

SMART STATIONS IN SMART CITIES

6th International Conference on Railway Stations

Madrid, 19-21 OCTOBER 2017

The background of the slide is a composite image. On the left, there's a blue-toned image of a modern high-speed train on tracks, overlaid with a network of glowing blue dots and lines, suggesting a smart or digital infrastructure. On the right, there's a silhouette of a city skyline with people walking in the foreground, also overlaid with a similar network of dots and lines, representing a smart city.

Development of Universal Design Guidelines for Urban Railway Stations: Targeting Suseo Station

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PARALLEL SESSION 4a. NEW SERVICES FOR USERS & CUSTOMERS

UNDER THE HIGH PATRONAGE OF

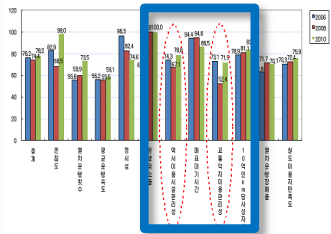


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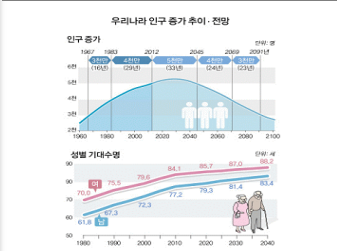


Introduction

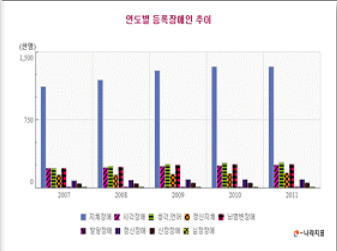
Increasing issues of railway service quality



Aging and diversification of urban railway users



Increased demand for convenience of vulnerable users



Guidance facilities that hinder use



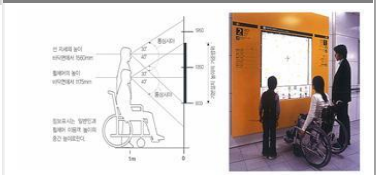
Inconvenience due to maintenance focusing on individual facilities



Dangerous use environment, inconvenience



Insufficient total design standard optimized for each station



Signs to enhance the convenience of urban railway station users **Universal design-based standardization** of the design standard

What is the Universal Design?

Design For All

Designing tools, equipment and facilities so that everyone can use them regardless of having a disability or other handicap



*Source : google.com

Development of Universal Design Guidelines

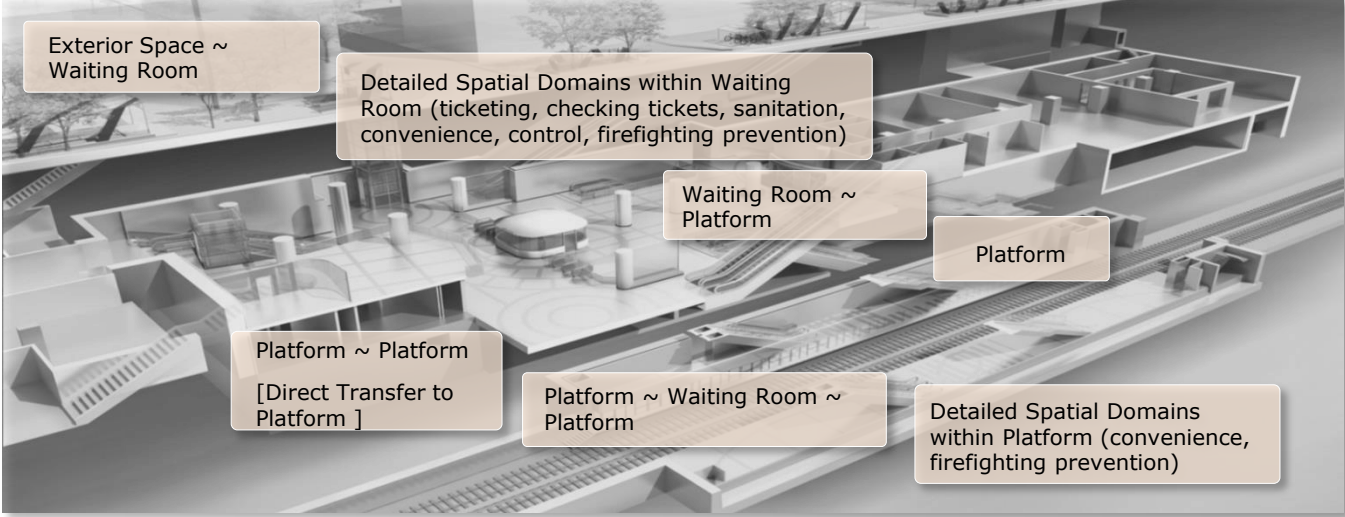
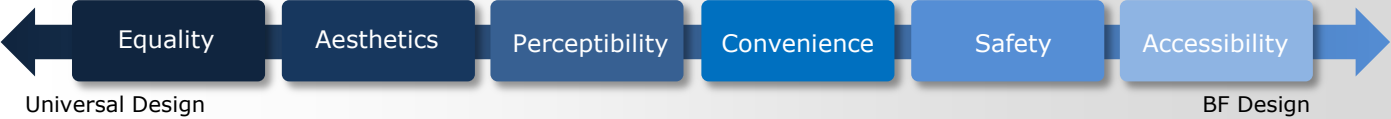
Defining convenience in using urban railway station

Standardizing classification of urban railway station users

6 principles of universal design for urban railway stations

Classifying urban railway station spaces based on movement flow of users

Refers to the comfort and ease of transportation within a station facility when urban railway passengers use the station



Development of Universal Design Guidelines

Development of universal design guidelines



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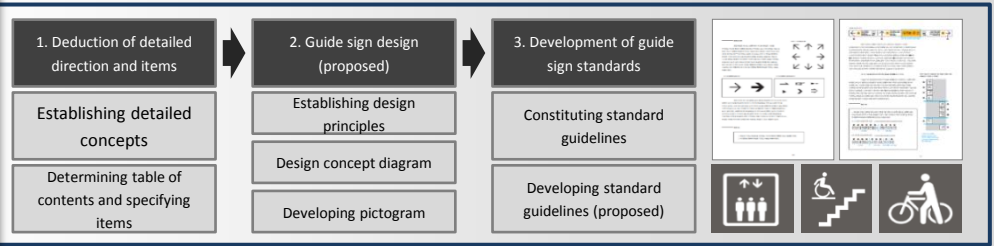
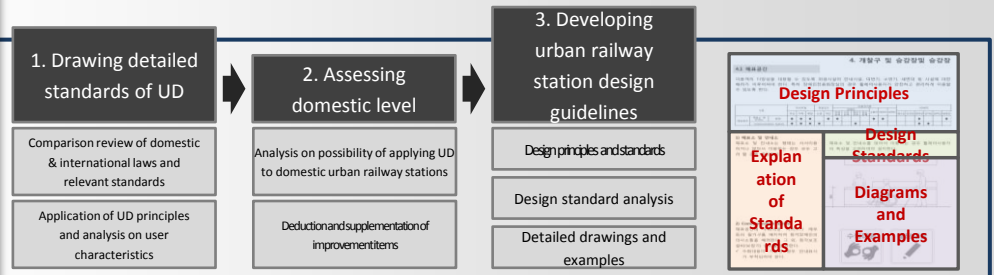
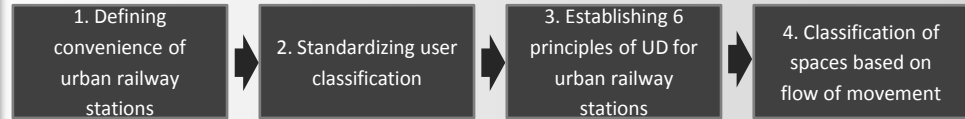
Chapter 1.
Overview of universal design for urban railway stations



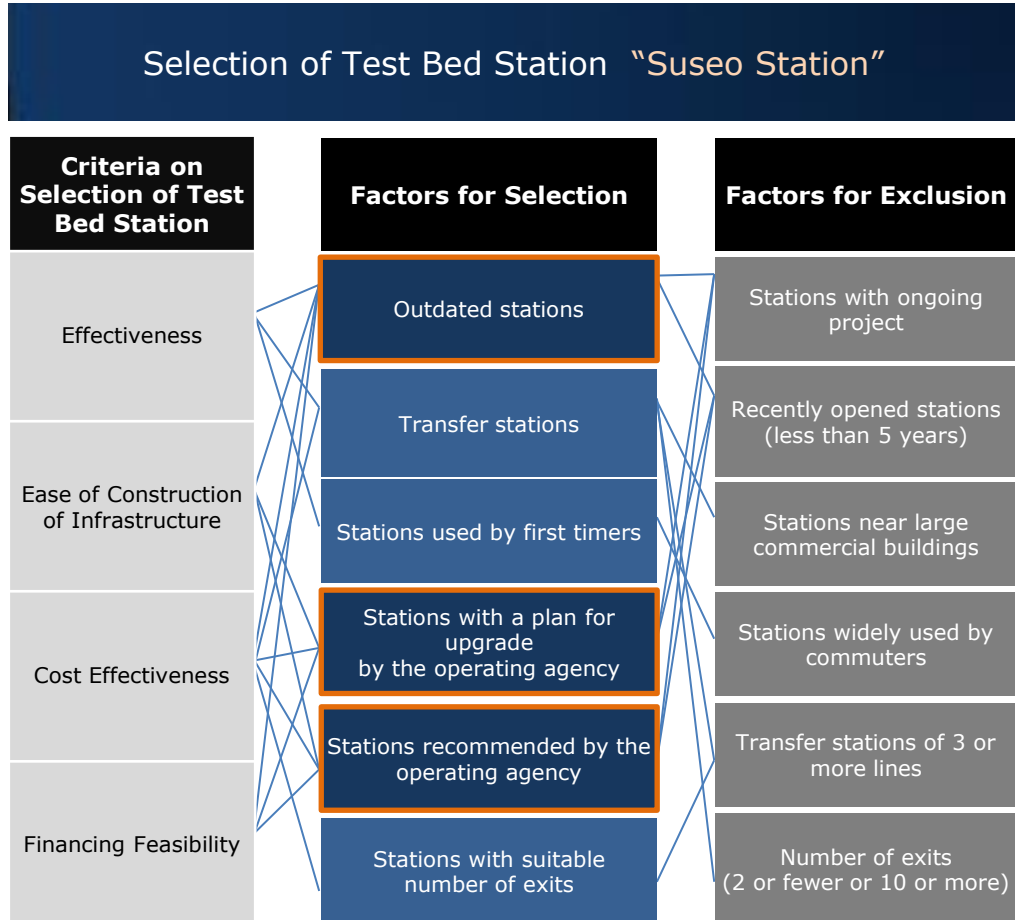
Chapter 2.
Design guidelines for urban railway station facilities



Chapter 3.
Standard guidelines on guide signs at urban railway stations



Selection of test bed station and deducing application scope

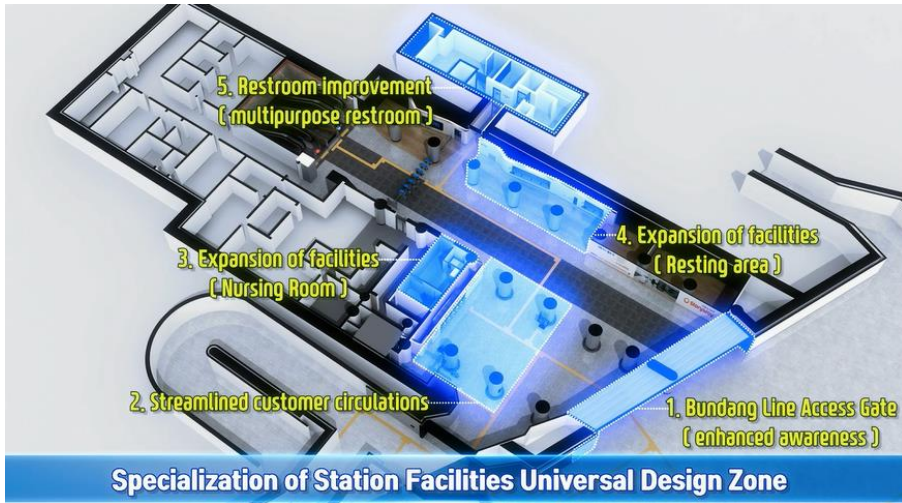


- Suitable to be selected as a test bed station
- Improvement necessary following the opening of the Suseo-bound SRT
- Operation agency support and budget subsidization available
- Formation of a Korail(Bundang Line) - Seoul Metro(Line 3) cooperation system

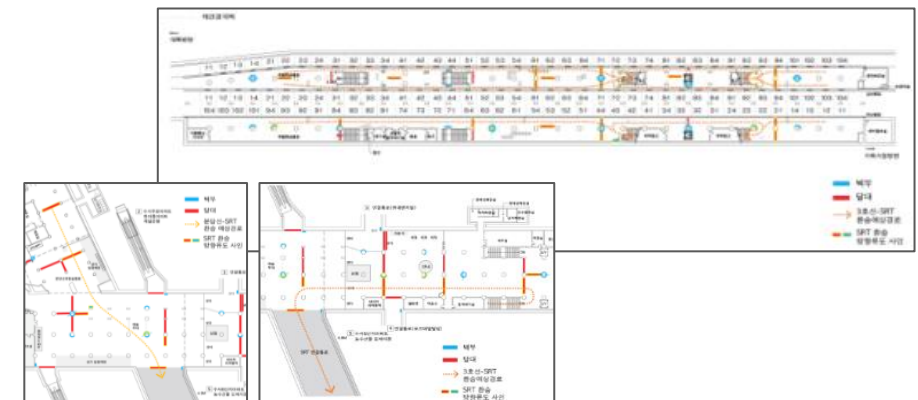
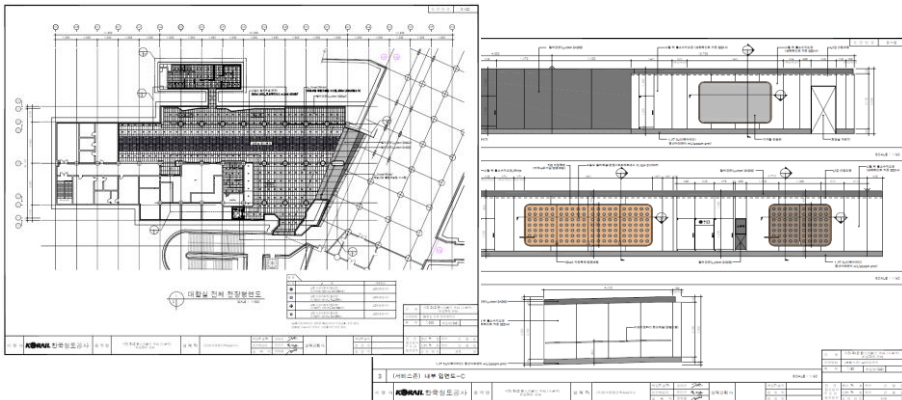
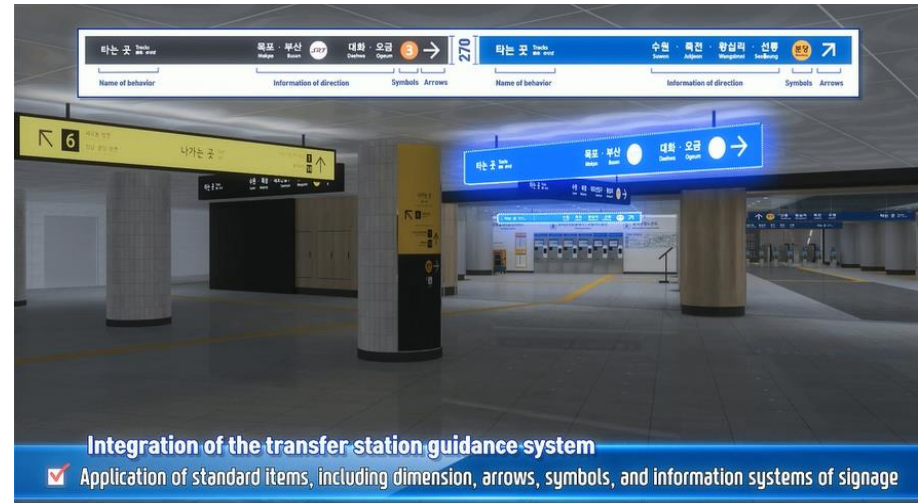
- Daily passengers at Suseo Station / 34,604 → 84,489(40% increase)
(As of 2015) (Estimated number for 2017)
- Approximately 22% are vulnerable users
- Transfer station Bundang Line (B4), Line 3 (B2), Construction work for SRT (B1, Exit 5) transfer passageway in progress

Test Bed Suseo Station Design

Improvement of facility



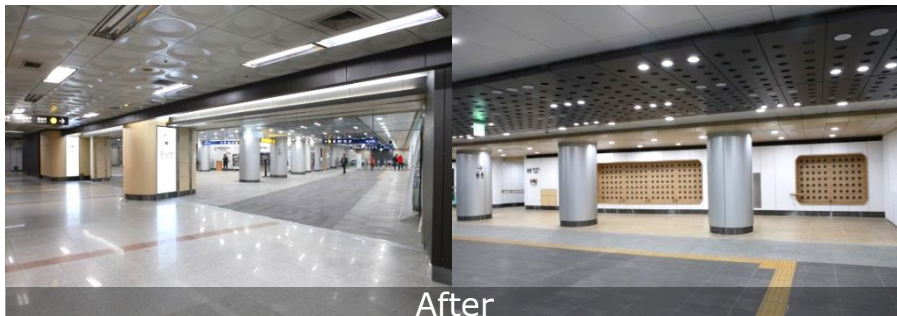
Improvement of signage



Establishment of Test Bed Suseo Station

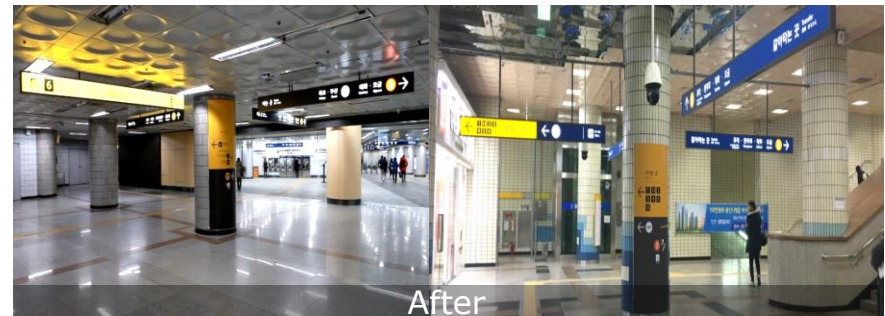
Improvement of facility

- Before: Dark areas, large number of pillars and idle spaces, lack of convenience facilities, narrow entrance to toilets Design (Plan): **Universal design specialization zone** in the waiting room of Suseo Station, Bundang Line (B1) (approx. 85% of station facility design guidelines applied)
- **After: Improved gate design, improved recognition with high illumination, expanded use of rational space, expanded convenience facilities**



Improvement of signage

- Before: Different signage by each operating agency, insufficient information system for traveling routes, information signage poorly located due to many pillars
- Design (Plan): **Integration of transfer station information system** through consultation with operating agencies (approx. 80% of information signage standard guidelines applied)
- **After: Enhanced arrangement of moving lines and viewing angles of travelers, secured visibility utilizing clear colors and layouts**

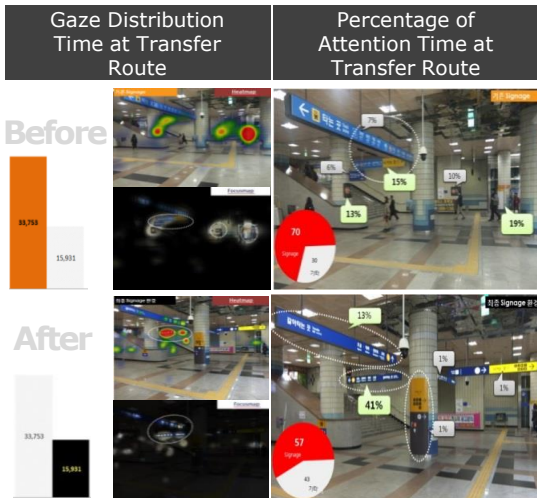


Test Bed Suseo Station Improvement Benefits

Eye tracking survey (transfer)

- Gaze distribution time **reduced by approx. 18 sec.**
- Hanging signage attention time **increased by approx. 32%**

Transfer routes and one other route, six travelers (general public, traffic-vulnerable), required time, gaze distribution time, percentage of attention time



User experience survey (4 routes)

- Total required time (average) **reduced by approx. 43 sec.**
- Total delay time (average) **reduced by approx. 38 sec.**

Exit routes and three other routes, approx. 40 travelers (32 general public, 7 traffic-vulnerable), required time, delay time, satisfaction with information signage

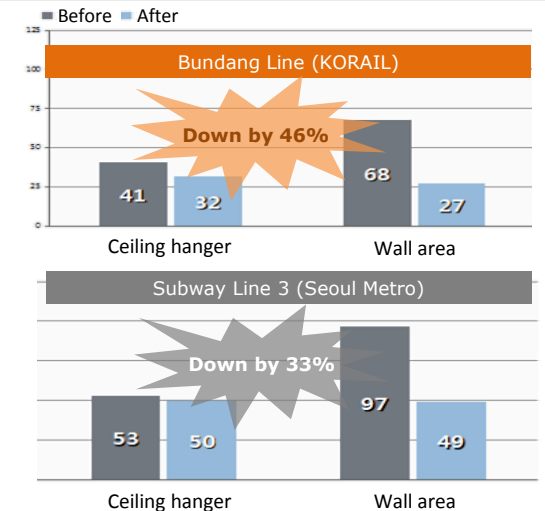
Required Time by Route (Average)		
Users	544	447
	Before	After
(Base)		(4)
Exit	192	170
Enter	146	132
Transfer	90	78
Transfer after finding the restroom	116	67

Delay Time by Route (Average)		
Users	33	12
	Before	After
(Base)		(4)
Exit	22	4
Enter	2	2
Transfer	3	2
Transfer after finding the restroom	6	4

Economic benefits

- Cost reduction** through decrease of information signage by **approx. KRW 100 million**
- Economic benefits by **approx. 1.15**

256 before improvement → 158 after improvement (decrease of 39%), cost of installation KRW 190 million
 Time Value: Traveling time (KRW 287/ person), delay time (KRW 103/ person)



Universal Design Guidelines for Urban Railway Stations Utilization Plan



“Development of universal guidelines for urban railway stations”

1 Improving practicality

- Application to the improvement of outdated stations of railway operation agencies
- **Improvement of waiting room facilities on the basement level of Suseo Station (Bundang Line)**
- Application to new station planning and design
- **Station facilities for double-track railway line between Wonju and Gangneung**
- **Information signage for double-track railway project between Seongnam and Yeosu**
- Reflection of design standards by Korea Rail Network Authority and ordering agencies
- Securing intellectual property rights through pictogram design registration

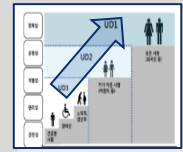


2 Improving system

- **Systemization** by reflection of urban railway design rules
- Unified guideline application to urban railway operation agencies
- Utilization in the improvement of station facility standard for not only the urban railway, but also express and general railways

3 Reflecting in policies

- **Utilization in the government's UD-related mid - to long-term road map development**
- Utilization in creating policy base for UD construction standard system establishment
- Reflection in five-year plan for the traffic vulnerable
- Reflection in mid- to long-term UD project plans of the local governments





THANK YOU
GRACIAS

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