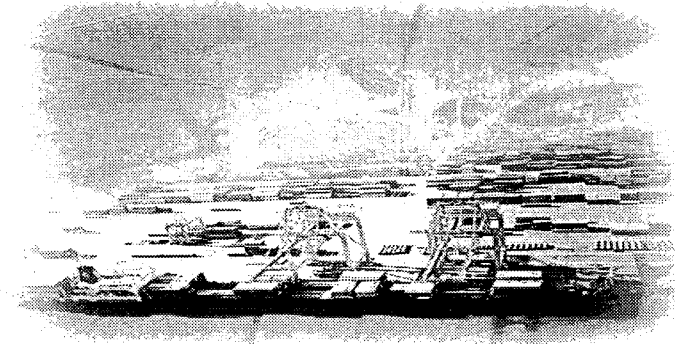


컨테이너 터미널 최적 운영 개선을 위한
항만용 가상현실 시뮬레이터



Total Soft Bank Ltd. Korea
Mr. J.R Choi/CEO

1. Introduction

- 1.1 CATOS-Port Simulator
- 1.2 System Strategy

2. CATOS-Port Simulator

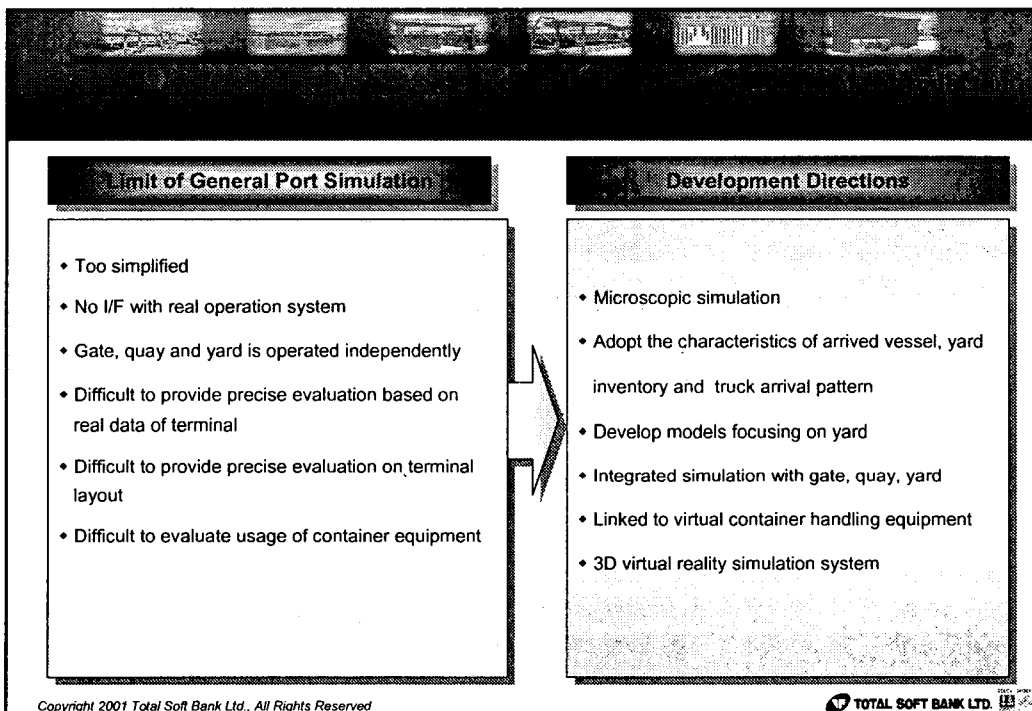
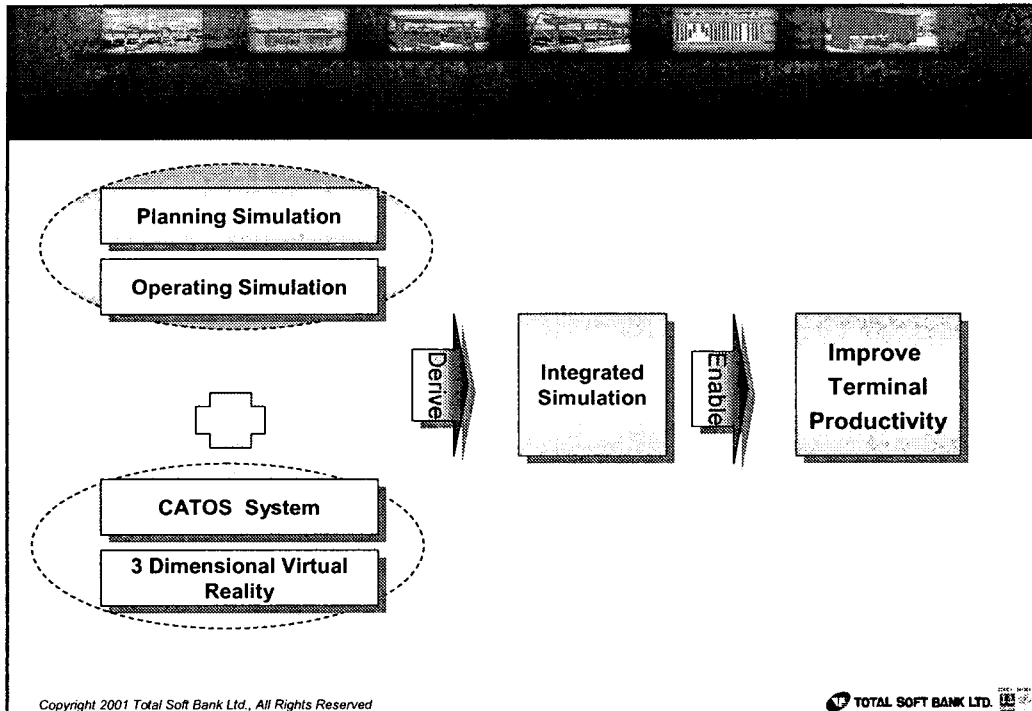
- 2.1 System Overview
- 2.2 System Configuration
- 2.3 System Feature

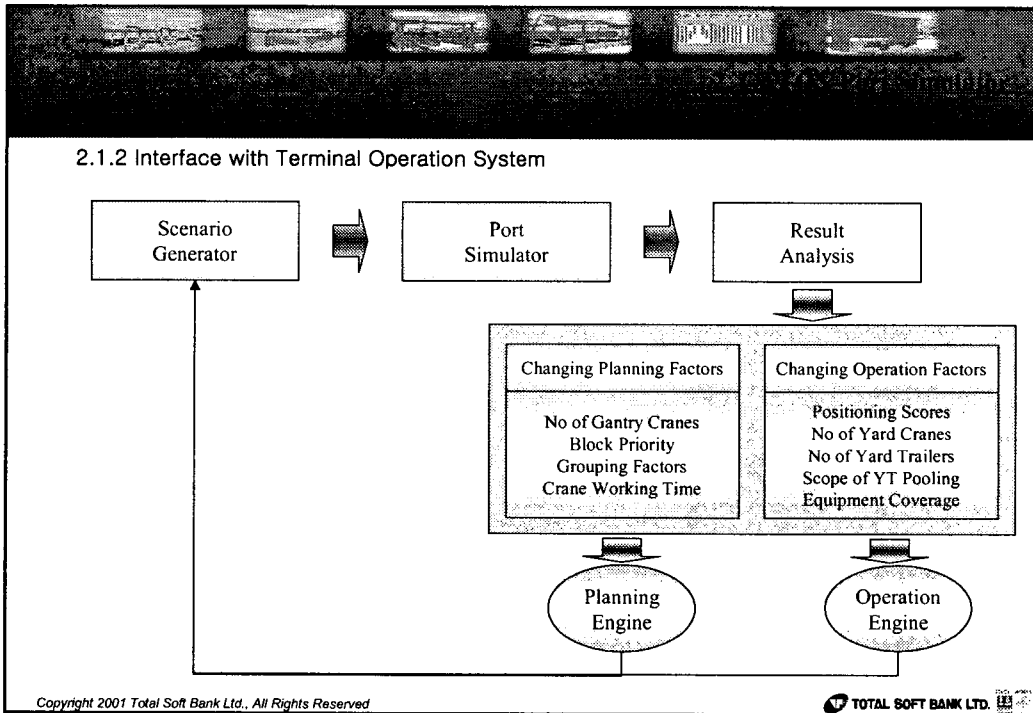
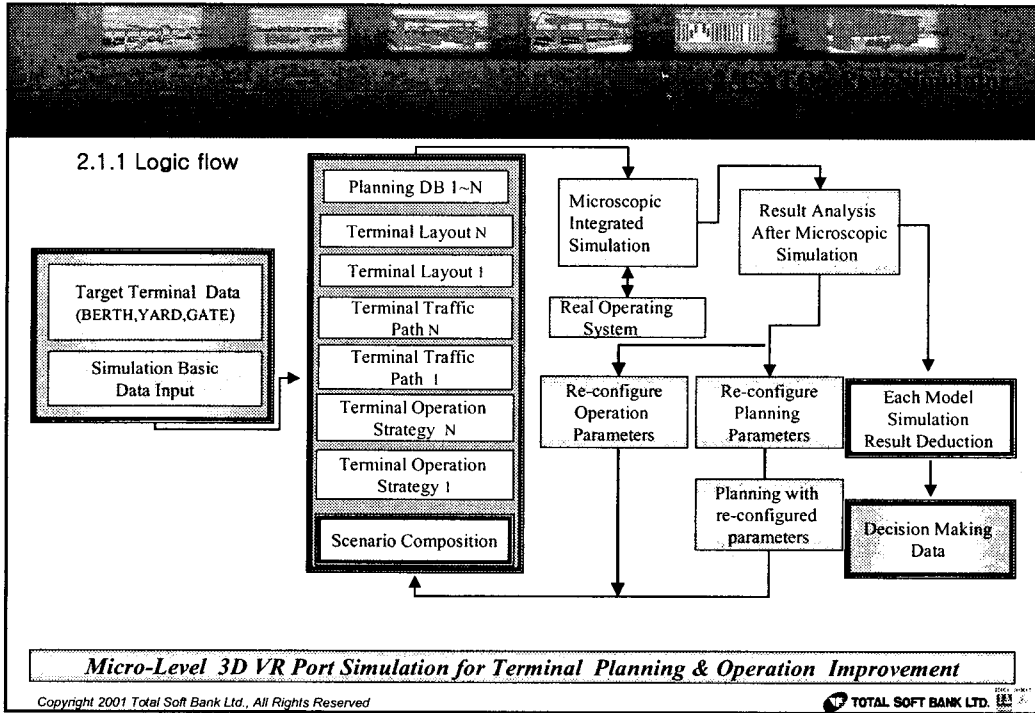
3. Case Study - KLINE OHI Terminal

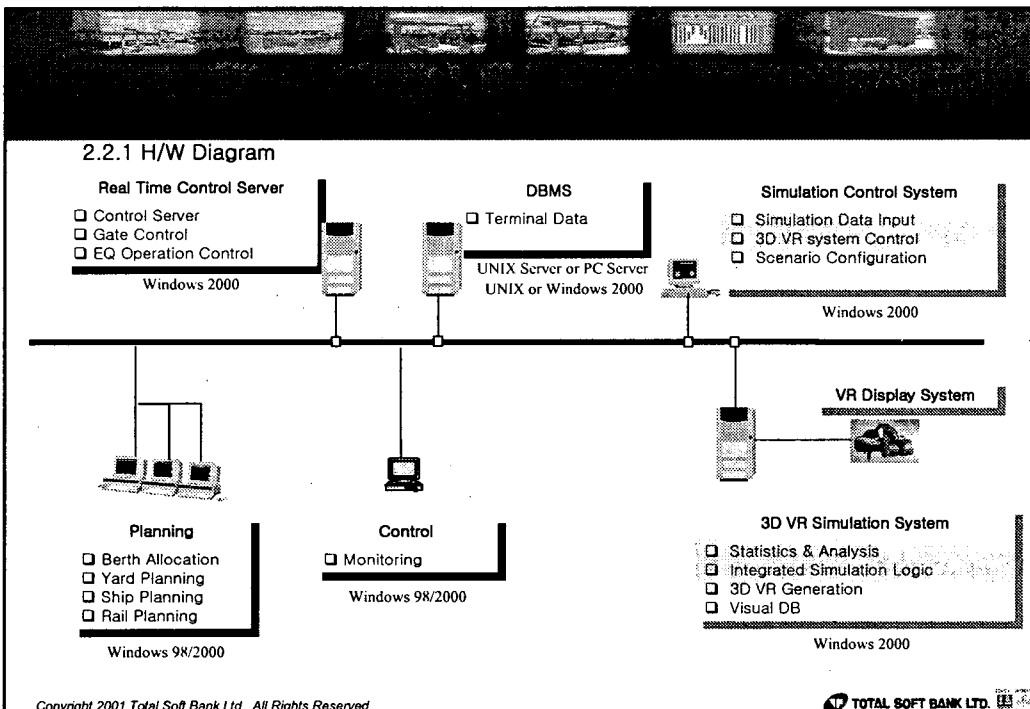
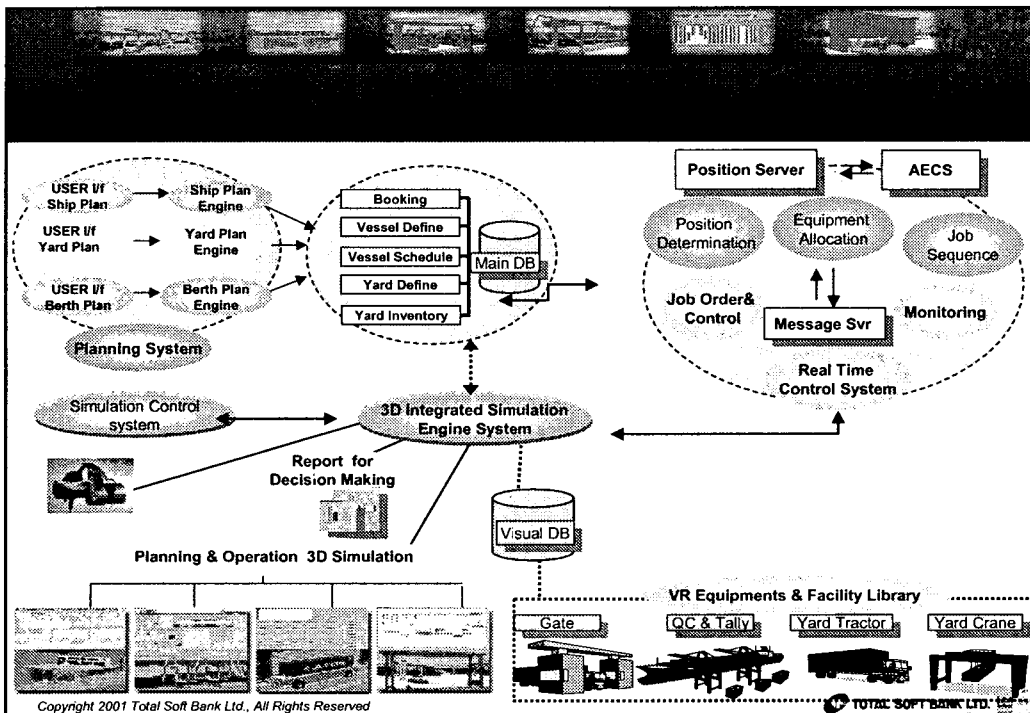
- 3.1 Simulation Environment
- 3.2 3D VR Microscopic Simulation

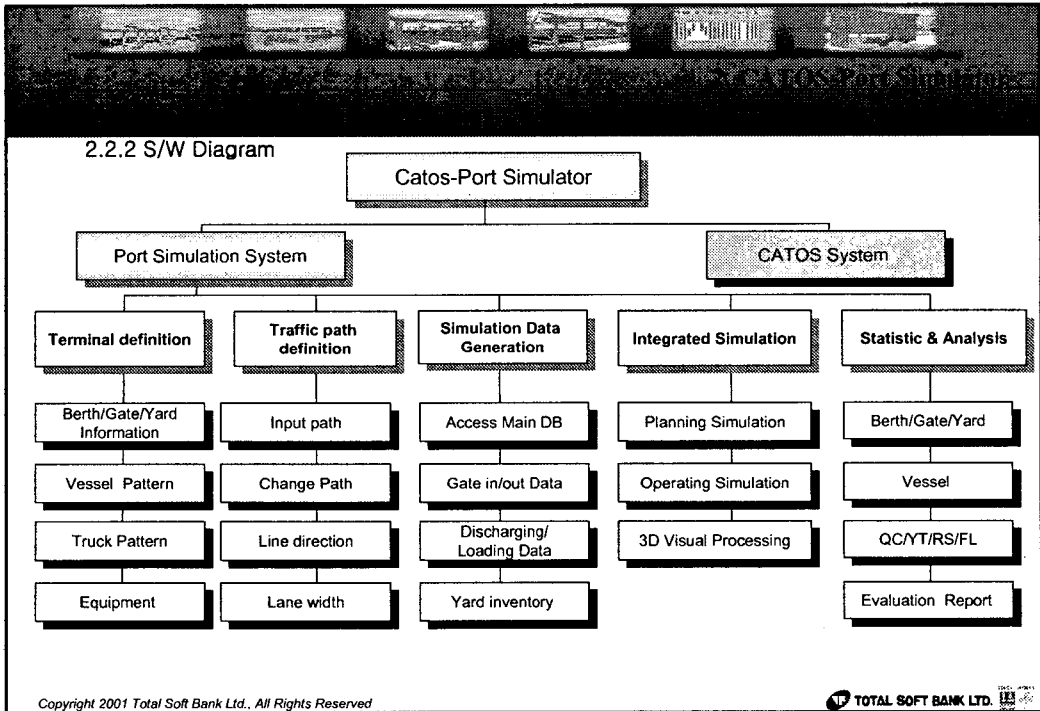
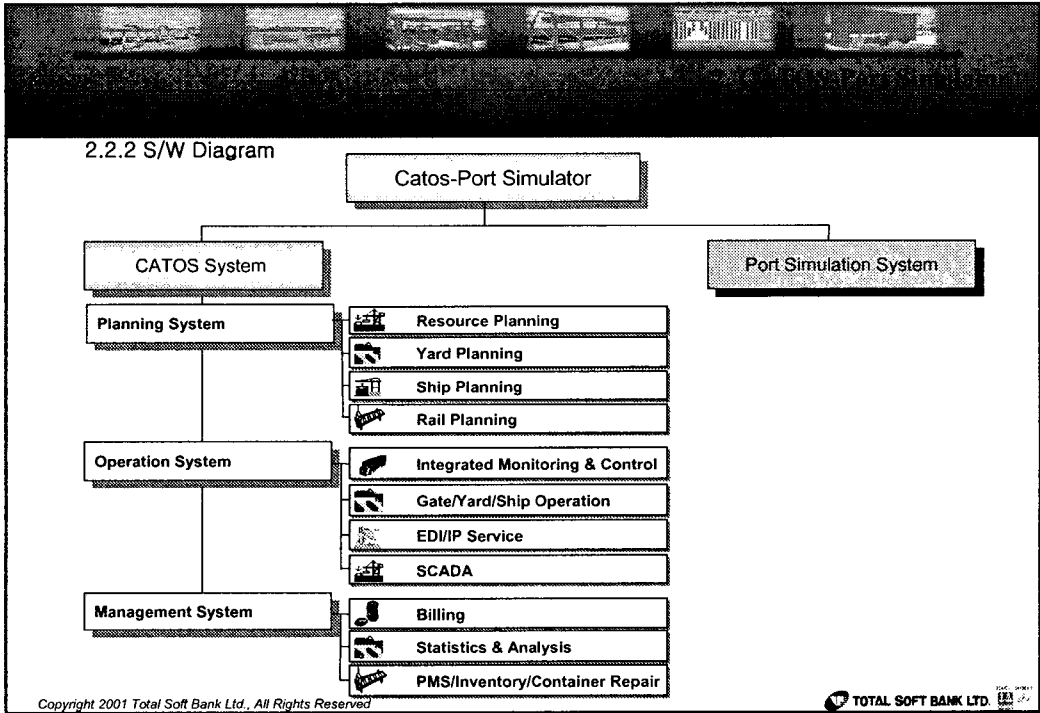
4. Conclusion


- 4.1 Expected Benefit











2.3.1 Targets and Critical Success Factor

Targets

- Improve yard, gate, yard utilization
- Make a plan for optimal work sequence
- Reduce truck turnaround times
- Improve QC, YC productivity
- Minimize the number of equipment shifting


Critical Success Factors

- Acquire a accurate terminal information
- Simulate with real operating system
- Mimic a real equipment operation
- Use the working planning database planned by real planning system

2.3.2 Major Features

- Evaluation of the given terminal Layout
- Evaluation of the given ship planning data
- Evaluation of the given Yard planning data
- Evaluation of the equipment assignment
- Evaluation of the yard assignment

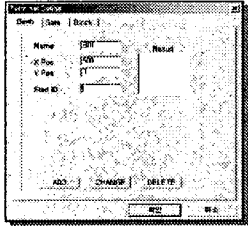
Copyright 2001 Total Soft Bank Ltd., All Rights Reserved TOTAL SOFT BANK LTD.



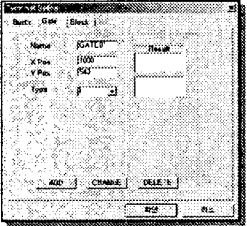
2.3.3 Target Terminal Definition

- Block Define
- Gate Define
- Berth Define
- Equipment Define
- Fixed Building, Facilities Define

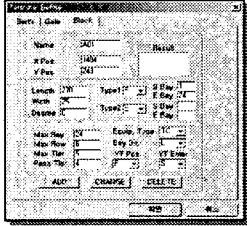
Berth



Gate



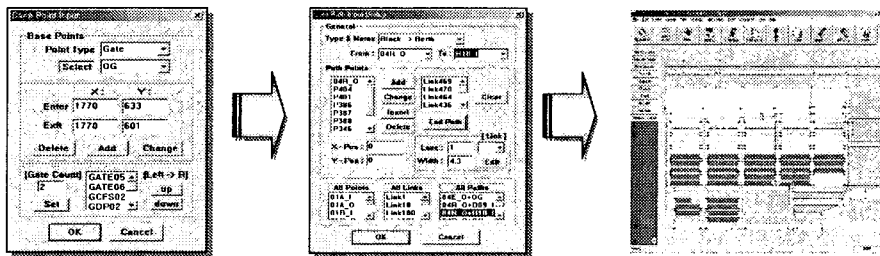
Yard



Copyright 2001 Total Soft Bank Ltd., All Rights Reserved TOTAL SOFT BANK LTD.

2.3.4 Traffic Path Definition

- Traffic route definition by user
- Block, berth, gate layout information
- Path input / output point generation by system
- Path modification
- Fixed Building, Facilities Define

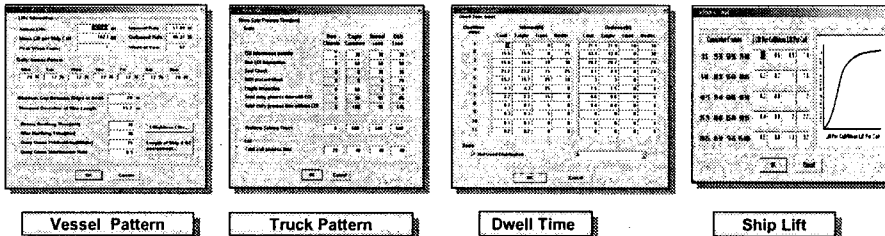


Copyright 2001 Total Soft Bank Ltd., All Rights Reserved

TOTAL SOFT BANK LTD.

2.3.5 Simulation data generation

- Connection with operation system database
- Gate in/out container list
- Ship discharging/loading list
- Yard inventory container list



Vessel Pattern

Truck Pattern

Dwell Time

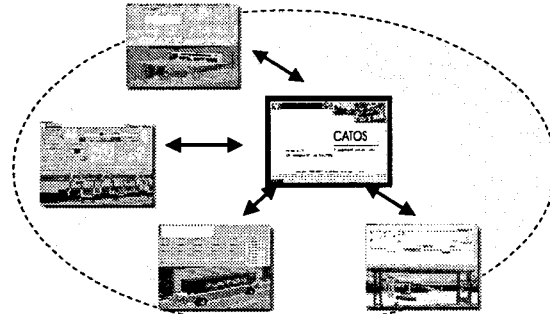
Ship Lift

Copyright 2001 Total Soft Bank Ltd., All Rights Reserved

TOTAL SOFT BANK LTD.

2.3.6 3D integrated simulation

- Integrated Simulation logic implementation
- Real time 3D visual & sound DB Processing
- Berth, Yard, Gate operation visualization
- Equipment operation visualization

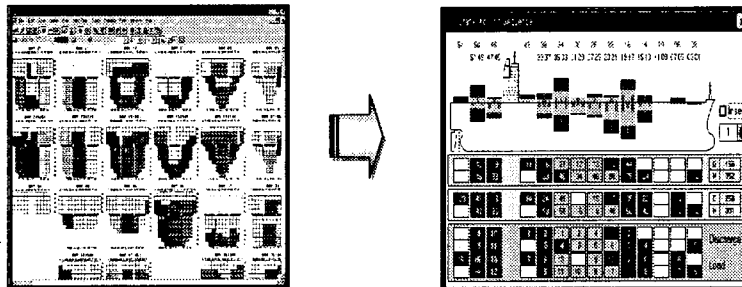


Copyright 2001 Total Soft Bank Ltd., All Rights Reserved

TOTAL SOFT BANK LTD.

2.3.7 Evaluation of the given ship planning data

- Allow users to simulate several work scenarios
- Help planners find the optimal quay crane sequence
- Avoid quay crane confliction
- Determine the optimal work scenario



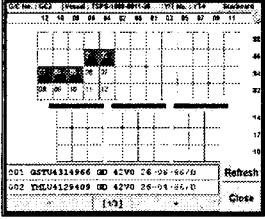
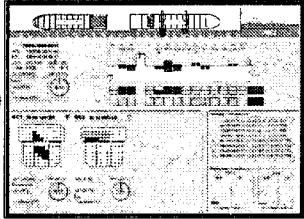
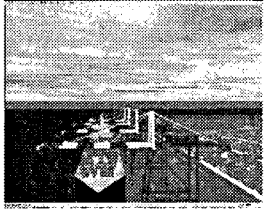
Copyright 2001 Total Soft Bank Ltd., All Rights Reserved

TOTAL SOFT BANK LTD.

2. CATOS Port Simulator

2.3.8 Evaluation of the given ship planning data

- Improve quay crane utilization
- Reduce vessel turnaround times
- Check re-handling container and irregular stowage
- Minimize the number of yard equipment shifting
- Minimize the number of quay crane shifting

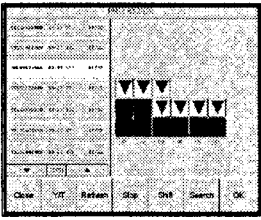
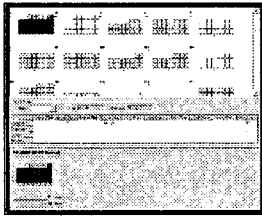
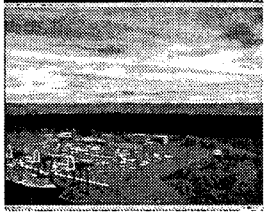

➔

➔


Copyright 2001 Total Soft Bank Ltd., All Rights Reserved TOTAL SOFT BANK LTD.

2. CATOS Port Simulator

2.3.9 Evaluation of the given Yard planning data

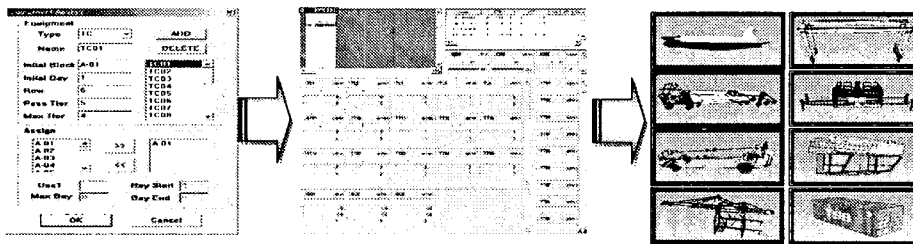
- Allow users to simulate several work scenarios
- Improve yard crane productivity
- Reduce yard tractor and trailer turnaround times
- Minimize the number of yard equipment shifting
- Assist yard planners with the optimization of the allocation


➔

➔


Copyright 2001 Total Soft Bank Ltd., All Rights Reserved TOTAL SOFT BANK LTD.

2.3.10 Evaluation of the equipment assignment

- Minimize equipment movement
- Reduce dispatcher workload
- Increase utilization of resources
- Improve terminal efficiency
- Reduce equipment idle time

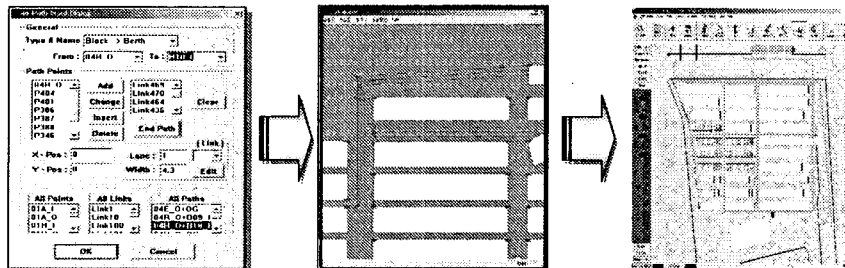


Copyright 2001 Total Soft Bank Ltd., All Rights Reserved

TOTAL SOFT BANK LTD.


2.3.11 Evaluation of the given terminal Layout

- Improve layout utilization
- Optimize traffic flow
- Reduce truck turnaround times traffic congestion on the yard



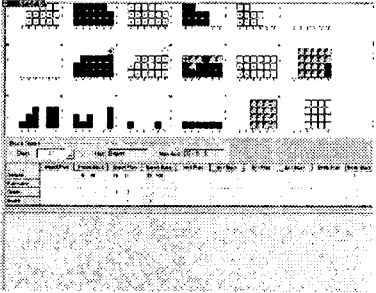
Copyright 2001 Total Soft Bank Ltd., All Rights Reserved


TOTAL SOFT BANK LTD.

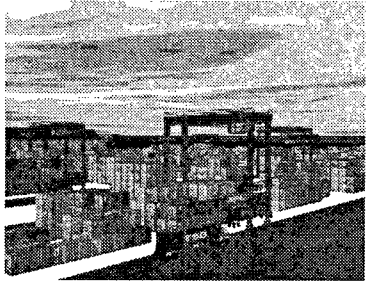


2.3.12 Evaluation of the yard assignment

- Optimize position assignment
- Minimize trailer turnaround times
- Improve yard density








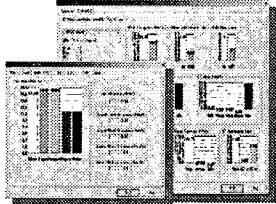
Copyright 2001 Total Soft Bank Ltd., All Rights Reserved

TOTAL SOFT BANK LTD.



2.3.13 Statistics & Analysis

- Report File
- Statistics Display

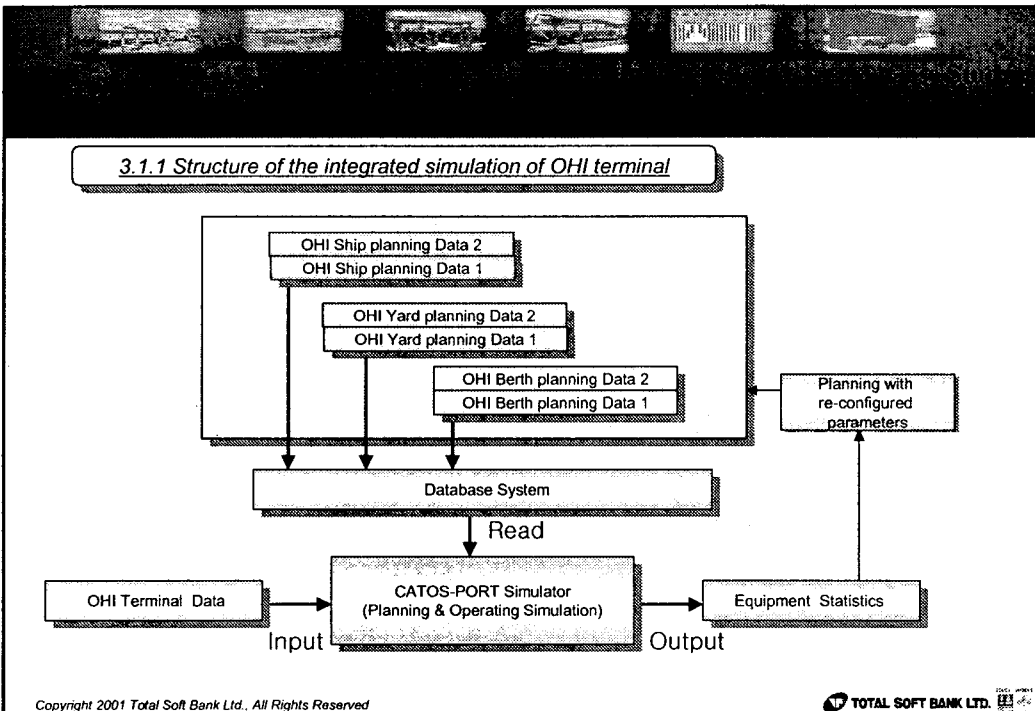
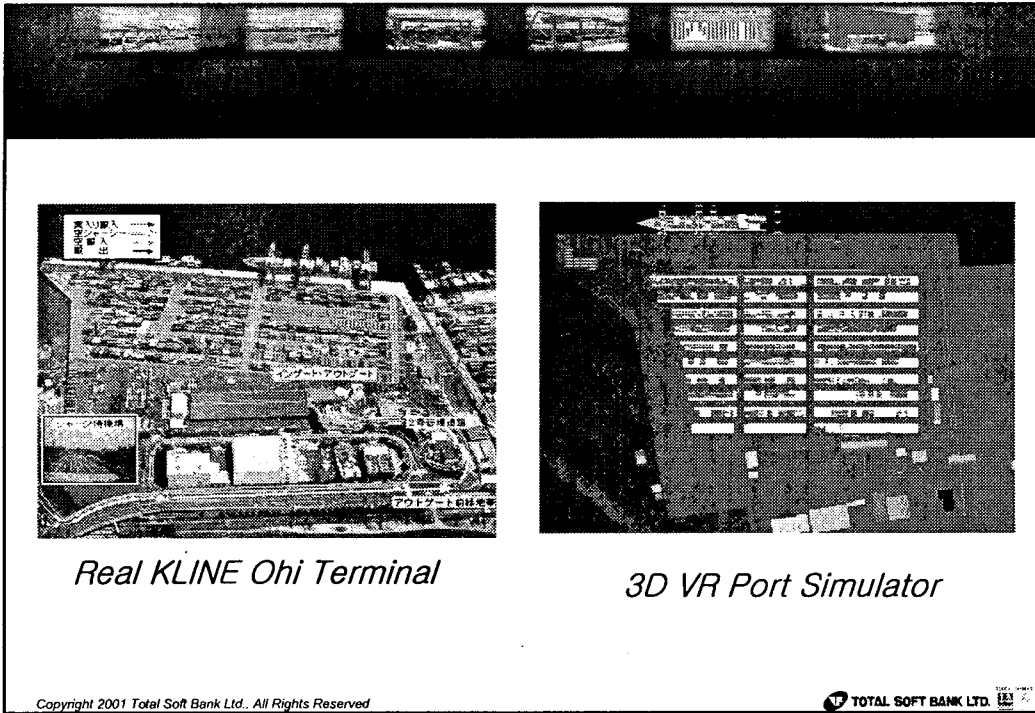


Simulation Statistics Analysis

<p>Facilities</p> <ul style="list-style-type: none"> Berth Gate Yard 	<p>Equipments</p> <ul style="list-style-type: none"> Trailer/Ship RMG/RTG Quay Crane AGV/YT
<p>Operation Strategy</p>	

Copyright 2001 Total Soft Bank Ltd., All Rights Reserved

TOTAL SOFT BANK LTD.



3.1.2 Input Data for Facilities of OHI terminal

Berth	Length	660m
	Max Berth	2
Gate	Max In Gate	12
	Max Out Gate	6
Yard	Max Block	30
Container Handling Equipment	Max GC	4
	Max YT	25
	Max TC	14
	Max FL	6
	Max RS	2

3.1.3 Input Data for Traffic Path of OHI terminal

3.1.4 Input Data for Equipments of OHI terminal

Equipment	GC	YT	TC	FL	RS	Truck
Speed(Km/h)	2.7	20	8.04	9.05	9.05	20

3.2.1 Result of Initial Planning Data #1

S #1	Work (min.)	Wait Time (min.)	Total Work	Handling Number/h	Handling CNTR
GC1	397	139	539	24.63	163
GC2	427	142	569	23.33	166
GC3	353	130	483	28.73	169

Analysis of Result # 1

GC2 Work Time Delay

Planning with re-configured this parameters

Change GC1, GC2, GC3 Planning data

Revised Planning data #2

3.2.2 Revised Planning Data #2

S #2	Work (min.)	Wait Time (min.)	Total Work	Handling Number/h	Handling CNTR
GC1	346	129	475	27.77	160
GC2	351	112	463	27.51	161
GC3	385	123	508	27.58	177

Copyright 2001 Total Soft Bank Ltd., All Rights Reserved

TOTAL SOFT BANK LTD.

3.3.1 Planning & Operating - 3D VR Microscopic Simulation and Evaluation

- In-gate working process evaluation
- Yard working process evaluation
- RS working process evaluation
- FL working process evaluation
- Out-gate working process evaluation
- Discharging-quay side working process evaluation
- Discharging-yard side working process evaluation
- Loading-Yard side working process evaluation
- Loading-quay side working process evaluation
- Gate Monitoring
- Yard Monitoring
- Berth Monitoring

Copyright 2001 Total Soft Bank Ltd., All Rights Reserved

TOTAL SOFT BANK LTD.

