Site Safety Seminar for Capital Works New Works Contracts
30 October 2019

Benchmarking Study on Construction Occupational Safety and Health Innovations and Technologies in Korea

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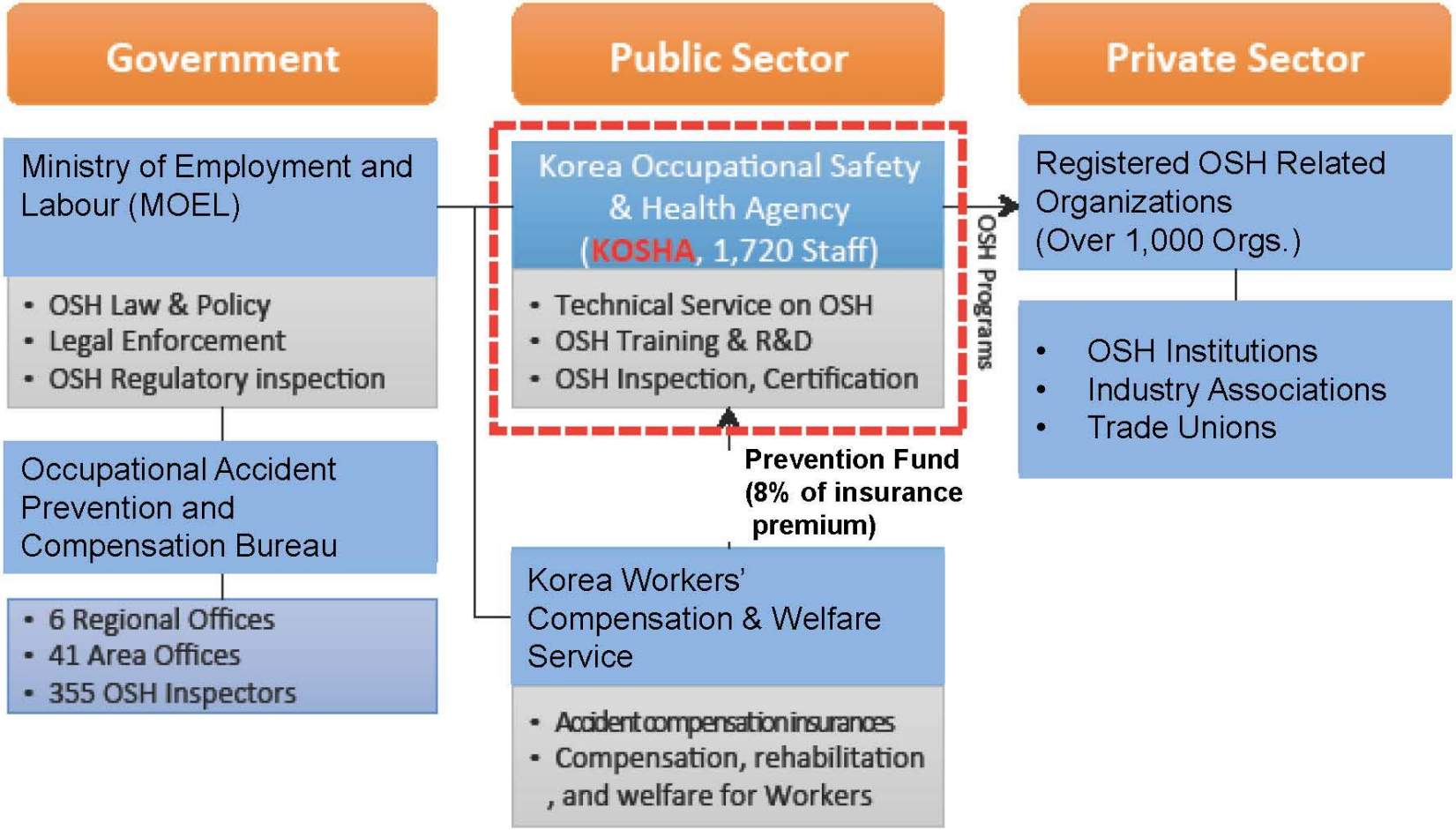
1) OSH Management System in Korea

OSH Management Structure



1) OSH Management System in Korea

Brief History

1981 - Occupational Safety and Health Act (OSH Act)

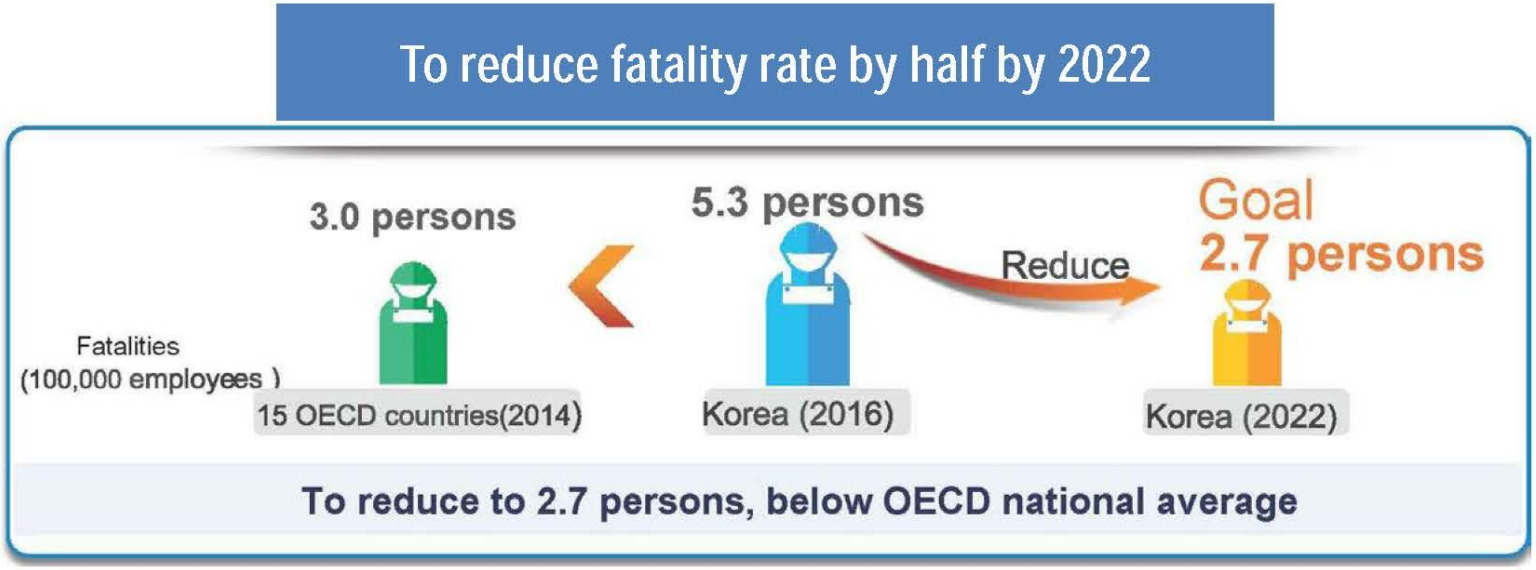
1987 - Korea Occupational Safety and Health Agency (KOSHA) established

- *support Ministry of Employer & Labour for accident prevention*
- *use **8% of Prevention Fund** for their prevention works*

1989 - Occupational Safety Bureau inaugurated in the Ministry of Employment & Labour (MOEL)

2019 - Review of the Act

16 Jan 2020 – enact revised version of OSH Act



2) Amendment of OSH Act

Areas of Amendments

1) Extended application of the Law – protect all persons who provide labour
   (e.g. persons who provide delivery services through on-line platform)

2) Limits on sub-contracting to prevent outsourcing risk
   - restriction on sub-contracts and outsourcing of harmful works → require approval by MOEL, subject to a penalty of up to 1 billion WON
   - improvement in contract approval system

3) Extended responsibility of accident prevention
   - impose duty on CEOs (Client) for health and safety planning

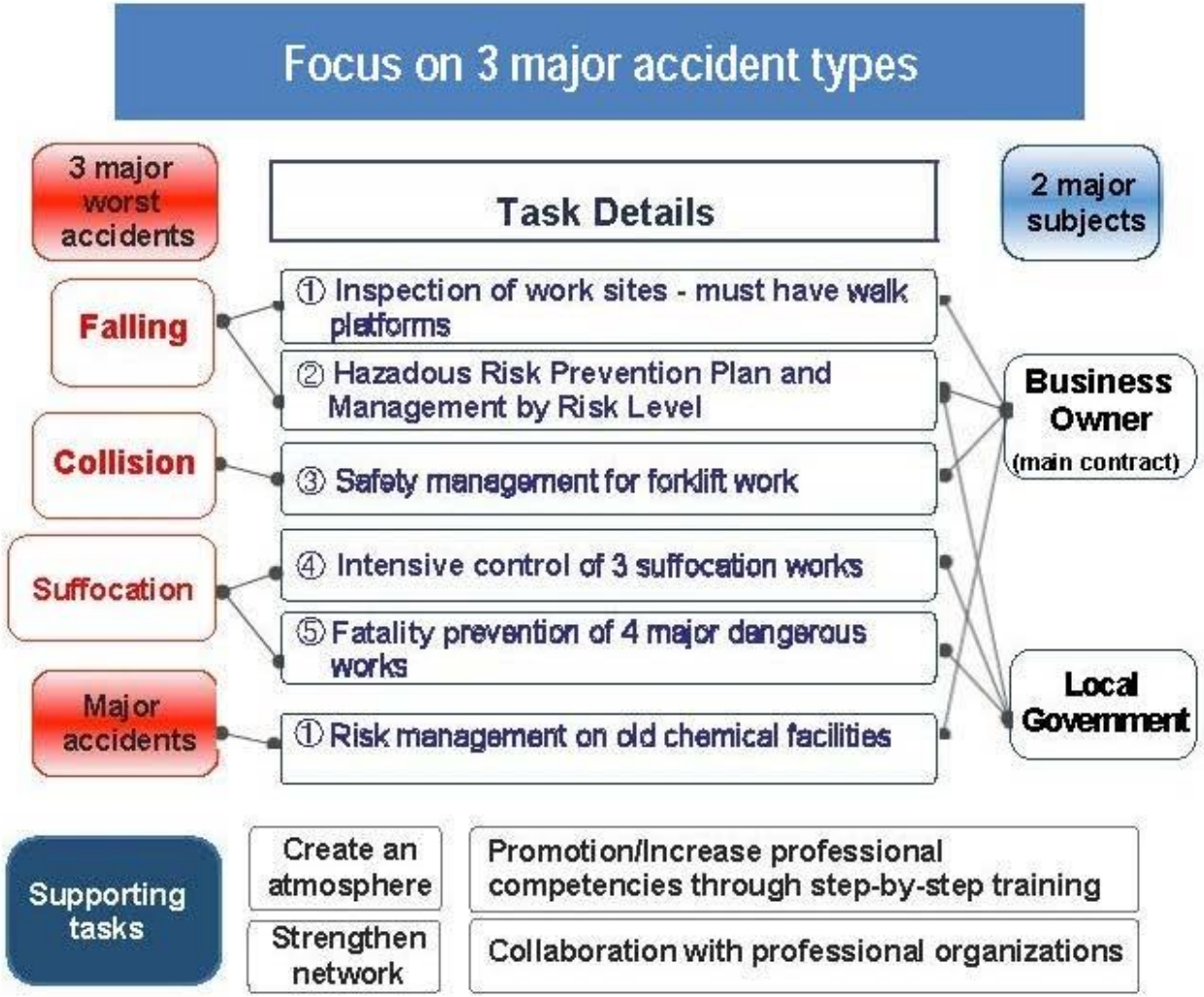
4) Worker's right to suspend works on account of an urgent risk of industrial accident - taking any adverse action, such as dismissal, against the worker will be punishable by imprisonment up to one year or a fine of up to 10 million WON.

5) Not allow shortening of construction period stated in the design plan and change of construction method for cost saving without justifiable reasons

6) Additional punishment and education on repeated accidents and death
   (e.g. additional penalty, order education on safety and health)

7) Mandatory legal appointment of health manager in construction industry

3) Accidents and Deaths Reduction Strategy



4) Accident Prevention Programme

Legal Program

- Review·and check hazard risk prevention plan document

Center's Internal Program

- Intensive guidance for sites without work foothold installed
- Construction site safety and health keeper operation
- Intensive tech guidance for accidental incident prevention
- Intensive management for high-risk equipment
- Safety and Health Management System (KOSHA18001)
- Banning the use of ladder as work foothold
- Future Strategy Team operation

Investigation asssessment

- Major accident investigation

Financial Support Program

- Construction industry clean work site installation support

Technical Guidance

Financial Support Program

4) Accident Prevention Programme

Hazard Risk Prevention Plan

1) **Prior to construction work**:
   - Proprietor to submit Hazard Risk Prevention Plan
   - Centre to review the submission and interview Safety Supervisor or the responsible officer
2) **During construction :**
   - Centre to check regularly the compliance
     (2, 4 or 6 months' interval for project with construction cost > 12 billion WON, 0.3~12 billion WON and low risk projects < 0.3 billion WON respectively)

Target Projects

1) Buildings or structures ≥31m above ground
2) Buildings with floor area ≥ 30,000 m^2
3) Cultural / assembly / religious / medical / refrigerated warehouse facilities with floor space ≥ 5,000 m^2
4) Underground shopping mall, tunnel construction
5) Works including bridge with span ≥ 50m
6) Dam more than 20 million tons capacity
7) Excavation works with depth ≥10m
8) Disassembly of sightseeing accommodation, etc.

4) Accident Prevention Programme

Intensive guidance for sites without system scaffolds and work footholds

1) Site field supervisor for intensive inspections on the installation status of scaffolds and safe railings and provide guidance on installations
(for project with construction cost > 12 billion WON)

[Steel pipe scaffolds]

[System scaffolds]

4) Accident Prevention Programme

OSH Keeper Operation

Purpose

Employ experienced retirees (senior retirees with age 55 or above) who are experienced in small-to-medium construction sites for repeated patrol and intensive guidance for scaffolds installations on hazardous sites

Target sites

1) Small-scale sites with poor scaffold installations
   - A team of 2 persons to patrol > 5 sites in average per day

2) Sites with high risk of accidents *(by reviewing construction type, site photos and reports)*
   - Input results to "Accident Prevention Institution Technical Guidance Input System" for review and monitoring and site ranking
   - Prioritize monitoring on low-rank (Grade C or D) organization

4) Accident Prevention Programme

Intensive Management for 3 Major High-risk Equipment

1) "Day of Construction Machinery & Equipment" (24th of every month for safety inspection of all kind of industries)

2) Since 2017, can apply to Ministry of Employment and Labour (MOEL) for joint inspection with KOSHA before installation and dismantling of tower crane

3) Checking of equipment on site before use and at 6-month intervals by Ministry of Land

[Excavator]

[Elevator Workbench]

[Mobile Crane]

[Tower Crane]

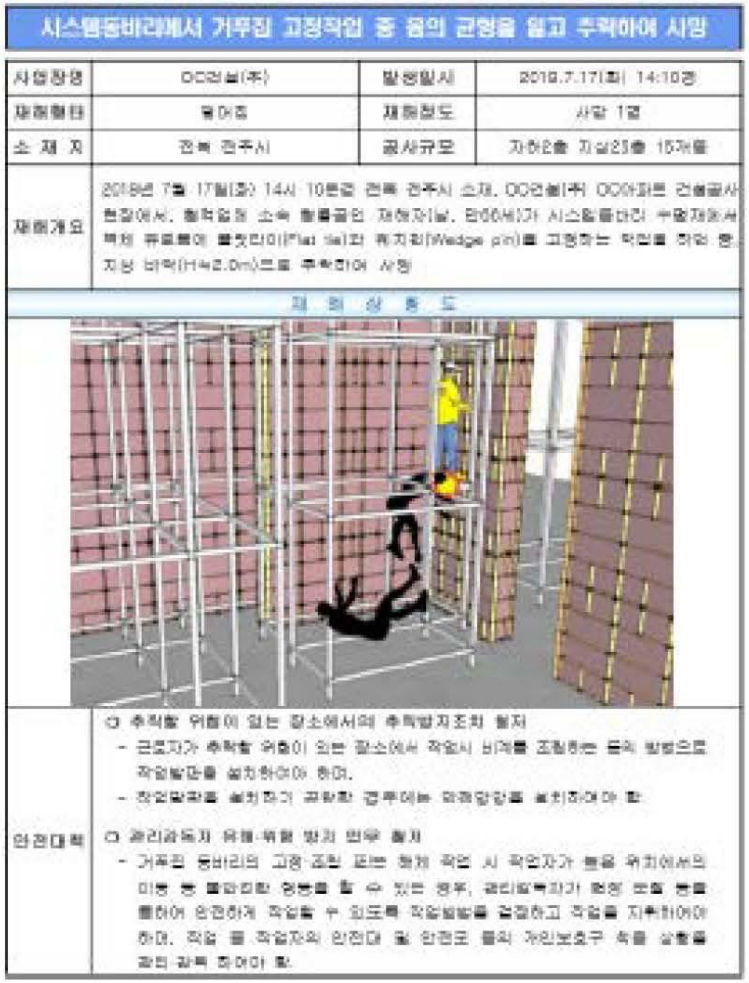
4) Accident Prevention Programme

Ban the use of ladder as work foothold

1) Unless with fencing and out-rigger, and use at area with anchor point for safety belt

4) Accident Prevention Programme

Disseminate Accident Cases and Publish Case book



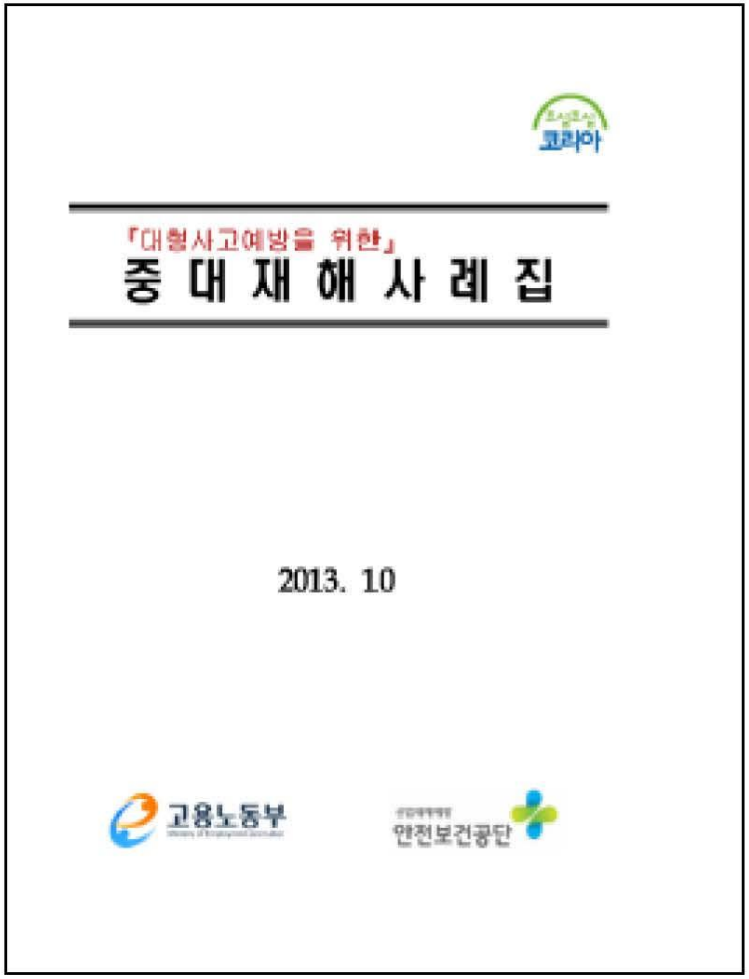
시스템동바리에서 거푸집 고정작업 중 몸의 균형을 잃고 추락하여 사망

사업장명	OO건설(주)	발생일시	2019.7.17(화) 14:10경
재해형태	떨어짐	재해정도	사망 1명
소 재 지	전북 전주시	공사규모	지하2층 지상23층 15개동
재해개요	2019년 7월 17일(화) 14시 10분경 전북 전주시 소재, OO건설(주) OO아파트 건설공사 현장에서, 철근업체 소속 철골공인 재해자(남, 만66세)가 시스템동바리 수평재에서 벽체 유로폼의 플랫타이(Flat tie)와 쐐기핀(Wedge pin)을 고정하는 작업을 하던 중, 지상 바닥(H=2.0m)으로 추락하여 사망		

재 해 상 황 도

안전대책	○ 추락할 위험이 있는 장소에서의 추락방지조치 철저 - 근로자가 추락할 위험이 있는 장소에서 작업시 비계를 조립하는 등의 방법으로 작업발판을 설치하여야 하며, - 작업발판을 설치하기 곤란한 경우에는 안전방망을 설치하여야 함 ○ 관리감독자 유해·위험 방지 업무 철저 - 거푸집 동바리의 고정·조립 또는 해체 작업 시 작업자가 몸을 위치에서의 이동 등 불안전한 행동을 할 수 있는 경우, 관리감독자가 현장 또는 현장에서 안전하게 작업을 수 있도록 작업방법을 결정하고 작업을 지휘하여야 하며, 작업 중 작업자의 안전대 및 안전모 등의 개인보호구 착용 상황을 수시 감독 하여야 함

[Accident Case Notification]



[Accident Casebook]

4) Accident Prevention Programme

Financial Support ('Pay for Safety' Concept)

1) Partial Subsidy

Encourage proprietors to use system scaffold

- 65 % subsidy (for project with construction cost <US$0.3M)
- 60 % subsidy (for project with construction cost US$0.3M ~ 1M)
- 50 % subsidy (for project with construction cost US$1M ~ 2M)

2) OSH Management Expenses

Proprietor shall award a contract with "accident prevention specialized guidance institution" before commencement of construction who will issue monthly technical guidance on how to use the OSH management expenses

- If not award or delay in award of such contract, does not pay the 20% OSH management fee or impose a penalty

5) OSH Management System by Contractors

Partner Safety Gate (by SK Engineering & Construction)

- To secure the ability of contractors through registration system

Gate 1	Gate 2	Gate 3	Gate 4
New Register - Safety level assessment (Pass / Fail) - KOSHA certified companies gain automatic PASS **Renewal** - Reflect points in Gate IV	**Bidding / Company Selection** - Evaluate business performance and pre-arranged planning - Explain safety management (Pass / Fail)	**Before Construction** - Approve detailed safety performance plan - Interview site manager	**During Construction** - Safety supervisor conduct quarterly safety performance evaluation - Award / punishment based on the evaluation results

5) OSH Management System by Contractors

Safety Mileage System (by Hyundai Engineering & Construction)

Change the performance assessment to employees

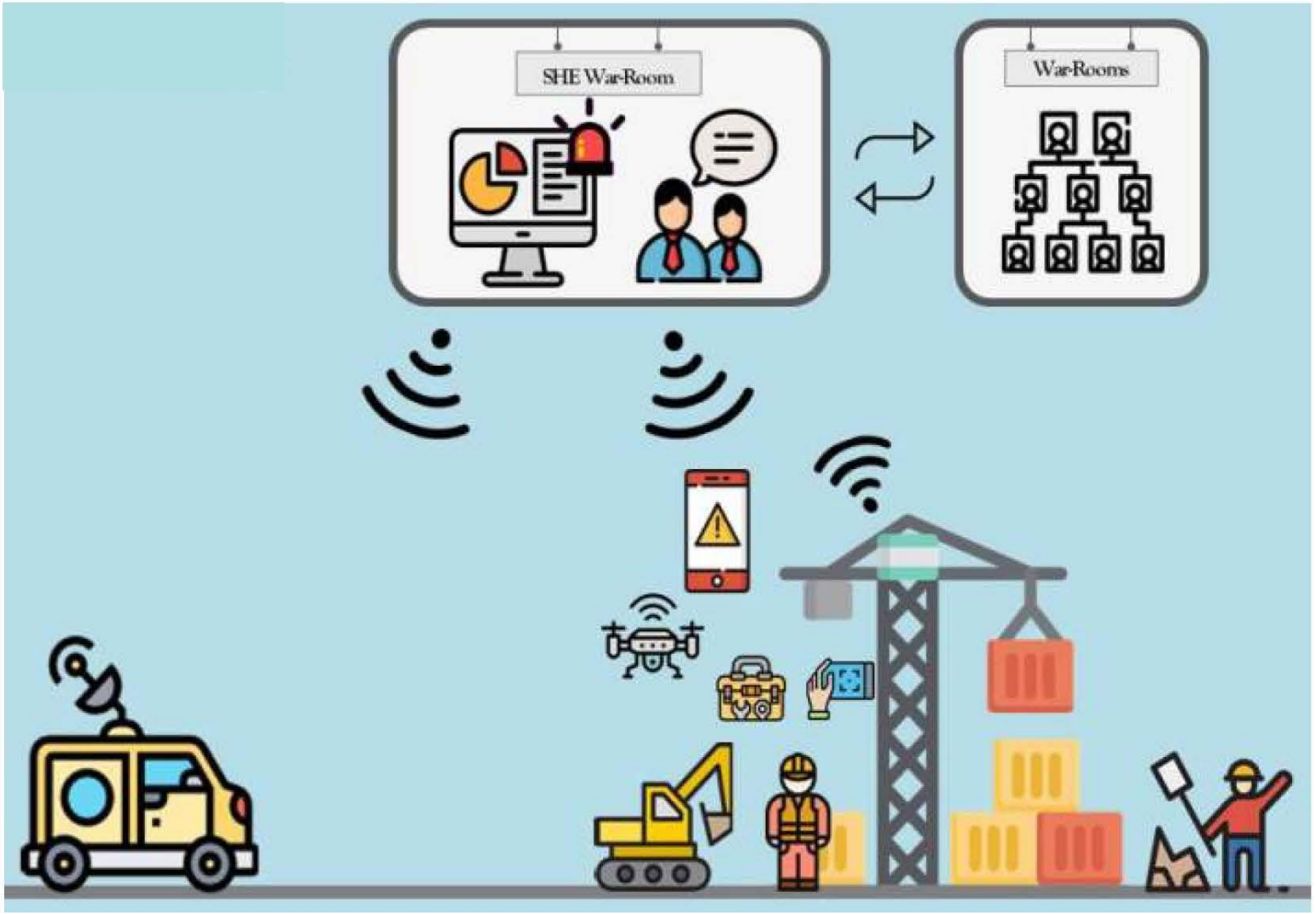
- measurement for safety management as leading indicators, which focus on preventive activities

Items to be evaluated
1. Checking activities – preparation of checklist and report on inappropriateness
2. Training activities – as an instructor of safety training for workers
3. Information activities – near-miss reporting, proposal of improvement in safety

Top Down Approach (by Hyundai Engineering & Construction)

5) OSH Management System by Contractors

Smart Safety (by SK Engineering & Construction)



5) OSH Management System by Contractors

Smart Safety (by SK Engineering & Construction)

Internet of Things (IoT)

[HSE Smart Work Platform]

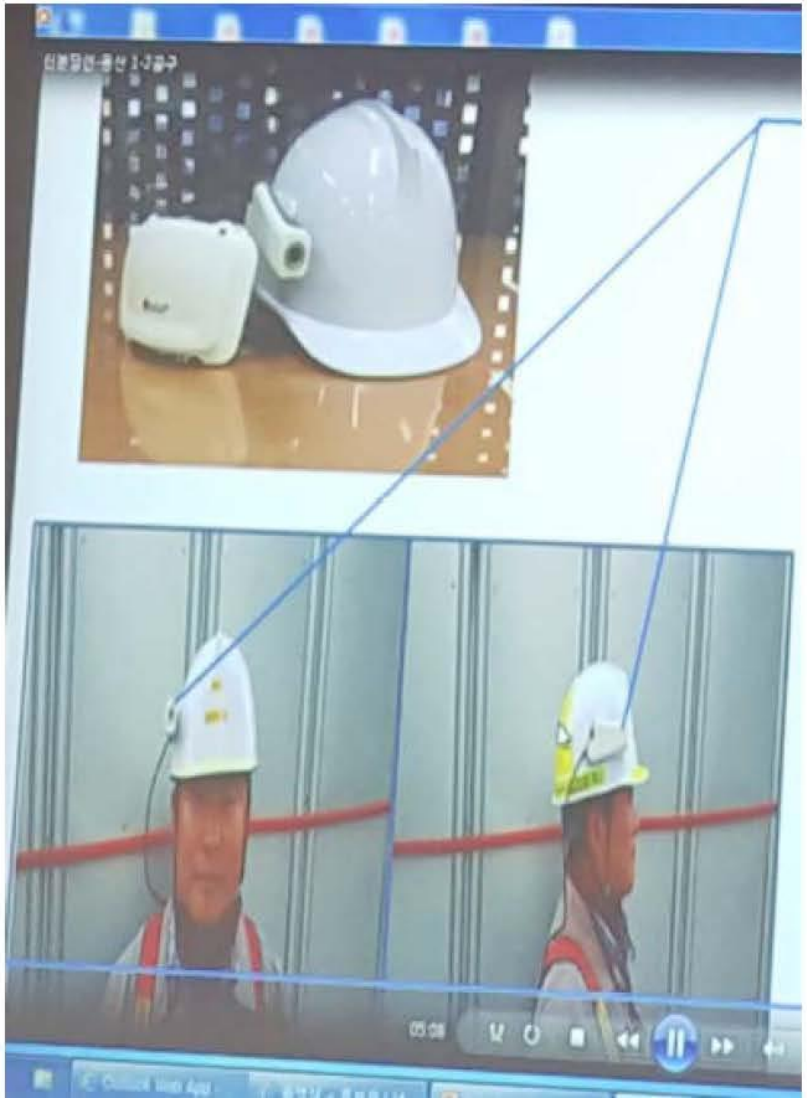
CCTV & drone to capture real-time image

6) Safety Practice revealed in Construction Sites

- Site Visit to Subway Construction Site

6) Safety Practice revealed in Construction Sites

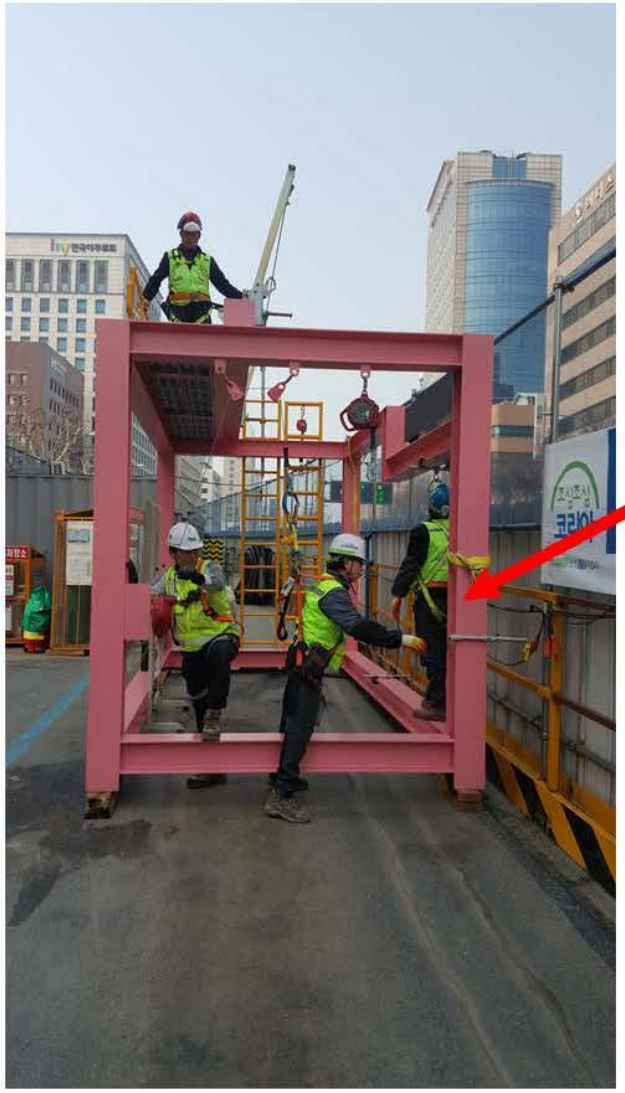
- Site Visit to Subway Construction Site

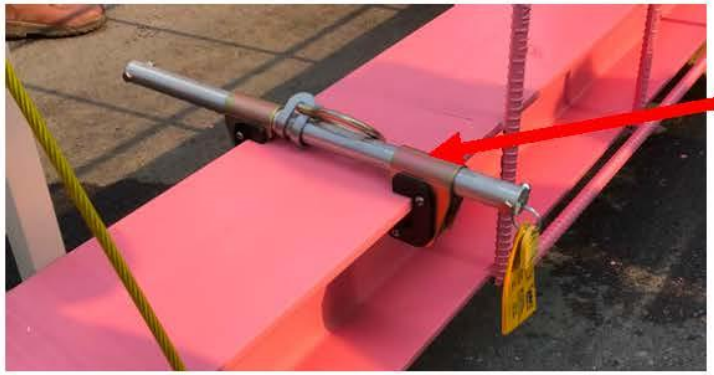


CCTV on Safety Helmet

6) Safety Practice revealed in Construction Sites

- Site Visit to Subway Construction Site





Adjustable & movable clamp as safety belt anchor

Simulation on Falling from Height
(Demonstrate the Importance of Safety Belt)

6) Safety Practice revealed in Construction Sites

- Site Visit to Subway Construction Site

Wrap for Trouser

Special Safety Vest

Led by Example
(Safety Belt carried
by Management
Staff All the Time)

Portable Fire
Extinguisher

6) Safety Practice revealed in Construction Sites

- Site Visit to Subway Construction Site

Separate Access Road for Worker
人車分路

Electrical Safety Shoes
Brushing Machine

6) Safety Practice revealed in Construction Sites

- Site Visit to Subway Construction Site

Safety Notice & Measures next to Water Tank

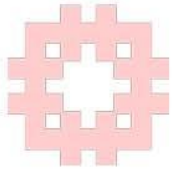
7) Design for Safety

- Tailor-made structural analysis software by KOSHA (Korea Occupational Safety & Health Agency) for use by contractors to review the structural stability of temporary propping structures

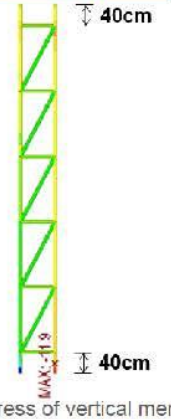
Fully installed	Partly installed
	
Maximum stress of vertical member : 11.9 MPa	Maximum stress of vertical member : 15.7 MPa

Under Different Diagonal Bracing Arrangement

7) Design for Safety

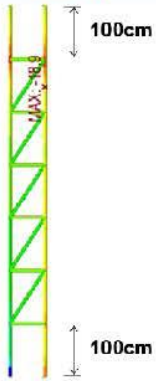


Location of horizontal member : 40cm



Maximum stress of vertical member : 11.9 MPa

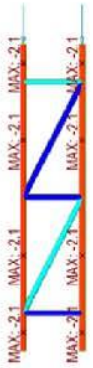
Location of horizontal member : 100cm



Maximum stress of vertical member : 18.9 MPa

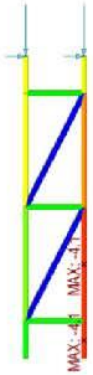
Under Different Top & Bottom Horizontal Member Location

Vertical load only



Maximum stress of vertical member : 2.1 MPa

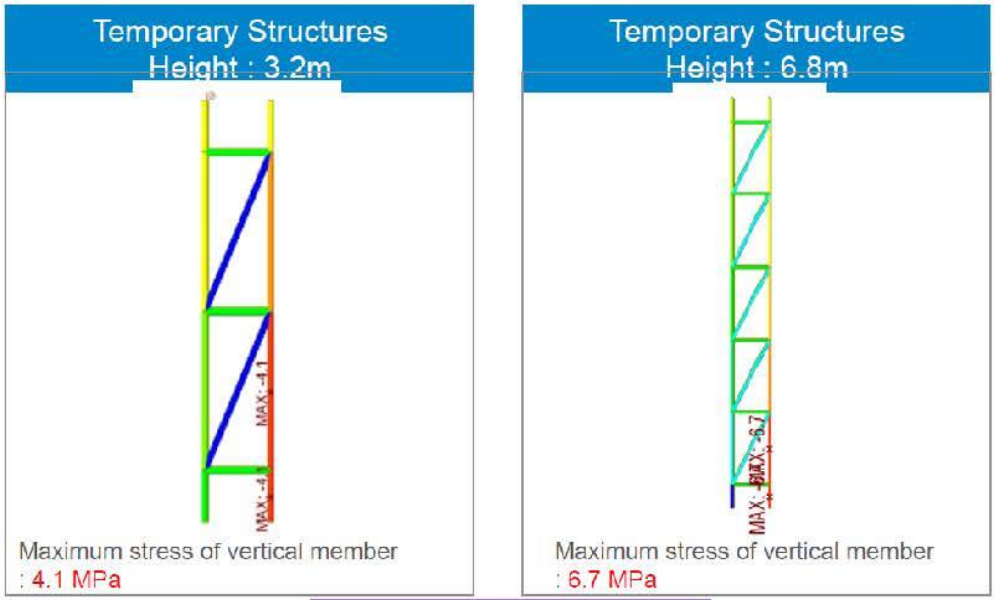
Both Vertical and horizontal load



Maximum stress of vertical member : 4.1 MPa

Under Different Load Application

7) Design for Safety



Under Different Height

- Easy to use by workers for checking
  - Able to do structural review according to height
  - Able to do structural review according to the location & quantity of bracing
  - Able to do structural review according to load application method

8) Safety Measures for Mobile Crane & Elevated Work Platform in Construction Sites

- Separate crane for goods and workers
  - Vehicle-mounted mobile crane (for goods only)

  - Vehicle-mounted elevated work platform (for workers only)

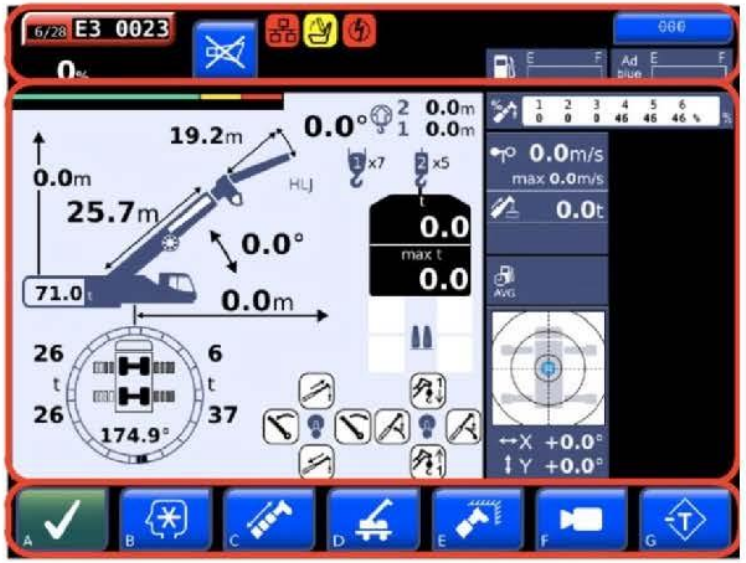
8) Safety Measures for Mobile Crane & Elevated Work Platform in Construction Sites

- **Manufacturing Stage**
  - Safety of vehicle-mounted mobile crane and elevated work platform is required to be certified before release to the market
  - "KCs" Mark Scheme initiated in 2009 (many products e.g. electronic & electrical products, toys, broadcasting & communications equipment, IT equipment, etc. must fulfill stipulated safety requirements to obtain the "KCs" Mark issued by an accredited body before they can be sold in Korea)

KCs Mark

8) Safety Measures for Mobile Crane & Elevated Work Platform in Construction Sites

- Use Stage
  - Vehicle-mounted mobile crane and elevated working platform can only be used after safety inspection at use stage (initial safety inspection at 3 years after shipment, and every 2 years thereafter)
  - Install AML-F crane control system

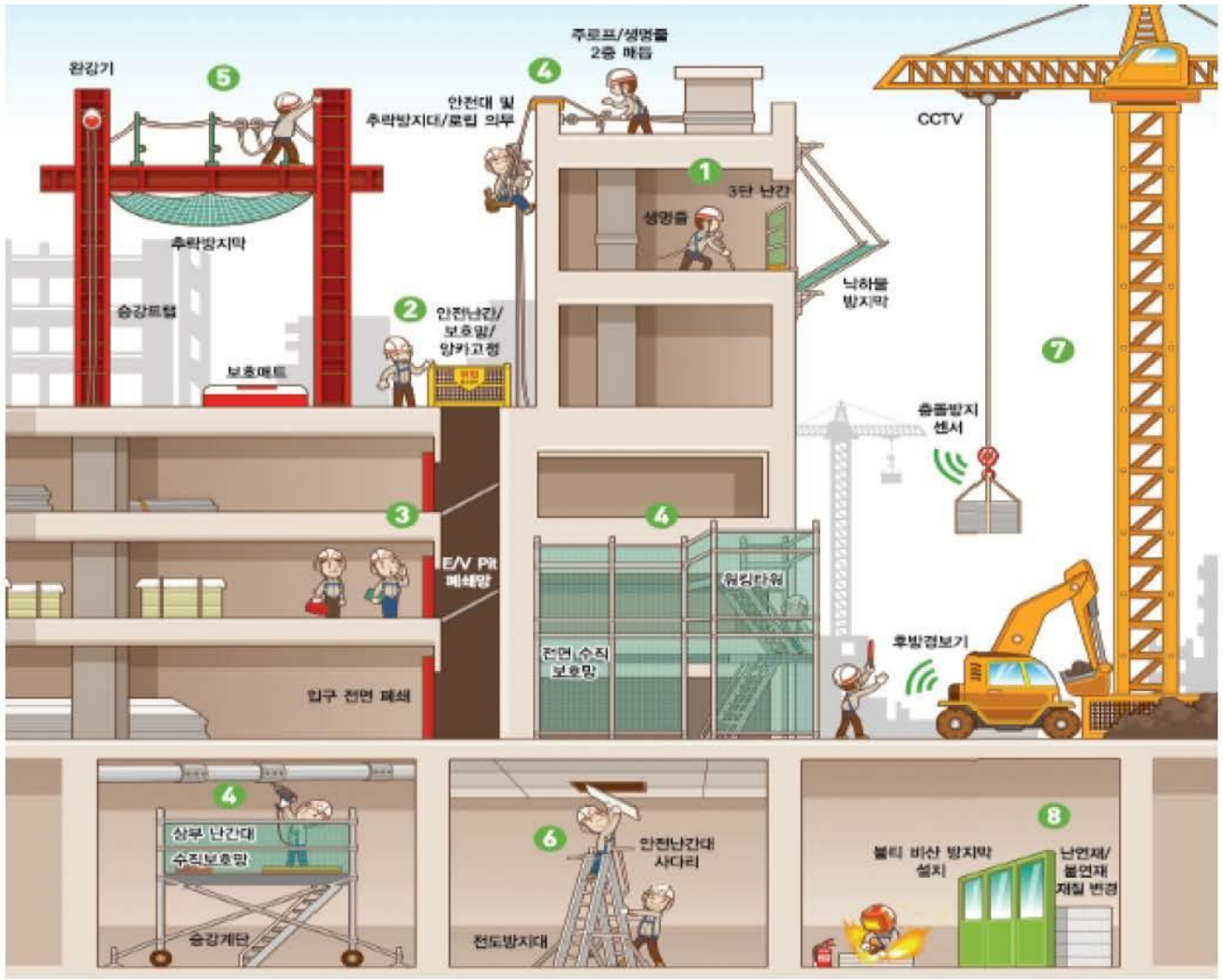


8) Safety Measures for Mobile Crane & Elevated Work Platform in Construction Sites

- User (Operator)
  - Separate qualification or licence is required for steering a vehicle-mounted mobile crane and elevated work platform (to be enforced after 1 February 2020)

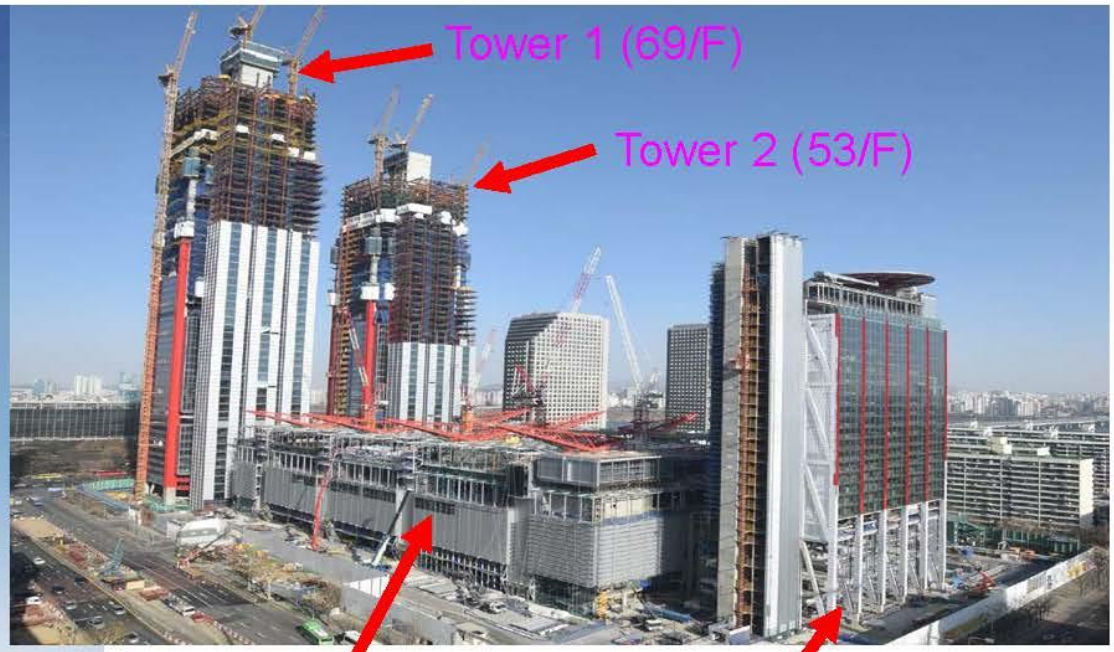
9) Back-up Fail Safe System

Multi-layer of safety measures on facilities/equipment to ensure safety even if the workers make mistake during operation



10) Safety Practice revealed in Construction Sites

- Site Visit to High-rise Building Complex



Retail (8/F)

Hotel (31/F)

10) Safety Practice revealed in Construction Sites

- Site Visit to High-rise Building Complex

Fall-arrest System at Steel Roof

10) Safety Practice revealed in Construction Sites

- Site Visit to High-rise Building Complex

Clear Information on
Mobile Plant Location

Covered Walkway
within Site and Building

10) Safety Practice revealed in Construction Sites

- Site Visit to High-rise Building Complex

Catch Fan

Large Hoarding Height

Safety Net

10) Safety Practice revealed in Construction Sites

- Site Visit to High-rise Building Complex

Safety Net at Opening

Fibre Board at Floor Opening

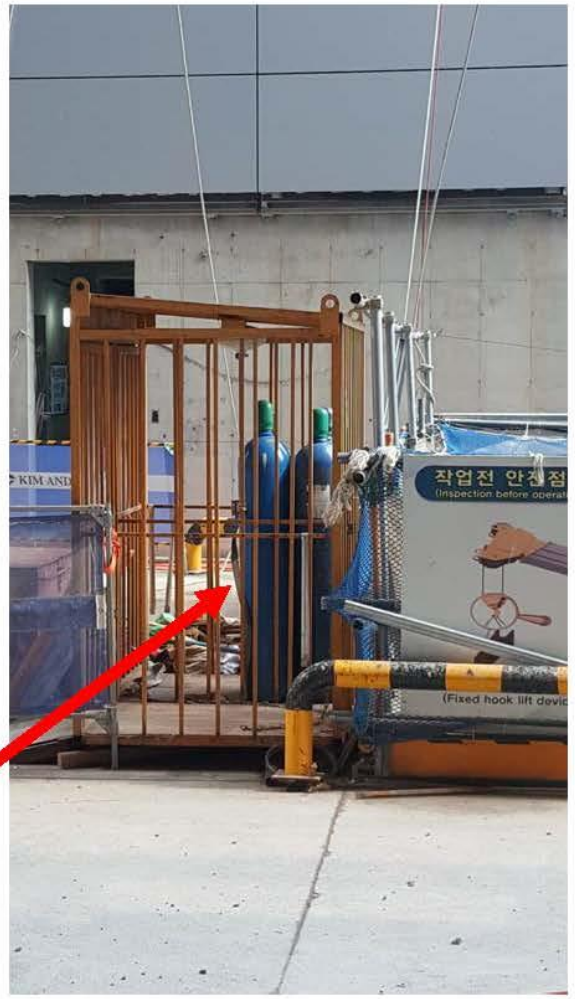
Lift Shaft Opening
Fenced with Safety Net

10) Safety Practice revealed in Construction Sites

- Site Visit to High-rise Building Complex

Emergency Kit
at every 3 Floors

Gas Containers
Properly Stored & Locked



10) Safety Practice revealed in Construction Sites

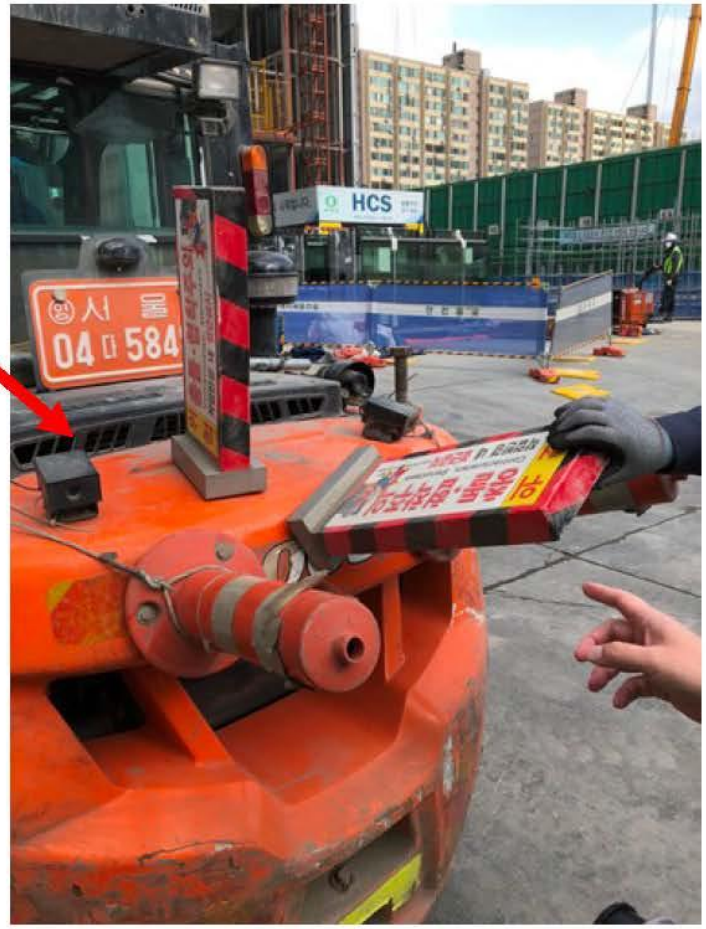
- Site Visit to High-rise Building Complex

10) Safety Practice revealed in Construction Sites

- Site Visit to High-rise Building Complex

Mobile Machine
with
Object Sensor

Elevated Platform
with
Height Sensor



10) Safety Practice revealed in Construction Sites

- Site Visit to High-rise Building Complex
  - Setup Task Group for Checking Site Equipment
  - Employ Foreigners for Training Foreign Workers

Display of Air Pollutant & Noise Monitoring Readings (at hoarding outside site)

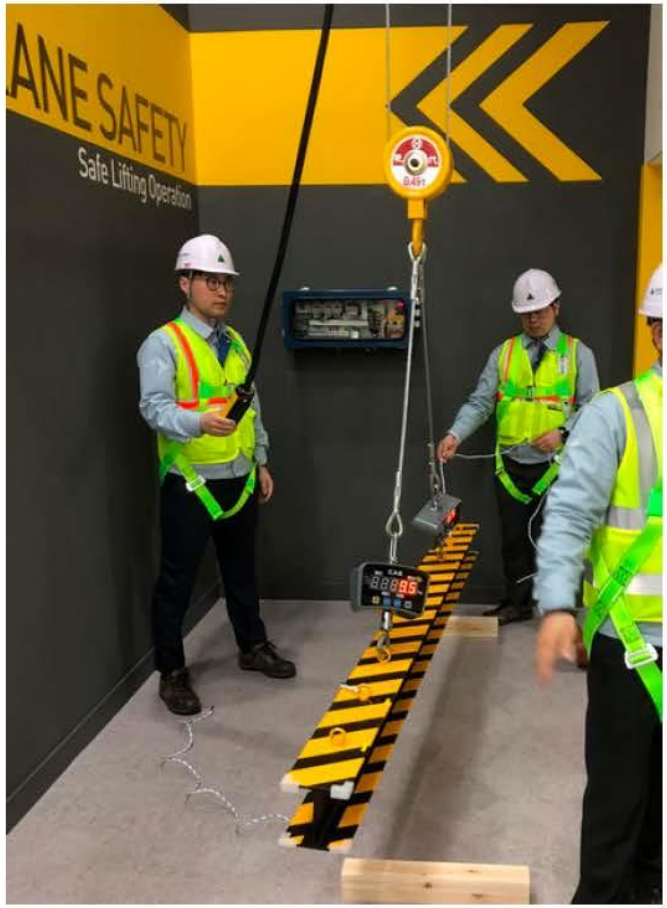
Display of Noise Monitoring Reading (within site)

11) Safety Innovation School

(by Hyundai Engineering & Construction)

11) Safety Innovation School

(by Hyundai Engineering & Construction)



Thank You

Here is the footage of

"Site Safety Seminar for Capital Works New Works Contracts"

which was held on 30 October 2019

by the Hong Kong Housing Authority

The Speaker is

Ms. Alanar Yu ,Senior Architect/3 &

Mr. Chang Kar Seng, Senior Structural Engineer/3 of the Housing Department

Their topic is Benchmarking Study on Construction Occupational Safety and

Health Innovations and Technologies in Korea

Good afternoon everyone

Welcome

In March this year, Mr.Sherman Chang and I were honoured

to participate in an exchange programme to Korea

and we would like to thank the OSHC

Occupational Safety & Health Council for the arrangement

for us to understand their site safety system

What could we learn from them

or anything we could exchange

Thanks for the arrangements of the OSHC

2 colleagues from the Housing Authority joined the trip

We will give a brief sharing here

We saw plenty during the 5-day trip

I will focus on major points today

The presentation will be put in a few parts

First, we will introduce the background

In this trip, we learnt that they were planning for reform

to set new statutory requirements on safety

on top of reviewing the current ordinance for improvement

on top of reviewing the current ordinance for improvement

What did they have in mind? What changes would be made?

I will also talk about our trip to two construction sites

I will also talk about our trip to two construction sites

Besides the seminars we attended

and the safety innovations discussed

I will also share about our observations on the sites

Finally Sherman will share on

Finally Sherman will share on

our visit to one of their “Safety Innovation School”

This is one of the schools collaborating with contractors

We will share the experience

I will not go into details of their management structure

They have the Korean Occupational Safety and Health Agency (KOSHA)

They have the Korean Occupational Safety and Health Agency (KOSHA)

is similar to OSHC in Hong Kong

Both aim to monitor site safety

besides training, they carry out site inspections

and also certifications

They hope to play a role in safety issues on all aspects

They hope to play a role in safety issues on all aspects

They want to promote the awareness of site safety

Some background information

Organization for Economic Cooperation and Development

has many member countries

In many member countries

accident fatality rates are relatively low

In Korea, based on a population of 100,000

the rate was 5.3

Although this rate was not only for construction sites

but all sectors of work and business

They hoped that in 2022, the fatality rate will be halved

This would not be an easy task

So maybe their first reaction was

If we would like to promote safety awareness in all sectors

maybe we need to make a change in the regulations

to make them comply

to make them comply

This was the main reason

Next, I will tell you what they wish to do

Some of their ideas may not have officially implemented

Originally, they would like the “OSA Act”

come into place at January 2020

but may be deferred due to the consultations in the industry

I will speak on that in a while

First, for the ordinances

there were changes in terms and conditions

Today I have selected some

interesting ones or major ones to talk about

For example, ordinances in the past

might not provide an extensive coverage

For example, delivery service for online shopping

would workers be covered in an accident?

They hoped that the ordinances would offer better coverage

More workers would be protected

Second was outsourced work

Outsourcing would be inevitable in businesses today

They wished to stop outsourcing relatively high risk tasks

They believed that workers trained by own company

would have better safety awareness

so it would be safer, if they would have to carry out relatively high-risk tasks

so it would be safer, if they would have to carry out relatively high-risk tasks

It would be hard to keep control of jobs

outsourced to different agents each time

Third, about employers and employees

It would not be ideal to put responsibilities entirely on workers or contractors

If developers or employers placed emphasis on safety

or if plans were made systematically

It would be easier for sites to ensure safety effectively

Fourth, if there were incidents

Fourth, if there were incidents

and workers aware of the hazard

“Should I stop the work and leave the site

But workers often not dare to decide

"To stop work and leave the site”

It is a decision of the boss

If “I” see some danger and “I” leave the site

will there be any penalty from the boss

This was a special ordinance forbidding employers

to punish workers casually without a sound reason

When a worker saw a danger and would like to avoid

but you did not allow him to leave

and requested for his reason of leaving afterwards

The ordinance was trying to change the perspective

so that workers could leave in case of danger

Fifth, I shared this at another seminar, everyone was shocked

Fifth, I shared this at another seminar, everyone was shocked

“How could that be?”

They are quite peculiar

A project with an estimated timeline and estimated costs

If people could come up ways to complete the work a month earlier

or ways to cut costs

Would the ideas be raised if it was in Hong Kong?

Korean ordinances would not allow cutting corners

unless there was a proof that the ideas were safe

Lawmakers worried that

money-saving work procedures might render hazards

or you deliberately shorten the works period

Could it be workers rushing to meet the deadline

that led to negligence in safety?

Or doing not enough

Changes would not be taken causally

Their ordinances would keep a close watch

Points 6 and 7 were simpler

Step up education work and increase penalties

These would enhance awareness of safety

Look at this table

it was not about the construction industry only

But we saw a few things

First, on the right we could see

in addition to the government could enhance regulations

in addition to the government could enhance regulations

Owner played an important role, not only contractors

The red colour on the left

The ordinances not only on construction sites but on factories too

Suffocation accidents happened quite often

Comparing Hong Kong with Korea

Fall from height mostly happened on construction sites

or within the construction industry

accidents happened more frequently in this aspect

About this Programme, what would they do?

It would be divided into different areas

Later some slideshows will provide explanations in detail

First, the legal program required submission

of a Hazard Risk Prevention Plan before work commencement

Hazard Risk Prevention Plan before work commencement

I will elaborate later

After commencement, certainly there would be a lot to consider

After commencement, certainly there would be a lot to consider

One major concern was accidents caused by fall from height

They focused on scaffolds and use of ladders

When ladders were to be used for climbing up and down

what must be given special attention

What were to be monitored

I will further explain later

The following items were about investigations after accidents

The following items were about investigations after accidents

But the work did not end here

They would keep records

and conduct a sharing session with colleagues

to avoid similar incidents, to learn from experience

to avoid similar incidents, to learn from experience

For financial support

There were some similarities to our Housing Authority's policy

We have the Pay for Safety Scheme

They had subsidies as a means of encouragement

Good industrial safety would be awarded with monetary subsidies

Hazard Risk Prevention Plan mentioned just now

required a plan to be submitted before work commencement

required a plan to be submitted before work commencement

They required more than just submission of the plan

Housing Department requires submission

of many documents before work commencement

They conducted interviews

The project manager and/or safety officer

would be invited to discuss the plan

They would be assessed whether they could execute the plan

They would be asked if they have any opinions on the plan

We asked them what to do if it was realised that

the plan was infeasible during implementation

He would need to re-submit the risk prevention plan

If the plan was very unsatisfactory, work cannot commence

work could be proceeded for minor resolvable issues

It would not stop the work completely

but there must be very close follow-up improvement measures

After work commencement, the submitted plan must be followed

and monitored against the plan

As work progressed

would there be any difficulty in complying with the plan?

There would be a review every other month, 4 or 6 months

There would be a review every other month, 4 or 6 months

The frequency would depend on the contract sum

For high contract sum, reviews would likely be every other month

Low contract sum would be twice a year

Look at the target projects at the bottom

Even without elaboration, you could see the risks

For example in an underground tunnel, excavation was underway

Or relatively high cost contracts

or those involving large floor areas

then they would monitor these projects

2 photos here

On the left, it was called Steel Pipe Scaffolds

On the right, it was called System Scaffolds

They would encourage the use of System Scaffolds

Steel Pipe Scaffolds on the left not provided with railing

and toe boards were unsatisfactory

When the project was ongoing

and they discovered your scaffolds were as bad as those shown on the left

they would increase the inspection frequency

One special thing about them was their consideration

"How to get enough manpower for inspections?”

Most Koreans would retire at 55

Many of them are experienced personnel

Many of them were experienced personnel

So these people could help with inspection work

They would be considered for employment

Two persons a team to inspect sites like those just mentioned

especially those sites with unsatisfactory scaffolds

Inspections would be scored

Sites receiving low scores would be inspected more frequently

Better sites would get higher scores

These sites would be inspected less frequently

There were 3 categories of dangerous equipment

First excavators, second, work platforms

Third, mobile cranes and tower cranes

They thought these were tools that require special inspections

In Korea, there would be a nationwide inspection

on the 24th of each month

It covered not only construction sites

but many other industries also have guidelines

to do safety inspections on the 24th

to do safety inspections on the 24th

Since 2017, as mentioned before, KOSHA, the host as mentioned

would sent officers to joint inspections

Regarding manpower

KOSHA would not promise to help contractors with inspections

If contractors or other organisations

coming across high risk procedures

such as demolition of cranes, entailing risky procedures

they could invite KOSHA to carry out inspections together

they could invite KOSHA to carry out inspections together

or observe specific procedures at specific times

The Korean National Transport Department would do this

Every 6 months, there would be a random check of equipment

When this was raised in their country

it created a controversy in the industry

Using “A” ladders

“A” ladders were banned from work sites

They must not be used in any work procedures

The most appropriate one was shown in the middle of the photo

A sturdy work platform, with guardrails would be even better

If an “A” ladder was necessary

there must be an anchor point for safety harness

to prevent a worker from falling from the ladder

Refrain from using “A” ladders in case of no anchor point

The industry was a little concerned about this

We all agree that “A” ladders are easy to use

Is it really necessary to set up a work platform for a minor task

But safety should be the major consideration

and safety measures must be enforced

Accident Cases book would record accidents on different construction sites

They would record them in one system

This would bring the information to people in the industry

All would know about the accidents and incidents

Hopefully casualties would be avoided in the future

Financial Support, this was similar to Pay for Safety

The photo you just saw

Contractors would adopt System Scaffold

keeping everything neat and tidy and provide toe boards

everything would be systematic

If contractors would use safe equipment

their costs could be higher

Subsidies from the authorities would be allowed

Subsidies amount would depend on the construction costs

Hopefully, safety would be enhanced by this

Hopefully, safety would be enhanced by this

Employer could work with accident prevention consultancy firms

Accident Prevention Specialised Guidance Institution

provides a service contract

For what?

These organisations would provide monthly guidance

suggesting ways to make use of the OSH budgets

How to use the money to improve industrial safety?

To do work related to safety and health

In case you did not have such plans

you could get help to work out guidelines

or you had not awarded contract to work out technical guidance

There might be penalties

Other than what I just mentioned

KOSHA liaised with the government

They would like to work together with some construction companies

This Partner Safety Gate was one of them

This Partner Safety Gate was one of them

It was similar to our PASS（Performance Assessment Scoring System)

If KOSHA had verified you to be a safety-minded company

If KOSHA had verified you to be a safety-minded company

the company might think that with KOSHA’s verification

the company might think that with KOSHA’s verification

you passed Gate 1, automatically entering Gate 2

you passed Gate 1, automatically entering Gate 2

I would have the opportunity to work with you in some projects

But your performance would be assessed

If you were hired to carry out the construction works

before work commencement

you would have to prepare a safety performance plan

During the construction period

performance scores would be checked quarterly

This would be a cycle

If your scores dropped

your chance of obtaining the next contract

counted upon your past scores i.e. past performance

It was similar to our PASS (Performance Assessment Scoring System)

This was another organisation

Sherman will explain later

We visited their Innovation Training School

Their top management thought

daily classes or training programs may still be insufficient

How can you be motivated to improve continually?

The idea came up to introduce employee performance reports

If an employee

did more safety related work or contributions

he would receive a higher score in performance report

For example, have you helped to draft a safety checklist?

Have you actively reported on dangerous behaviours?

Have you actively reported on dangerous behaviours?

Have you assisted in training?

Be an instructor of safety training?

If you happened to witness situations that might lead to an incident

Have you made a report?

They expected these to happen

They encouraged the management level to pay more site visits

and regularly attend safety meetings

This would enhance the entire company's safety awareness

I will now talk about site matters after covering theories

The first site we visited was a tunnel

They hoped to take advantage of advanced technology

Smart Safety was adopted to enhance industrial safety

The following Smart Safety information

was suitable for underground work

For example, Drone

using in limited space

for example, inside the tunnel or other confined spaces

these might not be accessible to everyone

or it was difficult to inspect dangerous locations

or it was difficult to inspect dangerous locations

Then drone could be used to see the real situation

Then drone could be used to see the real situation

Intelligent wrist bands were worn around the wrist

Some contractors in Hong Kong

are recommending wearing these wrist bands in some locations

In a confined space, a worker wearing an intelligent wrist brand

allowed others to know his location before he lost consciousness

at least we would know his whereabouts

Rescue would be easier

In a confined space, it would be very dark

We would not know the worker's location

For gases sensors

If gases sensors were installed around the tunnel

unknown gases can be detected earlier

and dangerous spots could be identified

We are familiar with VR (virtual reality)

It is often used to let workers feel the actual dangers

VR could let workers have a feeling

a sense of danger to fall from height

or tripping here would be dangerous

You would feel actual danger and get really frightened

Then you might pay more attention to safety at work

Smart helmet

You will see the smart helmet later

There was a camera on top

connected to a closed circuit television (CCTV)

When a worker wearing the smart helmet

his surroundings and working environment

could be captured with the images sent to the office

We visited the extension of a subway station

There were different depths, from 30-40m underground

There were different depths, from 30-40m underground

It was about 2 km long

We went to one of the stations and we went down for an inspection

Although we were there in person

we did not see all the items I mentioned just now

The subway company opined that smart safety

could be used underground

One example here was like a CCTV clipped to a safety helmet

The images were captured with this camera

The images were captured with this camera

In the tunnel, the same camera was set up

What was that for?

Workers might fall from height when they climb up and down

Workers might fall from height when they climb up and down

This smart helmet was used to monitor the situation

Look at the picture on the top right hand corner

This would facilitate the workers

This stick-like item could be taken away anytime

It could be clipped to an I-beam

and anchors need not be nailed to the wall

These tools might not be needed

When they saw an I-beam, they could clip this to the I-beam

and it was secured

Fasten this to the safety harness

He was giving a clipping demonstration as shown in the photo

Safety harness should be tied to supports at a higher spot

It should not be clipped onto the lowest beam

Safety harness should be attached to an anchor at a high spot

Workers could practise using this fall arresting system

Besides, there were other safety equipment

such as safety reflective vests

The back was specifically thickened

because working in tunnels, workers might be hit on the back

The thickened back could provide added protection

from falling objects on the back

There were portable fire extinguishers

They were very convenient

Use the strap to tighten the legs of the trousers

This would reduce the chances of tripping

Separation of vehicular and pedestrian passages

with colour indication would render safety for walking on site

Providing floats at water tanks

could save lives in case of emergency

Next Sherman will speak on

Design for Safety

Thank you, Alanar

I will continue to introduce

occupational safety and health measures in Korea

They have this plan called Design for Safety

KOSHA has tailor-made a software for structural analysis

The purpose was simply to let workers understand

the setting-up procedure of prop conditions

and to calculate the structural stability of the props quickly

By this they would know if the props were safe

For example, the different bracing arrangements of the supports

mean different forces (applied stress)

By checking the safety of the props

workers would know at once whether the props were safe or not

workers would know at once whether the props were safe or not

Another case

Different heights meant different stress

This was an up-down force, a vertical force

Or it could be a horizontal force, the stress would be different

Different height meant different stress

Workers could understand the prop conditions by using this software

the structure would be analysed to ensure safety

That was whether the props were within the safety index

The check was quick to determine whether the props was safe

The high wall was tailor-made for workers' use

It was convenient, not complicated

It was convenient, not complicated

More about how mobile crane and elevated work platform

were applied and supervised in Korea

Goods and passengers were separated

For example

For vehicle-mounted cranes serving for carrying goods only

were not permitted for carrying persons

The one below was Elevated Work Platform for workers only

Goods and workers were separated

There were different supervisions at different stages

At the Manufacturing Stage

There was the KCs Mark Scheme, a safety certification

Electronic goods and toys must pass the KCs mark

Passing the safety certification, they were ready for the market

Of course, elevated work platforms and mobile cranes

required KCs certification too before releasing to the market

This was the first stage of supervision

The second was the Usage Stage

An initial safety inspection was needed 3 years after delivery

Then every 2 years of inspection

This would ensure safety when the item was in use

Install AML-F Crane Control System

(automatic lifting capacity selection function)

We also have this in Hong Kong

It ensured loading of the lifting to be appropriate

Crane operators would be under supervision too

Crane operators would be under supervision too

It would be implemented on 1st February 2020

Operators had to acquire specific qualifications

and there was a licensing system for certification

Next, I will introduce back-up Fail Safe System

Next, I will introduce back-up Fail Safe System

In case workers missed a step in the procedures

there was an additional safety measure

in case the first line of protection failed

there would not be any immediate danger

Like what the picture showed

Take a look at the no.1 figure

For example, there were usually guardrails around the edges

Even if the guardrails were damaged

there were catch fan and safety nets to catch the falling worker

This was an additional line of protection

This was an elevator shaft

There were guardrails and fall arresting nets

For work at height, there were lifelines and fall arresting nets

This crane had the standard CCTV sensor

and sensors were installed in the related machines nearby

When 2 machines were very close to each other

signals would be sent to stop operation

There were double lines of protection

The Back-up Fail Safe System mentioned just now

were seen it when we visited the sites

Let me introduce it here

There were 2 buildings

One was 69 stories, the other was 53 stories

There were also an 8-storey retail provisions and a 31-storey hotel

On this work site, you can see Back-up Fail Safe System

This steel roof had lifelines and fall arresting net devices

Mobile crane signs were clearly placed at site entrance and exit

Mobile crane signs were clearly placed at site entrance and exit

If a crane was operating, it would be clear

On this site, the passageways were all covered walkways

All pedestrian paths were covered

Workers were protected from falling objects

Their hoarding were different from those in Hong Kong

They were especially tall, up to 8-9 metres

For the exterior hoarding, there were catch fans and safety nets

As mentioned just now, all holes were covered with safety nets

The holes were provided with railings and safety nets

The same for lift shaft opening though the picture was not clear

These were guardrails outside, safety net inside

In case a worker climbed over the guardrails

the net inside would catch him

In case he fell down, there were first aid kits every 3 floors

In case he fell down, there were first aid kits every 3 floors

The gas cylinders were inside locked cages

For housekeeping

items were arranged in a neat and tidy manner

neat and tidy, properly placed

Every mobile machine carried a sensor

The rear would not crash into people

Elevated work platforms had the height sensors

When the platform rose up

workers' heads would not be bumped upon the ceiling

They monitored air pollution indices and noise indices

There was open information

and the entire data file was displayed at the works site

Information was very transparent at work sites

Monitoring was enhanced

There was timed monitoring of work equipment on the site

Korea had imported a large number of foreign labourers

They hired expatriates to train imported workers

Lastly I would introduce what Alanar mentioned just now

Safety Innovation School

To experience the methods used in safety training centres

Safety measures were simulated

to give workers genuine feelings

of what safe work conditions would be like

Like this one, put in your feet with safety shoes

When objects fell down

you would be safe as you were wearing safety shoes

Do not make any attempt if you are not wearing safety shoes

Do not make any attempt if you are not wearing safety shoes

How about objects fell from above at your safety helmets

If you did not wear a safety harness and

the platform opened suddenly, you would fall

What would it be when you are wearing safety harness?

It serves to let workers have a sense of fear

It would feel like this even with safety measures

Without these measures, what would happen?

There was simulation on lifting

In lifting, the hook might be in the middle or on the side

The forces were shown here

What would happen if an object is lifted evenly or unevenly

The aim was to let workers know when tilting happened in lifting

the force would increase, causing dangers

There was VR of site simulation for workers to experience

We will end our sharing here

I wish to thank OSHC again

Without their perfect arrangements

we would not have been able to witness

the occupational safety and health measures in Korea

Thank you everyone

Thank you for watching