



Introduction to Ulsan Port

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san Port, Korea's largest industrial support port!

Corea's largest liquid cargo handling portJandles approximately 30% of domestic liquid cargo)

Following the Top 3 Oil Hub Ports,
Ulsan Becomes the World's 4th Largest
Liquid Cargo Handling Port

ay wall tension	Berthing capacity	Anchoring capaclity	Unloading capacity	Yard capacity	water surface area in port	Coastline length	The ebb and flow of time
977.4M luding pier)	122 ships (7,735,500 DWT)	42.51km ²	77,949 thousand tons	3,676 thousand tons (1,155 thousand m²)	114km²	58km	60.8cm

*Including private docks, excluding other mooring facilities

division	Length(M)	Water Depth (M)	Berthing capacity Tonnage (DWT) Number of Ships		Unloading capacity (thousand tons)	Main cargo handled		
an main port	10,085	7~17	1,815,500	60	32,276	Oil, coal, automobiles, etc.		
)nsan Port	5,073	7~27	1,807,000	33	18,270	Oil, chemicals, etc.		
Mipo Port	210	9	20,000	1	990	steel		
an New Port	6609.4	7~17	1,093,000	28	27,116	Liquid chemicals, containers, etc.		
division	Length(M)		Usage					
er mooring facilities	3,017		Tugboat waiting area, ferry, fishing boat mooring area, ship block unloading wharf, new ship outfitting quay, small ship mooring area, miscellaneous ship mooring area, etc.					



Introduction to Ulsan Port

Smart port

6 implementation

• Establishment of a pier to support floati • Expanding digital application in port co

· Digitalization of port operation system

• Creating a smart industrial ecosystem

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operation of cargo handling safety index

Port transportation business operator Safety

management system establishment support project

Isan Port Vision

Creating a Northeast Asian energy hub port

by expanding the supply of eco-friendly fuels such as LNG, hydrogen, and methanol

Management

eform and proactive administration

Advancement of job-centered compe

Internalization and diffusion of innovati •

nsation system and welfare benefits

9 innovation

on activities

1 New Strategy System Chart

Creation of an eco-friendly

• Establishment of methanol, ammonia

ng offshore wind power generation

• Establishing a global eco-friendly mari

energy specialized port

ne fuel supply chain

and hydrogen infrastructure

+ 1	new Strategy System	Chart						
		Eco-smart port lead	ling energy logistics					
	Leading the future (Future Leading)	Customer first (Customer First)	Innovation-oriented (Innovation Oriented)	social responsibility (Social Responsibility)	vis	ion	Creating	g a safe Ulsan port
ent	20% of new business sales	Traffic volume : 210 million tons	Debt ratio less than 20%	U-ESG Index S grade				ZERO serious disaster
c n	Leading energy logistics port	Implementation of a high value-added port	Improved management efficiency	Realization of sustainable management)) ta	arget	port operation
	1 Strengthening oil (liquid) logistics hub	Creation of port demand and cargo volume	Organizational management efficiency	10 Construction of a safe port				
	Expansion of liquid cargo handling infrastructure Attracting and revitalizing commercial	Strengthening marketing to attract port cargo volume Efficient operation of hinterland complexes and support for tenant	Strategic organizational operation and strengthening of expertise Establishment of a fair and transparent personnel system	Advancement of port safety management Strengthening systematic disaster	(I)		ategic ection	Realization of sustainable management
	tank terminal investment Energy Hub Stage 1 Activation	companies Establishment of overseas complex logistics center	Establishment of a competency- centered performance management system	management • Strengthening port security Eco-friendly port			ategic ask	Building a safe harbor
	Leap forward as a leading LNG port	5 Strengthening port operation competitiveness	Strengthening financial soundness	operation				
	 Construction of LNG terminal and stor age facility Increase in LNG demand Providing LNG bunkering services in th 	 Port facility performance improvement and maintenance Increasing dock productivity and oper ational efficiency Enhancing customer satisfaction and i 	 Expanding financial soundness and gr owth potential Strategic financing and operation Efficient budget planning and operatio 	Strengthening port air quality manage ment Implementation of a carbon-neutral po		Imple	etailed mentation tasks	Advancement of port safety management
	e southeastern region	mproving service	n	m			Ulsan	Port Development and

• Service innovation such as regulatory r • Strengthening ethical management an

Implementation of corporate shared values

d human rights management

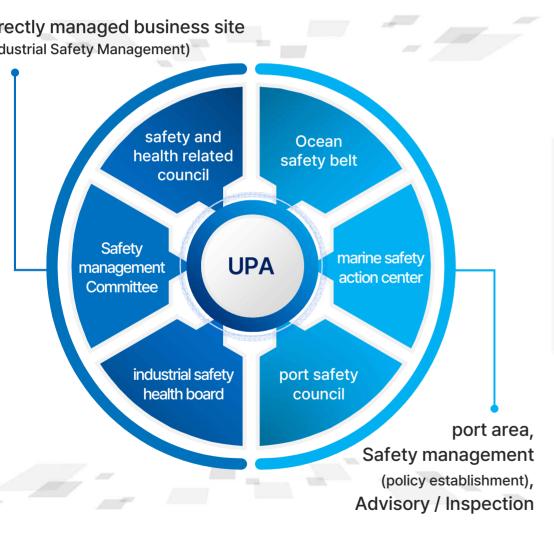
win cooperation

Strengthening public communication a

nd labor-management cooperation

Realization of shared growth and win-

Isan Port Safety and Health Management System

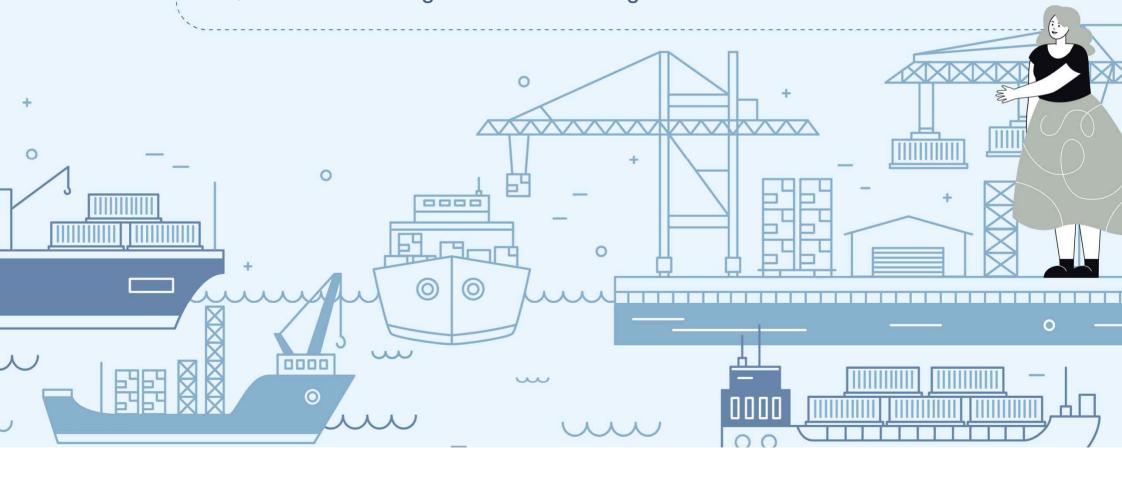




02

Performance of 'Ulsan Port Cargo Working Safety Index

World's First Development of 'Ulsan Port Cargo Safety Index' Enabling Safety Level Quantification Management and Achieving Reduction in Port Industrial Accidents!



Ulsan Port Cargo Working Safety index(UP CWSI) development completed

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hat is the Ulsan Port Cargo Working Safety index? (UP CWSI): Ulsan Port Cargo Working Safety Index

Developed for the first time in Korea as a port specializing in Ulsan Port, which calculates 5 safety grades (safe to error) by applying weights to 7 diagnostic indicators

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

Port unloading safety index = 100 points
∇ ⁷ woight Y

Each element formula

	division	safety budget Investment ratio	safety budget	Dedicated statt	Safety and health related Educational su i pport rate	On-site safety inspection Number of implementations	Safety inspection f Improvement implementation rate	compared to previous year Increase and decrease in fatal accidents	Sum
l.	response average	6.05	6.11	6.11	5.32	5.34	5.47	5.63	40.03
	Normalization (Weighting)	0.151	0.153	0.153	0.133	0.133	0.137	0.140	1.00

Safety and health budget Investment Ratio Score	Weight x 100/15 x [(Safety Budget / Entire Agency Budget) x 100]	compared to previous	<pre><formula 1=""> When decreasing compared to the previous year</formula></pre>	Min(60, [30 + { (previous year - next year) + (previous year - next year)/previous year } x 7]		
Safety and health budget execution rate score	Weight x [(actual execution budget / safety and health budget) x 100]	year death disaster		Weight x 10/6 x [30 + { (year before - year after) + (year after - year before)/year after }		
Safety and health manager percentage score	Weight x 100/5 x [(Number of OSHMS managers/Total number of employees in the organization) x 100]		<formula 2=""> When increasing</formula>	belole//yeal alter j		
On-site safety inspection Conduct score	Weight x 100/24 x (Number of unloading site safety inspections)	l	compared to the previous year			
Improved safety inspection fulfillment rate	Weight x [(Number of improvements / Number of on-site safety inspection points) x 100]					
Safety and health training Application rate score	Weight x {[∑m=1 (Number of employees who completed mandatory training hours)x0.5+ ∑m)=1 (Number of employees who completed non-mandatory training hours)]/(Total number of employees in the organization)}					

jisoo	score	range
safety	90~100 points	90 points or mo
Good	80~89 points	80 points
commonly	70~79 points	70 points
Inadequate	50~69 points	50~60 points
error	~49 points	Less than 50 poi

Ulsan Port Cargo Working Safety index (UP CWSI) development completed

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Securing reliability through correlation analysis

between 'Ulsan Port Cargo Working Safety Index (UP CWSI)' and accident rate

ndex reliability verification

rification system

aw-data collection

Index monitoring

ndex calculation for each operator

Correlation analysis

x ↔ Comparison of umber of accidents

expert advice

Korea Port Training nstitute Verification

nare analysis results

ate operators and tank terminals shop for 31 companies Good to safety grade workplace Index reliability verification completed



Derivation of correlation between index and number of disasters for each dock operato

As a result of the safety ~, no safety accident occured for 2years('21~'22) when it was rated as safe, good and average

division	Grade Description	note
safety	Excellent condition with no problems	Zero indu:
Good	There is no problem with overall safety, and it is generally in good condition.	accider a state t
commonly	There is no problem with overall stability	

Changes in the correlation between the index and the number of disasters in 2022 and 2023

'22 analysis results

For dock operators below commonly grade (70 to 79 points)

The level of safety accidents is inconsistent.

(Non-occurrence , mix of increase and decrease)

'23 analysis results

A grade of inadequate (50 to 69 points) or lowe

An accident occurred at a dock operator

Ulsan Port Cargo Working Safety index(UP CWSI) development results

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Contributing to the reduction of industrial accidents by developing the 'Ulsan Port Cargo Working Safety Index (UP CWSI)' measurement tool, the first port in the country to do so.



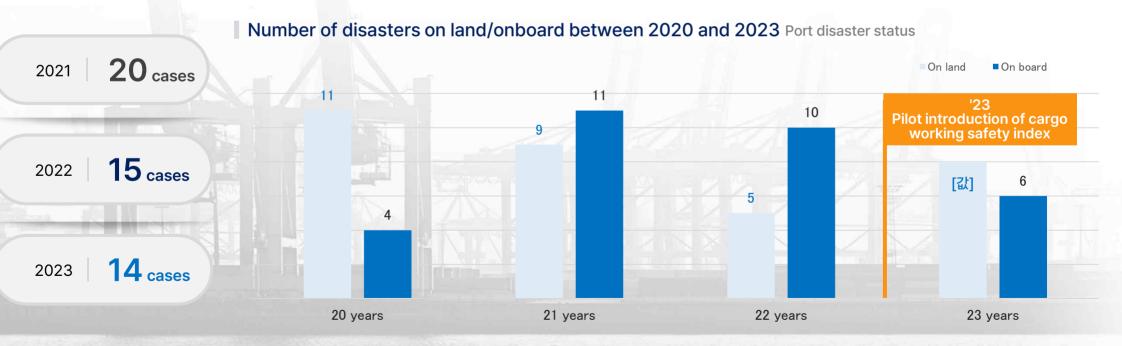
Total port disaster

After the pilot introduction of Cargo working safety Index in 2023, the total number of port disasters decreased by 7% compared to the previous year.



on board

Industrial accident The number of industrial accidents on board ships, which had been on the rise between 2020 and 2022, decreased by 40% from the previous year, from 10 to 6.



Ulsan Port Cargo Working Safety index (UP CWSI) development results

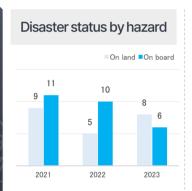
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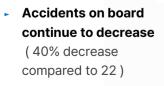
Creating a safe Ulsan Port by strengthening safety management at Ulsan Port loading and unloading sites

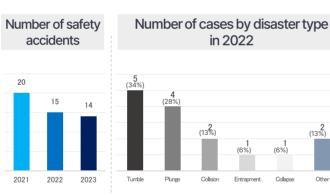
Ulsan Port industrial accidents decreased by 7% compared to the previous year (accumulated basis)

20 cases ('21) → 15 cases ('22) → 14 cases ('23)

ety accident status analysis for the past three years '21 ~ '23







 4 major disaster types (in that order: trip, fall, getting caught, and colliding)
 Strengthening accident response capabilities by type

Strengthening accident response capabilities by type through statistical analysis

Ulsan Port maintains zero major port unloading accidents for 5 consecutive years

Port loading and unloading major disaster

ZERO

- Development and operation of cargo handling safety index
- Implementation of support project to establish safety management system for port transportation business operators

Major disaster at construction site **ZERO**

 Hosted by CEO Construction site safety inspection

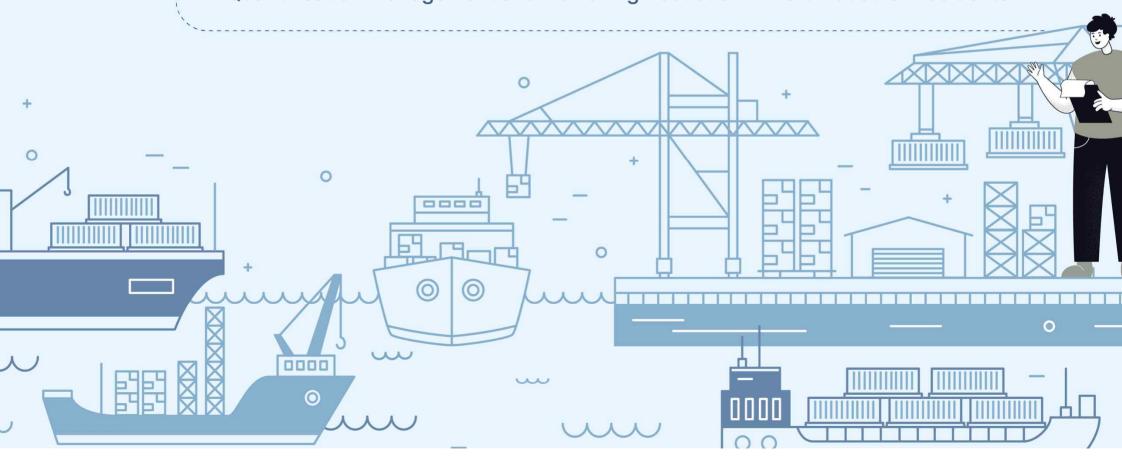


구항만물류협회

03

Efforts to develop the 'Ulsan Port Cargo Working Safety Inc

World's First Development of 'Ulsan Port Stevedoring Safety Index' Enabling Safety Level Quantification Management and Achieving Reduction in Port Industrial Accidents!



Background

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Due to the continuous occurrence of industrial accidents in ports, public institutions are required to take measures and expand their responsibilities for port unloading safety management, such as the enforcement of the Port Safety Special Act (August 2022).

current situation

Analyze the number of industrial accidents in the simple loading and unloading field and use it as a management standard for port safety accident prevention

problem

Comprehensive and objective loading and unloading safety level diagnosis is impossible as it is limited to the number of industrial accidents centered on port transportation business.

Necessity

Increasing need for development of measurement tools capable of diagnosing and returning comprehensive unloading safety level for Ulsan Port

Preventative indicators (safety budget, manpower, training, inspection and improvement, occurrence of major disasters, etc.) are reflected.

Developed a loading and unloading safety weighing diagnostic tool and applied it to the field

Discovering indicators that can be used as the loading and unloading safety index at Ulsan Port

Domestic and international literature review

 Deriving applicable items for Ulsan Port through literature review related to safety index development



- Safety risk assessment cycle
- Appropriate staffing
- Degree of securing professional qualifications
- education and training
- Safety management system perfection
- Number of days lost from work by injured parties

disaster analysis

- Analyzing a total of 3,147 cases of port accidents occurring nationwide from 2011 to 2020
- Analyzing industrial accident cases by industry, accident frequency, and accident type

Sectors

The most industrial accidents occur in the onshore cargo handling industry.

Accident frequency

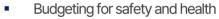
Annual average of 314.7 accidents

Occurrence form

Frequently falling, tripping, and colliding, in that order

Analysis of safety activity level evaluation indicators

 Deriving applicable elements through analysis of evaluation indicators for safety activity levels in public institutions



- Execution of safety and health budget
- Management and support of safety and health education
- Planning and execution of joint safety and health inspections
- Management and support of safety and health education
- Level of expertise within the company, including appropriate qualifications and competencies related to safety and health

STEP 1. Efforts to develop Ulsan Port Cargo Working Safety Index(UP CWSI)

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Development of Ulsan Port specialized index through survey of Ulsan Port Terminal Operation company(TOC) and tank terminals

iefing session held ('22.4)

Establishing a safety management system and holding briefing sessions on port safety

Consultation on the design of the Cargo Working Safety Index



Statistical data collection (22.9)

Collecting statistical data for diagnosing safety levels of terminal operation company(TOC) (1st round)

Survey items

- Workplace industrial accident management number
- number of employees
- Average number of monthly users of the Port Workers' Union
- Appointment of safety manager
- Safety / health management agency status
- Number of safety-related certification
- Agenda Health Management Certification
- Legal safety training completion status
- Non-legal safety training completion status

Derivation of safety evaluation indicators ('22.12)

 Deriving data survey items for calculating safety evaluation indicators for each terminal operation company(TOC)

Safety budget investment ratio

Safety budget execution rate

Total out-of-court safety training hours

Number of people who completed non-statutory safety training

Number of full-time workers

Number of on-site safety inspections within the workplace

Improvement implementation rate after safety inspection

Calculation of loading and unloading safety index ('22.12)

Ulsan Port Cargo Working Σ_1^7 Each element form Safety Index

Calculating Safety Rating by Applying Weights to 7 Indicators i the Diagnostic Index

Rate	Score	Ran
safety	90~100 points	90 points
Good	80~89 points	80 pc
commonly	70~79 points	70 pc
Inadequate	50~69 points	50~60
error	~49 points	Less than

STEP 2. Establishment of Ulsan Port Cargo Working Safety Index (UP CWSI) cooperation system

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March 2023 June 2023 August 2023 December 2023



Working group launching ceremony and Held a briefing session on safety index calculation standards

A total of terminal operation companies 29 safety managers attended

Common Criteria for Aggregating RAW DATA for the Formation of a Working Group on Cargo Handling and Calculation of Safety Indicators aggregation for calculation



By terminal operation company(TOC) loading and unloading safety index calculation



Loading and unloading Safety Index Results Sharing Workshop Held:

42 Terminal Operators and Tank Terminal Safety Managers Attend

Calculation of unloading safety index by dock operator

Share results and discuss future operation plans



Verification of the reliability of the cargo Working safety index by comparing the cargo handling safet index and safety level (result of industrial accident reduction) for each terminal operating company.

Ulsan Port Cargo Working Safety Index Working Group Launching Ceremony



Ulsan Port Cargo Working Safety Index Calculation Results Sharing Workshop



Ulsan Port Cargo Working Safety Index Safety Index Creation Guide Briefing Session



STEP 3. Verification of Ulsan Port Cargo Working Safety Index(UP CWSI)

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nalysis of safety accident status by dock operator from 2021 to 2023

- Compare the relationship between the increase and decrease in disasters between 2021 and 2023 by terminal operation company(TOC) and the loading and unloading safety index rating in 2022.
- Land disasters tend to decrease from 2020 to 2022, while disasters occurring on board tend to increase from 2020 to 2022.

Number of disasters by terminal operation company(TOC)



Risk factors

- Despite a strong safety policy, workers' safety awareness is lacking.
- Accidents continue to occur at sites that require a lot of manual work by workers.

Company C Industrial accidents are on the rise due to poor ratings for two consecutive years

	Number of indu	Safety Inc	lex Rating		
2021	2022	2023	trend line	2022 rating	2023 rating
1	2	2		Inadequate	Inadequate

Company A The safety grade is inadequate, but from 21 to 23, the number of industrial accidents increased from 6 to 4 to 1. Shows a downward trend (unusual case)

	Number of indu	Safety Inc	lex Rating		
2021	2022	2023	trend line	2022 rating	2023 rating
6	4	1		Х	error

- It is assumed that the CEO's strong commitment to safety, who took office in 2022, was reflected in Foreman (management supervisor).
- (Companies with a small number of direct employees tend to be influenced by the CEO's will and thoughts on safety)

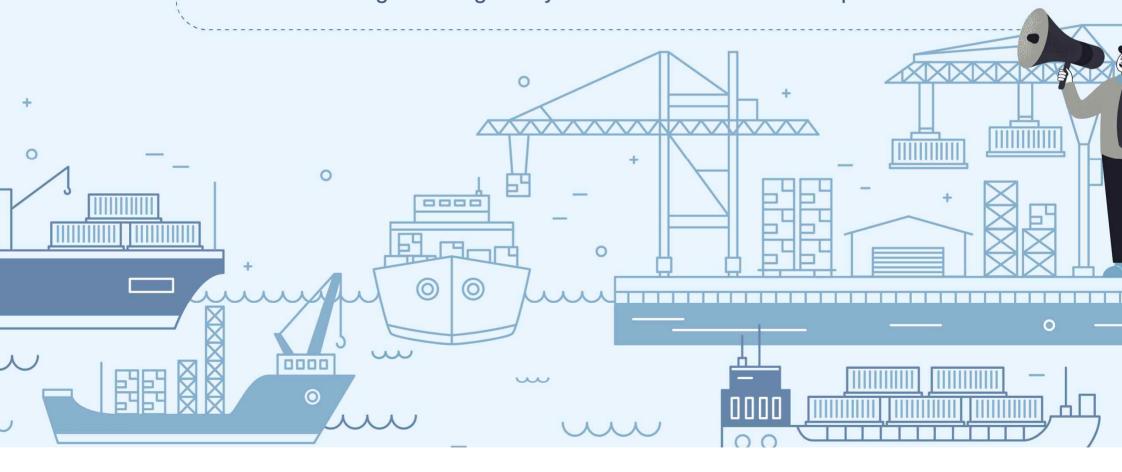
Company D, Company S The grade has been lowered compared to 2022, and the nu of industrial accidents shows an increasing trend (caution is required regarding industrial accider

	Number of indu	Safety Inc	lex Rating		
2021	2022	2023	trend line	2022 rating	2023 rating
3	4	4		commonly	Inadequate
2	3	4		commonly	Inadequate

_ 04

Efforts to promote and spread the 'Ulsan Port Cargo Working Safety Index'

Safety level quantification and management through the development of the world's first 'Ulsan Port Cargo Working Safety Index' Achieved reduction in port industrial accidents!



Efforts to revitalize Ulsan Port's cargo working safety index

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an Port through domestic mediantributions Safety management system promotion ('23.7.)

D safety accidents through development and of Ulsan Port cargo Working safety index"



Opinion on page 014, Monday, July 24, 2023

According to the 'Statistics on Accidents and Casualties in the Port Cargo Handling Industry', from 2011 to 2021, over the course of 10 years, 2,800 people either lost their lives or were injured while working at ports nationwide. This means that on average, one industrial accident occurred every 1.5 days.



Due to the unceasing industrial accidents at ports, the government implemented the 'Special Act on Port Safety' last August. At each port, a safety management system centered on cargo handling companies was established, and it became mandatory for individual workplaces to establish their own safety plans.

Accordingly, at the Port of Ulsan, under the leadership of the Ulsan Port Authority, a port safety council involving labor, management, and government has been legally established and operated as a permanent body. Various new Ulsan Port Cargo Working Safety Index Creation Guide Production (December 2023)



Safety indicators for Ulsan Port dock operators Held a briefing session on the writing guide (December 23, 2023)



UPA Holds Briefing on Safety Indicator Guide for Ulsan Port Cargo Handling Safety Index



Thursday, December 14, 2023 Page 008 Economy

As a follow-up to the workshop sharing the results of the 'Ulsan Port Cargo Handling Safety Index' calculation last August, the Ulsan Port Authority (UPA President Kim Jae-gyun) prepared a safety indicator compilation guide and held a session to explain it to port safety personnel.



Efforts to revitalize Ulsan Port's cargo working safety index

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Overseas Port Officials Visit Ulsan Port to Benchmark Safety Measures

res Cargo working Safety Index and Expertise with Myanmar, Sri Lanka, and Cambodia



Three countries including Sri Lanka, Benchmarking UPA's 'safe port operation know-how'

Monday, June 19, 2023 Page 002 Economy

Port officials from Sri Lanka, Myanmar, and Cambodia visited the Port of Ulsan to

benchmark its expertise in safe port operations.

According to the Ulsan Port Authority (UPA, President Kim Jae-gyun) on the 18th, around 10 port officials from the three countries visited the UPA on the



16th to benchmark Ulsan Port's know-how in safe port operations.



Korea Gas Corporation (KOGAS) visits Ulsan Port to benchmark the safety sector

Introduction to Ulsan Port's loading and unloading safety index and proposal for application to **KOGAS LNG terminal**

- Joint research discussions underway to expand the 'UPA-KOGAS cargo handling safety index (tentative name)



Efforts to revitalize Ulsan Port's cargo working safety index

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Fraining on the Severe Accident Punishment Act for port workers and Id a briefing session to share the 23rd Ulsan Port cargo handling safety index calculation results (March 2024)



UPA shares the results of the 'Ulsan Port Cargo Working Safety Index' calculation

Monday, June 19, 2023 Page 002 Economy

On the 26th, the Ulsan Port Authority (UPA) held an explanatory session at the authority's multipurpose hall to share the results of the calculation of the 'Ulsan Port Cargo working Safety Index', along with providing

customized education tailored to the characteristics of workers at the Port of Ulsan.

This explanatory session was arranged following the expansion of the Serious Accident Punishment Act to workplaces with five or more employees in January of this year. Around 30 safety practitioners from terminal operating companies and tank terminals attended the session, where external experts were invited to provide practical education.



Number of disasters in 22~23 by dock operator and Derive improvements through safety index grade analysis

-	Terminal operation company in 2022 23 Types and number of industrial Accidents	34% Falling, falling 2 crash1 Other1 22years	29% Evangelize, fall 1 Sternosis 3 23yeas	20% crash 2 collapse 1 22yeas	Faling, cra Ott	
By term	ninal operation company(TOC)from 202 1 to 2023 Port disaster status	例	如 Wears 23years	[m/	因 22 years	
	'21~'23 Number of disaster occurrences		3 people ('21) → 4 people ('22) → 4 people ('23)		2 people ^('21) → 3 peo → 4 people ^('21)	
Main Subcategory		Company D		Company S		
loading and unloading safety index (safety grade)		commonly	Inadequate	commonly	Inad	
Port unloading safety index score (700)		'22 518	'23 436	'22 509		
invest	(1) Safety and health budget investment ratio (15.1)	76	34	40		
	(2) Safety and health budget execution rate (15.3)	84	72	79		
group	(3) Ratio of dedicated safety and health personnel (15.3)	36	27	100		
	(4) Safety and health-related education support rate (13.3)	100	100	0		
activity	(5) Number of on-site safety inspections (13.3)	37	100	100		
	(6) Safety inspection improvement implementation rate (13.7)	85	87	90		
	(7) Increase/decrease in fatal accidents compared to the previous year (14.0)	100	100	100		

(Company D) Low safety and health-related budget and manpower investment ra

→ Directly visit the relevant operating company and strengthen support in areas where it is lacking

Efforts to develop and spread the first port-specific unloading safety index among ports nationwide

Selected as a task for the 2023 Ministry of Oceans and Fisheries government innovation action plan

Common autonomous tasks 1-3:

" Development and introduction of cargo working safety index "







Awarded the grand prize for best practices in public institution safety and health activities in 2023

Achievement Recognized for Contributing to the Prevention of Serious Accidents at Ulsan Port by Developing the First Objective and Quantified Safety Level Diagnostic System among National Ports



울산제일일보

컨텐츠(GINTEX) 9정시 장에서

경상일보



표기관 안전보건별통 우수시에 방묘대회에서

UPA, 안전보건활동 사례발표 대상

시장에서 열린 공공기관 안전보건활동 우수사례 발표대회에서 대상을 수상했다.

울산항만공사는 10개 모집부문 중 공공기관 안 전보건활동 우수사례 발표대회 부문에 출전해 사 잭 지난해 준대재해가 박색하지 않은 점 등을 인 정 받아 대상의 영예를 안았다.



Prepare a plan to build a smart safety and health management IT solution

Implementation of a system on the disaster safety website that displays the loading and unloading safety level for each dock operaso that port-related workers can check the loading and unloading safety level.

solutions

Applicability review

IT solution construction related Collection of opinions from port transportation workers ('23.7.)

 Seeking opinions to enhance accessibility to the disaster and safety homepage and provide occupational health and safety management information. Smart safety and health management IT solution design (Port Operators and Digital Strategy Department) ('23.9.~12.)

- Designing the Occupational Safety and Health Management System menu (safety budget, support for safety and health-related education, etc.)
- Designing the budget for developing a safety management tool

Smart safety and health management IT solution Development service implementation ('24.1~)

 Establishing usage and an institutional safety management system, and developing a representative safety management tool

solutions

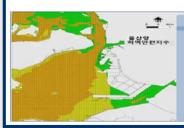
Implementation Plan

- The cargo handling safety index for each operating company can be viewed simultaneously by all operating companies (once the mutual disclosure is agreed upon).
- It is planned to provide the ability to mutually compare the average values between groups for each type of cargo handled and the data of each company





Example of displaying carg handling safety grades by terminal operating compa and tank terminal



pread of the Ulsan Port tevedoring safety index

Continuous verification and monitoring of the Ulsan Port Cargo Working Safety Index ('23~'24)

Index refinement through operation of a feedback system

xpansion of national rade ports

After verifying reliability and refining the process for the Port of Ulsan, expanding the cargo handling safety index to other port authorities and nationwide trade ports, aiming to establish it as the representative national port safety index.



Healthy, Safety and Security

By achieving a reduction in industrial accidents at ports through quantified management of safety levels,

the Port of Ulsan will become a leader in global port safety



