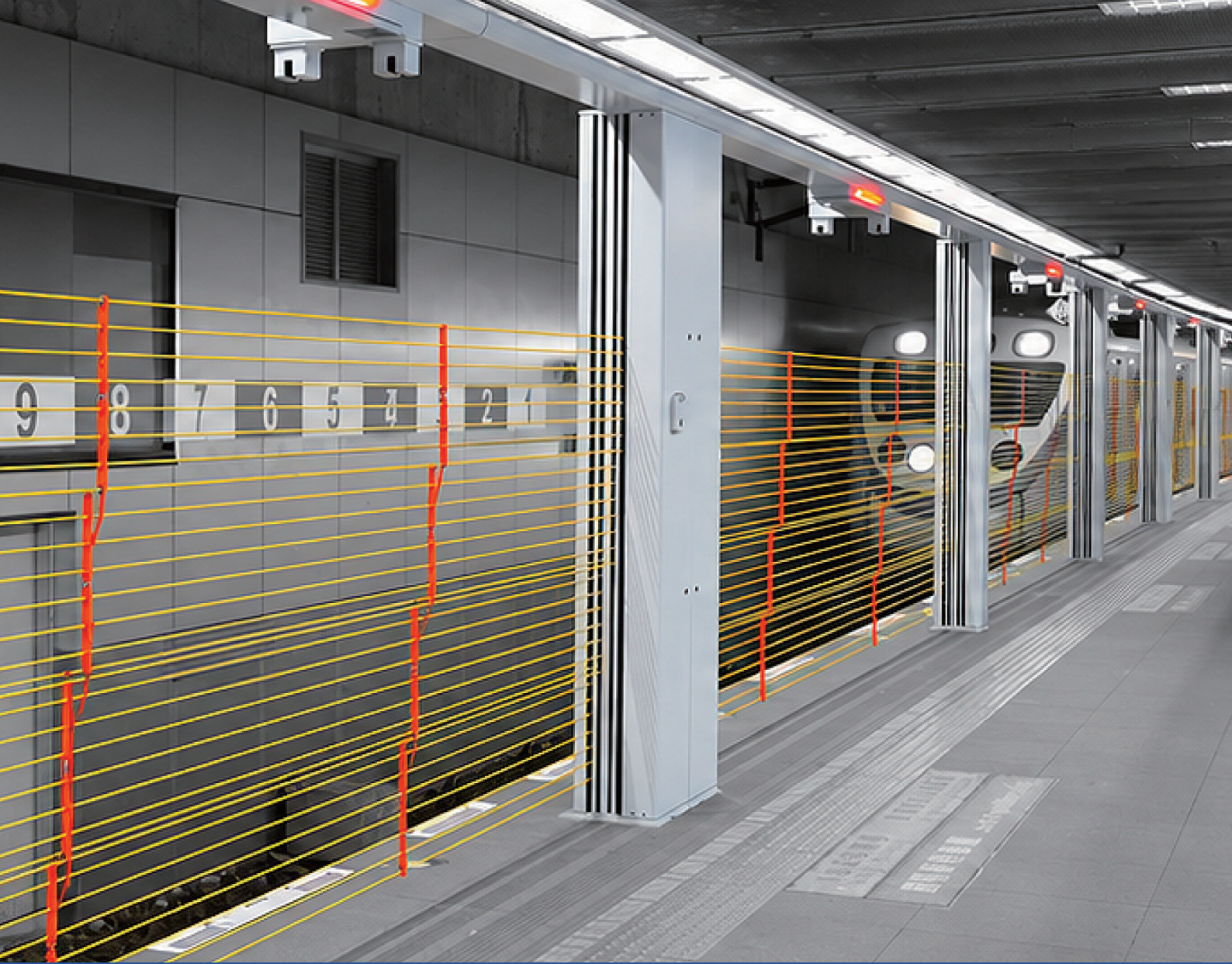




RSD

SIL 4 Certified
Rope Screen Door



SHINBO

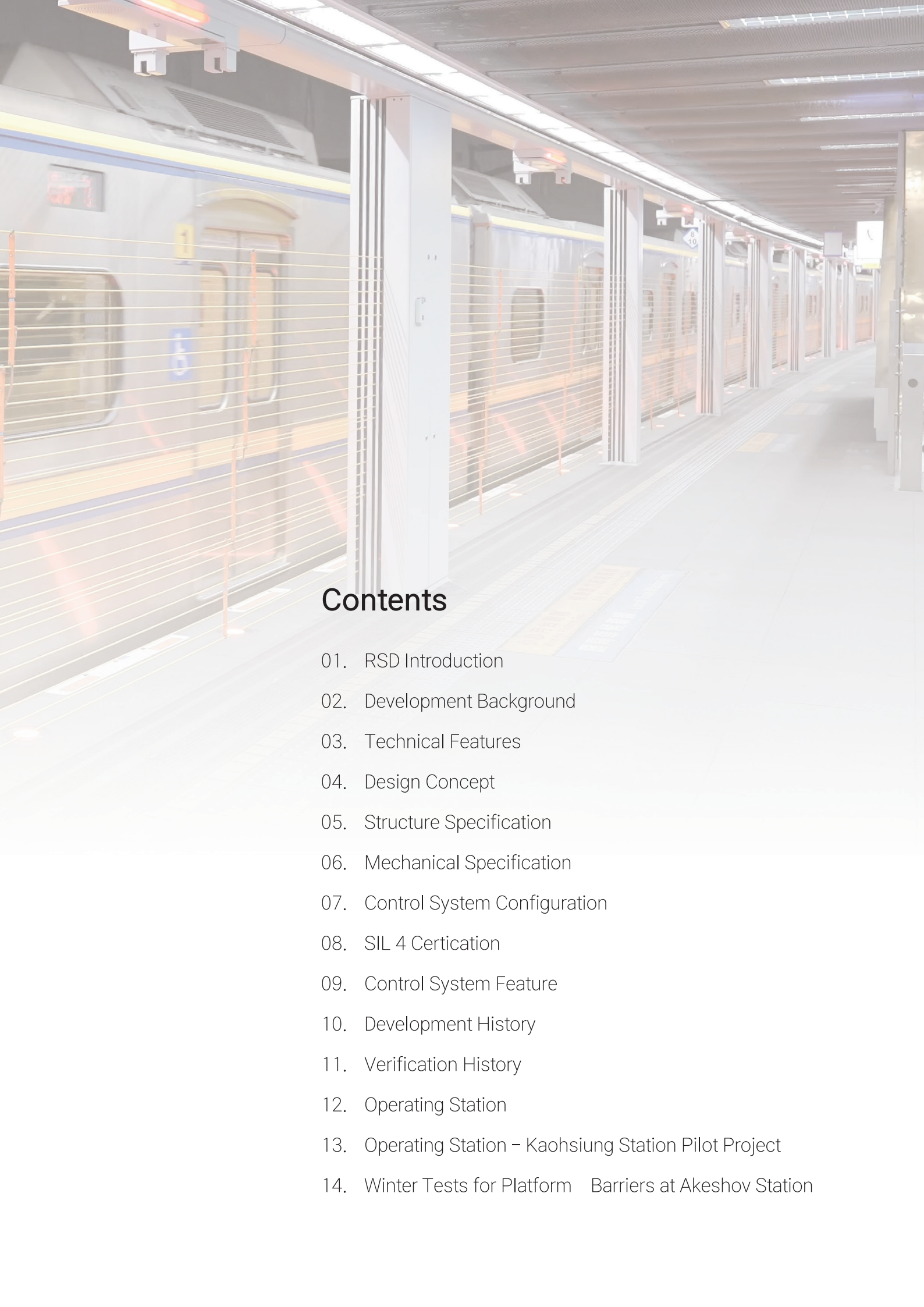




The World's First Rope Screen Door



SHINBO



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RSD Introduction

What is Rope Screen Door?

RSD is installed in subway station and ground station platforms to prevent track crashes and ensure passenger safety. Using wire rope made of metal with strong elasticity, the minimum number of motors is applied in the long-distance section. RSD is world's first rope type safety system.

Development Background



Daegu Subway Fire

The turning point was the tragic Daegu subway fire in 2003. Nearly 200 people lost their lives—mainly because the train doors didn't open properly during the fire. This incident clearly showed the need for a safety system that can open the entire section immediately in emergencies



Problems of PSD(Platform Screen Door)

Conventional PSD is expensive, hard to install and maintain, and only work well with fixed train types and door positions. But today's stations operate various train types—so flexibility is more important than ever.



RSD: A Simpler, Smarter Alternative

To address the challenges we just saw, RSD was designed to be:

- Much more cost-effective
- Much simpler in design
- Much more convenient to install and use
- Much more adaptable to different environments

Our goal was clear:

To create a platform safety barrier that's not only robust and reliable, but also economically efficient.

Technical Features

Advantage of RSD

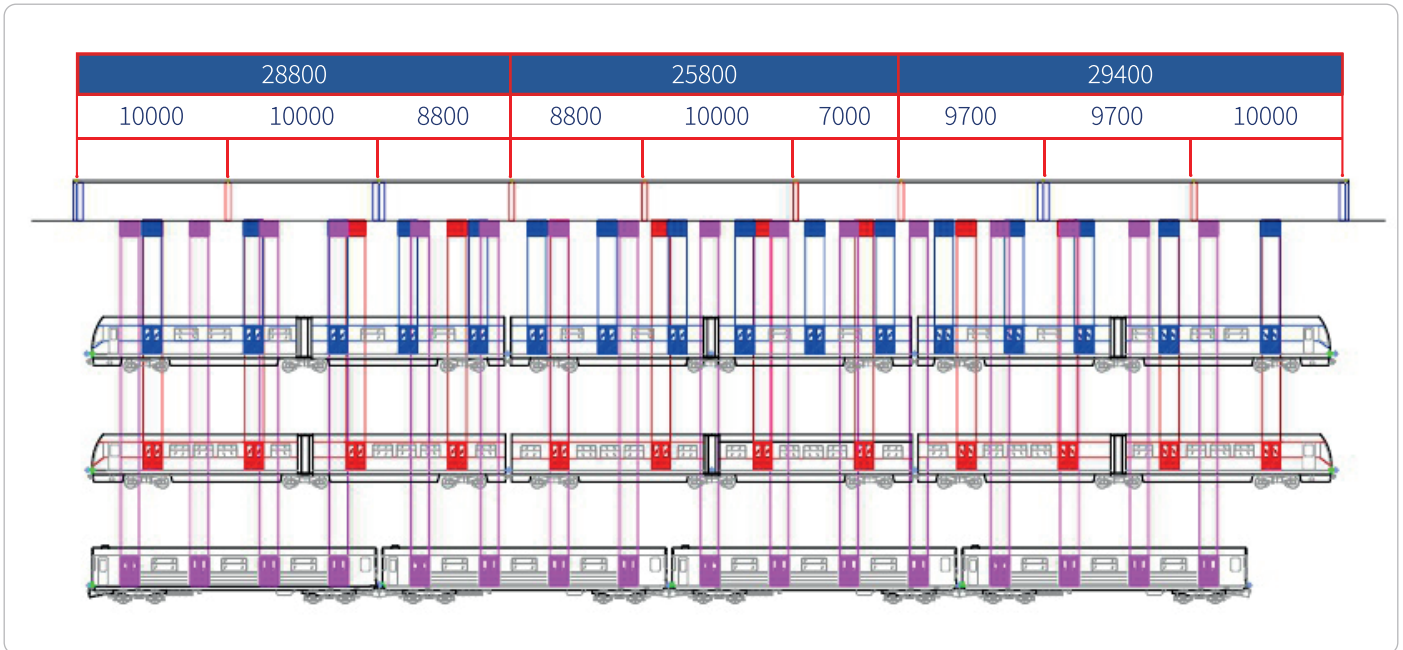
01. The flexibility of the wire ropes reduces the risk of severe injury and minimizes structural impact in the event of a collision.
02. No restrictions on the number of train doors or train length.
03. The wire rope structure is not affected by typhoons, train-induced wind, or other environmental conditions.
04. Easy emergency evacuation in the event of a power failure.
05. High operational reliability of 99.99% due to its simple structure. (Sofia Metro, Bulgaria)
06. Easy identification of any passengers remaining on the platform.
07. Lower installation and maintenance costs compared with full-height PSDs with left- and right-opening doors.
08. The system can operate either by interfacing with the station's signaling system or independently without an interface.

Technical limitations of PSD

01. In an emergency, passengers must open the screen door or use the emergency exit.
02. Cannot be installed in stations where different types of trains operate.
03. Unable to accommodate variations in train door positions.
04. Existing PSD systems involve high installation and maintenance costs.
05. Limited resistance to strong typhoons, train-induced winds, and other natural disasters.
06. High temperatures and the heat island effect can occur on ground-level platforms when platform screen doors restrict ventilation during summer.
07. Greenhouse effect caused by the glass screen doors and overhead roof installed along the ground-level platform.

Design Concept

It is possible to respond to various kinds of trains



Action Force

- Load felt by the passenger when the Block Wire comes into contact with the passenger's body when descending.
- EU Standard : 200N less, Korea Standard : 400N less
➡ RSD : 180N less

Manual Open & Close Force

- The ability of the passenger to manually lift the Block Wire in an emergency.
- EU Standard : 150N less, Korea Standard : 100N less
➡ RSD : 100N less

Operation Speed

- 3.0~4.5 Seconds (Adjustable)

Durability

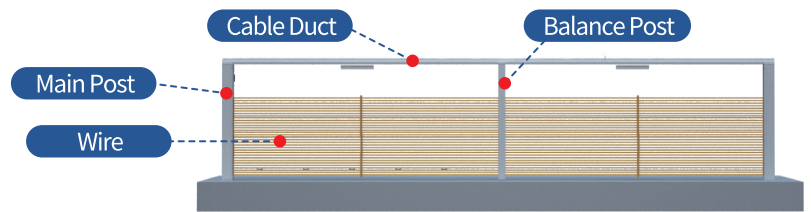
- More than 1,000,000 times continuous operation

Shock Absorption

- 1st : Wire Absorption 2nd: Wheel Absorption 3rd : Rail Absorption ➡ Minimize structural transmission shock

Application Load				
Fixed Load	Pressure (concentrated) Load	Wire Rope Load	Wind Load	Seismic Load
0.3 kN/m	3.67 kN	16 kN (Horizontal)	4.2kN/m2 (wind speed)	0.24g (Horizontal direction)

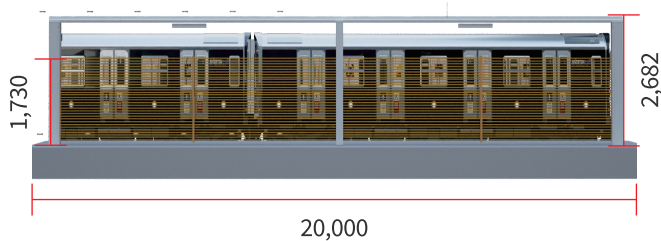
Structure Specification



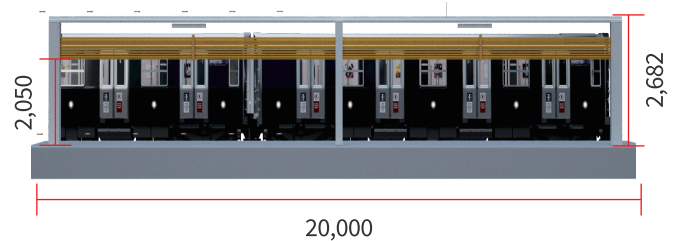
RSD Basic Structure (1Set, 20m)

Basic Specification	Feature	Common Performance
Barrier height : 1,730mm	4 barrier	Self wire-tension control system by temperature
Wire elastic distance 250mm by 1,000N	Basic Description	Servo Motor
Size: 381x317x2682	Wire: 32 units	Light Weight (20m, 920kg)

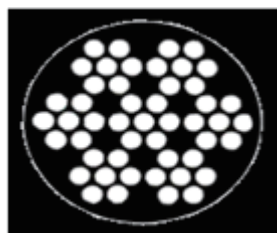
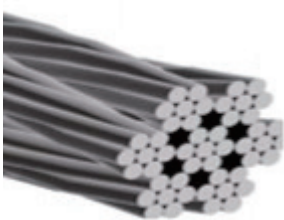
Close



Open



Wire Rope Specification



Feature		
Wire Diameter	Safety Factor	Shear Load (Working Load)
Φ 8mm	21.4	2,355 kg (110kgf)
Φ 5mm	18.14	907kg (50kgf)
Φ 4mm	11.4	454kg (40kgf)

The wire rope acts as a barrier between the track and passengers for the safety of passengers on the platform. Wire rope is consist of 7 bunches of 7 steel wires and covered with coating.

The wire rope has a diameter of Φ5 mm, and calculations indicate a safety factor of 18.14. This figure exceeds the Korean standard (safety factor of 4) as well as the safety factors required for cranes(safety factor of 5) and lifts(safety factor of 10).

Mechanical Specification

No.	Section	Category	Specification
1	Basic Description		It use tension of wire rope
		Composition	Distance between posts : 8 ~ 12m (adjustable)
		Machinery Operation	Motor (Servo)
		Method of Control	MDU (2 Motor, Position & Torque control) ↔ DCU
		Exterior Material	Al-alloy Wire rope : Steel, PVC/PE/PU Coated
2	Operating Basic Description	Open Height	Over 2,000mm
		Height for Passenger Blocking	1,730mm
		Operating time for Ascending/Descending	3.0 ~ 4.5 Seconds (Adjustable upon requests)
		Wire Quantity	32unit
		Distance between Wire	50mm
3	Main Post	Distance between Posts	10m (20m for Main post) Adjustable to 8 ~ 12m upon requests
		Composition	Motor, Rail unit, Weights, Sensor, Lubrication
		Weight	About 220kg
4	Balance Post	Composition	Weights, Sensor
		Weight	About 150kg

Control System Configuration



HMI

HMI displays OPEN/CLOSE status of each door and obstacle detection status on the screen for train driver.



LRF

A laser sensor to detect the train stopping by measuring the distance of train.



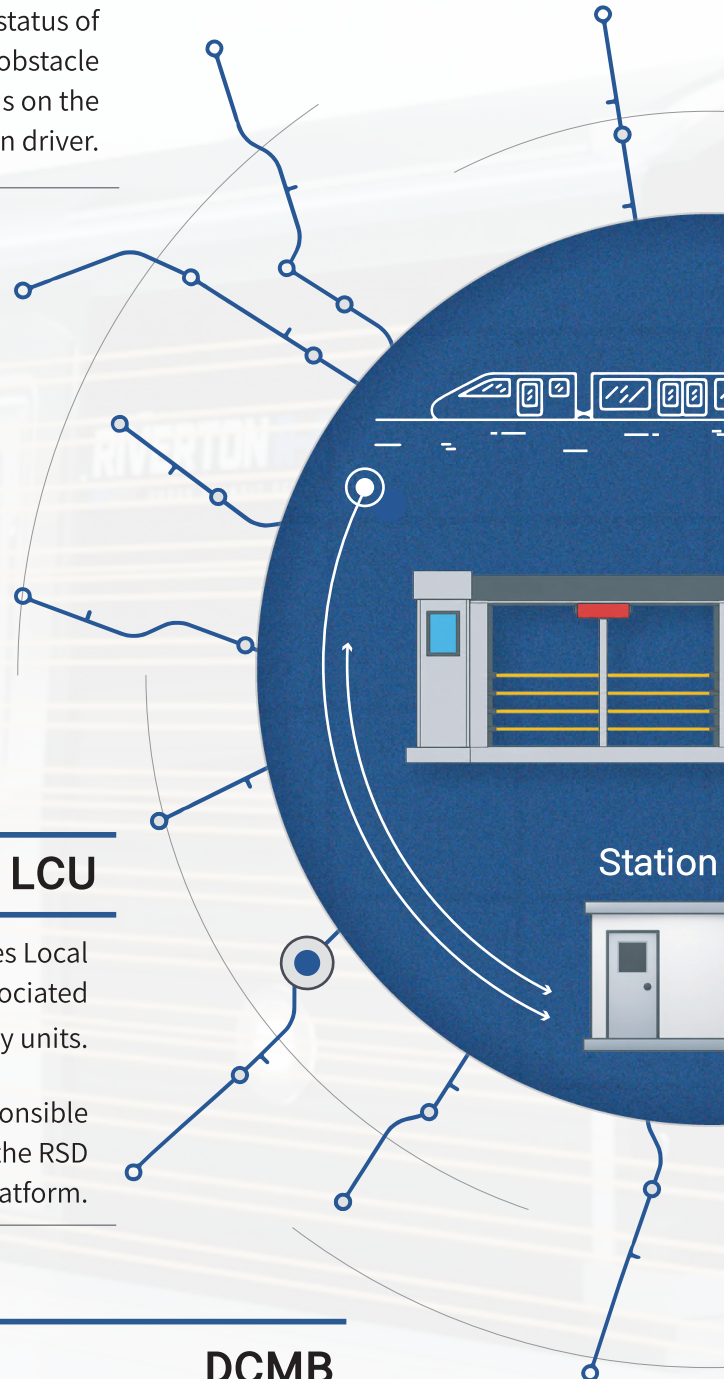
TIP & LCU

- A panel that accommodates Local Control Unit(LCU) and associated power supply units.
- A master control unit responsible for the overall control of the RSD systems installed on the platform.



DCMB

A main control box that comprehensively controls individual RSD by receiving the door control command.



TDS

A sensor that directly detects whether a train is on the track.



INDB & ODS

- INDB: A unit that alarming the hazard to passengers with sound(voice warning) and light(LED lamp) in case of obstacle detection.
- ODS: A safety sensors that detects for obstacles such as people and objects, on both track side or platform side.



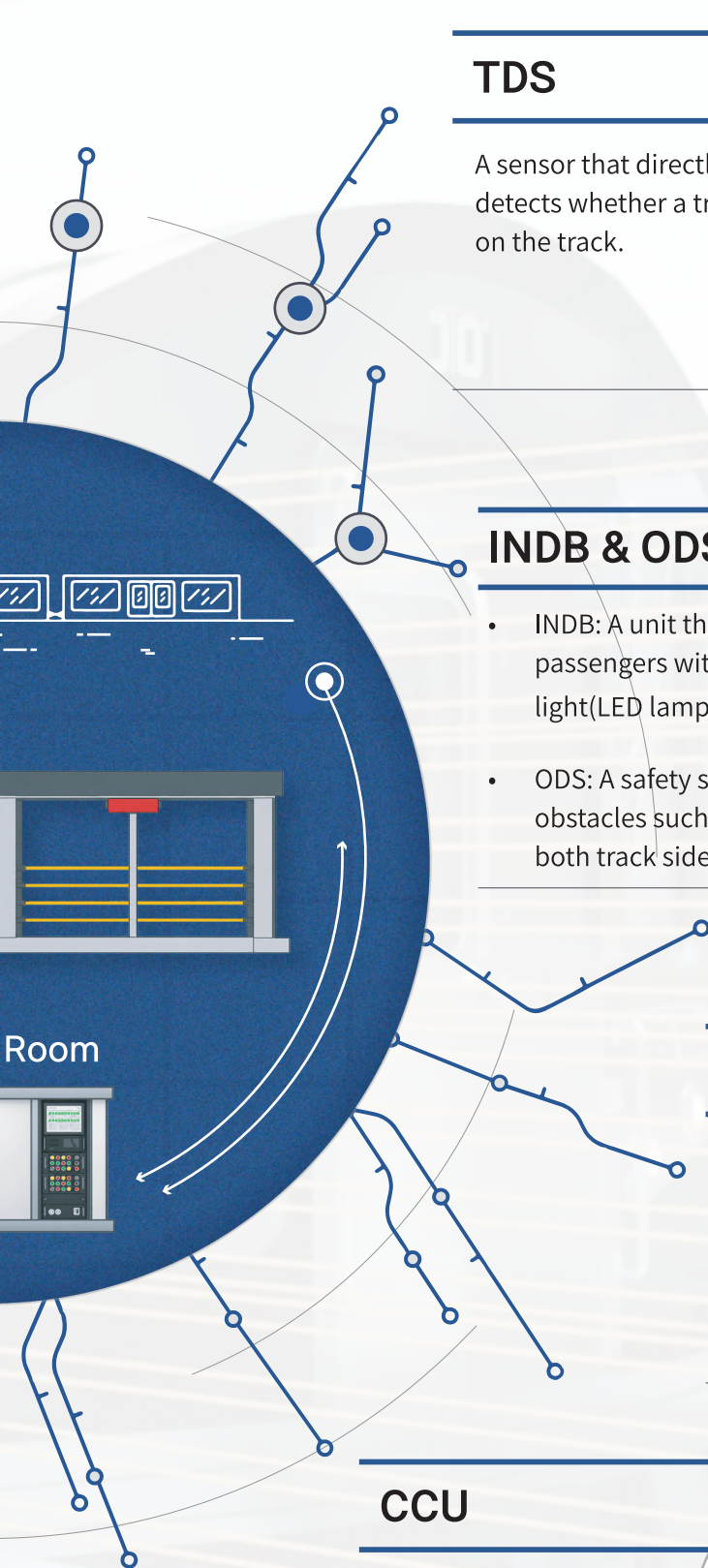
DCSB

A unit that collects signal from Train detection sensor(TDS) and send it to TIP, operates RSD with DCMB.



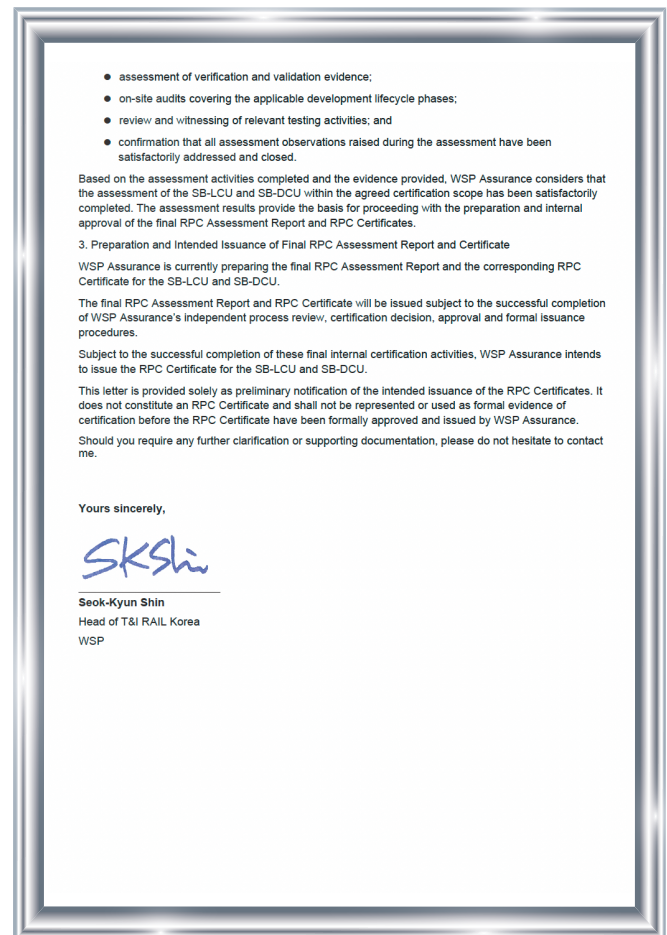
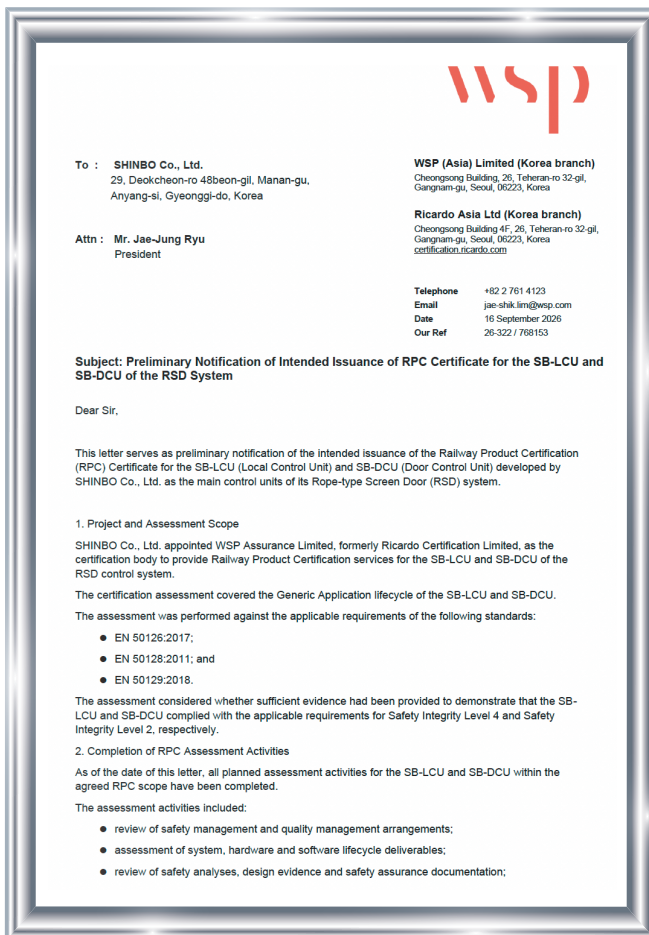
CCU

Central gateway equipment for RSD system operation and monitoring. CCU is installed in station room.



SIL 4 Certification

SIL 4 certification is scheduled to be obtained from Ricardo Rail in 2026.



Control System Feature

1. Obstacle Detection

- If the ODS detects an obstacle during the opening operation of the RSD, the RSD pauses its operation briefly until the obstacle is removed, and resumes operation once the obstacle is removed.
- If the ODS detects an obstacle or an Action Force is detected when passengers bump into the door during the closing operation of the RSD, the RSD slowly opens again, and then resumes operation once the obstacle is removed.

2. System Redundancy

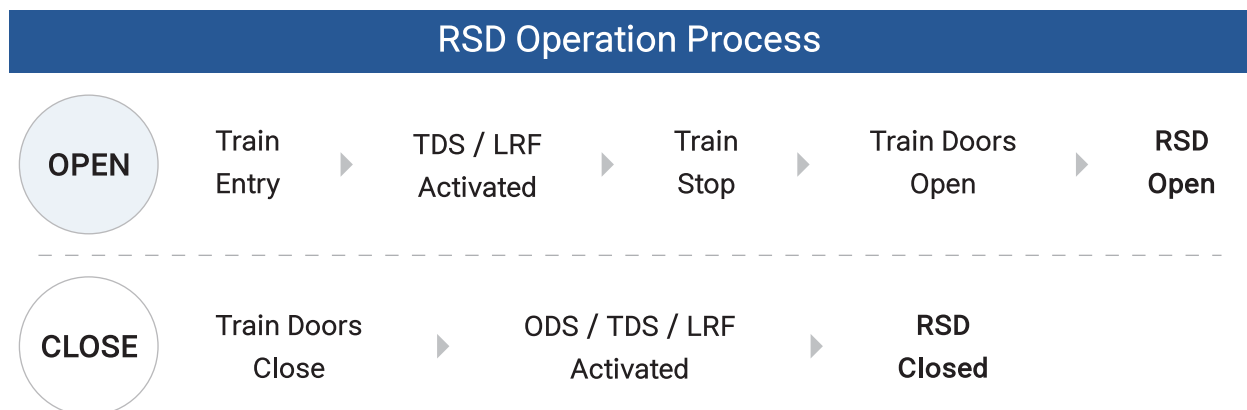
- Conventional PSD is expensive, hard to install and maintain, and only work well with fixed train types and door positions. But today's stations operate various train types—so flexibility is more important than ever.

3. Fail-Safe Mechanism

- RSD system has enhanced system safety by applying a fail-safe structure.

4. Independent Operation

- RSD system can operate either by interfacing with the station's signaling system or independently without an interface



- The RSD safely protects passengers by having each sensor (LRF, ODS, TDS) accurately detect the train's entry and stopping, obstacles between the platform and the track, and departure, and then perform the opening/closing process.
- While the RSD's operation process is fundamentally performed independently, it can also operate by interfacing with external systems such as ATO, CBTC.

Development History

2004

- Development of the world's first vertical type Safety door

2006

- Pilot Installation of Air Cylinder Type at Nokdong Station in Gwangju

2007

- Acquired Ministry of Science and ICT Certification of new technologies (NET 171)

2013

- Pilot Installation of Motor Type at Munyang Station in Daegu (~Currently in operation)
- Designates Core Future Strategy Technology and selects a strong company by Ministry of Land, Infrastructure and Transport

2014

- Installation of Tsukimino Station on the Tokyo Metropolitan City Line
Pilot operation and verification For 9 months)
- Installation of Sweden Stockholm Åkeshov Station (Verified Winter operation)

2017

- Pilot installation at Nonsan Station in Chungnam
(4 season operation test : 2017.06 ~ 2018.04)

2020

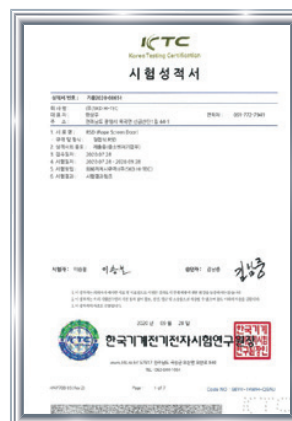
- Installation & operation 2 stations in Bulgaria
(2020.8~ Current Operational Reliability 99.99%)

2007

- Operating 12 stations in Bulgaria

2026

- Pilot Installation in Kaohsiung Station, Taiwan
- SIL 4 certification is scheduled to be obtained from Ricardo Rail in 2026.



Verification History



Korea Gwangju Nokdong Station(2006)



Japan Tsukimino Station(2014)



Sweden Stockholm Åkeshov Station(2014)



Korea Chungnam Nonsan Station(2017)



Nippon Signal Endurance
qualification



Hyundai Rotem
Chamber Test (-35°C)



Korea Testing Certification Institute
a million continuous operational tests.



Operating Station

- 1 South Korea – Munyang Station
- 2 Sofia Metro - Opalchenska station
- 3 Sofia Metro - Slivnitsa station
- 4 Taiwan – Kaohsiung Station(Pilot installation)
- 5 Sofia Metro - Zapaden Park station
- 6 Sofia Metro - Serdika station
- 7 Sofia Metro - InterExpoCenter Tsarigradsko Shose



8 Sofia Metro - G.M.Dimitrov

9 Sofia Metro - Mladost I

10 Sofia Metro - SU St. Kliment Ohridski

11 Sofia Metro - Vardar

12 Sofia Metro -Vasil Levski Stadium

13 Sofia Metro - Lyulin

14 Sofia Metro - Konstantin Velichkov

Operating Station

Kaohsiung Station Pilot Project

2026 Taiwan

In 2026, a pilot installation of the RSD was conducted on one track at Kaohsiung Station in Taiwan.

● Advanced System

- This was a challenging project installing a safety system in a long-distance(approx.330m) station and the accomodating various types of trains. By piloting an advanced RSD system to meet the project's requirements, the system's technological capabilities were further advanced.

● 330m Length Platform

- The length of Kaohsiung Station is over 300 meters. Through the pilot installation, the RSD demonstrated that it can adequately protect passengers by installing it across the entire track, even in a massive station.

● Accomodation of 10 Types of Trains

- Kaohsiung Station is a station where approximately 10 types of trains operate. The pilot installation proved that the RSD system can be used in station where various types of trains operate, and that it can autonomously deploy rope screen door modules regardless of the train's door position.



RSD in Operation at Kaohsiung Station

Winter Tests for Platform Barriers at Akeshov Station

2014 · 2015 Sweden

● Sweden Winter Comparative Open Operations Test

- PSD : Germany Gilgen, Hong Kong JCI
- RSD : Korea Hyundai Rotem(SKD)

● Evaluation Item (Safety, Punctuality, Cost, Effects of Platform and Working Environment, Sustainable Materials)

● Operator Assessment : Safety, Excellent Reliability ➡ RSD, Gilgen

※ Especially in the case of heavy snow, Easy resolution by pushing snow on platforms onto tracks → RSD

- Operating Company (Crew & Mechanic) : 13 out of 14 prefer RSD
- Passenger : Over 50% Selected RSD, 33% Selected PSD
- Firefighter : RSD has excellence in terms of open transparency.
(Quick rescue operations in case of emergency by cutting wires)
- On-site Test of the Senior Citizens' Association
Mention of Problem with PSD glass door
(Reduced passenger visibility due to fog and moisture, potential risk of breakage when glass is frozen.)
Rope type opens smoothly and fully, making it the best solution
- Evaluation of Program Manager : Excellence in artistic
RSD (The Influence of Various Forms of Cultural Environment and the Art of Existing Stations)

● Selection of a suitable type RSD for simultaneous operation (C20, C30, CX 3 types of trains)

- Rope type Safety Door
Outstanding System Reliability
Verified that there is no problem with intentional damage to the Wire Rope



Operation

PSD closure of underground stations

RSD Openness



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