EZ-INDUS Corporation

Innovation of Container Logistics

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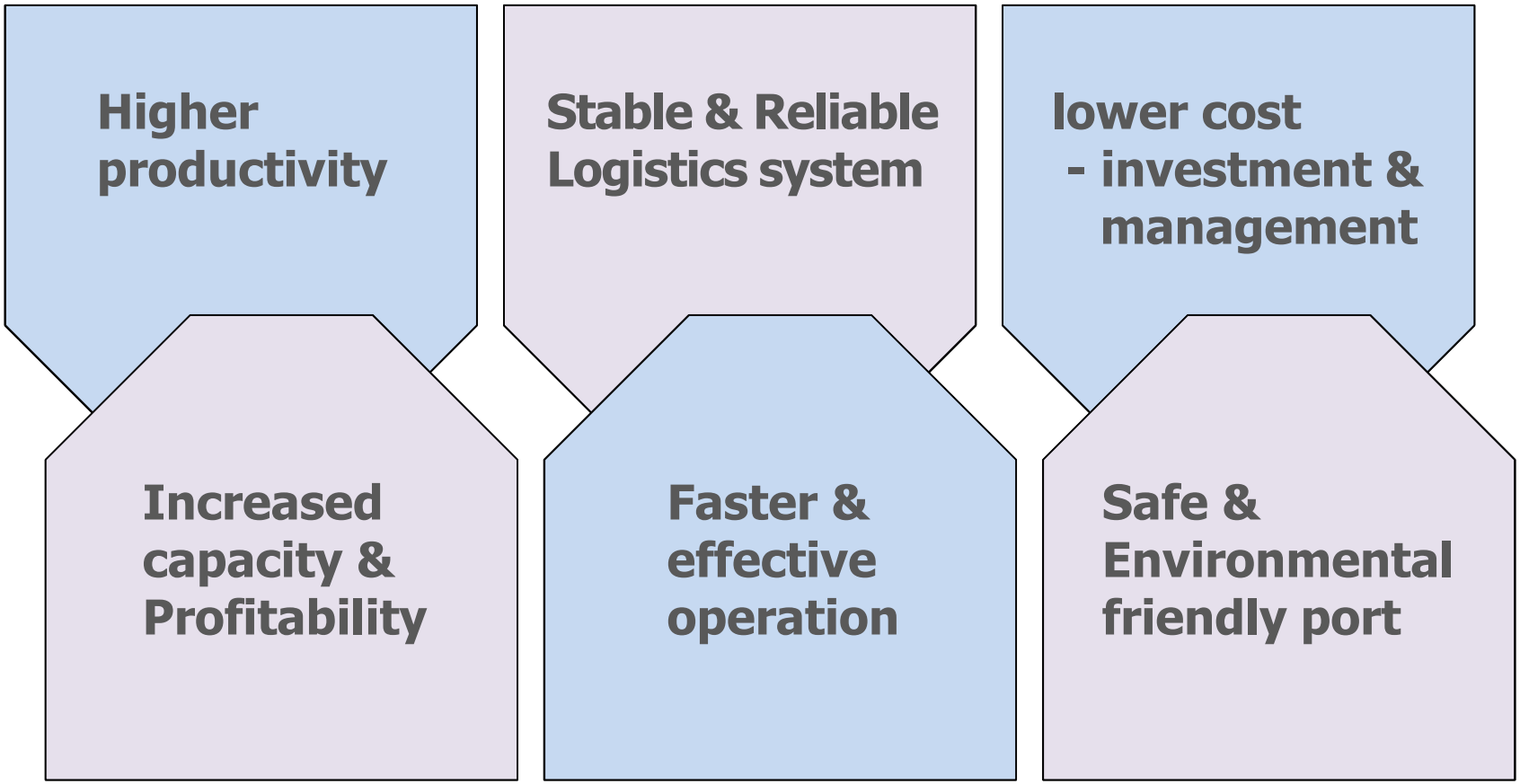
Trend
of
Container port

Container Port needs



Evolutionary changes of container terminals

1

RTGC
(Rubber Tired Gantry Crane)

2

RMGC
(Rail Mounted Gantry Crane)

3

ARMGC
(Automated Rail Mounted Gantry Crane)

4

UCW system

- The Latest, the most advanced,
- Store in containers 20~30 floor high
- Intellectual container handling
- The highest economical system

✓ Note : No.1~3 shows heavy equipment moves to carry containers. but, containers are moved by pathways in UCW system.

About
UCW system

UCW system – Outline

- national R&D technology by Korean government
- Stack & Store containers in 20~30 floor high
- Fully automated intellectual system-building
- The highest economical storage system

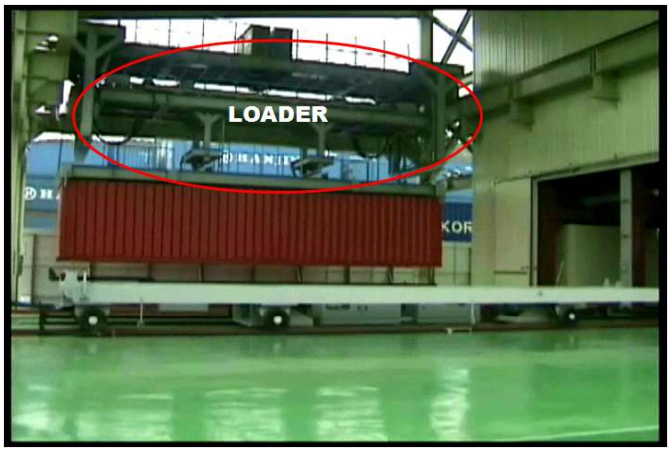
Name of the Patent	Registered number
Lifting device for tower type cargo storage warehouse	0457809
Tower type container loading equipment	0524663
Fixation device for container loading equipment	0524664
Applied for a patent in various countries including America, EU, Japan, China and India	

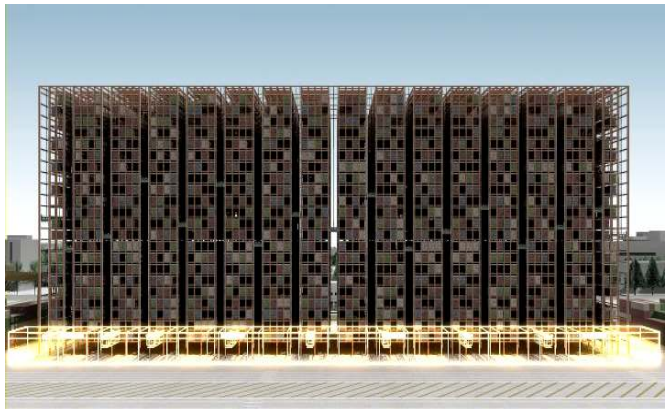
UCW system - R&D partners

Ministry of Education, Science and Technology	
MEST MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY	Supervisor of Engines for the Economic growth In the Next Generation
Ministry of Land Transport and Maritime Affairs	
MLTM	Supervisor of Intellectual Port Logistics Technology R&D project
Korea Ocean Research & Development Institute	
KORDI	Overall Management Organization
Korea Maritime Institute	
KMI	Associated UCW Research Partner

Component equipment of UCW

1. Loader

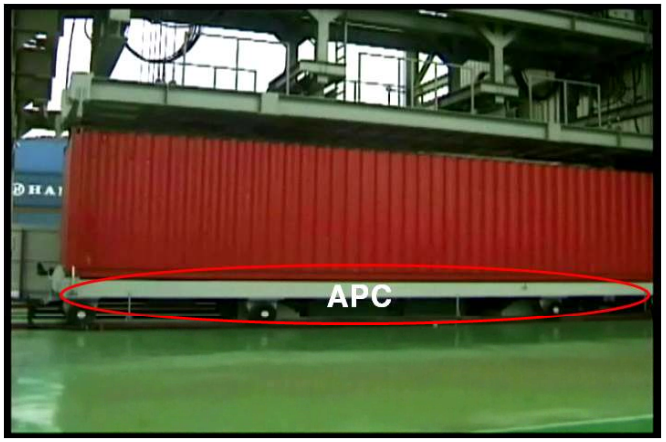




- Connecting module between YT (Yard Truck) and APC (Automated Platform Car)
- Loader picks up the container from YT and transfer it to APC
- As a contact point, loader can be added depending on port throughput and space condition of the port

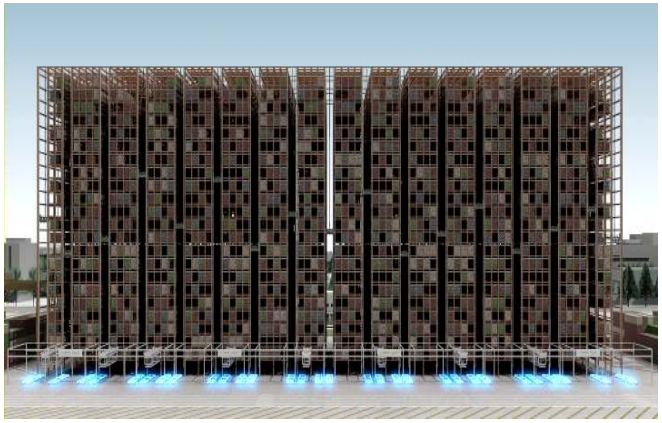
Component equipment of UCW

2. APC (Automated Platform Car)



- APC carries container inside under the elevator zone

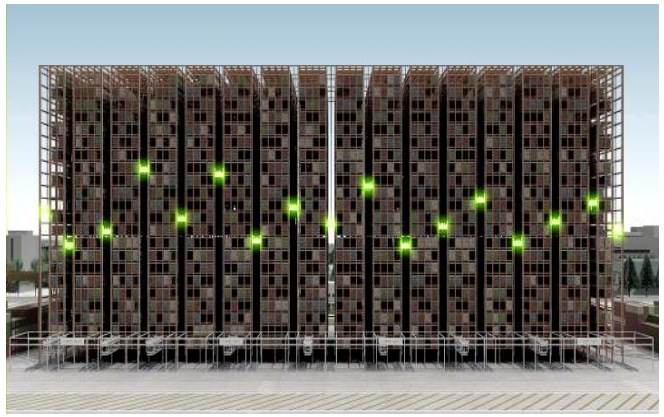
- APC moves along the rail installed on the ground floor



- APC moves straightly back and forth motion between inside and outside of the rack structure

Component equipment of UCW

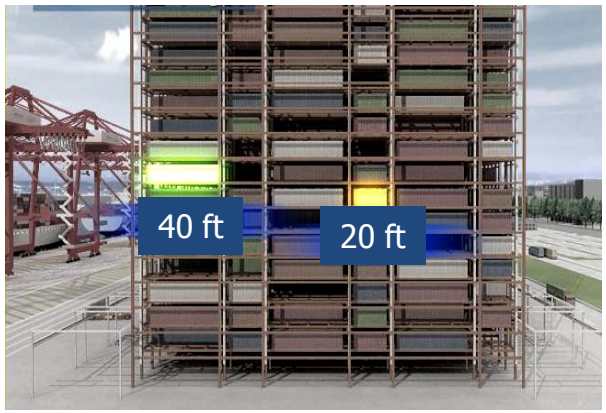
3. Elevator (Cage + Traveler)



- Elevator picks up the container from APC and delivers it to rack cell
- Elevator consists of Cage and Traveler
- During elevator moves upward and downward, cage and traveler are combined
- Traveler is separated from cage after elevator stops at destined level of rack cell, and then carries the container to the rack cell

Component equipment of UCW

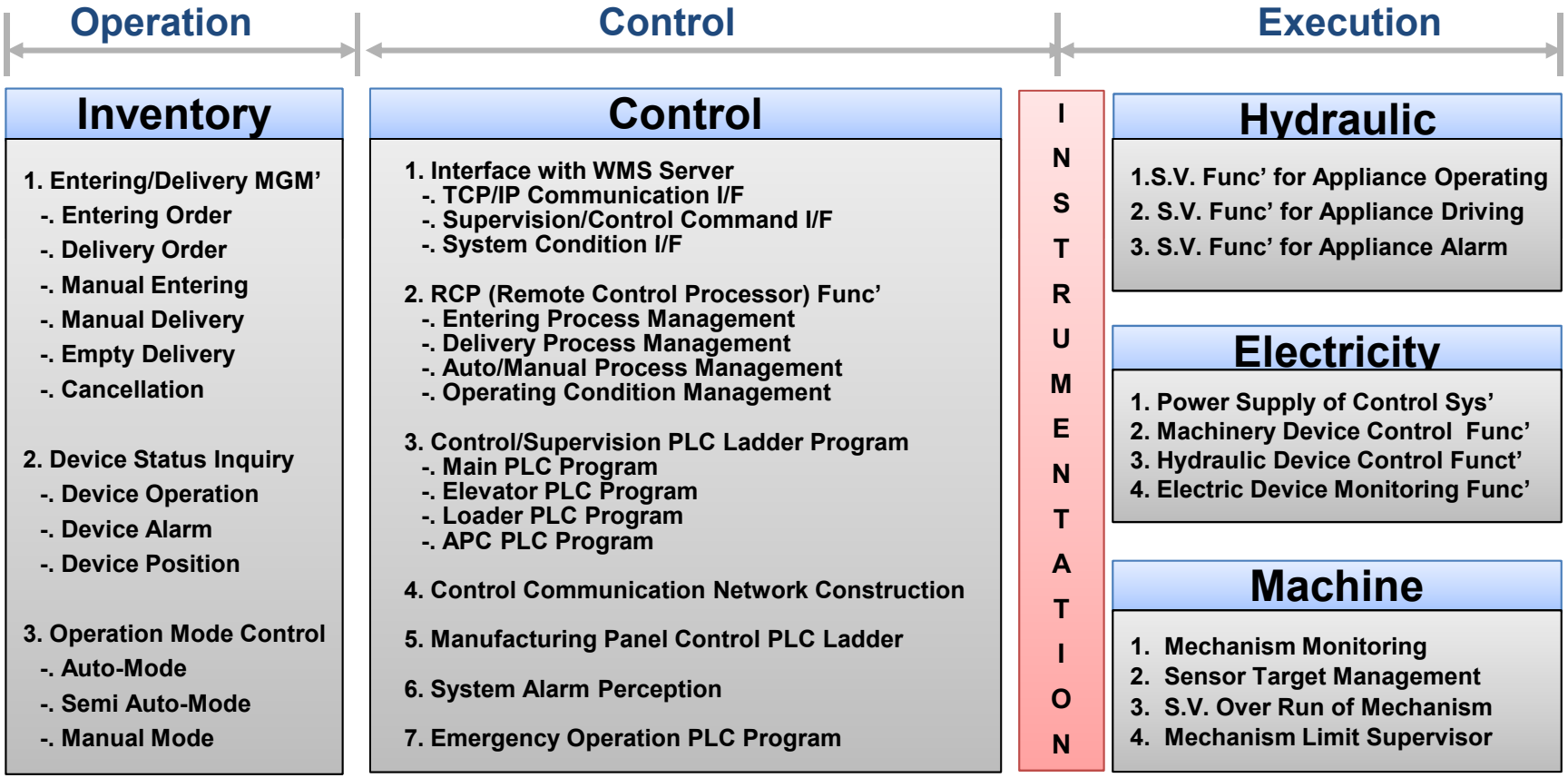
4. Rack



- UCW stacks and stores,20ft & 40ft, standard containers
- Rack cells are designed for the two type
- Each devices of UCW system is flexibly designed and prepared for troubled situation
- If a loader is out of order, it is moved out and repaired by manual operation, While repairing, other loader covers the broken loader's role.

UCW control system

Intellectual automatic operation & controlling system

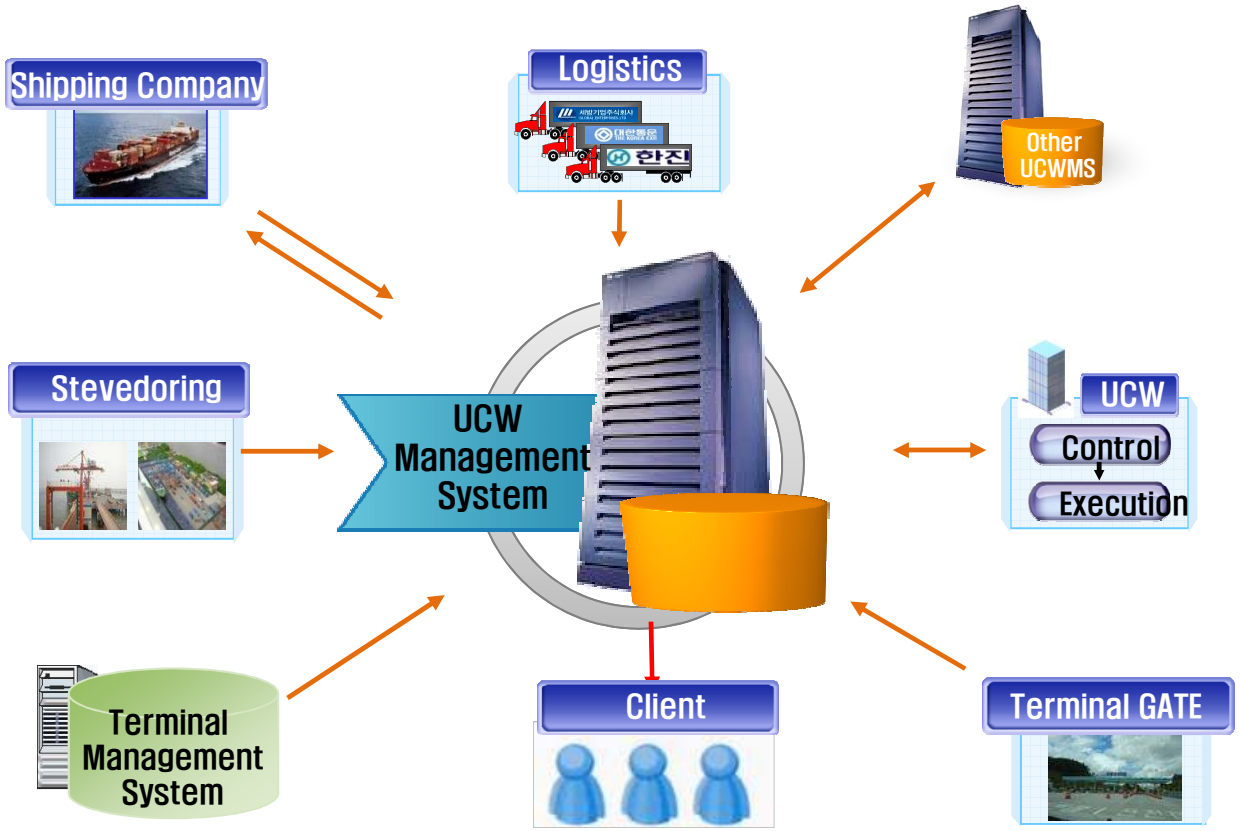


UCW management system (UCWMS)

Terminal operating function

- UCWMS interact with other systems from gate, shipping company, logistics company, stevedoring company, other UCW system and clients.

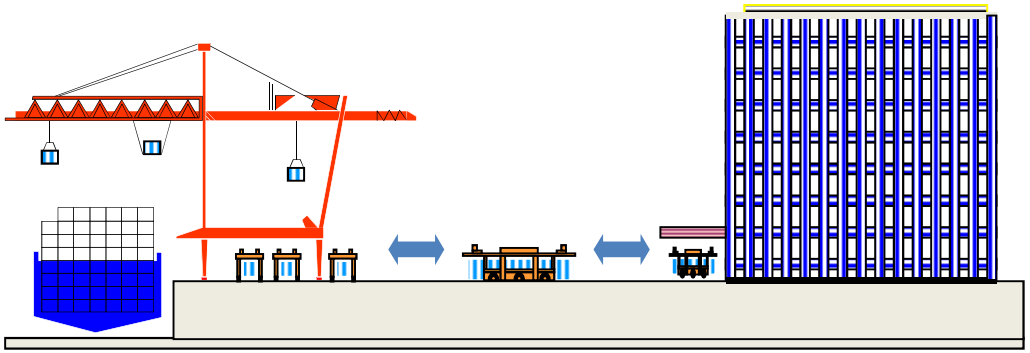
- Port logistics and inland logistics are connected and managed by UCWMS



Logic of UCW container terminal

UCWMS

- interacts and gathers schedule information from shipping liner, forwarder, terminal operator.
- make new schedule for entering and delivering containers considering the container's weight and delivery date.



Item	Logistics
IMPORT CONTAINER	SHIP→ C/C→ AGV (YT)→ UCW LOADER → UCW APC→ ELEVATOR→ IMPORT RACK → ELEVATOR → APC → UCW LOADER → EXTERNAL TRUCK → GATE
TRANS CONTAINER	SHIP→ C/C → AGV(YT) → UCW LOADER → UCW APC→ ELEVATOR →TRANS RACK→ ELEVATOR→ UCW APC→ UCW LOADER → AGV (YT) → C/C → SHIP
EXPORT CONTAINER	GATE→ EXTERNAL TRUCK→ UCW LOADER → APC→ ELEVATOR→ EXPORT RACK→ ELEVATOR→ UCW APC→ UCW LOADER → AGV (YT) → C/C → SHIP

Comparison of UCW terminal & conventional terminal

Comparison (1)

Technical comparison

Item	UCW terminal	Conventional terminal	Remarks
Storage	20~30 stacks high	5 stacks high	▲ 500~600%
	Indoor operation Ultra-high / centralized storage	Outdoor Conventional / decentralized storage	▲ Efficiency
Operation	Full automation, Unmanned	Manual work	▼ Cost
Management	Simple & Stable	Complicated Frequent error	▲ Productivity
Productivity	300~900van/berth	Avg. 150van/berth	▲ 200~600%

Comparison (2)

Operation comparison

Item	UCW terminal	Conventional terminal
Manpower	9 persons / 3 piers	180 persons / 3 piers
Container handling	Prompt and precise process by unmanned Automated operation	Manual work by labor
	Productivity increase 270%	Slow working speed and inaccuracy
Service	Safe storage in rack structure	Frequent damage and safety accidents
	Prevented deterioration, Maintain constant temperature and humidity	Damage by storm or gale

Comparison (3)

Model Analysis

KMI analyzed UCW system in case of container terminal with 4berths for 50,000teu ship and annual capacity is 2.4mil.teu

Yard efficiency per m^2

475%

UCW terminal	Busan port
13.8 TEU/m^2*Year	2.9 TEU/m^2*Year

Productivity per hour

270%

UCW terminal	Busan port
45 Van/ 1 loader	16.7 Van/1 RTGC

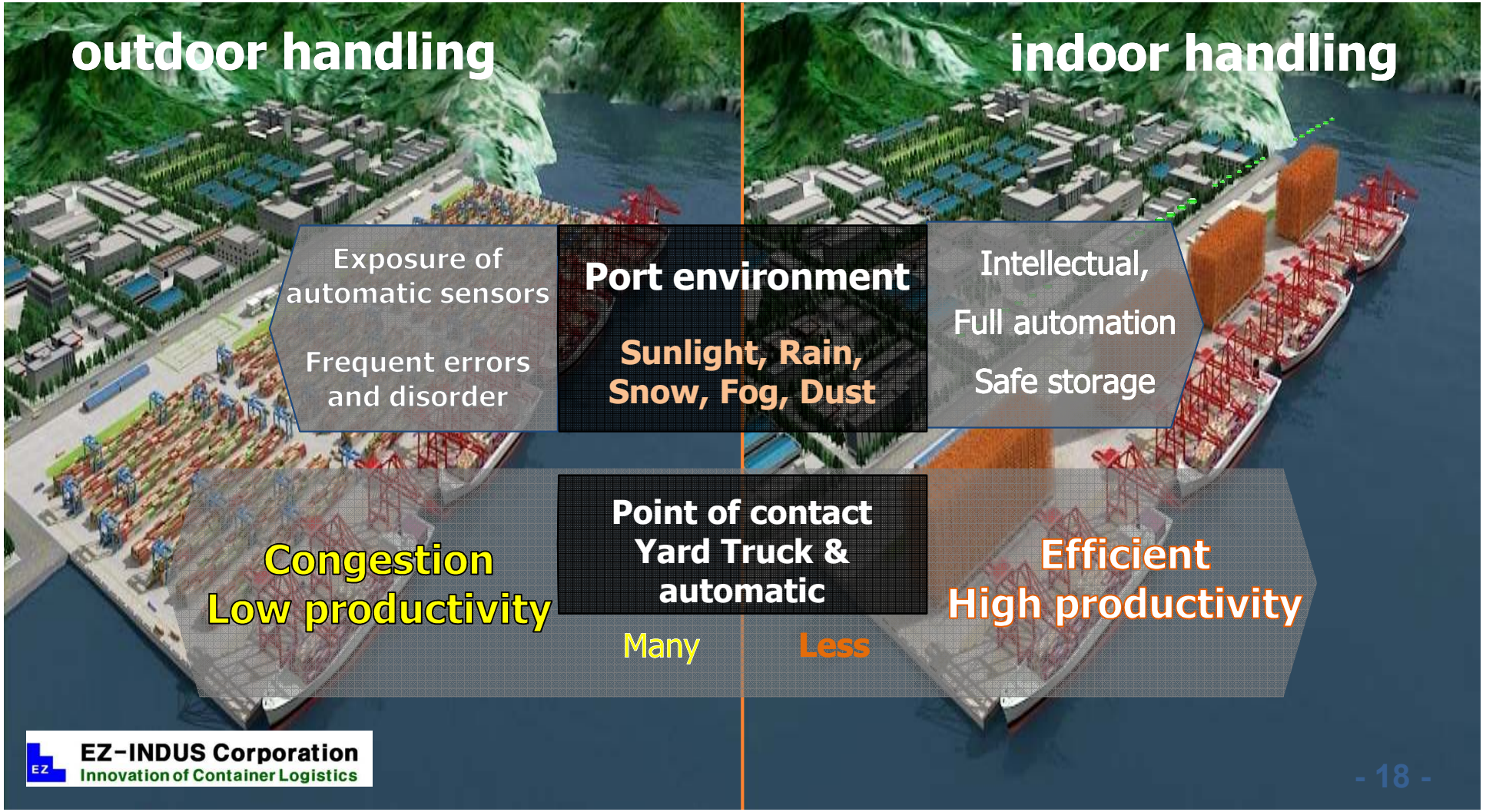
Manpower per berth

85%

UCW terminal	Busan port
9 p/berth	60 p/berth

Comparison (4)

Conventional terminal : **UCW terminal :**



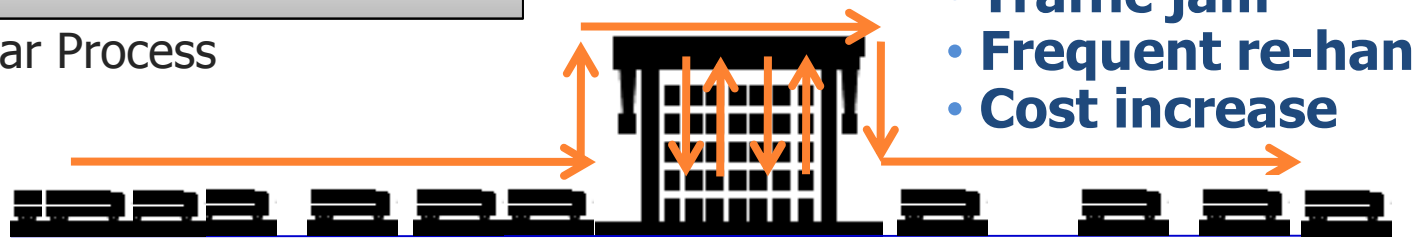
Comparison (5)

Yard operation

Conventional terminal

: Linear Process

- Long waiting time
- Traffic jam
- Frequent re-handling
- Cost increase

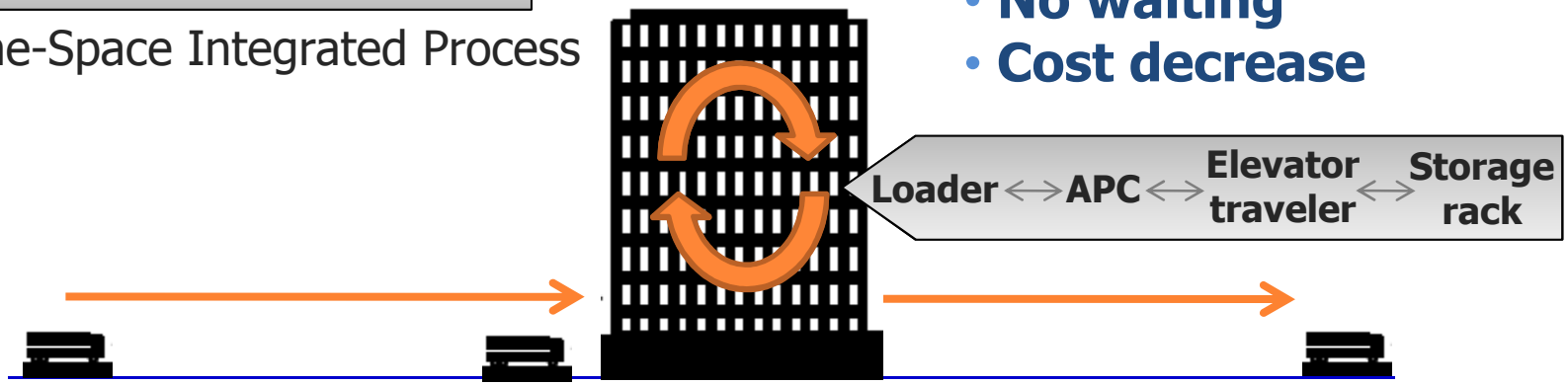


RMGC min.8

UCW terminal

: Time-Space Integrated Process

- Full automation
- No waiting
- Cost decrease



UCW 1 building

Why
UCW system ?

Benefits of UCW

UCW terminal benefits for the all port stakeholders

Port operator

- could handle massive container volume
- could reduce operation & maintenance cost
- could give more qualified service to clients
- could have competitiveness than other port
- could achieve green, clean & safe port

Shipping liner

- could save wharfing cost
- could service more faster delivery
- could object competitiveness

Investor

- could return investment in relatively shorter time

Government

- could reduce national logistics cost
- could growth of relevant industries
- could development & acceleration of hinterland
- could save marine environment and resources
- could use land with high efficiency

Advantages of UCW

1. Efficiency

Normally containers are spread out over wide area of the container yard in the port. With UCW, they will be able to be consolidated efficiently inside of UCW system.

- **Simplify working procedures which lead to faster and more productive work environments**
- **Raise the storage capacity of the container equipment**
- **Minimize re-handling or re-marshalling of containers**
- **Reduce bottleneck-effect in quay wall**
- **Shorten traffic lines**
- **Reduce waiting time of vessels**
- **Fast rotation of the vessels**
- **Acquiring high priority of a port of call from container ships**

Advantages of UCW

2. Cost Reduction

- Increase productivity and profit of port through fast circulation of container logistics
- Reduce labor expenses and operation cost due to fully automated system
- Save time and cost for both port operator and shipping companies from reducing demurrage
- Reduce maintenance and repair cost of port working equipment
- Reduce construction cost from land and foundation

Advantages of UCW

3. Mechanical Aspects

- Introduction to fully automated system
- Organize container freights by warehousing and delivery order from fully automated control and management system
- Every container process carried out in the rack-structured building
- Minimized manual labor and manpower owing to the automated equipment
- Safe working environment

Advantages of UCW

4. Order made Design

- Optimized design for each port depending on expert site survey, cargo volume, port condition etc.

5. Environmental Aspects

- Use electricity and oil pressure for operation
- Reusable and recycled oil for power to minimize environmental pollution
- Minimize air pollution and dust in port due toworking process inside of UCW building

Advantages of UCW

6. Industrial Complex in port hinterland

- One-stop and integrated service like manufacturing packaging and distribution etc. for the faster container handling
- Increase cargo volume and profit of the port
- Green place and convenient facilities for the users of the port and residents in the near city

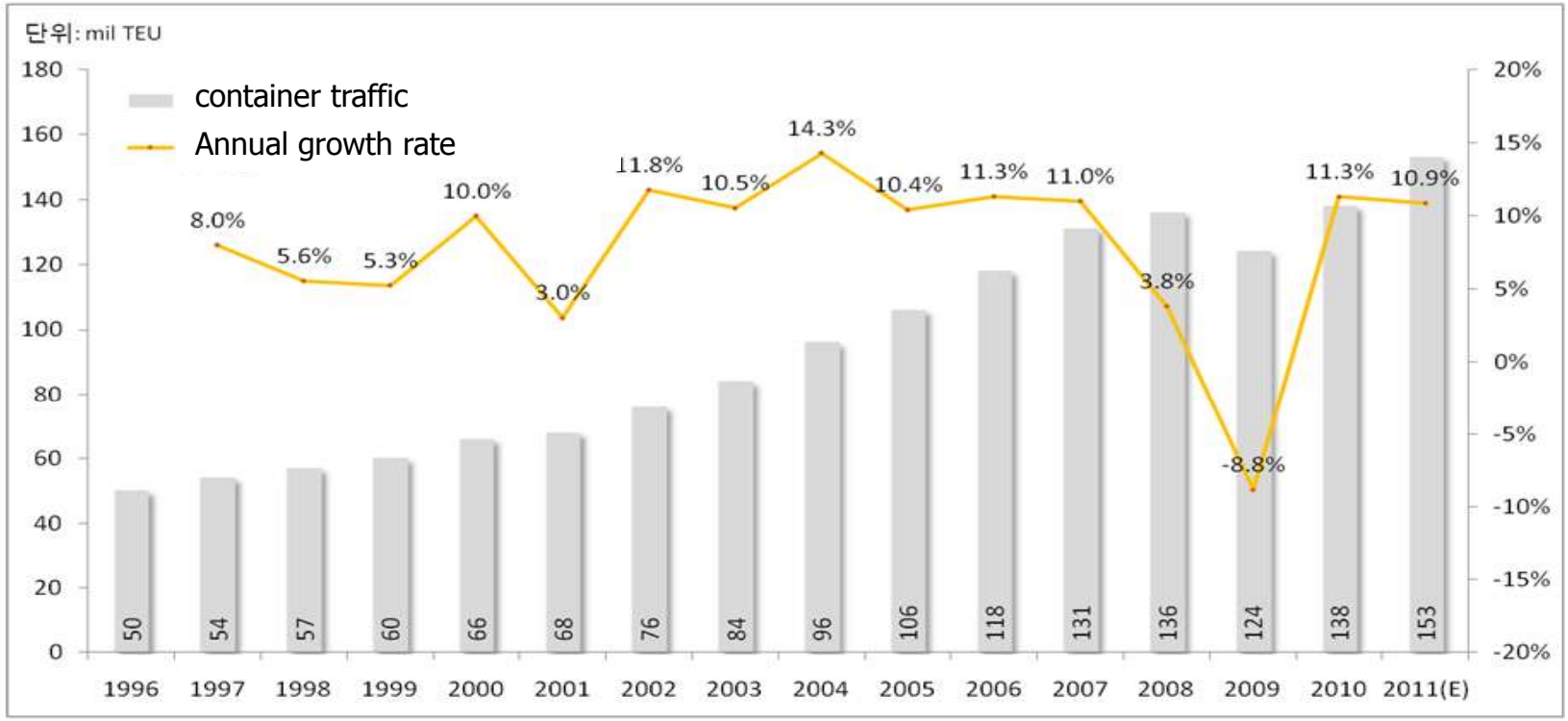
ıtainer terminal

UCW container terminal

The world market trend of UCW-System

Market forecasting of UCW system

International Annual growth rate of container traffic



Sources : Clarkson, Container, Intelligence Monthly, October 2010, KMI Data

KMI estimate "The international annul growth rate of container traffic" will be increased about 10% every year compared with the previous year. Therefore annual creation size about the world market of UCW will be reached more than 4.7billion USD even though the existing remodeling market exclude.

Proposals
for
national R&D technology

Proposals

For speedy commercialization of national R&D technology, let EZ-INDUS Corporation propose as following several measures because it has validity Government support the effective institutional fosterage policy & strategy.

◎ Fostering the UCW Test Bed for continuous improvement the technology & marketing promotion.

◎ Speeding up the introduction of UCW through giving an additional points in case the private contractors adopt UCW when the Government select the private capital contractor about the newly domestic(local) ports development as a national undertaking.

◎ Improving the public confidence through the positive marketing cooperation between the relevant governmental institution when companies work in obtaining order foreign ports-oriented.

◎ Supporting the financial Incentive enable to lend the domestic (local) low interest policy loan for foreign ports with a view to introduce UCW.

UCW system, your key solution.

Thank you.

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