BPA | 부산항만공사
BUSAN PORT AUTHORITY

Health Safety and Security Sector

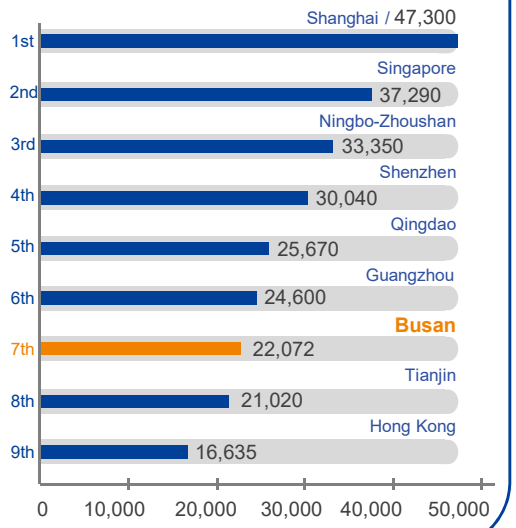
Safety guard of Busan Port : Introduction of 'e-EIR'

* Electronic Equipment Interchange Receipt

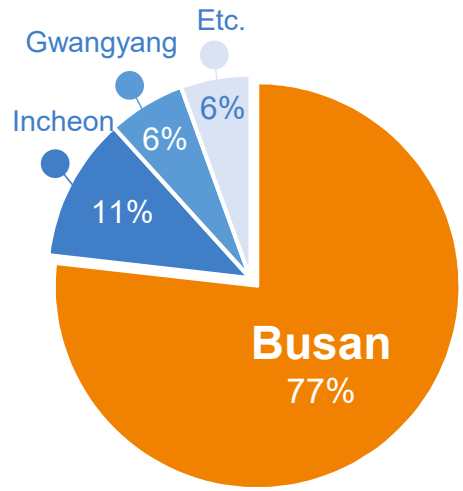
1. Current status of Busan port

- Strategically positioned at the heart of Northeast Asia, Busan Port serves as a gateway for imports and exports making it the seventh busiest container port in the world.
- Handling an impressive 77% of South Korea's container cargo, Busan port solidifies its reputation as the nation's preeminent maritime gateway, facilitating the seamless flow of imports and exports.
- Owing to South Korea's small land mass, ground transportation via trucks has emerged as the predominant(95%) mode for inland container movements.

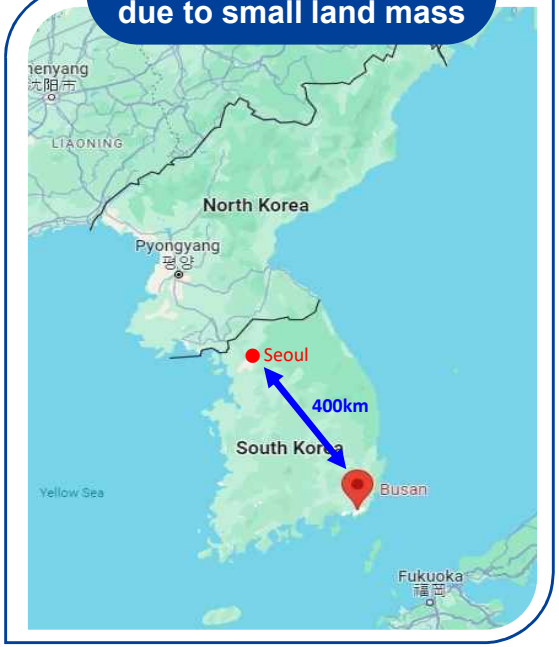
Global no.7 container port



Largest share of domestic container throughput



Ground transportation ↑ due to small land mass



2. Necessity for e-EIR adoption

Government Policy(Digitalization of logistics)

- National logistics basic plan(2021~2030) (Jul.'21.)
- Smart shipping and logistics diffusion strategy(Apr.'21.)
  / Korean new deal(Jul.'21.)

↓

Busan Port Authority develops Port logistics platform(2019~)

- Development and operation of 9 smart systems including transshipment transportation, truck reservation, integrated information system, etc.

↓

Lack of accident prevention systems in port terminals

Primary emphasis of most systems lies in enhancing the efficiency and streamlining operation processes

Frequent safety accidents

Operation of heavy machineries in terminals can lead to severe accidents even with slight inattention

- (Comp. A, Dec. '20.) Truck driver in the refrigeration unit killed by an accident
- (Comp. B, May. '21.) Fatalities of a folding container handling worker
- (Comp. C, May. '22.) Very large forklift caused worker fatalities

↓

Tightened safety laws threats to port shut downs

Implementation of Safety and Health Act(Jan.'22.) and Special Act on Port Safety(Aug.'22.)

+

"The need to establish a comprehensive port safety system spearheaded by Busan Port Authority"

2. Necessity for e-EIR adoption

- Most of the container terminals in Busan Port were using paper Equipment Interchange Receipt(EIR) (except 1 in New port)
- The process and movement of trucks transporting container cargo within the terminal area is as follows :

▶ Transporting **empty container** into the terminal :

1. The truck proceeds to the designated inspection area for thorough examination of the incoming empty container.
2. After any necessary cleaning, the truck advances to the empty container yard and finds the assigned block.
3. Upon identifying the designated block, the truck receives a sequence for its turn to unload the empty container.
4. Once the unloading is complete, the truck exits the terminal premises through the gate.

▶ Transporting **full container** into/out of terminal :

1. The truck proceeds directly to the designated block assigned for loading or unloading operations.
2. Upon reaching the assigned block, the truck identifies to receive a sequence for its turn to process the container.
3. Once the process is completed, the truck exits the terminal premises through the gate.

→ **Container terminals feature extensive routes and constant movement of large vehicles like trucks, heightening the risk of accidents when drivers disembark and walk around the premises.**

3. e-EIR implementation process

1 Overview of the introduction of e-EIR

❶ Identify risks

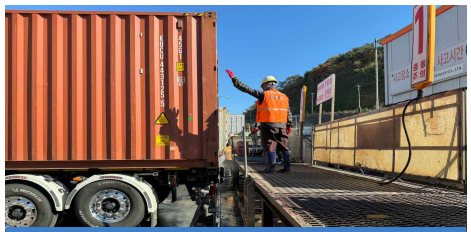
Truck Drivers

Frequent get offs are inevitable in terminals

A truck driver walking along right next to large heavy machineries

Port Personnel

Hard to communicate with the truck driver



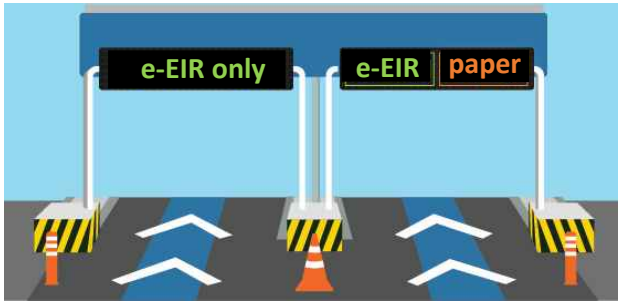
Giving hand signs to the truck driver during container cleaning process

❷Coming up with solutions

- Establishing a no-disembarkation process for truckers
- Developing real-time communication channel between port personnel and truck drivers
- Proactive dissemination of urgent alerts to notify potential safety hazards within terminal premises

❸ Decide adoption

Hardware



Installing dedicated e-EIR gates to facilitate efficient and secure entry and exit procedures

+

Software

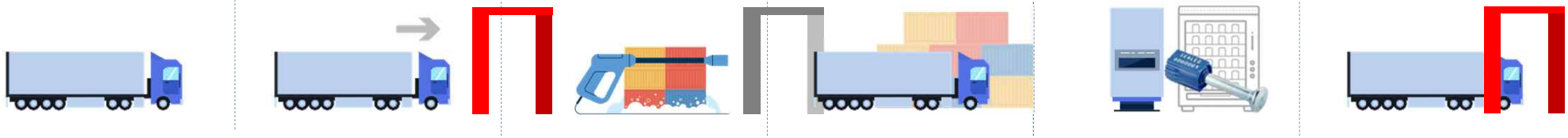
Developing an integrated e-EIR application to enhance overall port logistics

paper EIR

3. e-EIR implementation process

2 Analyzation of disembarkation points in terminals

Pre-gate in/out information → Gate → Inspection/ cleaning area → Container yard → Sealing → Gate



Departure

A truck must approach the terminal gate to receive its transportation information. Until the truck arrives at the gate, it's impossible to know whether the information is well transmitted to the terminal.

Gate entrance

Vehicle stops for issuing paper EIRs create queues and congestion.
If there are errors in the transportation information, drivers must disembark from the truck and visit the terminal office for processing.

Inspection / cleaning

For empty containers, the location of inspection/ cleaning area is assigned and handwritten on a paper EIR by terminal staff.
Unless the driver gets off the truck and checks manually, work progress remains unknown.

Loading / unloading

The driver has to manually find the assigned loading/ unloading block.
Even if they find the right block, they are unable to know their turn or work progress, causing a long wait.

Seal reception

Requires truck drivers to get off the truck and visit exceptional container office to pick up the seal.

Gate exit

Due to lack of channels to send individual notifications to drivers, such as urgent messages from the terminal, notices are given out inefficiently.
(e.g., attached on-site)

⚠ Congestion

⚠ Danger

⚠ Danger

⚠ Danger

3. e-EIR implementation process

3 Development of a structured system

Build up collaboration and communication channels

Busan Port Authority	Terminal	Trucking Comp.	Trucker
	10 companies in Busan Port	Korea Integrated Logistics Association	Truckers' Union Headquarters

Terminal CEO meetings
(Dec.'22.~, 6 times)

Practical workshop with Terminal staff
(Dec.'22.~, 8 times)

Visits to trucking companies
(Lotte, Hanjin, Cheonil, etc.,10 times)

Visits to Truckers' Union HQ
(Discussion on development, occasional meetings)

Step by step development

- Step 1- **Introduce** — Agreement to build a system for all container terminals (10 comps) (Dec.'22.)
- Step 2- **Design** — Work process adequacy review (Jan-May.'23.) System process review (May-Jul.'23.)
- Step 3- **Develop** — Building and developing a standard interface for Busan Port (Jul-Oct.'23.)
- Step 4- **Test** — Test for individual terminals on field (Oct-Nov.'23.)
- Step 5- **Deploy** — App Store Deployment (Dec.'23.)

4. Progress

1 Conversion of paper EIR to e-EIR

AS IS

When a truck heading to the dock passes through the gates, the vehicle is recognized and must pause to receive a paper EIR containing its transportation information, causing traffic congestion and waiting times. Sometimes, strong winds blow away the paper EIRs, forcing drivers to disembark and rush to retrieve them.

TO BE

e-EIR lanes and gates allow trucks to automatically receive their transportation information on their smartphones as they enter, easing traffic congestion near the gate and eliminating the potential risk of drivers having to pick up paper EIRs in person.

* South Korea smartphone penetration rate : 97%

2 Integrating separate applications of Busan port

AS IS

Due to the lack of communication channels, useful information for drivers, such as terminal closures due to weather or traffic, is posted on-site or sent to individual terminal apps. Drivers have to install multiple apps, which adds confusion and causes inconsistencies in information.

TO BE

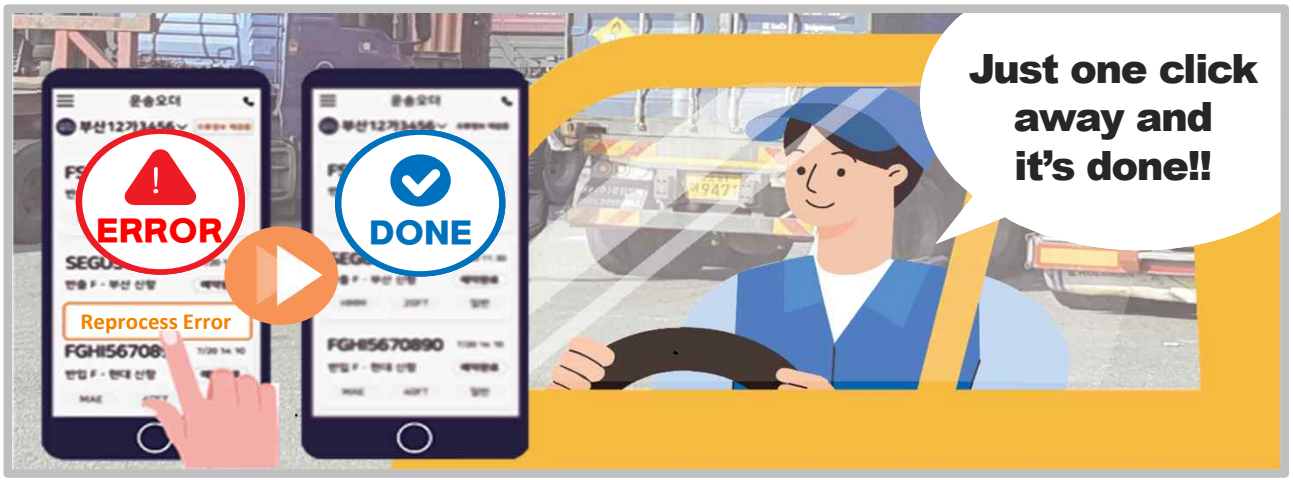
By integrating multiple channels into a single app, emergency notifications and useful information can be instantly sent to workers in real-time, increasing work efficiency.

3 No-disembarkation of truck drivers

AS IS

The risk of accidents increases when the driver needs to disembark from the truck to visit the terminal office. This often happens when drivers arrive at the terminal and find that the transportation information confirmed on the phone has not been properly transmitted to the terminal, or when the paper EIR itself has an error.

TO BE



As transportation orders are sent(with an alarm) before the truck arrives at the terminal, errors can be resolved before reaching the terminal. If there is an error in the information received at the gate, the driver can process it themselves through an in-app recall without embarking from the truck.

4 Real-time communication during tasks

AS IS

When bringing in an empty container, the inspection and cleaning area is assigned and written on paper EIR by terminal staff. Also, since work progress is unknown unless the driver disembarks from the truck, completion notifications for another truck can be mistaken by other drivers, causing departures with workers still inside the container doing their job.

TO BE

When the truck's license plate is recognized at the gate, the screen immediately switches to the e-EIR to inform the next destination, such as the inspection area or yard.
The e-EIR provides a completion notification when the work is done, enabling the driver to directly assess the on-site situation, increasing safety.

5 Providing real-time on site information

AS IS

If the driver doesn't know the exact location of the assigned loading/unloading block, they need to disembark from the truck to check manually.
Also, even if the driver arrives at the block but the truck is not recognized, they have to wait indefinitely without being assigned their turn, causing a waste of time and transport inefficiency.

TO BE

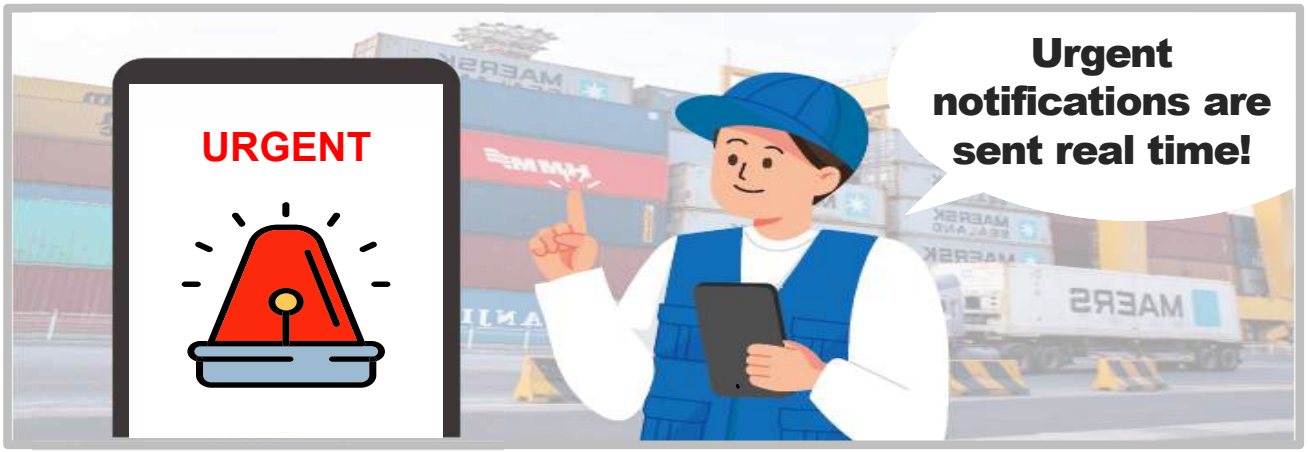
On the e-EIR, a truck's next destination(inspection, loading/unloading block etc.) is assigned and notified.
Upon arrival at the assigned block, recognition and turn assignment notifications are sent to the driver right away.
As work progresses, completion notifications are sent to ensure uninterrupted workflow.

6 Sending of urgent notifications

AS IS

Due to the lack of a one-stop communication channel, it is difficult to provide timely information for safe and efficient transportation, such as port closures due to weather or nearby traffic congestion for detours.
Also, in case of cargo misdelivery, it is hard to deal with immediately since the terminals do not keep contact information for every trucker.

TO BE



In case of emergency, app notifications can quickly communicate the situation to truckers to ensure safety within the terminal.
Also, when a container is misdirected, real-time notifications are sent to the driver to reprocess the misdirected container before it leaves the terminal, saving time and increasing productivity.

5. Expectations & Achievements

1 Expectations of e-EIR

Prevention of safety accidents

* 1 USD = 1,300 KRW

- Sustainable port operation
  Closing of Busan port causes 54.6million USD loss
- Reducing risk of accidents
  by minimizing drivers disembarking from the truck
- Secure safe working environment
  of port workers in Busan port

Busan port

Truck driver

Terminals

Reduction of costs

* 1 USD = 1,300 KRW

- Save costs collecting paper EIR wastes
- Reduction of fuel costs to visit ECO
  More than 3.5 million USD per year
- Elimination of paper EIR issuing costs
  More than 308 thousand USD per year

By introducing e-EIR and implementing it fully to the entire port(Jul.'24.),

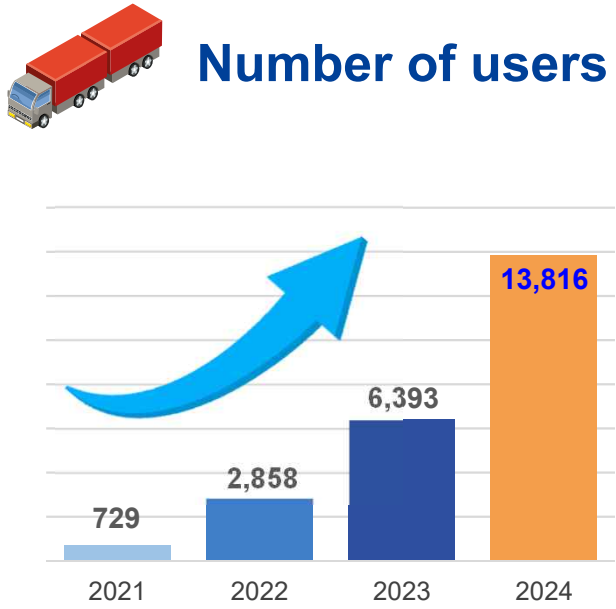
Busan port will provide **Safe, Convenient, Affordable** port services

5. Expectations & Achievements

2 Achievements of port logistics platform

"Activation of port logistics platform(e-EIR and 9 existing systems) brought **Rapid growth of users** and **excellence recognition**"

Number of users



- Trucker app users surpass 80%
  (Based on 17,324 trucks using Busan port)

Excellence recognition

- 'South Korea Presidential award'(1st place)
  (Korea Logistics Award, Nov.'23.)

Thank you