RMQC

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Simulation Program for Advanced RMQC

Suk-Hwan Hwang and Jae-Seung Choi

Key Words : RMQC (   ), Critical path (   ), Hoist (   ),
Trolley (   )

Abstract

RMQC, rail mounted quay crane, lifts and moves large container by means of hoist and trolley motion on the dock. Our company is trying to develop advanced RMQC applying the concepts of elevator hoist and container conveyer for the automation and high efficiency in handling the boxes. Prior to the development of new products, it is necessary to check the capacity of the new systems using simulation program. The program simulates container-handling rates and gives some design factors for the new-type cranes.

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[6].

1.

RMQC   Rail Mounted Quay Crane   ,   ,
                                        (Container)   RMQC   [7]
                    . RMQC

.

RMQC   .

.

2.   Crane Motion

                                                              . **Fig. 1**
[1,2].   RMQC   .   ,
                                                                                          Fig. 2

,   Critical
[3-5].   ,   ,
            RMQC   .   Critical
        ,   Path,   .
                        /   RMQC

                                                  .

                                                                                    (Critical Path)

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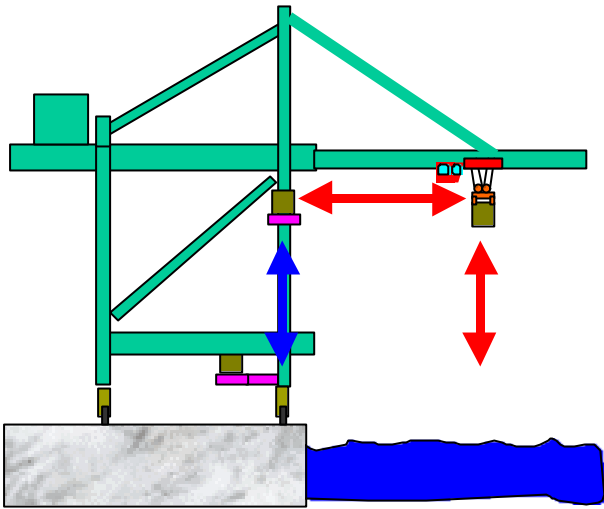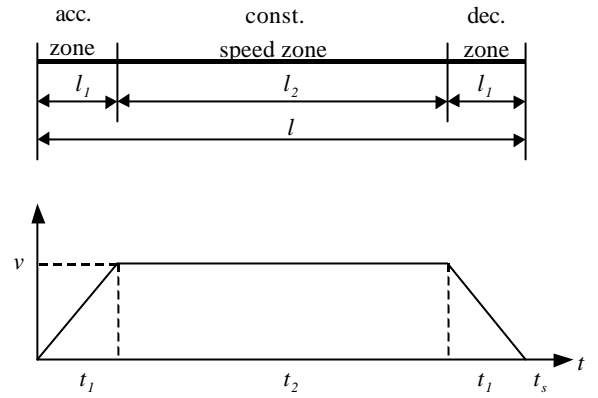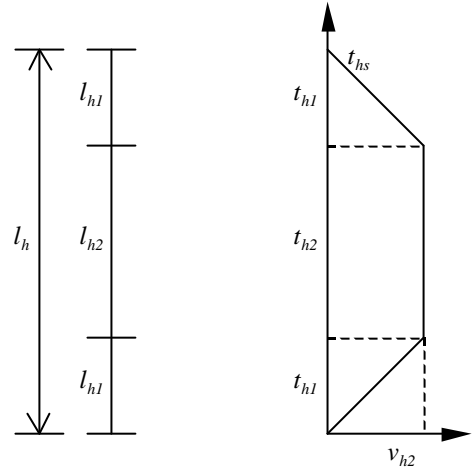   .

Fig. 1 Advanced RMQC system

(a) Trolley motion

(b) Hoist motion

Fig. 2 Crane motion

Critical Path

RMQC

(Deck)

2

Critical Path

RMQC

,

$$T = \sum (T_1 + T_2 + T_3) \tag{1}$$

where, T_1 = time (hoist and trolley) for one cycle
T_2 = time (elevator) for one cycle
T_3 = delay time for one cycle

RMQC

$$H = \frac{N}{T} \times 3600 \tag{2}$$

where, N = number of container box (ea.)
T = total handling time (sec.)

3.

RMQC

,

MS Visual Basic 6.0

[8], 9

Flow

Chart **Fig. 3**

, Feedback

( ), , ( ) 3
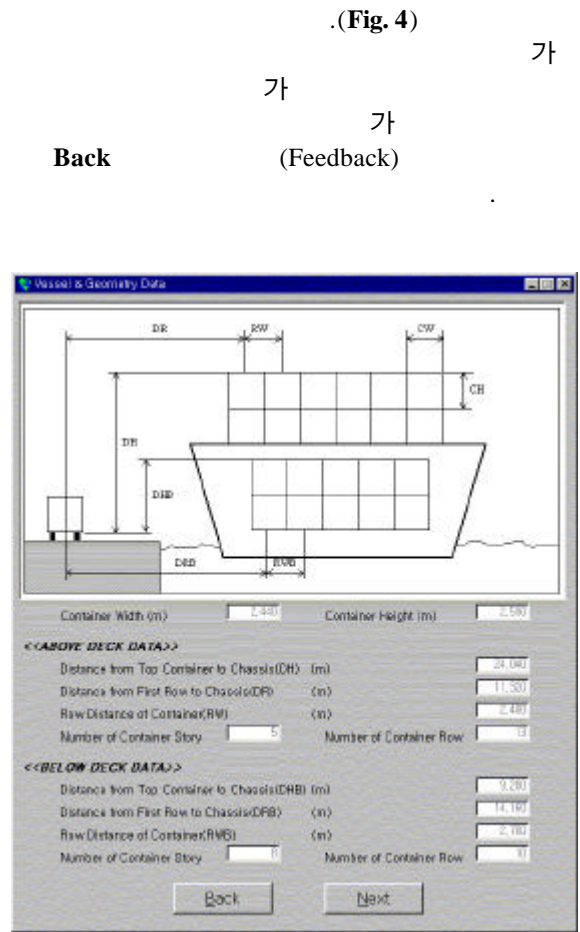
RMQC

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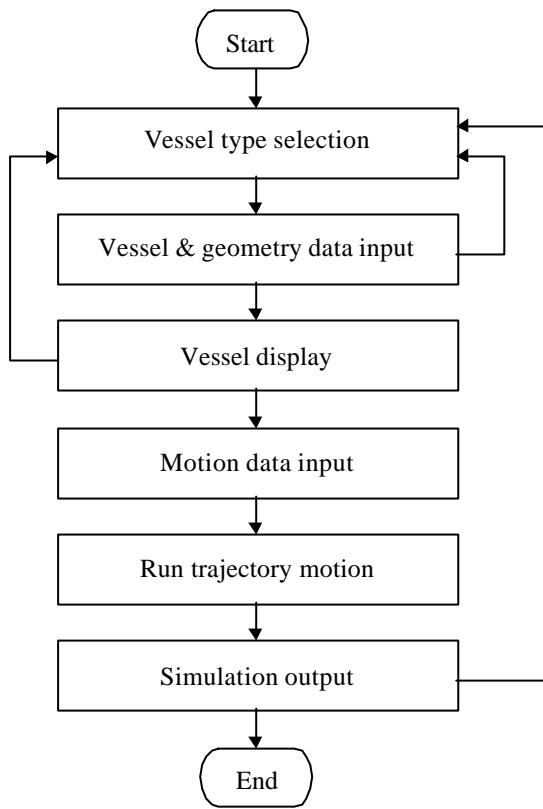
Fig. 3 Flow chart of simulation program

.(**Fig. 4**)

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Back   (Feedback)

.

Fig. 4 Vessel and geometry data window

Scroll

.

3.1

.

a)
b)   ,   ,
c)   ,   Critical   Path
.

,

(Manual Input)

.

3   ,

.

,

.

Pana-Max

.

Meter   ,

Fig. 5 Motion data window

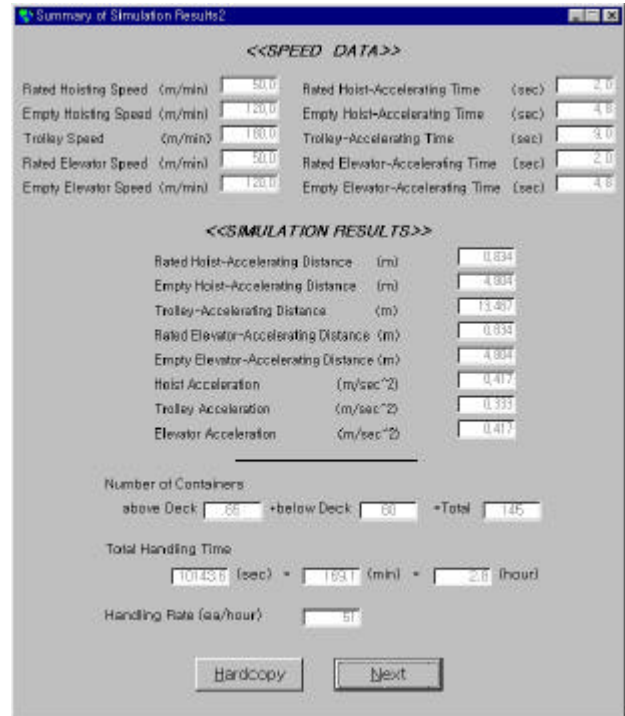**Fig. 6** Trajectory motion window

. Critical Path, Delay Time,

.

. **Fig. 5**
,
(Second) (m/min)
. (Pre-Processing)
(,)
.

3.2 Trajectory Motion

. **Fig. 6**

. **Run**

.

,
1 (1 Cycle Time),
.

.
Next

.

3.3
3 ,

(Geometry, Critical Cycle Path, Delay Time)
, **Hardcopy**
.

Fig. 7

,
.

,
.

Fig. 7 Summary of simulation results
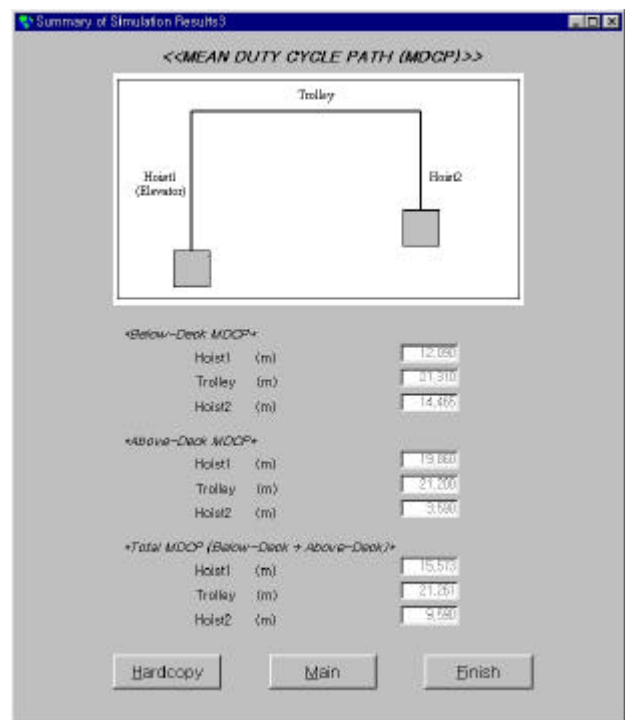

Fig. 8 Mean duty cycle path

, Mean Duty Cycle Path
. Mean Duty Cycle Path
, Above-Deck, Below-Deck, Total
.

(Hoist1),   ,
(Hoist2)   (Mean Duty Cycle Path)
.   Mean
Duty Cycle Path   .(**Fig. 8**)
Main
.

.

4.

.

.

,   RMQC
.

5.

.
RMQC
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