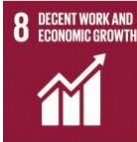


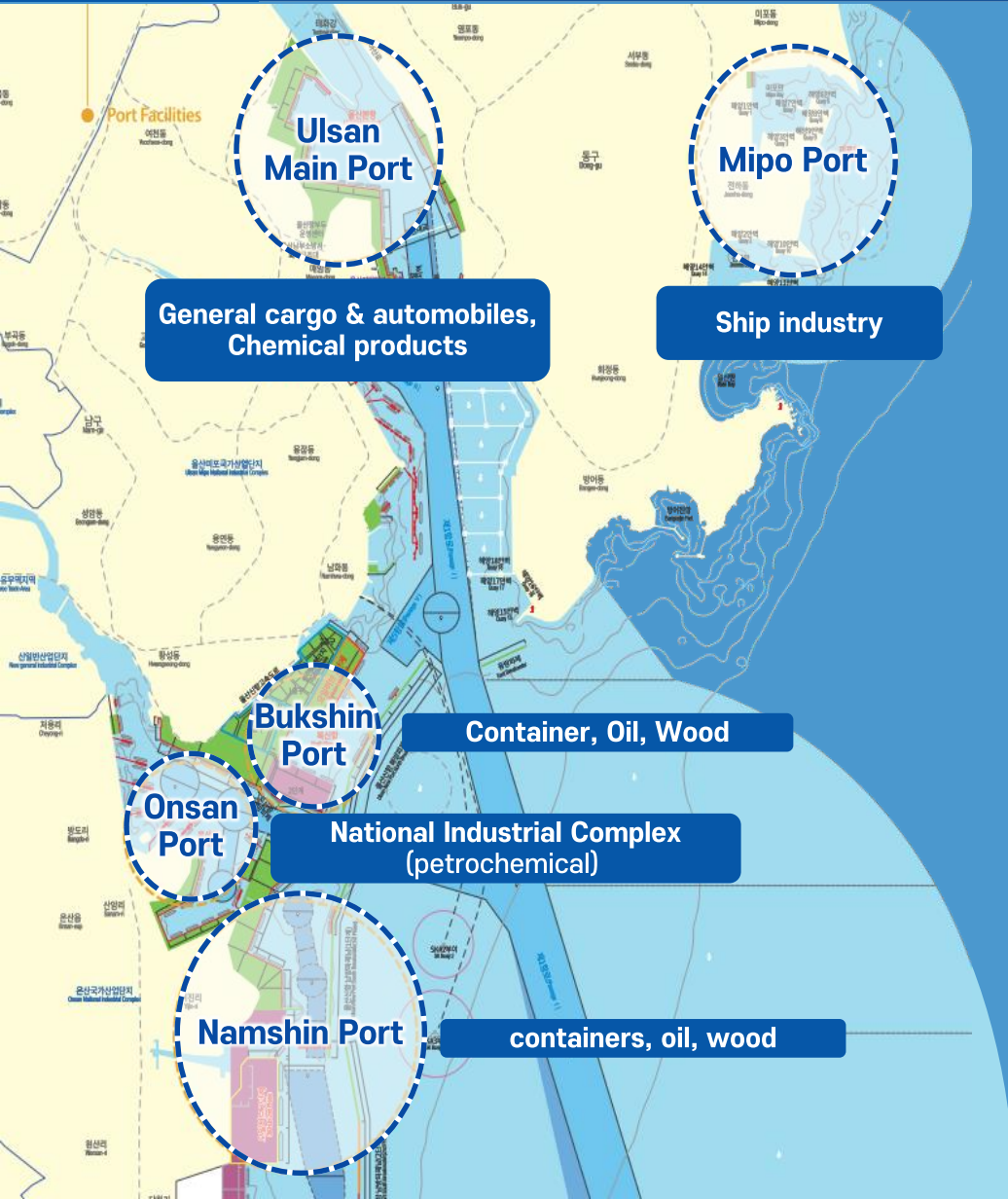
Port of Ulsan, implementing a comprehensive safety network for port industry



-Based on safety augmentation cases
of Ulsan Port



Ulsan Port Overview



Operational Administrations



Ulsan Regional Oceans & Fisheries Administration

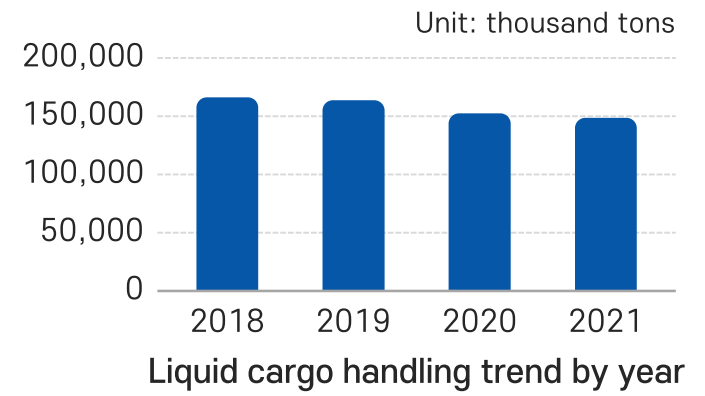


Ulsan Port Authority

Ulsan Port has developed into an industrial port that supports the automobile, shipbuilding, and petrochemical industries located in the national **industrial complex**. It has world-class petrochemical complexes, oil refining companies, and large-scale liquid cargo storage facilities.

This port processes 33.8% of the country's liquid cargo and 41.05% of its crude oil in South Korea, making it **the largest liquid cargo handling port in Northeast Asia**.
1st in Korea and the 4th largest in the world

World-class port



The Ulsan Port Authority manages the world-class liquid cargo handling port and the largest industrial support port in Korea, establishing a comprehensive safety network to ensure the safety of both port facilities and users.



Ulsan Port Authority implements **specialized safety management plans** with the vision of establishing a safe Ulsan Port.



UPA CEO KIM JAE GYUN

“**Vision for Safe Ulsan Port**”

Maintain ZERO Major Accidents

Strategy Goal | Achieve Sustainable Management

Task | Establish the safest port

Task Details

Port Industry Safety Network

Disaster response system

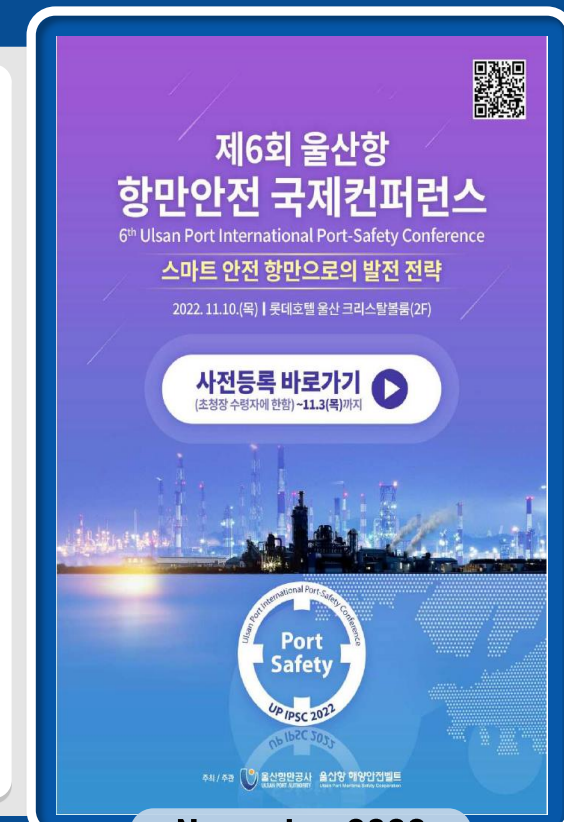


Ulsan Port annually hosts domestic and international harbor safety conferences to disseminate its **excellent safety management plans** and **port safety culture** around the world.

▶ Ulsan Port Port-Safety Conference (International/Domestic)

Objectives and Progress Reports (2017-2022)

- Regularization of port safety conferences to enhance awareness of the importance of port safety
- Contribution to sharing domestic and international port safety management strategies and spreading safety culture.



November 2022

Introducing the safety culture of Ulsan Port
that embraces the safety of
"port facility, workers, and vessel" to
achieve **ZERO** major disaster port.



CONTENTS

Establishing a comprehensive safety network of port industry

CHAPTER

01

Preparing for a chemical explosion

Enhance Information Management during Port Entry
Joint Response System for Chemical Accidents at sea
Ship Training Programs for firefighting personnel

CHAPTER

02

Preventing safety accidents

Eliminate blind areas
Identifying and improving safety factors
Develop Port Safety Measurement Tools

CHAPTER

03

Strengthening safety of ship navigation

World's first AI-based ship mooring monitoring system
Corner protection device (patented)
Real-time safety communication platform



Hazardous
Materials
& Explosions

Prevention of
safety accidents
in the pier

Strengthen ship
navigation safety

Joint response system of “private-public” sectors for hazardous material explosion accidents

Ulsan Port's 'Marine Safety Belt' Campaign

Incase of an explosion

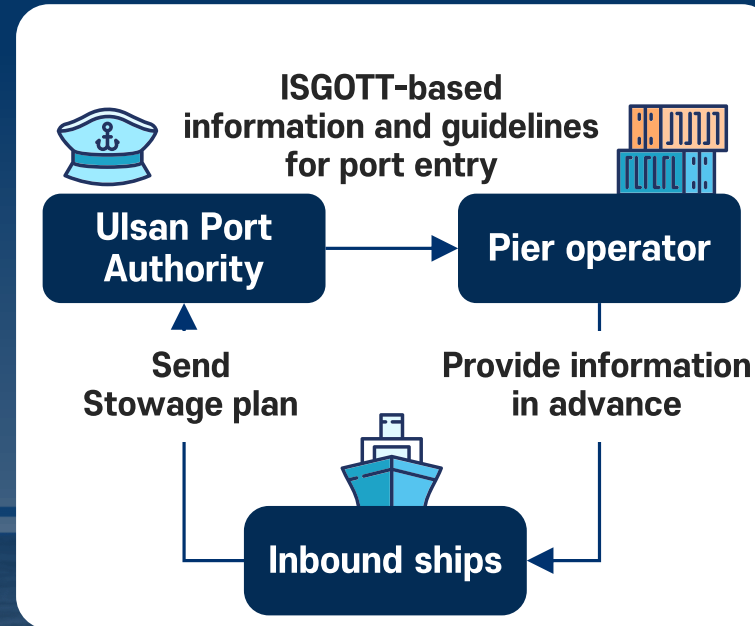
Previous Individual response
(organization, company)



Current “private-public” sectors
joint response

**Systematic and
prompt response**

Standard dock entry information system of dangerous goods.



Training land-based rescue personnel on ship structures and equipment

Training land-based rescue
personnel on ship structures
and equipment

Train land-based rescue teams
to enhance their ability to
respond to incidents such as
liquid cargo vessel fires and
maritime chemical accidents.

Organize and operate Ulsan Port “Marine Safety Belt”

“**Marine Safety Belt,**” an Ulsan Port Safety Community, led by UPA, led by Ulsan Port-related public institutions and the private sector,

2014

UPA-led, 13 organizations participated in **building “marine safety belts”** and **conducting joint training on accident**

2015 ~ 2017

Production of tanker vessel safety guidelines, **safety training for loading master, and establishment of a disaster response Collaboration system, etc.**

2018 ~ 2019

Expansion of participating institutions(17 institutions)
Reinforcing dangerous goods accident prevention training such as dangerous goods worker tour training

2020 ~ 2021

Expansion of alcohol-resistant fire extinguishing agent
Advancement of Dangerous goods pier entry information

2022

Reinforcing a cooperative system for joint response to maritime chemical accidents, such as production of ship engine safety guides, etc

Establishment of a joint response system in preparation for an explosion of hazardous materials based on the Ulsan Port disaster safety collaboration system

Participating organization in marine safety belts

- ✔ A total of 18 organizations, businesses and organizations participated up until 2022
 - **(Public)** Ulsan Metropolitan City, Ulsan Regional Maritime Affairs and Fisheries Office, Ulsan Maritime Police Station, Ulsan Port Authority, Korea Maritime Environment Corporation, Ulsan Port and Maritime Traffic Control Center, Safety and Health Corporation,
 - Korea Maritime Transportation Safety Authority, Korean Register of Shipping, Maritime Dangerous Goods Inspector
 - **(Organization)** Ulsan Port Pilot Association, Korea Tugboat Cooperative, Ulsan Port Tank Terminal Association, Ulsan Port Labor Union, Korea Shipping Association,
 - **(Companies)** SK Energy Co., Ltd., S-OIL Co., Ltd., Shinheungsa Co., Ltd.

Main activities

- ✔ Preparation of safety measures related to Ulsan Port
- ✔ Conducted joint drills to respond to maritime chemical accidents
- ✔ Production and distribution of safety training materials

Establishment of private + public collaboration system and activities to strengthen joint disaster response capabilities

Reinforcement of Ulsan Port-related organizations and companies accident response capabilities and systematic and prompt response in case of an accident

Marine Safety Belt activities | Completion of private, public, and public communities in preparation for maritime chemical accidents and expansion of response equipment

Reinforcement of joint disaster response system and expansion of disaster response equipment through joint education with maritime safety belt participating organizations

April 2021

Designation of target vessels for business participation
And on-site meeting

May 2021

Establishment of plan to expand alcohol-type foam fire extinguishing agent and response equipment

July 2021

Production of training materials for seafarers related to the operation of foam fire extinguishing systems for harbor tugboats

November 2021

Alcohol-resistant fire extinguishing agent (48 tons) loading of tugboats (11 vessels) and operation training of fire extinguishing equipment

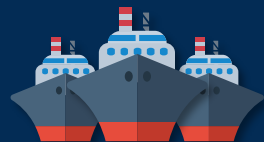
November 2021

Joint training in response to complex disasters due to chemical product carrier explosion and fire

Category	Start of 2019	2020 (1st project)		2021 (2nd project)	
		Resource	Budget support	Resource	Budget support
Fire extinguishing agent	39.7 tons	69.7 tons	UPA KRW 180 million	123.7 tons (+84 tons)	UPA KRW 240 million
Mobilizable ship	5 ships (coast police)	14 ships		25 ships (+20 ships/spare ships)	

Simultaneous initial response for up to

3



fire-stricken vessels

Reinforcement of community systems such as private, public, and public joint training

Expansion of disaster response equipment

(Fire extinguishing agent, fire suppression vessel, budget, etc.)

Reinforcement of first responding ability to maritime chemical accident

Advancement of dangerous goods entry information

Establishment of a standard system for exchanging safety information such as pier information and loaded cargo information between pier ↔ ship when dangerous goods enter the pier

July 2021

Dangerous goods entry into port information advancement research service commenced

August 2021

International Safety Management Guidelines (ISGOTT 6th) training for hazardous materials safety managers.

August 2021

Organize a TF and hold a workshop to advance dangerous goods entry into port information

December 2021

Production and distribution of arrival information guide for Ulsan Port cangerous goods terminal by company (16 companies)

Improving the level of safety management of dangerous goods in the port through advanced dangerous goods entry into port information

Establishment of standard system for dangerous goods pier entry information

- ☑ Advancement of dangerous goods handling terminal arrival information (16 companies)
 - Including terminal-specific safety management plans, emergency response procedures, and safe navigation information
- ☑ Changes to the cargo information reporting system for vessels entering port
 - (Previous) Report only unloading cargo information → (Change) Report all cargo

Production and distribution of the latest safety checklist between ships and terminals

- ☑ Provide step-by-step checklist for unloading ship/terminal
 - Latest international guide (ISGOTT 6th) such as detailed procedures and preventive measures for each task reflected

※ISGOTT
: International Safety Guide for Oil Tankers and Terminals

Improvement of internal safety standards by establishing a standard system for port entry information and creating a safety checklist

Rapid cause analysis and response is possible while preventing accidents, in the event of an accident

Ship rescue/equipment familiarization training for onshore rescuers

Conduct ship rescue and equipment familiarization training to strengthen the ability of land rescuers to respond to maritime ship accidents

July 2021

Provide self-produced training materials for emergency rescue personnel (coast police, firefighting)

August 2021

Ulsan main port local adaptation joint training for new firefighters

August 2021

Joint training in response to complex disasters caused by chemical product carrier explosions and fires

December 2021

Customized training for firefighting and coast guard rescuers (ship structure and fire extinguishing equipment, etc.)

Ship familiarization training activities for emergency rescue agencies (coast police, firefighting) → Enhancement of ship disaster response capabilities

Support for local adaptation training for firefighters in preparation for disasters

- ✔ Support for local adaptation training for firefighters (rescue/firefighting)
 - Inspection of firefighting access roads, high-performance equipment utilization plan, firefighting facilities, etc.
- ✔ Support for waterproof work training in preparation for large ship fire (1 session/26 people)
 - Fire extinguishing procedure proficiency training according to the response procedure manual

Customized ship structure/facility familiarization training support

- ✔ Conduct specialized training on ship rescue and firefighting equipment (3 times/74 people)
 - Joint training to maintain land and sea (firefighting/coast guard) cooperation system
- ✔ Preparation of educational materials to enhance understanding of ship rescue/firefighting equipment
 - Ship/firefighting drawings, ship firefighting equipment (movable/fixed), etc.



Reinforcement of capacity to respond to maritime chemical accidents through customized ship structure/facility training for onshore rescuers who are not familiar with ship rescue

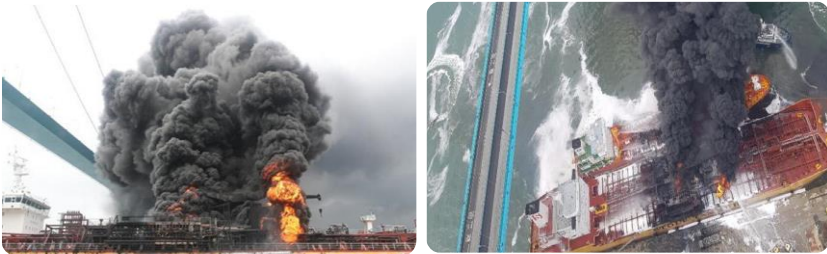


Performed joint response training for marine chemical accident with participation of global liquid freight shipping company (STOLT TANKERS)

- Training to enhance joint response training for marine chemical accident based on accidents in the past

Accident cases

2019. Ulsan Port



Accident overview

- ▶ An accident leading to a massive fire starting from ship tank coming into port
- Extinguished fire within only 18 hours quickly thanks to cooperation system at the Ulsan port

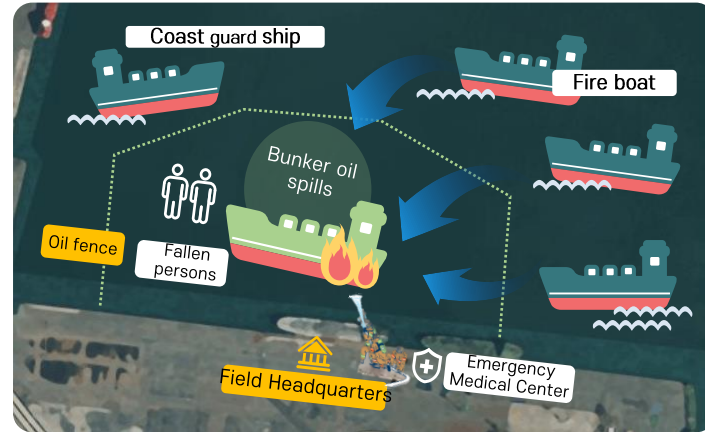
Matters to be improved

- ▶ Need to improve response capacity to marine chemical accident
- Quick corresponding measures shall be established by improving accuracy of reporting information of hazard materials
- Initial response abilities to accidents through operation trainings shall be enhanced

Training Situation

video is accompanied separately

Joint Response Training



- Crashed into a quay in the process of berthing tanker ship
- Fire occurred in the engine room
- Injured & isolated persons in the ship occurred
- Persons fell into the water among evacuated crews
- Oil was leaked from punctures inside the ship

Ship(Vessel)
Response training inside of the ship
Training to cope with fire and injured & isolated persons in the ship

Marine Safety Belt at the Ulsan Port	
Initial response	Control of spillage oil
Saving lives and Putting out fire	Prevent hazardous materials from leaking into see

Major achievement : Enhanced joint response ability for hazard material explosion accident

01 Enhance response capacity by conducting training specialized for explosion accident of hazardous materials after reflecting characteristics of the Ulsan Port with heavy quantity of goods transported

02 Improve manual by conducting simulation by identifying possible problems in real situations in advance



Pictures taken at the joint response training for marine chemical accident with the global liquid freight (STOLT TANKERS)

Fire extinguishment inside of ship



Response to marine accidents by fire-fighting teams or resources



Lifesaving



Fire extinguishment at sea



Composition of response headquarters at on-site accidents



Fence establishment for preventing and combating marine accidents



Hazardous
Materials
& Explosions

Prevention of
safety accidents
in the pier

Strengthen ship
navigation safety

Preliminary discovery and improvement of port safety hazards

Ulsan Port "Industrial Safety Guidance Team" Activity

Consultation
with
professional
safety
instructors



Voluntary
safety
management
activities

Prevention of safety accidents
in advance

Establishment of an inclusive safety net without safety vulnerable groups

Ulsan Port "Industrial Safety Guidance Team" Activity

Continuous education through
production of education and operation
of training center for the underprivileged
in training (racing, rowing, temporary
port entrants, etc.)

Building an inclusive
safety net without blind spots

Development of unloading safety measurement index "Unloading safety index"

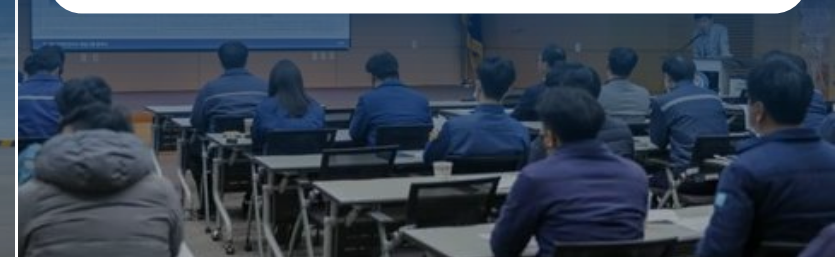
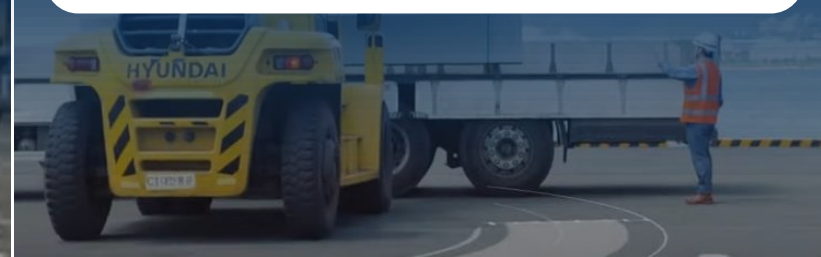
Ulsan Port "Industrial Safety Guidance Team" Activity

Safety
measurement

Safety
quantification

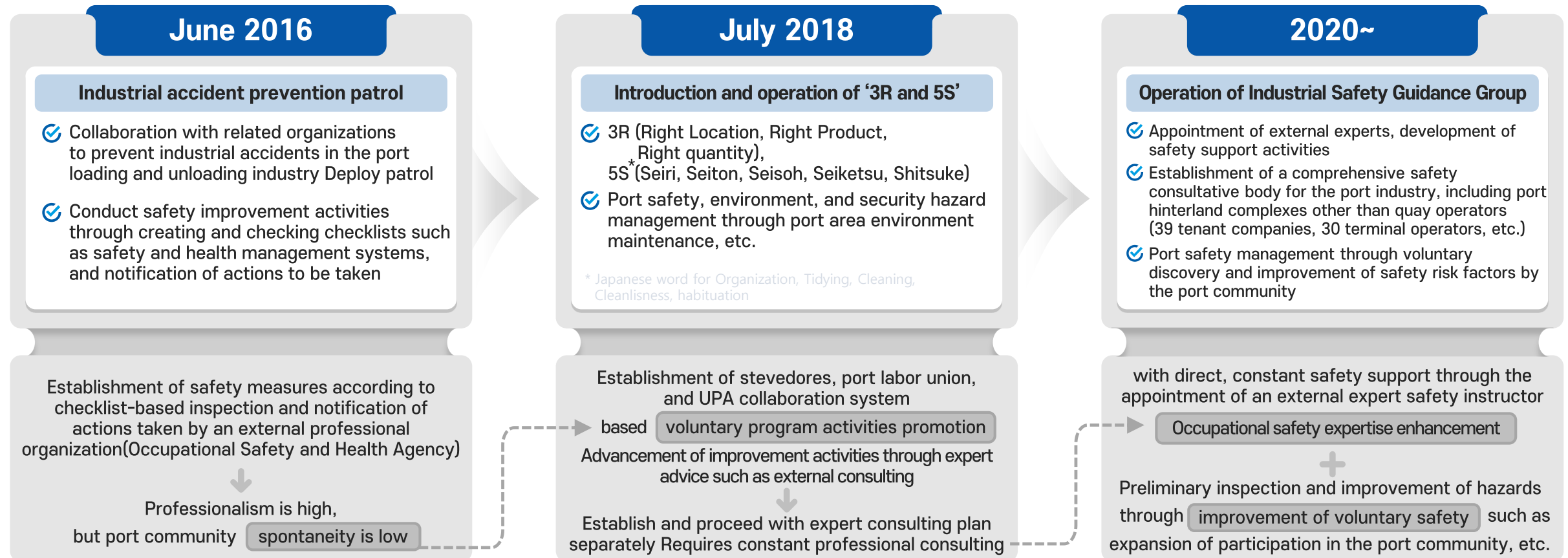
Safety
reflux

Reinforcing safety
management of loading
and unloading at Ulsan Port



Evolution of port industrial accident prevention and safety management system, “Industrial Safety Guidance Team”

Ulsan Port Safety accident prevention collaboration system between professional safety instructors and voluntarily participating port companies “Industrial Safety Guidance Team”





Occupational Safety Guidance Group activities | Safety hazard discovery results and representative cases of improvement

Improvement of port safety through constant identification of safety risk factors and practical improvement of the port-based industrial safety guidance team

	Risk assessment	Safety training	Basic · Safety	Machine · Equipment	Electricity · Device	Fall · Dro facility	Fire · Explosion · Leakage
Improvement factor discovery	12 cases including promotion of effective risk assessment	6 cases including thorough on-site safety training	27 cases including work area arrangement	19 cases including control and autonomy within conveyor belt facilities	12 cases including light tower collision protection measures	4 cases including installation of toe guards on aerial work platforms	27 cases of safety measures including installation of oil dikes

	General cargo port site	Liquid cargo port site		
Improvement factor discovery	Arranging work zones, securing traffic safety	Installation of facility explosion-proof and protective devices	Ensuring the safety of unloading liquid cargo	Reinforcing firefighting equipment to respond to fire and explosion
Management system improvement	 <p>Apron lane and subdivision separation</p>	 <p>Installation of light tower panel protection device</p>	 <p>Installation of oil dikes in the liquid cargo loading area</p>	 <p>Installation of tower monitor and water curtain</p>

Occupational Safety Guidance Group activities | Reinforcement of inclusive safety management for safety vulnerable groups 1

Resolving safety blind spots due to lack of safety education, and **reduction of life-threatening accidents and serious accidents** by production of safety education videos and implementation of education by industry

Production of customized safety training videos for each industry



Implementation of customized safety training for each industry



Problems

In the case of lineman and cargo fixer, they were in a dangerous work group, but were in a blind spot for safety due to the lack of safety education content.

Improvment

Production and distribution of safety training videos for port-related service businesses (lineman, cargo fixing business)
Implementation of customized safety training for each industry

Establishment of an inclusive safety net for the safety-vulnerable class and those excluded from safety education



Occupational Safety Guidance Group activities | Reinforcement of inclusive safety management for safety vulnerable groups 2

Enhancing the safety of all workers in the port by providing safety training for temporary visitors to the port who are not subject to compulsory training

Before

❌ Inadequate management of temporary visitors (many daily workers) and safety training in port workplaces

- Absence of grounds for compulsory safety training other than port service workers (according to the current 「Port Transport Business Act」)



After

✅ Implementation of compulsory training for dockers

- Implementation of regular compulsory education for all workers entering and exiting the port
 - Temporary accessor safety training program design
 - Education place maintenance(2021.10) →
- Training is possible at all times even for one visitor**



Establishment of training programs and permanent training centers for all port workers



Monthly average
1,729
people



Yearly
20,748
people

Can use training rooms

Development of “Unloading Safety Index” | Representative case of comprehensive port safety management

Development of **the first domestic port safety index measurement tool** through subdivision and quantification of port safety measurement factors



(Background) As industrial accidents continue to occur in ports, the demand for public institutions' countermeasures for port loading and unloading safety management is expanding.

(Before) The number of industrial accidents in the port sector, which is compiled by the Port Logistics Association, is the standard for accident prevention due to the absence of quantitative indicators of loading and unloading safety.

Comprehensive diagnosis of loading and unloading safety level at Ulsan Port and development of measurement tools capable of providing feedback



Apr 2022



Sep 2022



Dec 2022



Dec 2022

Cooperating institutions

Establishment of safety management system and **consultation on loading and unloading safety index design**

Composition of working group by cargo



Pier operator safety level diagnosis Statistical data collection (1st)

Investigation items
Workplace industrial accident management number
Number of employees
Average monthly average number of users
Appointment of a safety manager or safety and health manager
Safety/Health management agency
Number of safety-related license holders
Safety and health management certification
Completion of legal safety training status
Out-of-court safety requirement completion status

Safety index for each pier operator Data research for calculation (2nd)

순번	Investigation items
1	Safety budget investment ratio
2	Safety budget execution rate
3	Total hours of out-of-court safety training
4	Total number of out-of-court safety training participants
5	Number of full-time worker
6	Number of on-site safety inspection inside work place-
7	Improvement execution rate after safety inspection

Held the final briefing session on the **development/calculation of loading safety index**



Participation of 13 companies located in Ulsan Port

S-oil, United Terminal Korea, Hyundai Oil Terminal, Taeyoung Industry, VOPAK, ODFJELL, Hyundai Motor Company, CJ Logistics, LS MnM, Korea Port Logistics Co., Ltd., Ulsan Port Operation Co., Ltd., Ulsan Port 6/7 Pier Operator Co., Ltd., Jeongil Ulsan Container Terminal (JUCT)



Development of “Unloading Safety Index” | Representative case of comprehensive port safety management

Derivation of detailed elements (budget, person in charge, training, accident rate) required for port safety management and formula-based safety index section setting

Unloading safety index =
 $\sum_1^7 \text{Weight} \times \text{each element formula}$

Category	Safety budget investment rate	Safety budget execution rate	Percentage of safety and health managers	Safety and health related education support rate	Number of on-site safety inspections	Safety inspection improvement implementation rate	Increase and decrease in fatal accidents compared to the previous year	Sum
Response average	6.05	6.11	6.11	5.32	5.34	5.47	5.63	40.03
Normalization (weight)	0.151	0.153	0.153	0.133	0.133	0.137	0.141	1.00

$$\text{Health and Safety Budget Investment Ratio Score} = \text{Weight} \times \frac{100}{15} \times \left[\frac{\text{Safety budget}}{\text{Institutional budget}} \times 100 \right]$$

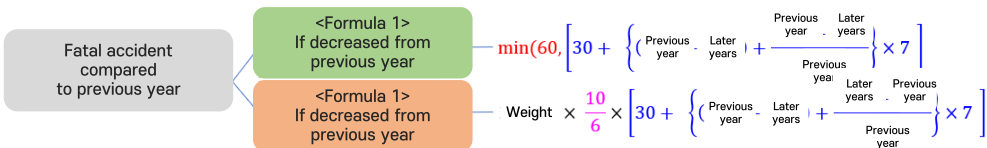
$$\text{Health and Safety Budget Execution Rate Score} = \text{Weight} \times \left[\frac{\text{Actual executive budget}}{\text{Health and safety budget}} \times 100 \right]$$

$$\text{Percentage of Safety and Health manager Score} = \text{Weight} \times \frac{100}{5} \times \left[\frac{\text{No. of safety and health managers}}{\text{Total number of employees in the institution}} \times 100 \right]$$

$$\text{Safety and health related education support rate score} = \text{Weight} \times \left[\frac{\sum_{i=1}^m (\text{Statutory training hours} \times \text{number of completed students}) \times 0.5 + \sum_{j=1}^n \text{Statutory training hours} \times \text{number of completed students}}{\text{Expected education hours per person} \times \text{number of port transportation workers}} \times 100 \right]$$

$$\text{On - site safety inspection score} = \text{Weight} \times \frac{100}{24} \times (\text{Number of safety inspections conducted at unloading work sites})$$

$$\text{Safety inspection improvement implementation rate} = \text{Weight} \times \left[\frac{\text{Number of improvements}}{\text{On - site safety inspection pointed out}} \times 100 \right]$$



Ulsan Port Safety Index = 100 pts

Index	Point	Range
Safe	90~100 pts	Over 90 pts
Good	80~89 pts	80 pts
Normal	70~79 pts	70 pts
Inadequate	50~69 pts	50~60 pts
Bad	~49 pts	Under 50 pts

Hazardous Materials & Explosions

Prevention of safety accidents in the pier

Strengthen ship navigation safety

Artificial intelligence-based vessel berthing accident prevention Around View Intelligence System for Ship”

Utilization of AI technology, support for smart berthing

→ Prevention of accidents caused by human error when berthing a ship



Patented “Corner protection device” for night navigation and enhanced berthing safety

Buffer function when docking a ship + Equipped with LED light

→ Reinforcement of the safety of ship navigation at night



Two-way & real-time SNS safety communication window “Ulsan Port Safety Keeper”

Ulsan port weather and disaster information provision + Receipt of safety hazards such as real-time accidents

→ Increased safety and convenience for vessels using Ulsan Port



03 Strengthening Ship Safety

Ulsan Port introduction

Explosive accident preparation

Safety accident prevention

Ship safety enhancement

Conclusion

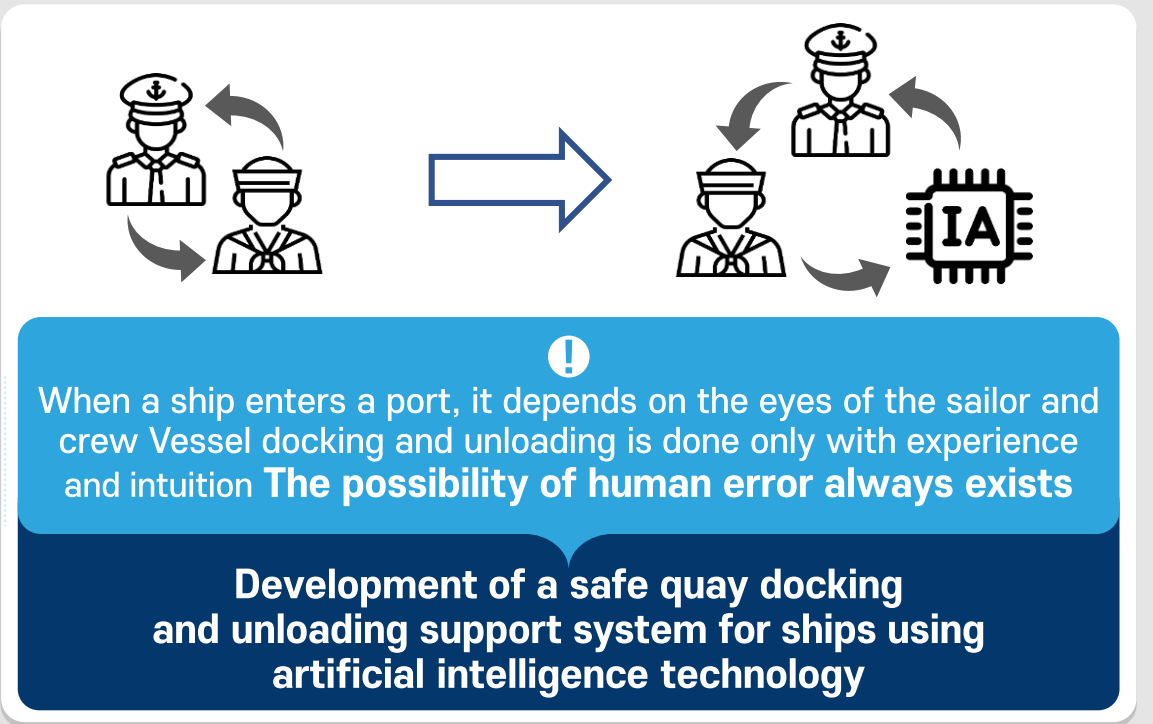
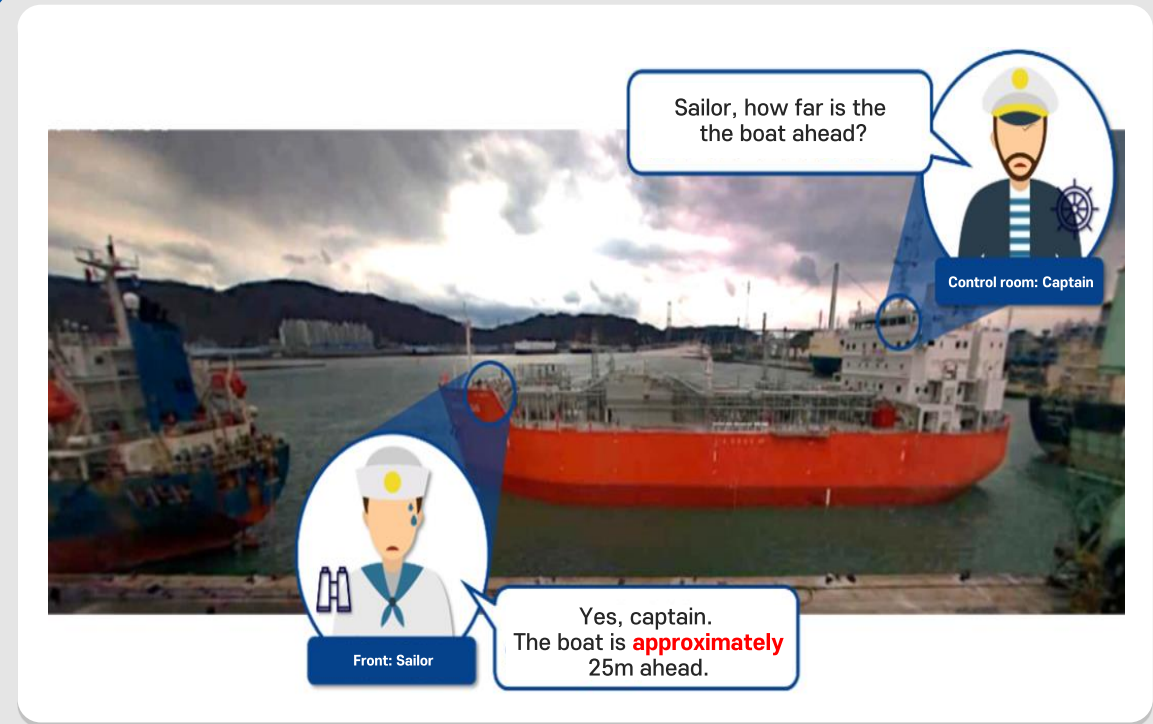


Utilization of the Around View Intelligence System for Ship(AVISS)| The world's first AI-applied vessel docking monitoring system

* AVISS: Around View Intelligence System for Ship

Reinforcement of vessel berthing safety through the development of the world's first AI-applied vessel berthing monitoring system

Around View Intelligence System for Ship technology development background



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Utilization of the Around View Intelligence System for Ship(AVISS)| The world's first AI-applied vessel docking monitoring system

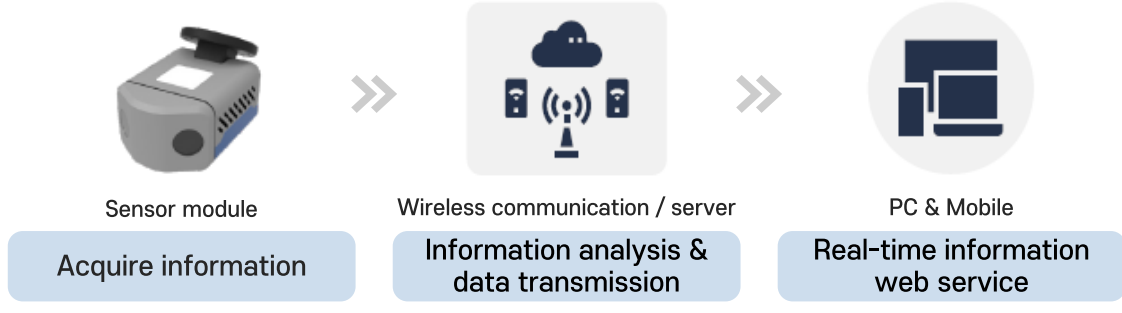
Supports safe navigation from entry to departure of the ship through real-time provision of automatic analysis of the AI berthing vessel and surrounding environment



AVISS introduction

- ✔ Provides real-time situation information through automatic analysis of the surrounding environment of the ship docking based on AI technology
- ✔ Provides port operation assistance data from vessel entry to Departure → Increase operational efficiency and safety

AVISS process



03 Strengthening Ship Safety

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Utilization of the Around View Intelligence System for Ship(AVISS) | The world's first AI-applied vessel docking monitoring system

World's first AI-applied vessel berthing monitoring system contributes to achieving ZERO accident at Ulsan Port

Key Achievements of Around View Intelligence System for Ship (AVISS)

0 Achieving ZERO accidents occurrence when berthing ships

Reduction of port facility maintenance expenses such as replacement of insect repellents and pier damage repair

1 Developed the world's first AI-applied vessel docking assistance system

Implementation of advanced port safety using digital technology

Representative cases of introducing major ports nationwide

Incheon Port
•Incheon liquid vessel quay
3EA

Ulsan Port
•Ulsan liquid quay
•Ulsan Yanggok quay
5EA

Yeosu/Gwangyang Port
•Jungheung quay
•Nakpo quay
2EA

03 Strengthening Ship Safety



Ulsan Port introduction | Explosive accident preparation | Safety accident prevention

Ship safety enhancement

Conclusion

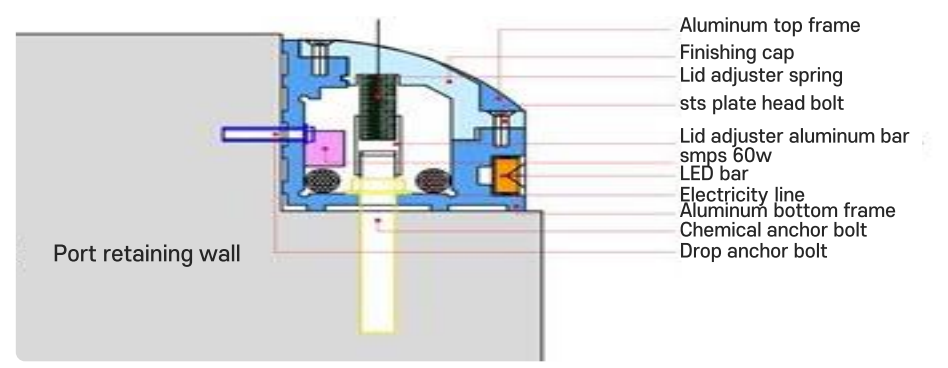
Port detachable corner protection device | Development of UPA patented safety device to support ship navigation at night

Contributing to improving night navigation safety and berthing safety of ships in the port and reducing port facility maintenance costs

<p>Feb~May 2021</p> <p>Development of 「Port detachable edge protection device」 technology and domestic patent application</p>	<p>Sep 2021</p> <p>Obtained a domestic patent for 「Port detachable edge protection device」</p>	<p>Jan 2022</p> <p>Applied international patent for 「Port detachable edge protection device」</p>	<p>Sep 2022</p> <p>Prototype production and installation work carried out for 「Port detachable edge protection device」</p>	<p>Feb 2023</p> <p>Complete installing prototype of 「Port detachable edge protection device」</p>
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Prevention of ship safety accidents during night navigation in Ulsan Port - Contributing to the establishment of a safe port

Port removable edge protector facility structure



Facility features

- ✔ Detachable structure (Feature) Modular structure allows each part to be separated
- ✔ Upper cover: Equipped with shock absorber function such as adjuster spring and aluminum bar
- ✔ Equipped with a light to output light at night



03 Strengthening Ship Safety

Ulsan Port introduction

Explosive accident preparation

Safety accident prevention

Ship safety enhancement

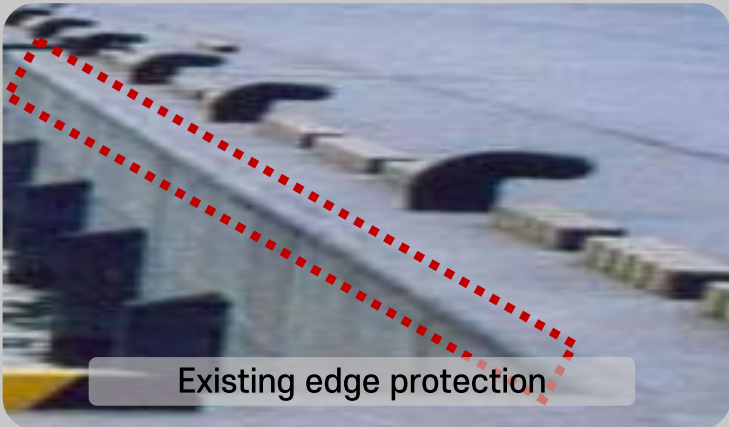
Conclusion

Port detachable corner protection device | Development of UPA patented safety device to support ship navigation at night

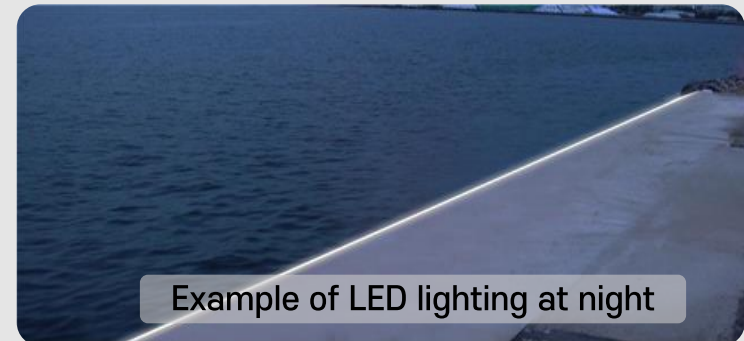
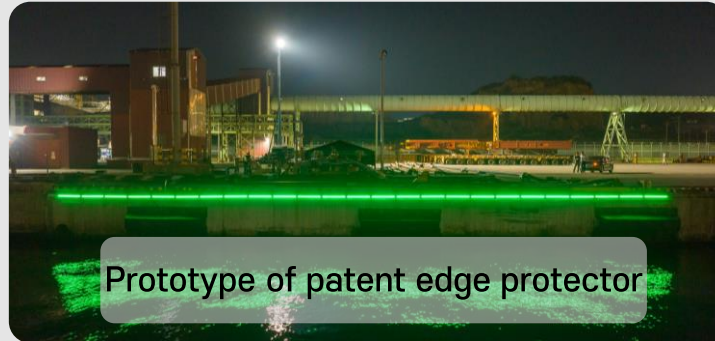
Contributing to improving night navigation safety and berthing safety of ships in the port and reducing port facility maintenance costs

Before

- ✔ Port facility edge simple protection function
- ✔ In case of partial damage, maintenance of the entire facility is required → Excessive maintenance period and cost



After



- ✔ **LED lighting facility**
Supporting ship navigation safety at night and strengthening berthing safety
- ✔ **Buffer system (internal spring)**
Reinforcing ship docking safety, minimizing damage to port facilities
- ✔ **Detachable structure (module design)**
Replace damaged parts only → Quick and economical maintenance

03 Strengthening Ship Safety

Ulsan Port introduction

Explosive accident preparation

Safety accident prevention

Ship safety enhancement

Conclusion

Operation of Ulsan Port safety guard | Real-time provision of safety and weather information at Ulsan Port

Established and operated “Ulsan Port Safety Keeper”, a real-time and two-way safety communication channel for safe navigation of ships, such as utilization of SNS platform, disaster safety information and weather information at Ulsan Port

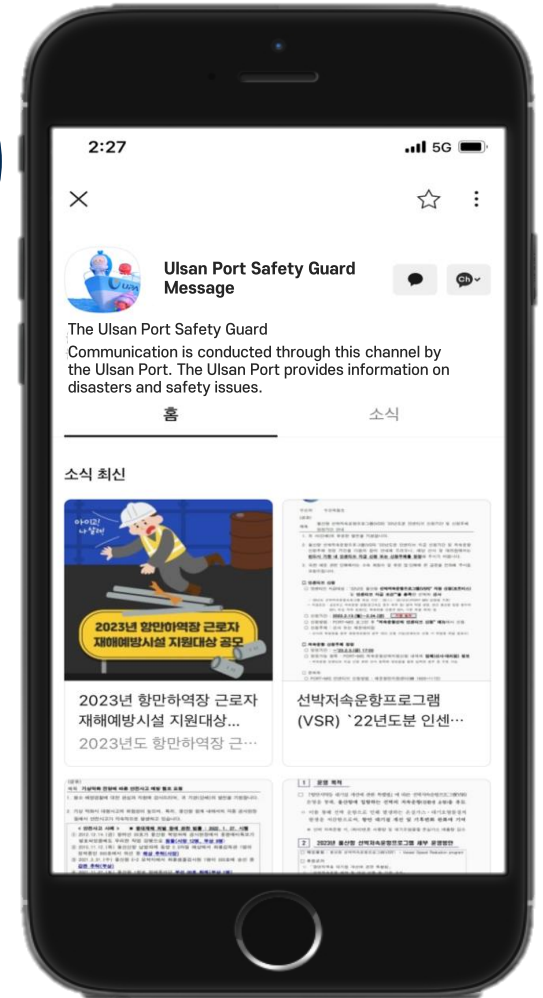
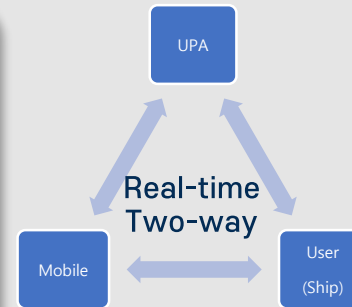
Introduction background

(Previous) Port operation information and weather information are provided on the website to prevent safety accidents and improve customer service at Ulsan Port.

(Problem) Information can be obtained only through website access, and it is difficult to respond immediately to disaster safety related issues

Improvement operation

(Improvement) Use of SNS platform
→ Provide real-time information
→ Two-way communication
→ Disaster safety issues
Immediate response and Reinforcing Safety Accident Prevention



03 Strengthening Ship Safety

Ulsan Port introduction

Explosive accident preparation

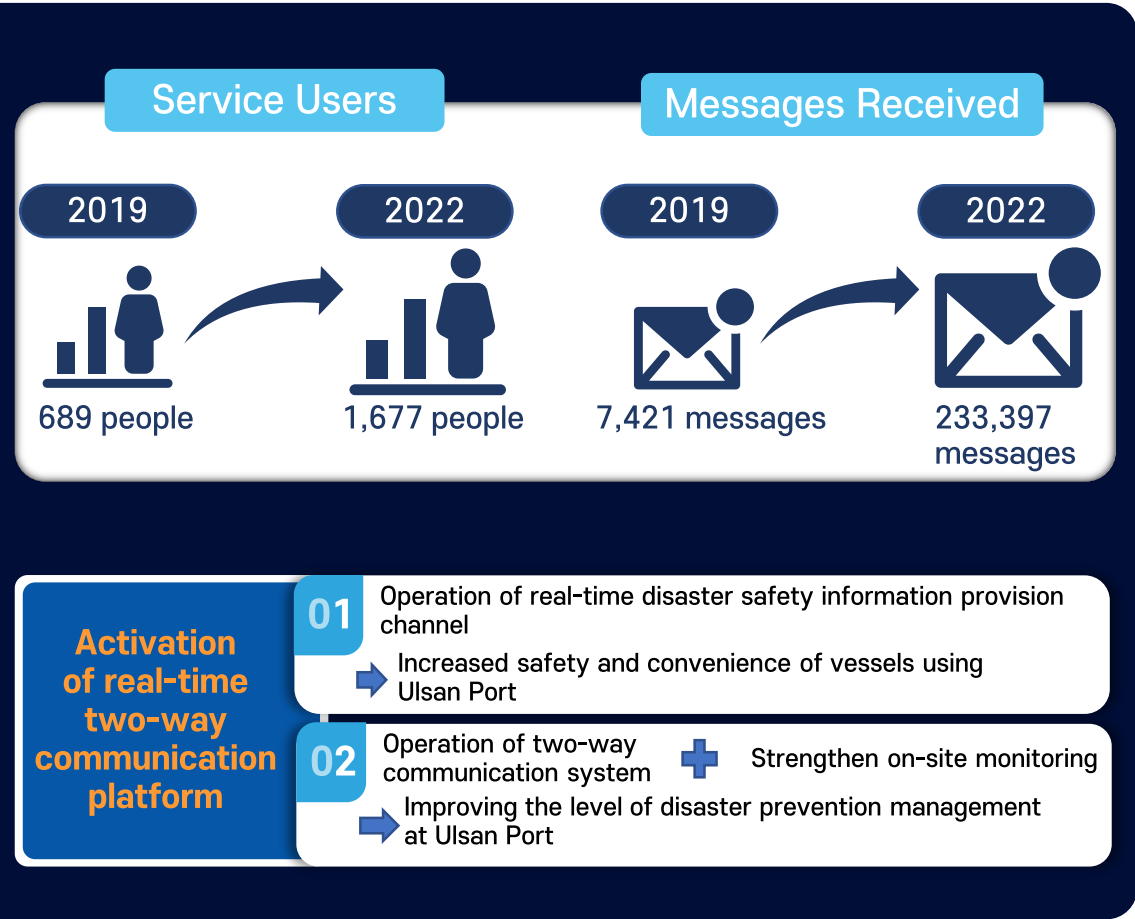
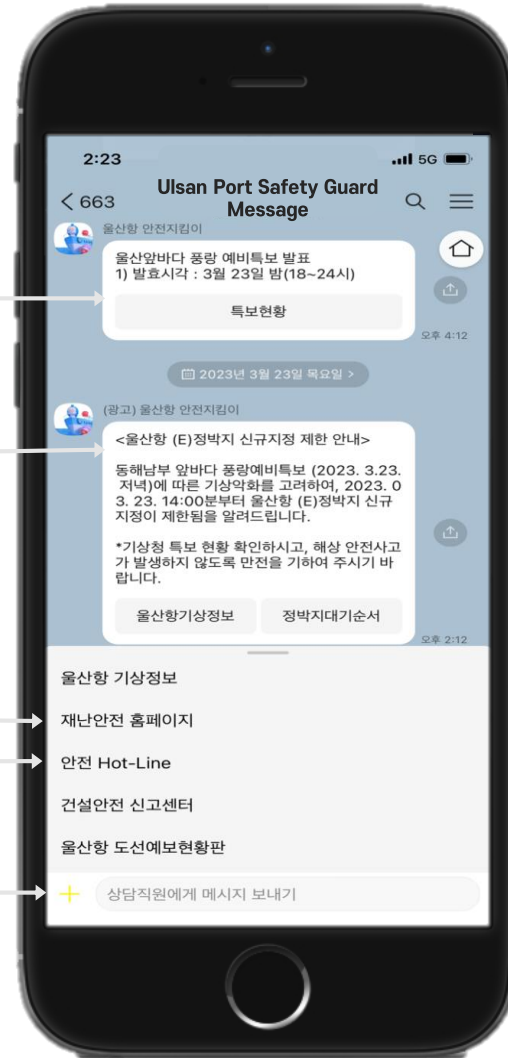
Safety accident prevention

Ship safety enhancement

Conclusion

Ulsan Port Safety Guardian | Real-time provision of Ulsan Port safety and weather information.

- Weather Info**
 - Provide local weather information for Ulsan Port
 - Weather (wind speed/wind direction/wave height /atmospheric pressure/precipitation, etc.)
 - Typhoon information provided (by 4 hours)
 - Big data-based storm and flood disaster response
- Port Info**
 - Notification of control/resumption of Ulsan Port due to bad weather, etc.
 - Provision of port operation information (pilot/berth operation, etc.)
- Disaster & Safety Homepage**
 - Connection to Safety Report Center
 - Receive/respond to safety hazards in real time
 - Communicate port operation information (anchor control, etc.)
- Safety 'Hot-Line'**
 - Connection to Safety Report Center
 - Receive/respond to safety hazards in real time
 - Communicate port operation information (anchor control, etc.)
- Real-time counseling channel operation**
 - Provides real-time consultation on weekdays from 9:00 to 18:00



- Activation of real-time two-way communication platform**
- 01 Operation of real-time disaster safety information provision channel
 - ➔ Increased safety and convenience of vessels using Ulsan Port
 - 02 Operation of two-way communication system + Strengthen on-site monitoring
 - ➔ Improving the level of disaster prevention management at Ulsan Port

Ulsan Port Authority will embrace the safety of Ulsan Port's facilities, workers, and ships, and further protect the country's assets and the safety of its citizens.

