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The Effects of Using Automated Rubber Tyred Gantry (ARTG) Towards Crane Operator in Semarang Container Terminal

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Abstract

As the high technology is applied in port industry, several changes may occur resulting to a reduction of the number of labors. The focus of this research includes: 1) What qualifications are needed as an operator of Automated Rubber Tyred Gantry (ARTG)?; 2) What factors do affect the labor absorption for ARTG operators?; 3) What efforts do the management of Semarang Container Terminal need to perform in order to overcome the problems related to ARTG? Based on the analysis, several findings were found: 1) a qualification for the crane operator was urgently needed especially for the position of the crane operator of Automated Rubber Tyred Gantry Crane (ARTG) in Semarang Container Terminal. 2) the factor which probably affected the labor absorption for crane operators was technology procificiency and English proficiency; and 3) what the management need to do was the employment expansion opportunities by transferring the crane operators to other ports whose cranes are not equipped with the new system**.** Moreover, the influence of ARTG reduced the absorption of RTG operators. Based on the findings, it is suggested that the management of Semarang Container Terminal needs to be careful in establishing any policies to overcome the problems. Thus there would not be any violation regarding any laws and regulations.

Keywords: Crane Operators, ARTG, Labor Qualification

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1. Introduction

Container terminal is a facility where cargo containers collected from the hinterland or other terminals are transshipped to the destination or to other hinterland terminal. Hinterland, itself, is an area located behind a port which is not involved in the administrative border of a certain region, province, or country. This area only depends on the the port's existence.

Hinterland of Semarang Port includes Kendal port and Jepara port. Loading and unloading are activities proceeded in the container terminal. There are a lot of facilities which support the loading and unloading process, one of which was crane. Crane is a

large machine designed to lift and move materials which is equipped with a hoist rope, respectively.

Rubber Tyred Gantry Cranes (RTGC) is a large machine designed to load and unload containers at the countainer yard (CY). The machine functions to transfer the containers onto the trailer; or otherwise within stacks according to blocks, slots, rows and tiers. In its operation, electricity supplied by State Electricity Company (Perusahaan Listrik Negara - PLN) is used as its primary energy. From time to time, Rubber Tyred Gantry Cranes (RTGC) has been developed. According to its recent development, Automated Rubber Tyred Gantry - ARTG was established. As the name suggested, the operation of this machine is managed by an automated system. Meanwhile, the operator is now able to handle the crane operation from the control room.

Semarang Container Terminal is one of the largest container terminal operators in Indonesia. This terminal also provides various facilities including piers, container yards, and loading and unloading tools. In order to support the performance of Semarang Container Terminal and to seize global market opportunities related to this particular operator business, a facilities improvement is obligatory. Thus, in 2017, Semarang Container Terminal started to utilize Automated Rubber Tyred Gantry (ARTG). This large machine is operated through a remote control connected to the satellite through the use of Global Positioning System (GPS). Since then, Automated Rubber Tyred Gantry (ARTG) has been applied to support high-tech services in Semarang Container Terminal. It has been growing in high numbers of usage and replaced the old machineries. This development has indeed improved its market value.

2. Literature Review

1. Crane

   A crane is a tool which is used to both lift and lower materials vertically and to move them horizontally by using the mechanism of two-degree system. In the operation, this tool is generally applied by using the principle of rope. There are various types of crane, including:

   (a) Stationary Crane which is able to be rotated

   Stationary which is able to be rotated is known as swivel crane. It is generally a fixed crane with a slanted pole which can spin on a vertical axis. The most popular type of this crane is tower crane. In a construction project, tower crane is suitable for a construction of a high-rise building. Tower crane is considered

as the main lifting tool or equipment since in a multi storey building project, it is used to lift loads horizontally and vertically, hold them up, and lower them into a specified area by using the mechanism of luffing, slewing, and travelling.

(b) Crane which moves on rails

Crane that moves on rails generally consists of cantilever and monorail crane (either those which are able to be rotated or those which are not). As the name suggested, this type of crane moves on a certain track/ line.

(c) Crane with no trajectory

The Crane with no trajectory consists of the top of mast crane which is mounted on a truck, car, or tractor. This crane is usually used in a calcareous, rocky, or paved area.

(d) Crane mounted on a tractor chain or locomotive

This type of crane is usually mounted on a locomotive or tractor or rear-wheel-drive vehicles including a stronger mast crane which moves on a rail line, roads, dirt road, and in a warehouse.

(e) Bridge crane

Bridge crane is a type of crane which travels along a structured bridge and moves on a rail line on ground surface. In order to move on the ground surface, the viaduct is equipped with tall adjustable legs, mounted on either side of the bridge (gantry and cargo transfer bridge) and mounted on only one side of the bridge (semi gantry).

2. Crane Operator

Crane operator is the person in charge of operating the crane. Crane operators should be those who are familiar with the types of crane they are going to handle as each type of crane has different specifications and characteristics. Crane operators must be those who are qualified and certified as a crane operator. They also need to be experienced in operating cranes due to their important duties and responsibilities.

3. Automated Rubber Tyred Gantry Crane (ARTG)

Automated Rubber Tyred Gantry (ARTG) is generally similar with the Rubber Tired Gantry Cranes (RTGC). Their difference lies on their technological development. ARTG has been equipped with an automation technology with which a remote operation can be possible performed by using Graphical User Interface (GUI). These systems are connected to the terminal operating system known as the

control room. ARTG maintenance cost is estimated 30% lower than the standard RTGC; it saves 70% of the total fuel cost. Moreover, ARTG is environmentally friendlier as it reduces Carbon dioxide (CO_2) emissions reaching 60-80% compared to the conventional diesel of RTGC. in other words, ARTG reduces CO_2 emissions 20% per TEU.

3. Methods

In this research, a qualitative approach was applied by using USG (Urgency, Seriousness, Growth), an analysis used to describe and elaborate a research object whose finding would include exposure, explanation, and description of the object at any given time.

1. Research data

   In this research, in order to collect the data, various data source were obtained including:

   (a) Primary Data Source

   Primary data are defined as research data obtained directly from the original source. According to Jonathan Sarwono (2006:37), primary data require data or information from the first sources or respondents. The data or information can be collected in form of written data through questionnaires or oral data through interviews.

   (b) Secondary Data Source

   Secondary data are data obtained indirectly through an intermediary. The data can be possibly obtained and recorded by other parties.

2. Data Collection Method

   The data of this research were collected through several methods, including:

   (a) Observation

   Observation is used to obtain or collect data directly when the research takes place. In this research, an observation was carried out during the working hours in Semarang Container Terminal. In this case, the researcher observed and got involved in all crane activities.

   (b) Documentation

   In this research, an interview to some associated parties was carried out. The interview involved the safety supervisor and some workers who were responsible to coal loading process at Semarang Container Terminal.

(c) Literature Review

This research also applied literature review in order to collect data. In this method, various references related to the research topic, Automated Rubber Tyred Gantry (ARTG), were obtained.

4. Results and Discussions

1. General Overview of Research Object

   The establishment of Semarang Container Terminal (*Terminal Peti Kemas* Semarang –TPKS) cannot be separated from the Port of Tanjung Emas Semarang. The pot management, itself, has undergone several changes starting from its status as a state enterprises (*Perusahaan Negara* - PN) in 1960, as a company (*Badan Pengusahaan Pelabuhan* - BPP) in 1969, and as a public corporation in 1983. At present, the port of Tanjung Emas Semarang is run by Pelindo III headquartered in Surabaya. During this period, the port's development projects phase I was proceeded. On November 23, 1985, the port was launched by President Soeharto as Tanjung Emas.

2. Problem Analysis

   This research focused on the use of Automated tools Rubber Tyred Gantry (ARTG) at Semarang Container Terminal, the labor absorption before and after the use of ARTG, the crane operator's qualifications, Semarang Container Terminal efforts to be in accordance with the Law No. 13 Year 2003 on manpower. Based on the interviews to the operational and staffing employees, some problems caused by the implementation of Rubber Tyred Gantry Automated (ARTG) related to the labor absorption in Semarang Container Terminal were identified. The problems were as follows:

   (a) The number of human resources as the crane operators were reduced
   (b) Automation system had not supported
   (c) The capability of the human resources in technology handling was low
   (d) English proficiency of the human resources was low
   (e) The willingness of technology learning was low

In order to identify the problems, some factors such as human resource capabilities, cost, energy, technology, etc needed to be considered. Thus, a priority assessment should be performed to identify the urgency level of the problem. In this case, Urgency,

Seriousness, Growth (USG) was applied. USG is an analysis to set the priority order with 1-5 scale. The analysis was done by considering the three USG components: Urgency, Seriousness and Growth. Based on the research problem, the reduction of human resource role, factors which influence the labor absroption were found as follows:

1. The qualifications for the operator of ARTG

   Based on the analysis, there were several qualifications needed by the operator of Automated Rubber Tired Gantry (ARTG) in PT. Container Terminal. The requirements and qualifications are as follows:

   (a) Indonesian citizenship;

   (b) Medical certificate and free of tattoos or piercings

   (c) Min. 20 years old and max. 40 years old;

   (d) Min. Senior high school graduated;

   (e) A heavy equipment operator license;

   (f) Normal color vision proven by a color vision certificate;

   (g) Those who live in Semarang are preferred

   (h) A police certificate of good conduct (*Surat Keterangan Berkelakuan Baik* - SKCK).

2. Possible factors which affect the labor absorption of Crane operators due to the use of Automated tools Rubber Tyred Gantry (ARTG)

   There are various factors which influence labor absorption. However, in this research, the factors were focused on those which affect the labor absorption due to the use of ARTG in Semarang Container Terminal. Several factors were identified as follows:

   (a) Capability in using technology

   Nowadays, in this modern era, technology procifiency is very important. Human resources should be capable in operating modern technology. Thus, they would not be left behind. Based on the research, it was found that during the recruitment process, there were some operators of Rubber Tyred Gantry (RTG) who were considered unqualified due to their lack of knowledge in operating computer system.

   (b) English Proficiency

   Based on the research, it was found that during the recruitment process of Semarang Container Terminal, there were many operators who had limited

English procifiency. This limited English procifiency, unfortunatelly, prevented them from being accepted.

3. The management of Semarang Container Terminal's efforts to overcome problems resulted from the implementation of Automated Rubber Tyred Gantry (ARTG)

   It is undeniable that an implementation of a certain technology at working space will definetely lead to negative effects. The more sophisticated a device is, the less human resources it will need. In other words, technology have not only positive effects but also negatives effects. In this research, as stated earlier that some problems were found as the impact of the use Automated Rubber Tyred Gantry (ARTG). In this case, Semarang Container Terminal applied some strategies one of which was inviting some of the operators of Rubber Tyred Gantry Cranes (RTG) to apply and join the recruitment for the position as the operator of Automated Rubber Tyred Gantry (ARTG).

5. Conclusion

5.1. Based on the findings, some conclusions and suggestions could be drawn as follows:

1. Crane operator's qualification was urgently needed especially for those who would be in charge of Automated Rubber Tyred Gantry Crane (ARTG) in Semarang Container Terminal. The qualification is a must in order to provide a reliable, professional, skillful operator who would hopefully increase the company performance.
2. Factor which was assumed to affect the labor absorption of crane operators due to the use of Automated Rubber Tyred Gantry (ARTG) was both technology proficiency and English proficiency.
3. The effort made by the management Semarang Container Terminal to overcome the problems affected by the implementation of the Automated tool Rubber Tyred Gantry (ARTG) included: (1) inviting some of operators of the Rubber Tyred Gantry Cranes (RTG) to apply and join the recruitment for the position as the operator of Automated Rubber Tyred Gantry (ARTG); (2) performing employment expansion opportunities by transfering them to other ports which do not have a crane with the new system, (3) providing equality among the operators of RTG or ARTG; and (4) Providing training, guidance, or socialization to the operators of ARTG.

Based on the findings, some suggestions could be drawn up as follows:

1. First, it is suggested that a more structured, scheduled, and efficient recruitment system should be applied in Semarang Container Terminal so that qualified and prospective labors would be easily found. In order to generate better crane operators, since the recruitment process requires some strict stages, it is important that only competent and qualified selectors would be hired.

2. It is also adviced that Semarang Container Terminal provides some training facilities especially English course, not only for the operators of ARTG but also for other employees to improve their English proficiency.

3. Last, it is suggested that Semarang Container Terminal has programs aimed to improve the technology absorption related to automation system so that an optimal performance could be possibly achieved by the crane operators.

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