

## Analyzing The Impact of Gate Automation To Expedite Export Import Flow at PT. TPK Koja

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**Abstract.** The research objective is to find out the impact of gate automation to expedite export import at TPK KOJA. PT (Persero) Pelabuhan Indonesia II (PELINDO II) is a state-owned enterprise that consists of PT. Jakarta International Container Terminal, Koja Container Terminal (TPK), PT. Pelabuhan Tanjung Priok, PT. Electronic Data Interchange, PT. Rumah Sakit Pelabuhan and PT. Multi Terminal Indonesia. In 2016, PT. JICT and PT. TPK KOJA joined the Auto Gate. The research problem is focussing on Auto Gate System (AGS), which was the N-Gen system gate. It took effect of the transportation and the flow of export import. It was one of the problems that could inhibit the delivery flow which resulted in adding some additional costs and traffic caused by many truck containers lining up since they couldn't get into JICT and TPK KOJA to load and unload cargo. Method of research used was qualitative. The results can get from increasing of total containers because implemented AGS that needs only 30 seconds to serve the container. It is expected to provide the solution for port party so as to improve the quality of gate system and keep maintenance of the gate in order to be able work better so it doesn't create problems that will incur loss to port service users and people who lived around the port.

**Keywords:** port, loading and unloading, gate system, export and imports, transportation

### 1. Introduction.

In this developing technology industry 4.0 era, port of Tanjung Priok especially PT. TPK Koja has applied the digitalization form which started from the using of Auto Gate System and the operational at port. Port is affected to expedite the container flow or passenger, because port is a transit place for ship and containers moving to the destination place. Based on the constitutional law on shipping, Law of the Republic of Indonesia Number 17 Clausul 1 Year 2008, Ports are places that consist of land and / or waters with certain limits as a place of government activities and legal activities that are used as a place for ships to berth, and / or loading and unloading goods, in the form of terminals and berths of ships equipped with shipping safety and security facilities and port support activities as well as intra-location and inter-transportation modes. Expedition of containers' flow and passengers are influenced by human resources, support facilities at port, and management to manage the system at port.

Port is well known as a terminal point which confronts transportation modes; intermodes and multimodes. It is a component of technical logistic to distribute goods from seaside ship or Container Yard (CY). According to (Roa et al., 2013), Ports are locations that are attached with infrastructures and technical facilities to the sea, ocean or river via waterways connections. Ports manage a variety of loads for which they are specialized in. The importance of port in serving the ships is not only supported by the availability of facilities at port but also the availability of the elements in the port to provide reliable port services and satisfy the customers. Expedition of export and import flow will have an impact on satisfaction for users of port services because the goods will arrive on time and the costs will be more efficient.

PT. Pelabuhan Indonesia II (Pelindo II) cooperates with PT. Hutchison Port Indonesia (HPI) established a subsidiary company which is PT. Terminal Peti Kemas Koja on January 27th 1997 to handle operational activity at Tanjung Priok port terminal. The capacity of containers at TPK Koja has increased from 680.000 until more than 1.000.000 TEUs containers every year. By having an area in the amount of 21, 80 Hectars, TPK Koja provides Container Yard for import in the amount of : 9,828 TEUs , Container Yard for Export in the amount of : 9,072 TEUs , and Container Yard for Reefer Company in the amount of : 310 Plugs (Source : web TPK Koja). Every year, TPK Koja has improved the service quality for export and import activities; therefore TPK Koja has been consistent in providing services for customers in terms of goods loading and unloading services both export and import and stacking containers at Container Yard.

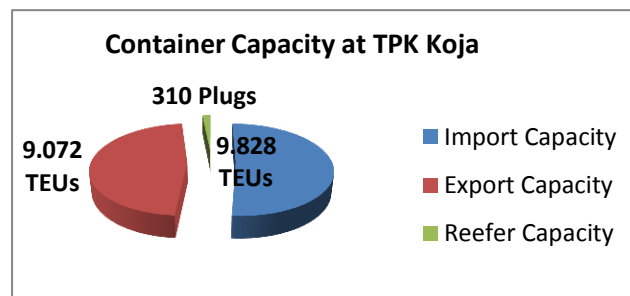


Figure 1. graphic container capacity at TPK Koja (source : web TPK Koja)

TPK Koja has begun implementing electronic and online systems to support fast data access and information exchange between Koja and Customers. Previously, PT. Pelabuhan Indonesia II (Pelindo II) had implemented a temporary online Container Yard which is a digital solution for electronic container data exchange. This application is to complete Auto Gate System and Automatic Tally System which were used in PT. JICT and PT. TPK Koja as subsidiary company. PT. JICT and PT. TPK Koja cooperated in joint Auto Gate by launching Auto Gate System which was supported by N-Gen System to improve export import flow through terminal with 100 Million USD investment and 20 Gates (Yuafanda, 2019). With specification details of 10 Gates operated by PT. JICT, 6 Gates operated by PT. TPK Koja and 4 Gates operated as alternative gates and will be operated when the flow of export and import crowded. Terminal Gate is the dividing point between the internal and external transportation of the TPS and the limit when the container is deemed completed and has left the TPS. Gate management is very necessary because long container queues in the terminal can cause traffic and high port costs (Gharehgozli, Roy, & de Koster, 2014) (Yuafanda, 2019).

The Auto Gate system can reduce the handling costs of containers in and out; also to increase data accuracy and validity. AGS functions to replace the check gate at the entrance and exit gate with an automatic check point machine that uses radio frequency identification and e-ticket to replace the export and import cards. Before the Auto Gate has applied, PT. TPK Koja used the manual method with 2 gate officers ; one from Bea Cukai to check the cargo of the containers, and one officer from TPK Koja. With the upgrading development facilities and technology in software and hardware, TPK Koja could improve their service to customer. The facilities are insisted of OBX Single Billing Overview, Cargo Link System, and N-Gen System. The automated transaction system can speed up all processes for transferring data and information. All drawbacks from the previous manual system can be minimized and even eliminated. This is a breakthrough that can improve the services of export and import containers at TPK Koja.

Export and import have affected the economy in Indonesia. Export is a commercial activity which involves exchange of domestically produced or value added imported goods or

services for valuable consideration across national borders (Ayisha Millath, Thowseaf, 2016). Meanwhile, import activity plays an important role in the connection between export and growth rate (Kim, Lim and Park, 2009). The increase of export means the production in that country has improved, so the economy in that country changes and the growth rate will also increase. In other way, if import has increased, the growth economy will also increase. If the import activity has decreased, the growth economy will also decrease. Because supply and demand are interconnected, If supply and demand of import from other countries increases, it will motivate economy activities on that country to produce, consume and distribute (Ismadiyanti, Fitri, 2018).

**2. Methods**

Data and Methodology . The method used is qualitative descriptive analysis. In terms of data collection and analysis, the qualitative approach comes from primary data and secondary data

- Primary data

The information source was from open-ended question. This information was collected by researcher through interview with participant and expert speaker in their job. The question provides the opportunity for the participant to answer questions by providing clear and accurate information.

The data collected was the number of container exports and imports from January 2019 to March 2019, with detailed data as follows :

	January 2019	February 2019	March 2019
Export	22,684	18,651	22,120
Import	28,369	20,967	25,921

Source : TPK Koja

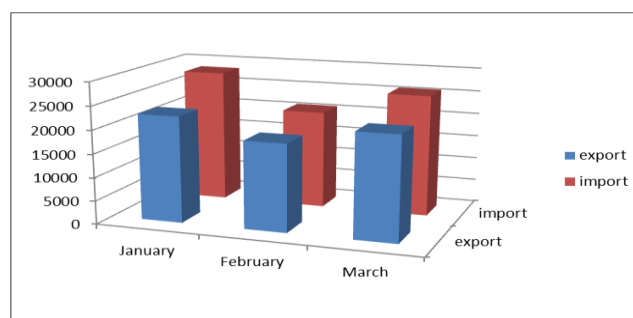
Tabel 1. Containers export and import from Januari 2019-March 2019

- Secondary Data

Research data sources were collected from several published journals related to the research title and content.

**3. Discussion and Result**

3.1 Container Export & Import flows at TPK Koja



Source : TPK Koja

Figure 2. amount of container export & import pass gate TPK Koja (January-March 2019)

Based on the data collected, it can be explained that export & import flows at TPK Koja which passed the Auto Gate System were fluctuative, so it did not guarantee that every month

the container would increase continuously. In other conditions, there was one factor that triggers the drop in containers which was national holidays.

In this data, during 3 months in 2019, the export & import flows were analyzed and the result put in one table every weeks, so there were 13 weeks to know the percentage. This was done to find out whether the export & import has increased or decreased every weeks.

Week	Period of export	Total
1	1-7 January	4545
2	8-14 January	4856
3	15-21 January	5669
4	22-28 January	4401
5	29 January-4 February	5137
6	5-11 February	4696
7	12-18 February	4468
8	19-25 February	4804
9	26 February-4 March	5088
10	5-11 March	5117
11	12-18 March	5399
12	19-25 March	4801
13	26-31 March	4474
	Total	63455

Tabel 2. Period of export in 13 weeks (January-March 2019)

Meanwhile, for the import data flows as followed:

Week	Period of import	Total
1	1-7 january	6213
2	8-14 january	6975
3	15-21 january	6302
4	22-28 january	6020
5	29 January-4 February	5403
6	5-11 february	6162
7	12-18 february	5631
8	19-25 february	3584
9	26 February-4 March	5458
10	5-11 march	6304
11	12-18 march	6711
12	19-25 march	5710
13	26-31 march	4784
	Total	75257

Tabel 3. Period of Import in 13 week (January – March 2019)

The comparison of total containers between used manual gate and auto gate :

	Manual (2015)	Auto Gate (2019)	Percentage
Import (per 3 months)	65,070 units	75,257 units	13.53%

Tabel 4. Import percentage for manual and auto gate

	Manual (2015)	Auto Gate (2019)	Percentage
Export (per 3 months)	46,080 units	63,450 units	27.38 %

Tabel 5. Export percentage for manual and auto gate

### 3.2 The condition at TPK Koja after the implementation of Auto Gate

Auto Gate System was launched on July 2016. The presence of Auto Gate could accelerate the export and import cargo, create a chance to change an old system into new system and always provide the best service to customer. AGS brings positive impacts for expedition flows of goods in and out of exports and imports. The Auto Gate System has proven its use, it is very efficient in terms of time for container to get in and out. It could also be faster than the manual which used gate staff to operate the gate.



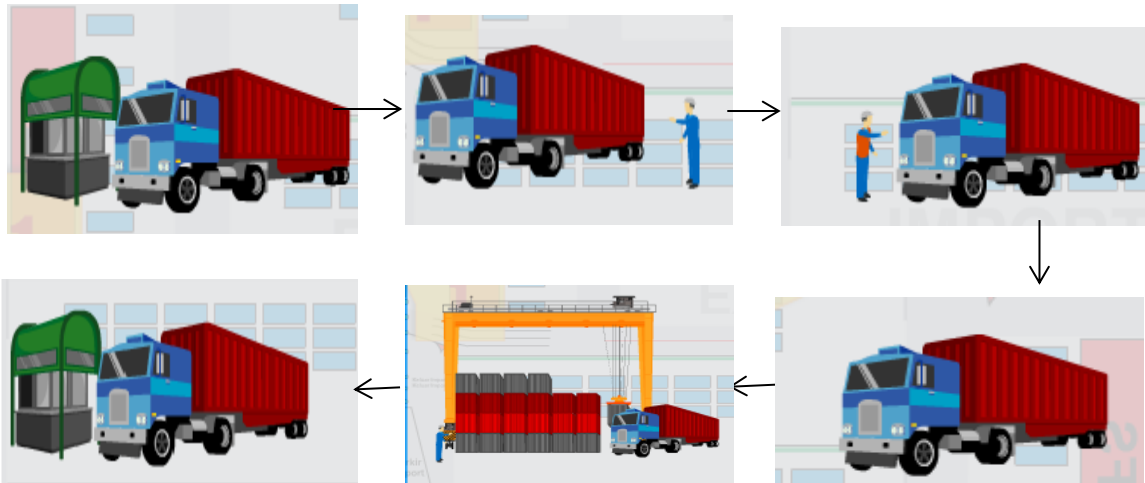
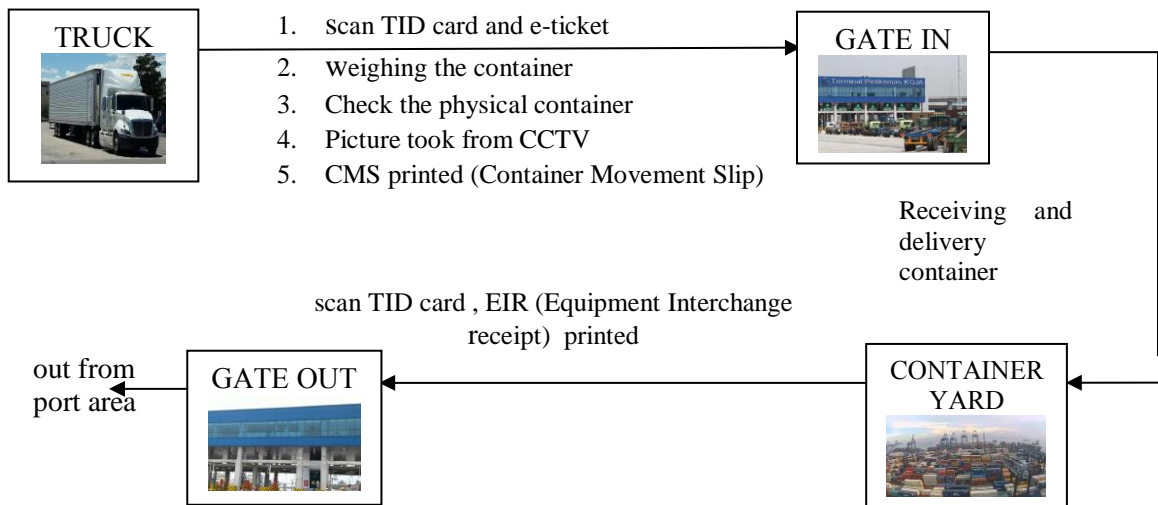
Before implementing Auto Gate System



After implementing Auto Gate

To receive or delivery cargo containers at TPK Koja, you must have 2 cards which are TID Card and E-ticket. Truck Identification Card (TID Card) is a truck identification card, to make sure that the TID card number is the same as the truck number. While the e-ticket as a substitute for an export card contains data about the container that will be sent or taken. The number on the e-ticket must be corresponding with the container number. E-ticket can be obtained at TPK Koja billing office after completing the payment process that can be done directly at the billing counter or via e-banking.

As the procedure applied to pass the Auto Gate System will be explained as followed:



- When the driver wants to enter the auto gate, you must prepare a TID card and e-ticket
- At the gate of the Auto Gate System, the truck pass the motion weigh, and it will automatically weigh and record the weight of the container
- The gate checker will do a physical inspection of the container that wants to enter, check E-ticket and TID Card, input data of containers & truck and send the data online to the auto gate system
- When the TID card was scanned, the Automatic Tally System (ATS) automatically takes pictures of 5 container positions. Then the button of Auto Gate will be pressed to print the CMS card (Container Movement Slip) then ATS will validate the data and automatically print the CMS card. After that, the portal is open, and can go directly to the location listed on the CMS card
- At the specific location, the container will be taken by the RTG operator to be stored in the stacking field
- After the container is taken, the truck can go directly to the exit. At the exit gate, TID card is scanned to print the EIR (Equipment Interchange Receipt) and ATS validates then the EIR card is printed after the portal is open so the truck can exit the ATS.

Based on gate operator, Auto Gate System took only 30 seconds until 1 minute from the arrival of the containers at the gate until the gate is open when the documents were checked automatically by system. It is different if the port used manual way to check the container, it took around 5 until 6 minutes to inspect the data until the gate operator opened the gate. To make sure the cargo is worth to enter the container yard, there are some requirements to fulfill, such as it was not detained by the customs, it didn't pass the closing time, and not over weight.

Eventhough it has used a sophisticated system, there is still a possibility of the system having damaged. Auto Gate system isn't always working well, it has been down for the system. According to supervisor gate, there is an obstacle on implementing Auto Gate which is often having problem with network system to check data of container number, so the system down and the activity has to use manual system until the automatic system was fixed. The cause of auto gate system down was the delay of network server. Several impacts that were felt by customers included paying more of closing time because the cargo was late to get in the port, the increase of rid in one trip, and the crowded entrance queue at the port.

### 3.3 Explanation of definitions terms in the process of gate in and gate out:

- a. Billing is a sub-section of finance that verifies and inputs service request data and E-ticket / proforma / pre publishing note
- b. EIR (Equipment Interchange Receipt) is a gate out operation document which contains information on container numbers and the physical condition of the container
- c. CMS (Container Movement Slip) is a gate in operation document that contains information on container numbers and stacking locations
- d. Tapping is attaching the TID / Etiquette document to the Enclosure machine
- e. Enclosure is a CMS and EIR document printing machine
- f. Seal points are customs checkpoints in the field
- g. Checkers are officers who carry out container inspections at each gate lane.
- h. TID is Truck Identification
- i. E ticket is an export card or access document / exit gate
- j. SP2 is a document of goods issuance order.
- k. Container Yard (CY) is a storage area for containers before loading or unloading
- l. Receiving / Delivery container is the job of moving goods from a pile / stacking place in a warehouse / stacking yard and submitting it until it is arranged on a vehicle in a warehouse / stacking gate or vice versa.
- m. New Generation (N-Gen) is a software application that supports loading and unloading planning activities, schedule control activities and container terminal tools and guarantees accuracy in terminal operations.

## 4. Conclusion

The Auto Gate System generally has a positive impact on service companies at TPK Koja because it facilitates the process of containers to get in and out from the port entrance to Container Yard. The Auto gate system is a smart transportation system who took only 30 seconds until the gate is open. In addition, the auto gate also shortens the process of checking documents and cargos because when the container enters the gate, the container is checked by cctv which is monitored through the control room and weighed by a VGM to determine the weight and dimensions of the container. Many of the Cargo entering and leaving the port provides best services for exports and imports. In terms of transportation, it means increasing the number of containers due to the large demand and supply of goods through sea transportation.

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