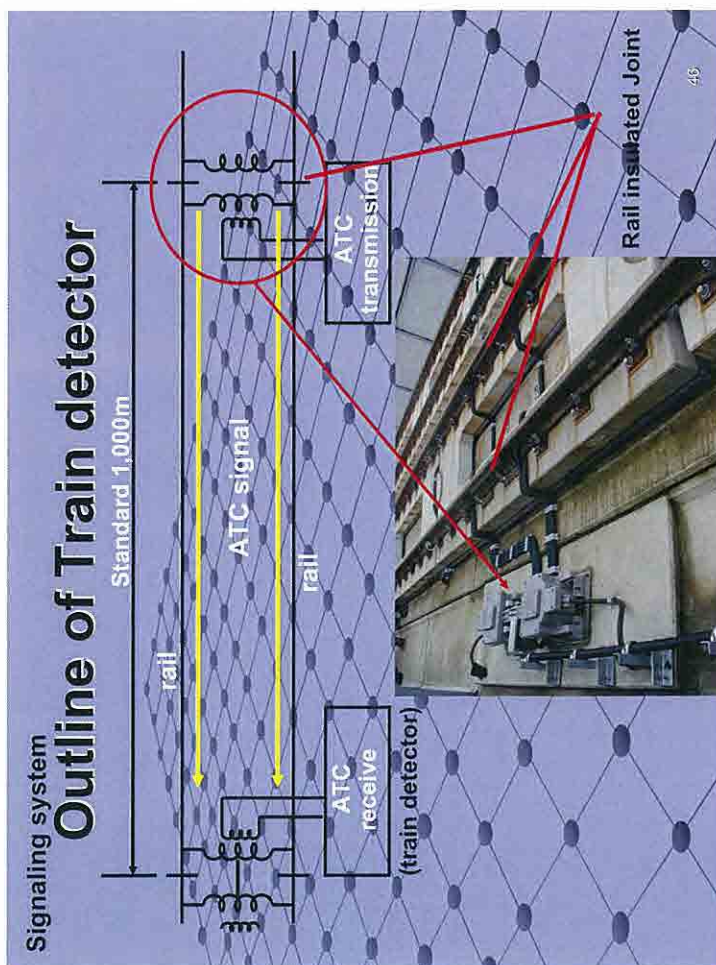
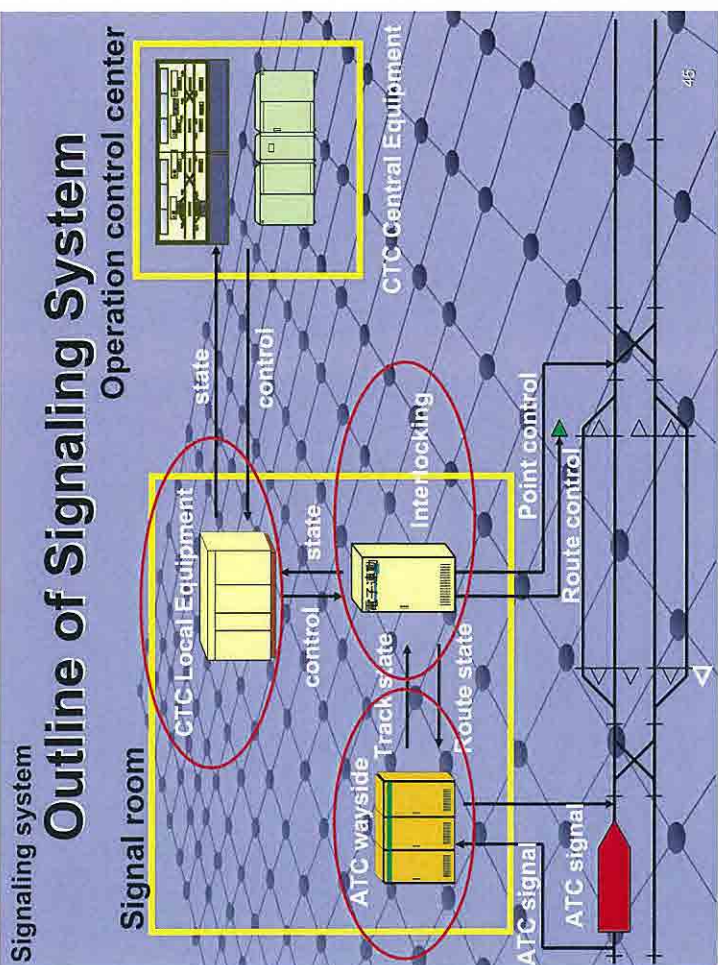
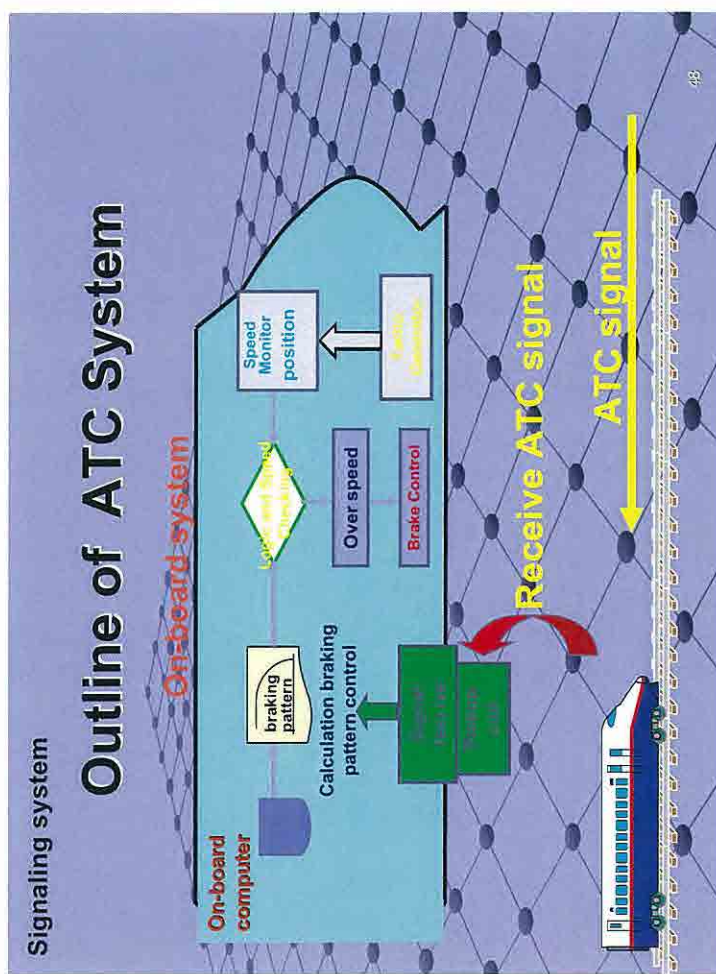
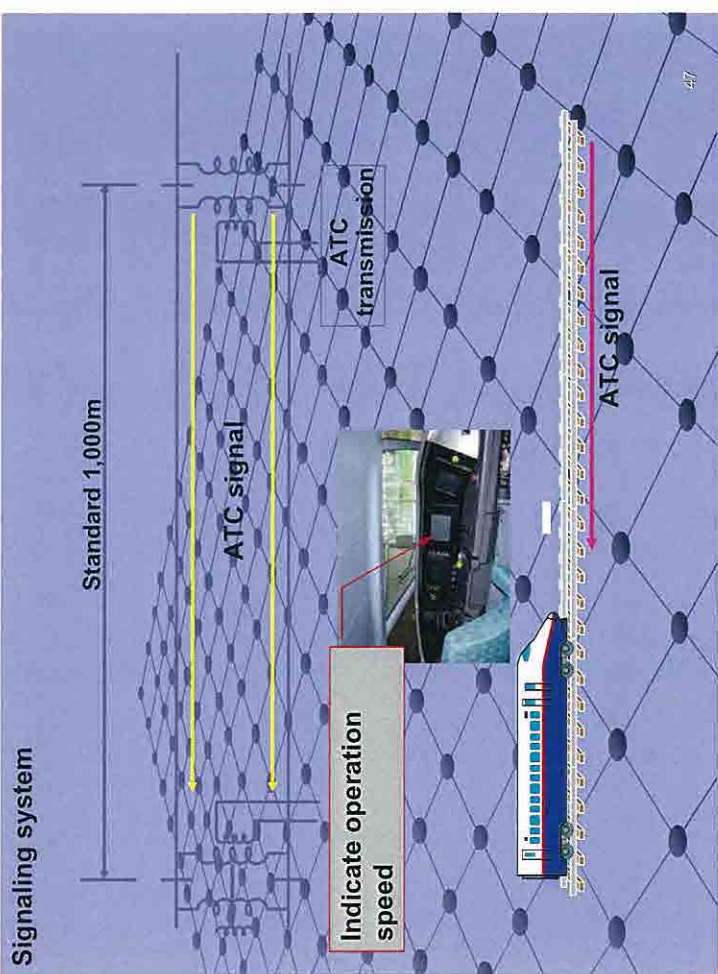
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# Signaling System

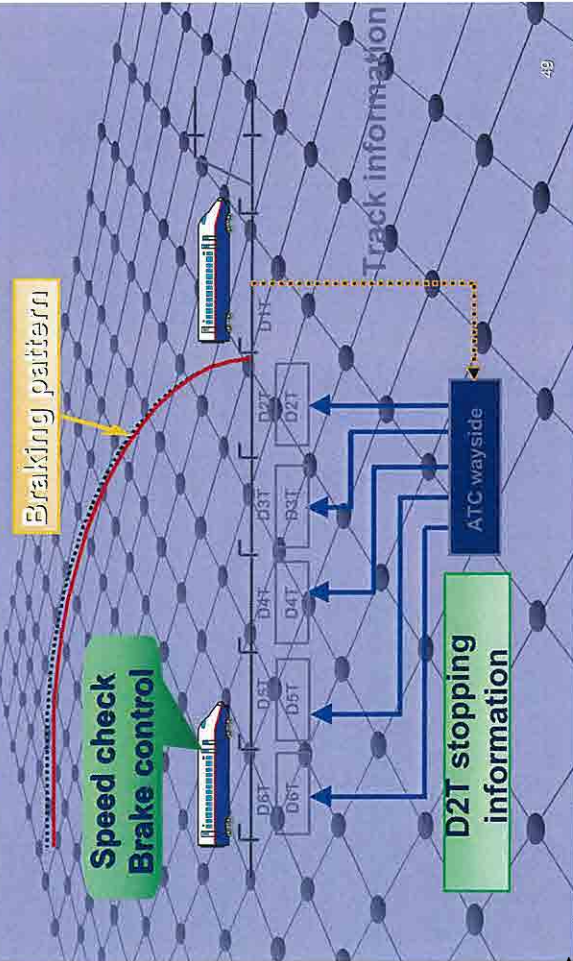
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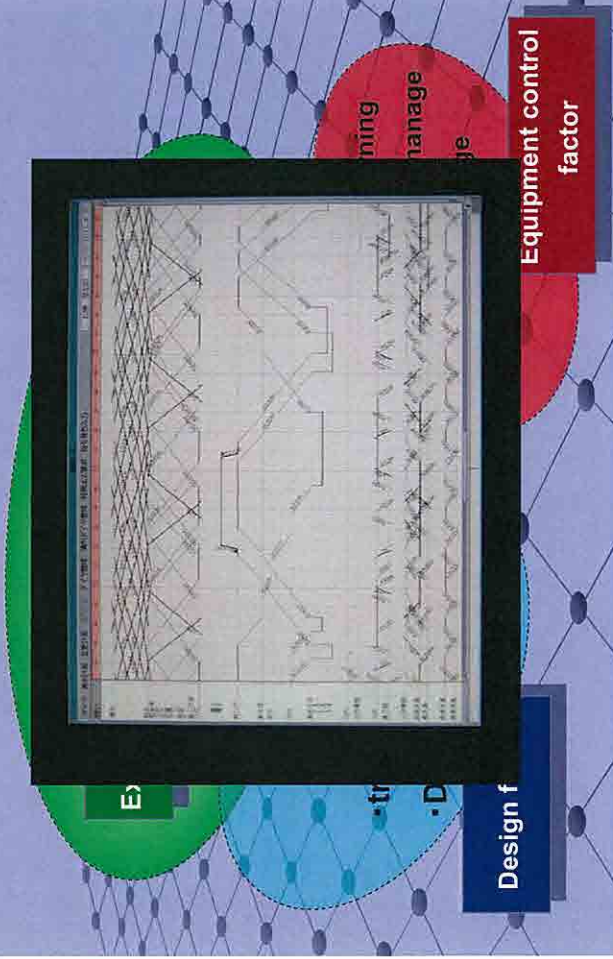




# Outline of braking pattern control



# Outline of Signaling & Traffic control system



# Signaling & Traffic control center



# Signaling & Traffic control system

