

CONPAS to improve CT landside operation in Port of Yokohama

1. Introduction

Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT) has applied the practical operation of the new port information system, "CONPAS (**C**ontainer **F**ast **P**ass)". CONPAS aims to improve efficiency of gate operation of CT (Container Terminal) and cargo handling operation in CY (Container Yard) by utilizing ICT.

2. Background and purpose of the project

The number of unloading containers per port have significantly increased due to ever-larger containerships, which caused significant landside congestion at CT gates. A range of peaks and off-peaks of container handling operations at CT per week has been also widened for liner shipping, due to various sizes of calling containerships. Furthermore, re-handling operations of import containers at CY are unavoidable, because in-coming trailers to pick them up are expected to arrive at random in CY even in the case of Terminal Appointment System (TAS). Those operational circumstances are widely observed across the world, which have accelerated landside congestion and deteriorated operational efficiency of CT.

2.1 Landside gate congestion due to increased number of trailers arriving at CT before and after a large containership call

The main causes of landside gate congestion are concentrations of the arrival of in-coming trailers in a specific time

zones, because it takes much time to confirm container loading/unloading information of in-coming trailers at the gate. Moreover, the fact that in-coming trailers cannot enter until the gate operation of previous in-coming trailer is completed, which may be delayed due to inefficient cargo handling in CY. Such a situation deteriorates the working environment of drivers of in-coming trailers who play an important role in container logistics, and leads to the job separation and shortage of trailer drivers, therefore the landside congestion problem must be solved immediately.

2.2 Inefficiency of re-handling operation of import containers at CY due to increased number of containers dwelling at CY

Increased number of containers dwelling at CY caused a shortage of container storage space in CY, resulting in multi-layered container stacking. Excessive multi-layered stacking of containers leads to extraordinary increase of re-handling¹ especially at the time of delivering import containers and contributes to significant inefficiency of container handling at CY. This is another congestion problem at CY to be solved immediately together with the landside gate congestion.

3. Outline of CONPAS and its trial operation

The expected effects of CONPAS include:

- 1) Reduction of waiting time of in-coming trailers at CT by introducing the carry-in/out reservation system,
- 2) Reduction of gate

processing time by utilizing PS (Port Security) card of drivers, 3) Reduction of gate entry time by prior verification of carry-in/out information of containers, and 4) Reduction of waiting time for re-handling operation by utilizing in-coming trailer

location information along the access road to CT. The details and the results of the trial operation of CONPAS conducted in Minami-Honmoku pier in Port of Yokohama are illustrated in Figure-1.

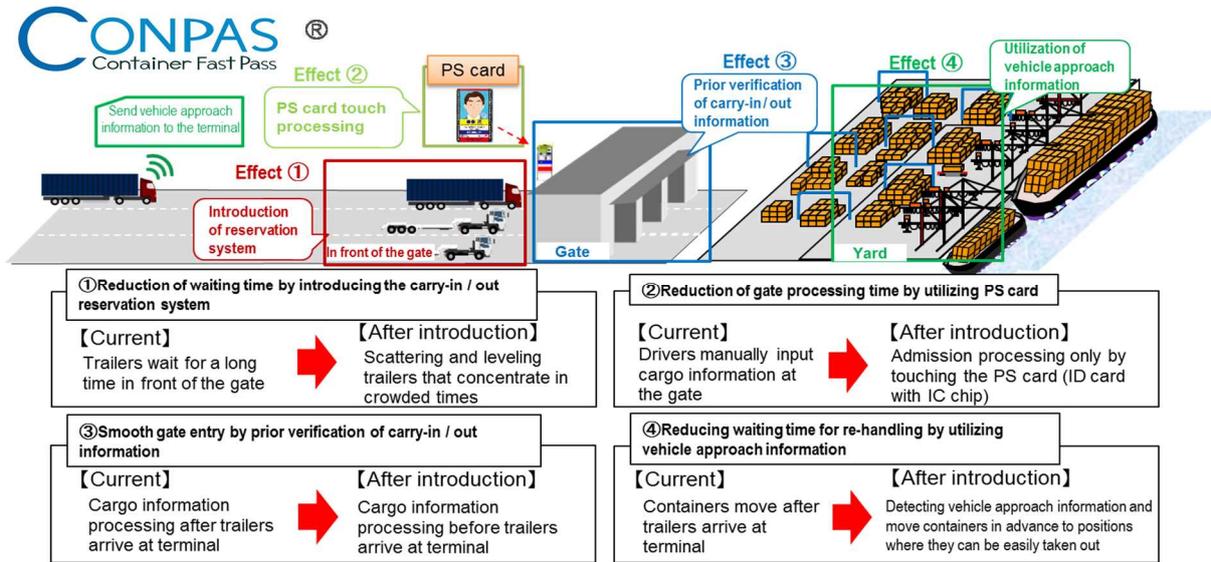


Figure 1 Expected Effects by Introduction of CONPAS

3.1 Reduction of waiting time of in-coming trailers by introducing the carry-in/out reservation system

Many container terminals have been recently congested at the landside gates due to concentration of arrivals of in-coming trailers to a specific time window. In order to solve this problem, TAS (Terminal Appointment System) corresponding to the gate processing capacity of CT was proposed, which may avoid excess concentration of in-coming trailers to a specific time window by prior-reservation to wide-spread time windows. Thereby, the total waiting time of in-coming trailers at CT gates has been reduced. In the trial operation, approximately 14% of in-coming trailers made reservation via. reservation system of CONPAS at the time of container delivery, and as a result, the total waiting time of in-coming trailers including trailers without reservation

was reduced by approximately 10%.

3.2 Reduction of gate processing time by utilizing PS card of drivers

PS (Port Security) card is a nationwide available IC card issued to each driver by MLIT, which reliably and smoothly enables identifying a driver who enter and exit from CT with pre-entry information in the system. When an in-coming trailer enters a terminal, a driver needs to manually input a container number at the gate in some cases, so that an erroneous input may occur and it sometimes takes a longer time to pass through the gate. In order to solve this problem, the system was proposed that the in-coming trailer driver registers container information, driver information, and vehicle information in advance to complete the procedure by simply touching PS card over the card reader when

the driver arrives at the gate. As a result, the time spent for manual input can be reduced and erroneous input by the driver can be avoided. In the trial operation, the gate processing time was reduced by approximately 20%.

3.3 Smooth gate entry by prior verification of carry-in/out information (computerization of carry-in/out slips)

When an export container is being carried-in, the gate clerk collects the information on the written carry-in slip presented by the trailer driver, verifies it with pre-entry information on Terminal Operation System (TOS)², and adds some more inputs, resulting in a longer gate processing time. The verification system has been developed so as to integrate and simplify these procedures. Ocean shipping lines pre-registers the information on the carry-in slip in CONPAS and automatically verify it with the TOS information before the trailer arrives at the gate. Thereby, an export container carrying-in procedure is completed simply by holding the PS card over the reader. The verification work by the gate clerk is not required when an export container arrives at the gate, so that the gate processing time can be reduced. In the simulation, the gate processing time is reduced by approximately 60%. (Trial operation is planned to be conducted in this fiscal year.)

3.4 Reduction of waiting time for re-handling operation by utilizing in-coming trailer location information along the access road to CT

When delivering an import container, the terminal operator does not know the order of which import containers are delivered in advance, so that containers stacked on the target container need to be re-handled when

in-coming trailer arrives at CT. In the meantime, in-coming trailers need to wait until re-handling operation is completed, causing a longer turn-around time of in-coming trailer in CY. To resolve this problem, the system has been developed to grasp the in-coming trailer location information and prepare re-handling operation before the trailer arrives at CT. Thereby, the turn-around time of the in-coming trailers in CY can be reduced. In the trial operation, the in-coming trailer location information was acquired via. ETC (Electric Toll Collection) system on the access road to CT, which provided approximately 15 minutes for re-handling operation. In the future, the widely-used smartphones or other devices will be utilized as a trailer/driver location information.

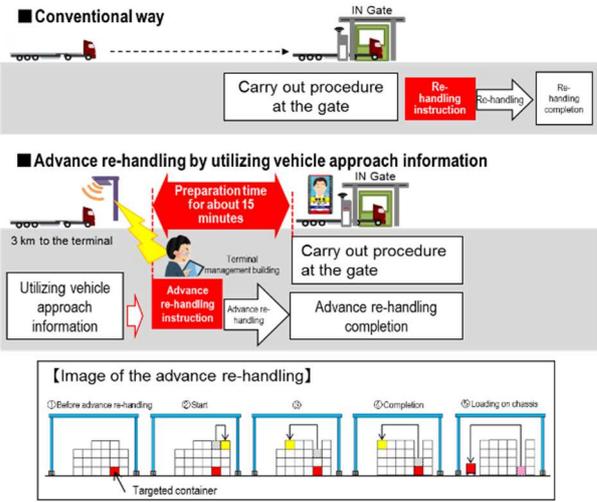


Figure-2 Advance re-handling utilizing vehicle approach information

4. Future challenges

In the trial operations, approximately 14% of in-coming trailers made reservation via. reservation system of CONPAS at the time of container delivery, and as a result, the total waiting time of in-coming trailers including trailers without reservation was reduced by approximately 10%. In developing CONPAS

and conducting trial operations, MLIT has collaborated closely with all the stakeholders in Port of Yokohama, e.g. terminal operators, port operators, land transport operators, etc., which succeeded in building mutual understanding of all the parties' concerned. This is a critical key to success of the project, because the more land transport operators and container terminals participate in CONPAS, the more benefit will be delivered to them.

4.1 Wider use of CONPAS by land transport operators

By introducing the carry-in/out reservation system, the total waiting time of in-coming trailers at the gate decreases, as more trailers participate in this project. In addition, the introduction of CONPAS at multiple terminals will make it easier for land transport operators to make trailer allocation plans.

4.2 Cooperation with port-related data linkage infrastructure

In order to maximize the effects of smooth gate entry by prior verification of carry-in/out information, more and more participation of trailers in electronic carry-in/out slips is recommended. In order to achieve this challenge, a system is required to create an electronic carry-in/out slip with minimum information input in cooperation with the "port-

related data linkage infrastructure"³.

4.3 Easier way to use CONPAS

For example, if smartphones, etc. are utilized as the means of acquiring trailer location information, electronic carry-in/out slip information can be displayed on a smartphone of the driver and the smartphone can be used as information sharing tools between the land transport operator and the trailer driver. Furthermore, another idea is displaying a destination instruction in CY on a smartphone. We will think about more effective ways to use CONPAS and discuss with related parties.

4.4 Introducing CONPAS to more ports

We are now consulting with more port authorities to share the effects of CONPAS and maximize them. Many stakeholders express an interest in introducing CONPAS.

5. Conclusions

We would like to express our gratitude to all the stakeholders involved in this project. In addition, we will carefully listen to the opinions of relevant parties who participated in trial operation of CONPAS system, and continue to work closely with the relevant stakeholders to improve the container terminal productivity by improving the gate processing operation and cargo handling operation in CY.

¹ A series of works to take out the lower container from the stacked containers

² Terminal operation system

³ Government infrastructure system under consideration to construct by the National Strategy office of Information and Communication Technology, Cabinet Secretariat, Government of Japan and Ports and Harbours Bureau of the Ministry of Land, Infrastructure, Transport and Tourism