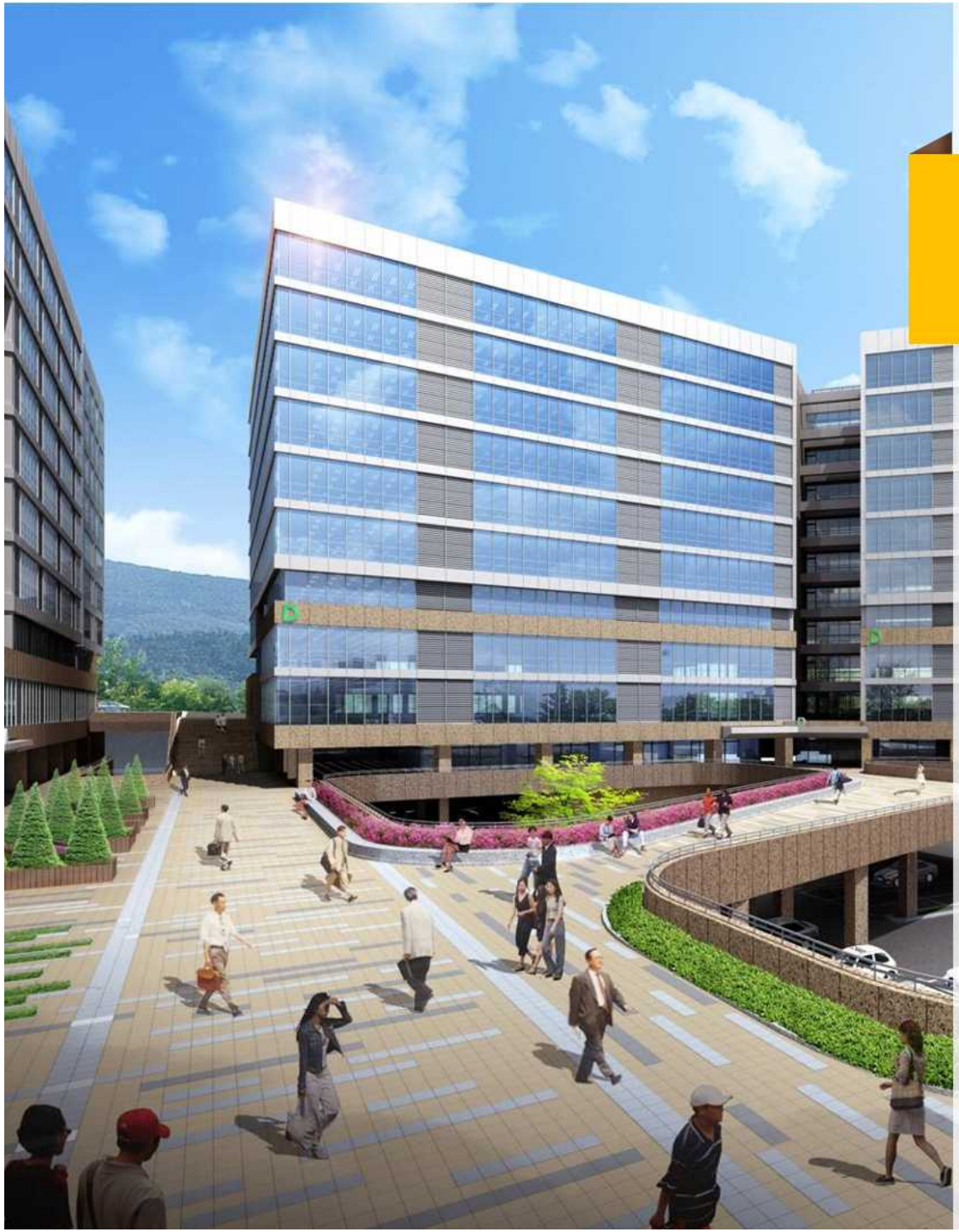
Indeogwon IT Valley
Construction Management



Indeogwon IT Valley Construction management

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SUNJIN
ENGINEERING & ARCHITECTURE

Chapter 01

Project Introduction

Project Purpose

Project composition

Marketing

KOREIT

DigiPrism

Construction

SAMSUNG HEAVY INDUSTRIES

CM

SUNJIN
ENGINEERING & ARCHITECTURE

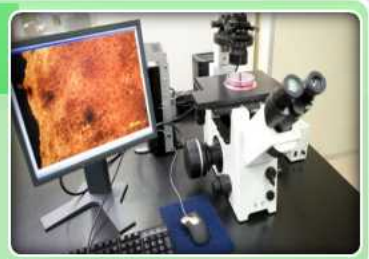
Development Target

Complex working space

- Developing high-tech academic
- Linkage between Companies

High-tech IT Cluster

- High-tech intensive research Cluster
- Developing latest IT technologies



Forming self-sufficiency

- Creating added value
- Establishing production base

Establishing national growth base through IT Research Complex

Overview

Site Address	40, Imi-ro, Uiwang-si, Gyeonggi-do	Gross Area	Total 199,166.93㎡
Con. Period	2012.04.30 ~ 2014.05.30	Con. Cost	₩1,56billion(CM ₩2.64)
Use	Knowledge Industrial Center, Dormitory	Story	B3/10F

CM Strategies ▶ Building permit & Functional linkages

Project Analysis

Project Side Analysis

Marketing Target

- Distribution guarantee (Non sale → Contractor)
- Con. Cost reduction

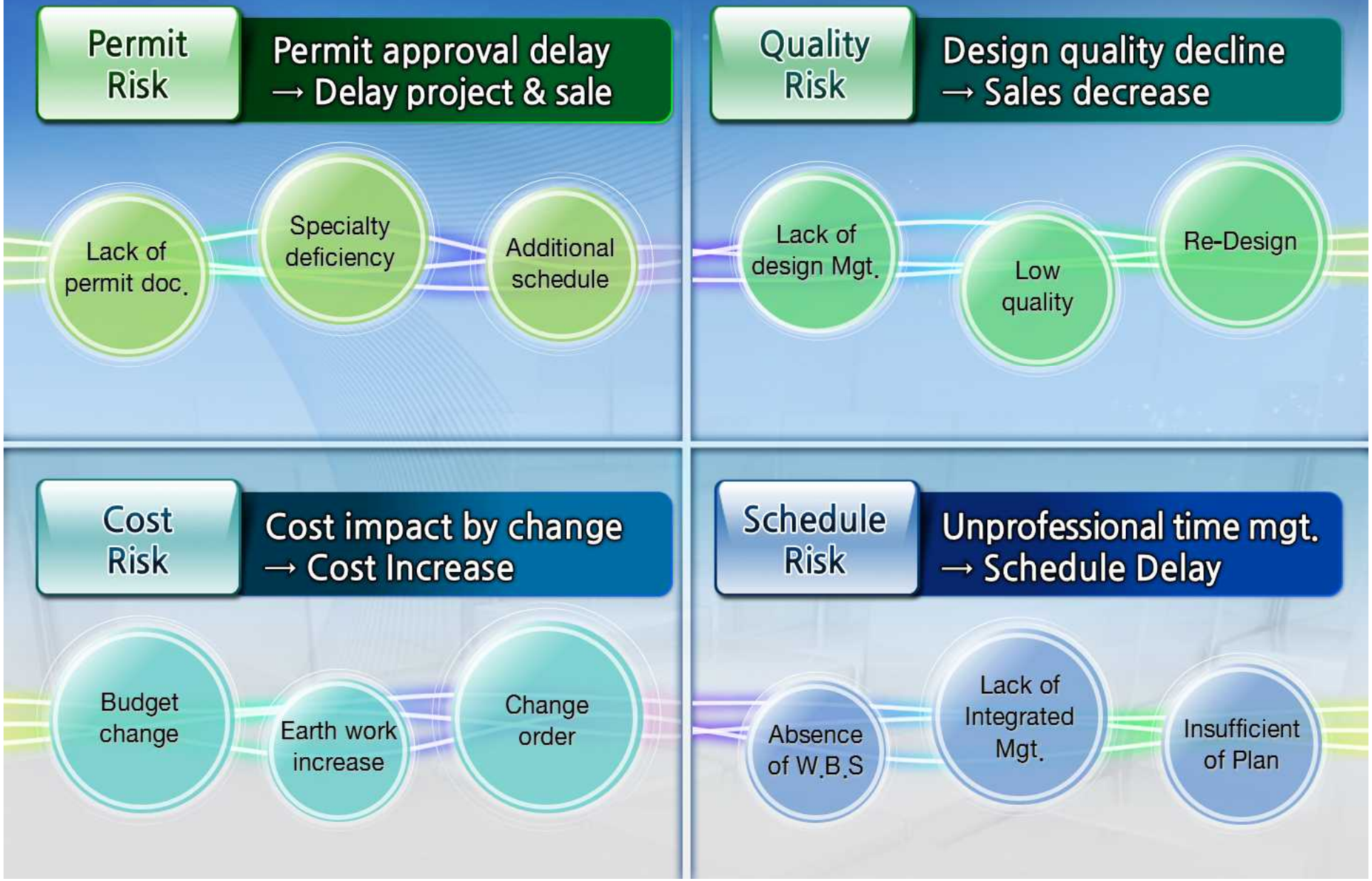
Construction Side Analysis

Construction

- Earth work with rocks
- 4 Mass concurrent con.
- Design change

CM Strategies ▶ Management of Each project phase

Risk Analysis



CM Target

Strategy 1 CM service for proper permit

Strategy 2 Design Quality upgrade

Strategy 3 Cost reduction & Cost Mgt.

Strategy 4 Schedule reduction – 1Month

Strategy 5 Marketing Support for profit increase

Chapter 02

CM Achievement

CM1 CM service for proper permit

Require ments & status

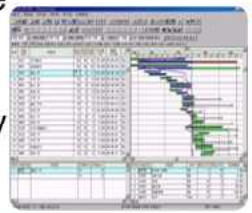
Proposal Schedule

Establishing strategy for permit

Needs

Compliance sales schedule

- Compliance const. schedule
- Establish permit schedule
- Securing of sales profitability
- Processing approval work



Risk

Schedule delay(Manpower shortage)

- Unstable planning schedule
- Shortage expert manpower
- Reviewing regulations
- Delaying a sale

Suggest an alter

- Plan the suitable permit schedule
- Process a conference with permit institution

Ensure design quality

- Involve the part experts in design phase
- Review and apply the check-list

Involve experts

- Involve experts of over 20years experience
- Prepare for the pre-reviewed documents

Review a statute

- Review regulations related Uiwang City
- Propose alter. of target for consideration

CM1 CM service for proper permit

Require ments & Status

Proposal Schedule

Detailed plan for permit schedule compliance

Category	2011 11M	2011 12M	2012 1M	2012 2M	2012 3M	2012 4M	2012 5M	2012 6M
General Permit schedule	Analysis of permit schedule of apartment factory							
Proposal Permit schedule	Reduction of 2 months							
Construction Deliberation		Interview with deliberator						
Establishment Approval			Support document preparation					
Construction Permits				Prepare document				
Analysis of Traffic Impact Assessment		Archi.& Total deliberation						
Landscape Consultation	Reflect improvements							
Energy use Plan		Completion prior to approval						

Reduction of Permit Schedule

- Minimize reconsidered parts by interviewing deliberator
- Prepare documents of const. &establishment approval
- Acquire permit by prior consult. with permit mgr
- Do the landscape consult. if deliberation occurs
- Manage a energy use plan report after beginning CM

CM2 Design Quality Upgrade

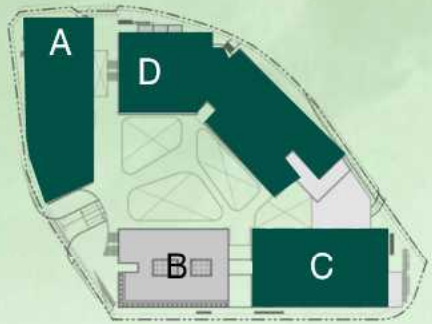
Factory

Office

Supporting Facility (dorm, commercial)

Customized work space(considering space use, work efficiency)

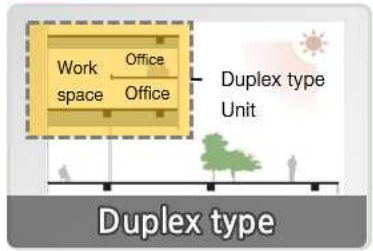
Factory overview



- **Zone**
  A(B1~4F),
  C(B1~4F),
  D(B1~4F)
- **Facilities**
  Manufacturing business
  (general, knowledge basis)

1 Optimized work space


Hoist in work space

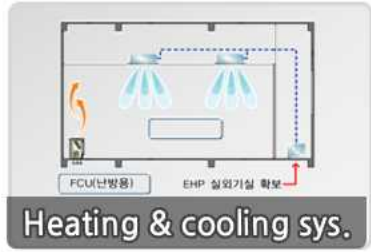


Duplex type

- Design efficient plan & optimize exclusive area
- Secure reasonable height & safety of weight
- Improve marketing by duplex space examination

2 Pleasant environment


Ventilation unit



Heating & cooling sys.

- Review each ventilation plan in underground space
- Remove complaint factor by business grouping plan
- Select reasonable heat&cool sys. by space characteristic

3 Efficient distribution Sys.


Drive-in sys.


Multipurpose warehouse

- Review drive-in systems in all work space
- Plan enough parking and loading&unloading space
- Plan multipurpose warehouse for temporary storage

CM2 Design Quality Upgrade

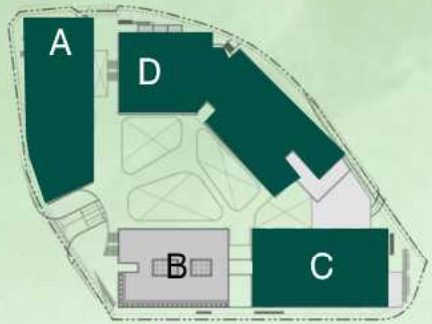
Factory

Office

Supporting Facility (dorm, commercial)

Functional space(considering knowledge-based service industry characteristic)

Office overview

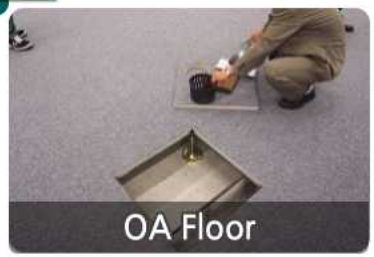


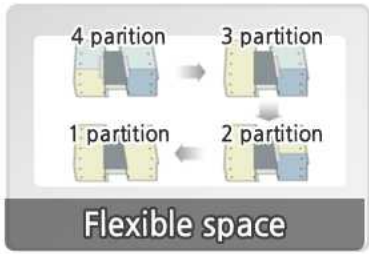
- **Zone**
  A(5~10F),
  C(5~10F),
  D(5~10F)
- **Facilities**
  General office,
  Research lab

1 High-tech office infra

- Construct wireless network & office automation
- Establish integrated mgmt. facility for sys. manage
- Build security sys. related knowledge-based service

2 Practical work space





- Maximize marketing area through securing personal space
- Improve work environment by OA Floor
- Construct flexible space for office layout change

3 Creative work space

- Decrease ventilation load by optimized ceiling height plan
- Create environment-friendly rest space by green roof
- Offer pleasant air condition by clean system plan

CM2 Design Quality Upgrade

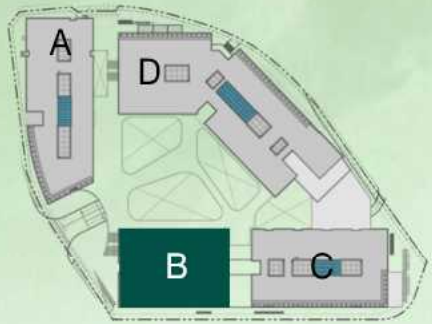
Factory

Office

Supporting Facility (dorm, commercial)

Differentiated supporting facility(considering convenience & efficiency)

Supporting facility(dorm, commercial) overview



- **Zone**
  B(3~10F),
  B(B1~2F)
- **Facilities**
  Dormitory,
  Commercial facility

1 Convenient commercial facility


Food Court


Amenities

- Assure future variability through designing variable wall
- Design plan interconnected with convenience facility&MD
- Secure and design proper area of applied facility

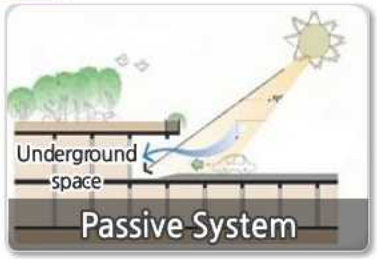
2 Individual rest area(dorm)


Interior dormitory space


Integrated security sys.

- Complex function & design for independence
- Introduce crime/disaster prevention sys. for safety
- Plan proper module per man for storage space

3 Pleasant environment



Passive System


Sunken

- Plan passive sys. such as daylighting and ventilation
- Establish soundproof measures for pleasant
- Install sunken for improving access of underground

CM3 Cost reduction & Cost Mgt.

Similar facilities Data

Cost Analysis

CM Plan

Analysis of similar Project cost for checking the suitability

- Case study for checking the suitability
- Make a list of apartment factories
- Select 5 projects(similar scale/feature)

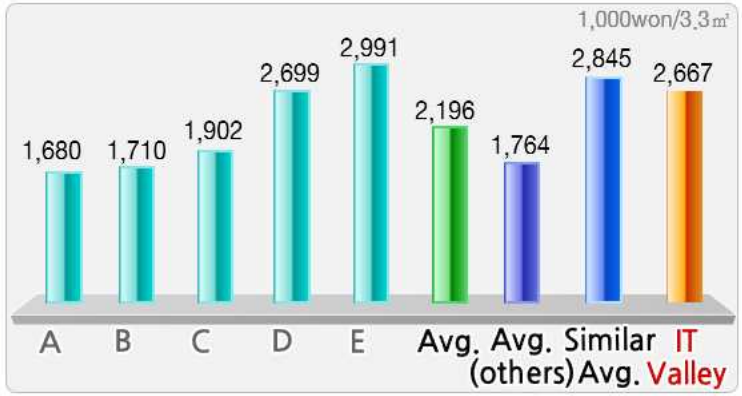
Make a list (20 projects) → Select 5 similar projects → Analyze projects data → Draw cost managing plan

	Bucheon Techno Park 3	EZEN APT Factory	Poongsan APT factory	Incheon Mechatronics	Songdo T-center
Image					
Site	Bucheon, Gyeonggi	Gimpo, Gyeonggi	Hanam, Gyeonggi	Incheon	Incheon
Scale (area)	B1/F13, 6 buildings (330,282m^2)	B1/F8, 3 buildings (216,544m^2)	B4/F10, 1 buildings (197,273m^2)	B2/F28, 1 buildings (67,070m^2)	B1/F30, 1 buildings (106,712m^2)
Purpose	Factory/Dorm/ Commercial	Factory/Dorm/ Commercial	Factory/Office/ Commercial	Urban factory/Study /Venture firm	Urban factory/Study /Venture firm
Structure	R.C	R.C	R.C	S.R.C	S.R.C
Method	SCW+Strut/Raker	Open Cut	SCW+Strut+L.W	SCW+Sheet Pile	RCD+Sheet Pile
Finishing material	AL Sheet panel /16T color pair glass	AL composite panel /18T color pair glass	AL composite panel /Curtain wall/16T-color tempered glass	AL composite panel/ SPG/Color pair glass /Exposed Con'c	AL composite panel/ SPG/Color pair glass

CM3 Cost reduction & Cost Mgt.

Check the cost suitability & Analyze risk of increase in cost

Similar facilities cost analysis



Anls. 1

It is 470,000won/3.3㎡ more than similar facilities total Avg.(2,190,000won/3.3㎡)

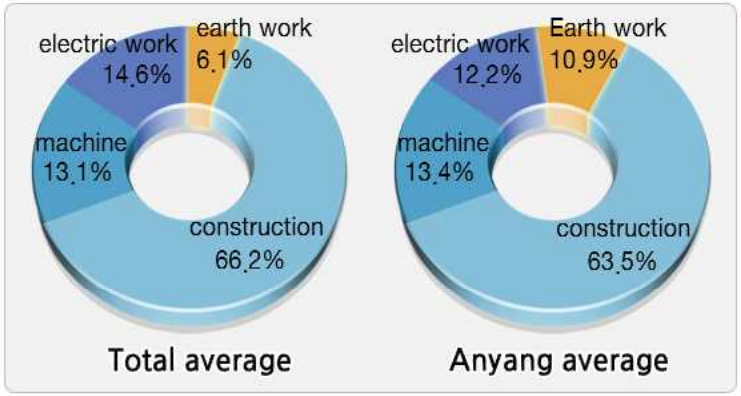
Anls. 2

There are project-specific deviations that are different.

conclusion

180,000won/3.3㎡ lower than similar Avg, it is essential to manage the cost.

Detail cost analysis



Anls. 1

The rate of earth work in Anyang is 4.80% more than total average.

Anls. 2

The rate of earth work increases because of the rocky area at site.

conclusion

It is necessary to manage the cost considering the rocky area at site.

CM3 Cost reduction & Cost Mgt.

The Cost & Risk management plan based on the analysis

Cost management tech. | Detail cost reduction item | Cost changes management

CM start

- Compute a reasonable cost by the cost planning
- Remove excessive design factors by basic deign study

Enforcement design

- Derive the best value design plan based on VE
- Reasonable contract support by checking the cost detail

Construction

- Budget management based on actual input
- Suggest alternative solutions when design changes occur

Complete the project within scheduled cost

CM3 Cost reduction & Cost Mgt.

The Cost & Risk management plan based on the analysis

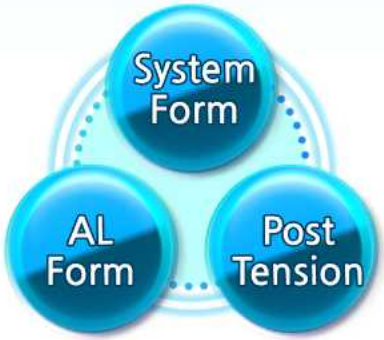
Cost management tech. | **Detail cost reduction item** | Cost changes management

Earth work

- Select reasonable items that secure safety of blasting work

Structure work

- Apply optimal cost reduction items considering material, manpower and period



Finishing & etc.

- Find out items based on the analysis of maintenance abilities & input resources

Secure the reserve fund by cost reduction

CM3 Cost reduction & Cost Mgt.

The Cost & Risk management plan based on the analysis

Cost management tech. | Detail cost reduction item | **Cost changes management**

Apply the latest trend

- Appearance & finishing Material suitable for IT-Valley

Minimize the risk of the client by checking the level of appearance & reserve fund

Develop Eco-system

- Increasing in the cost due to introduction of eco space & new renewable energy.

Preliminary review of eco-system & select the economic alternative

Specialized facility

- Increasing in the cost by the demand of the client about special function for marketing

Review the facility performance in the cost and make a PR strategy

Minimize the risk of client by cost changes

CM4 Schedule reduction – 1Month

Schedule Risk Mgt.

Reduction Item

Suggested Schedule by Contsructor(26Months)

Suggested schedule by Sunjin Engineering(25months) — 1M reduction

Plan 1 — Utilizing process management techniques

Utilizing and applying Proper process Management techniques to construction

- Zoning
- LOB/ TACT

Plan 2 — Considering schedule compression

Choosing and Examining Possible Schedule Compression method on each work section

- Optimize Earth work method
- Cycle Time Plan

Plan 3 — Schedule compressing Item

Choosing and managing schedule Compressing Items to improve productivity

- Dry Material
- Unit Material

CM4 Schedule reduction – 1Month

Schedule Risk Mgt.

Reduction Item

Suggested Schedule by Contsructor(26Months)

Suggested schedule by Sunjin Engineering(25months)

1M reduction

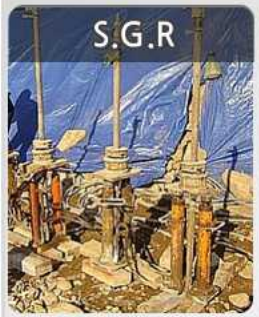
Earth work

Structure work

Finishing work

Plan on Earth work

- Applying different excavation work on each sections
- Improving efficiency using Blasting method

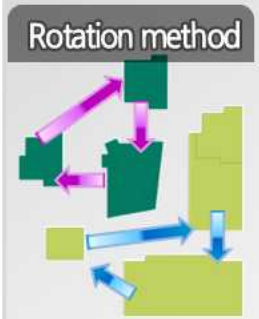


Plan on Structure work

- Improve Efficiency by Zoning & Cycle Time
- Using factory manufactured rebar

Plan on Finishing work

- Work Team rotate with zone for concurrent construction
- **Unitification & introduction of dry material**



CM5 Marketing support for profit increase

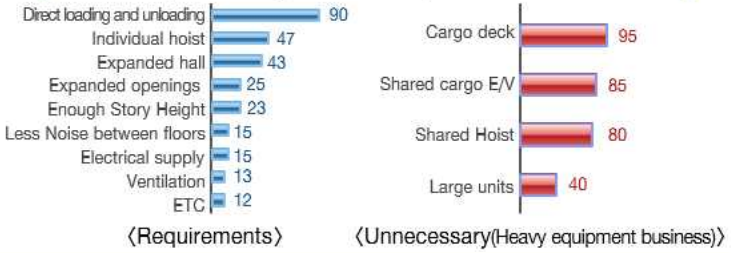
Project Analysis

Profit Increase

Analyzing business conditions to secure Profitability of the project

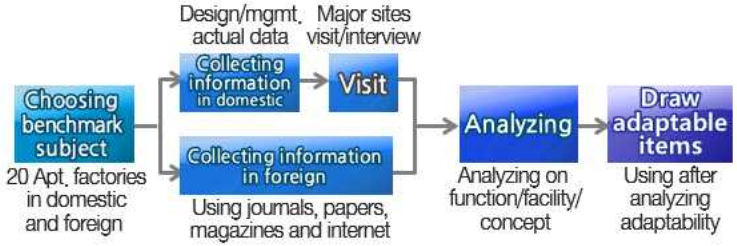
Resident requirement analysis

[Case study on 20 apartment-style factories in Korea]



Improving marketability by applying survey results to make user-centered design

Case study on similar facilities



Draw adaptable Items through understanding requirements and latest trends by benchmarking on similar facilities

Analyzing schematic design

Planning	Minimalizing less demanded outside unit because of impossible of loading&unloading	Improving marketing
Common facility	Minimalizing low frequency of usage items Such as, Shared cargo E/V, shared Hoist	Increase profitability
Private rate	Improving private rate by revising plan considering unnecessary factors	
Const. method	Considering Proper new const. technologies and methods for cost reduction and schedule compression	

Draw method to improve marketability and private rate through reviewing schematic design in advance by experts

Cost Analysis in similar facilities

Analyzing on similar facilities' construction costs to use as a standard for quality assurance of design

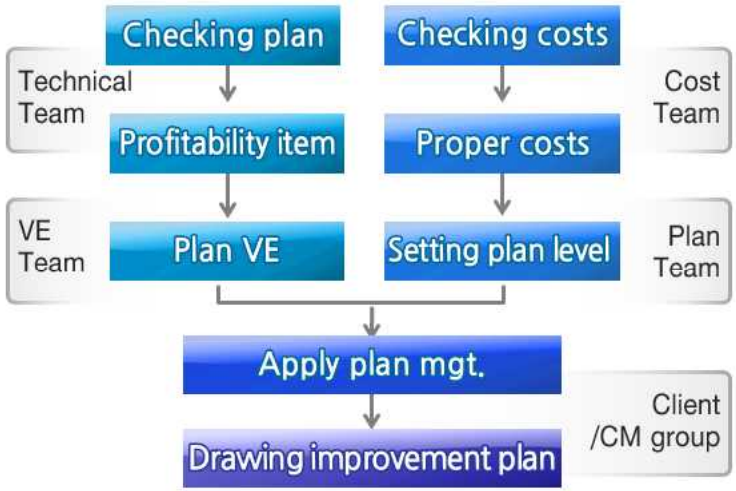
CM5 Marketing support for profit increase

Project Analysis

Profit Increase

Drawing proper plan & Secure profitability by phased management

increase profitability in estimated costs



- Performing VE & applying enforcement design about profitable items based on basic design
- Maximizing Clients profitability by drawing proper plan in estimated costs

Maximizing profitability by drawing proper plans

apply required facility performances

- Examining applicability of drawn items' through analyzing & benchmarking resident' requirements
- Improving marketing by gaining facility performance through focusing quality on required performance

Improving marketing by acquiring required performances

Conclusion

Thank you