

# THE EVALUATION OF SERVICEABILITY AND SERVICE LEVEL GROUND SUPPORT EQUIPMENT (GSE) AT PT GAPURA ANGKASA CABANG SOEKARNO HATTA 2015

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## Abstract

*The purpose of this study is to determine the level of company performance in achieving the target of 90% in serviceability and service level achievement of motorized and non- motorized ground support equipment. From 2015 data report, serviceability and service level achievement is not reached 90%, its caused of some equipment being prepared, using by another branch, some equipment idle. The method used is descriptive statistic, using mean calculation, mode, median and standard deviation to find deviation of readiness of ground support equipment. Sources of data used are primary data obtained through interviews to key person, while the secondary data used is the report serviceability report, service level and bibliography. The results show that in 2015 serviceability and service level of equipment support equipment average of 85% because there are constraints such as tools damaged or borrowed by other branches.*

**Keywords:** *Serviceability, Service Level, Ground Support Equipment*

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## INTRODUCTION

Ground Handling Company plays a very important role in supporting the success of the airline to achieve on time performance, flight safety and customer satisfaction. Ground Handling handles the aircraft during pre flight and post flight, ie handling passengers and aircraft while at the airport. Objects handled by ground staff include passengers, luggage passengers, cargo items, postal items and ramp handling. The scope of ground handling work is arranged in (IATA, 2014) consisting of 9 standard service sections: Passenger Handling, Baggage Handling, Cargo and Mail Handling, Aircraft handling and loading, Load Control, Air Side Management and Safety, Aircraft Movement Control, Standard Ground Handling Agreement, Airport Handling GSE Specification.

Among these services there is Airport Handling GSE Specification that specializes in handling the aircraft while on the ground with ground support equipment equipment in accordance with the type of aircraft. To facilitate the work required some auxiliary equipment movement of aircraft, passengers, and cargo during landing (IGOM by IATA, 2014). Prepared equipments support the needs of aircraft as long as the aircraft is on land, either on departure, arrival. or transit, the equipment is known as GSE (Ground Support Equipment).

GSE equipment is classified into two parts based on its motion capability or working capability, ie GSE Motorized and Non Motorized (IATA, 2014). The Company currently has 217 GSE equipment and there are several tools that are under repair, unusable and some borrowed by other branches. The problem in this research is company target in serviceability and service level achievement is 90%, but seen from condition of tool and report result of data analysis and serviceability and service level calculation, 90% target is not reached. The company strives to achieve the specified target in accordance with the wishes of the customer (airlines) by always having daily

checks, GSE maintenance and GSE maintenance. By performing data analysis, it will be seen what tools are not achieved according to the company's target of 90% serviceability and service level.

## **Literature Review**

Transportation is the transfer of goods and people from the place of origin to the destination, The transport process is a movement from the place of origin, from where the transport activity begins, to the destination, where the transport activities ends (MN Nasution, 2008). Ground Handling (IATA, 2014) is a service activity or providing continuing services from a series of service sales activities undertaken by an airline in other words: an aviation supporter whose service activity services at the airport prior to the flight (pre flight) and after the flight (post flight). According to (Rangkuti, 2008) Operational management is one of the functional management activities related to the transformation of all inputs (inputs) in an integrated manner and can produce added value in the form of output (output) in the form of products or services. Activity through the transformation process is done effectively and efficiently, and can be measured based on certain specific criteria. The result is a product or service performance and technological process and in accordance with the intended market objectives.

## **RESEARCH METHOD**

Data analysis techniques using descriptive statistics, namely statistics used for data analysis by describing or describing the data that has been collected as it is without any purpose to make conclusions for generalization (Sugiyono, 2009). Presentation of data through table, graph, histogram, mode calculation, median, mean (measurement of central tendency), calculation of data dissemination through mean calculation and standard deviation, percentage calculation. (Agus Tri Basuki, 2016)

## **RESULT AND DISCUSSION**

### **Ground Support Equipment maintenance program that is categorized based on Motorized and Non Motorized**

Department of ground support equipment do maintenance program with divided into 3 parts namely :

1. GSE preventive maintenance, which performs the task of checking the condition every day of equipment breakdown and tool delays and performing periodic maintenance. Periodic maintenance is done based on hours of use and see the condition of the tool.
2. GSE Heavy maintenance. Perform the task of checking and repairing GSE equipment with categories of heavy and light damage and requires intensive care. For Over houl great improvement.
3. GSE Line maintenance (trouble shooting). Carry out the task of handling problems when in the field or operation takes place.

In the process of treatment of GSE motorized and non motorized preventive maintenance activities carried out routinely and perform routine checks, for tools requiring maintenance of heavy and light damage on heavy maintenance is carried out routinely, as well as checking GSE tools motorized and non motorized at the time in the field or operational progress. With the GSE Presentive program, companies can control costs and can minimize damage to ground support equipment.

Results of research conducted by Tachan said (Tachyan et al., 2010) The control of GSE maintenance costs is intended to offset the costs incurred to minimize GSE maintenance costs to achieve efficiency levels, then PT. Gapura Angkasa controls the cost of maintaining GSE equipment by reducing costs by exerting all efforts to use them more effectively and efficiently in order to obtain more results with less cost and use the budget by comparing the realization / cost of maintenance of GSE equipment to the standard (budget) company that has been legalized and if there is any difference or deviation hence can be done revision or improvement of budget. It can be concluded that

with the treatment program GSE Motorized and Non Motorized apabila damage or repair if there is no in the eyes of the budget can be done budget revision.

### **Analysis of demand and availability management Tools Ground Support Equipment Motorized and Non Motorized**

Operational activities in the apron area is to meet customer demand that provides ground support equipment in accordance with the type of aircraft. Demand Management and Availability of GSE Tools are under the Operator department, the procedures performed for demand management are as follows :

1. Schedule of aircraft distributed to GSE Operator (Daily schedule)
2. Division of labor by group. The working group is divided into 2 shifts.
3. The handling of the aircraft is carried out by the operator according to the type of aircraft (Wide and narrow body), and in accordance with the operator's license.
4. Distribution of GSE tools based on the type of aircraft handled.
5. Implementation Handling of aircraft based on aircraft type.

From the interviews it is said that the handling of wide-body aircraft using ground support equipment as much as 15 tools in accordance with the request of the pilot that is, Passenger Stair, High Lift Loader, Baggage cart, Push back Car, Pallet, Long pallet dolly, Lavatory Truck and Water Service Truck . As for Narrow Body, it takes 10 tools in accordance with the needs of aircraft and pilot demand. Currently the needs of GSE tools are met, however, the company also experiences some obstacles, such as unavailable tools or tools that are damaged and are under repair, or even borrowed by other branches. To overcome this, the company tried to borrow to similar companies or rent to GSE equipment provider company, so there is no queue in the field, or refusal to handle the plane.

Goals or targets to be achieved by ground handling is flight safety, on time performance, customer satisfaction, and efficiency (Silaban Batara, 2014). The target of flight safety and on time performance is greatly felt by external parties (users of aviation services) and internal parties (companies). Aircraft handling procedures at airports between one type of aircraft and the other are not the same. However, in general the time required for turnaround arrangement is 40 minutes to 1 hour. The activities carried out are Aircraft loading unloading, marshalling, parking, ramp to flight deck communication, starting, safety measures and moving aircraft, while activities related to aircraft servicing are exterior cleaning, interior cleaning and toilet service, water service, cooling and heating, cabin equipment and inflight entertainment, material and storage cabin material.

Added a review of maintenance journal (Dameirianto & Maintenance 2013) Flight delay is a scourge for the airline because it makes its image damaged in the eyes of society and cause material loss if it exceeds three hours. Delay is caused by many factors, one of which is the unpreparedness and incompleteness of the support equipment or the Ground Support Equipment (GSE). In aircraft operations, GSE support is required prior to departure (preflight) or after the plane arrives at the destination airport (post flight). Likewise, when aircraft undergo maintenance in a hangar, the capacity and capabilities of the GSE are decisive. In addition to being grouped into non-powered equipment and powered equipment, GSE equipment is also grouped in motorized and non-motorized.

Included in the non-powered wheel chocks in front and behind the wheel to prevent the aircraft moving when parking, work stairs, bag carts to transport cargo, excess baggage, mail, and materials from the terminal to the aircraft (sorting facility), and dollies for containers and pallets to transport cargo in container and others. Equipment of this category in the hangar include docks as a platform in the care of the hangar, aircraft jacks that support the aircraft when undergoing maintenance, engine stands, APU stands, wheel and brake change stands and others. Including powered equipment include refueling trucks to provide aircraft fuel, tugs and tractors that have several functions as ground service supporters, ground power units to supply power to aircraft parking, ground turbine compressors that provide pneumatic power to aircraft in land, container loader for loading and unloading cargo, transporters to help the process of loading and unloading, potable water trucks to fill drinking water on the plane, and others.

Other benefits that can be obtained is the lack of time wasted, the work process to be effective and efficient, reliability is achieved and customer satisfaction obtained. To ensure its availability, maintenance of GSE equipment is an important factor. Supported by (Dameirianto & Maintenance, 2013) Maintenance of GSE equipment includes preventive maintenance and maintenance Four important factors must be met ie man, method, machine, and material. In the context of these four important factors, GSE equipment belongs to a group of machines. Although in-service GSE equipment maintenance is never mentioned or used directly, but the presence of GSE equipment itself is sometimes more complex than tools and equipment used directly in aircraft maintenance. The significant role of GSE equipment not only ensures the safety and security of aviation but also comfort in the aviation business. The availability of complete and feasible GSE equipment is an important factor of operational and aircraft maintenance.

### **Analysis of Serviceability Management and Service Level Ground Support Equipment**

Serviceability and service level greatly affect the level of service in apron. Each company has its own standards or airlines can also determine the serviceable and service levels that must be achieved by the company ground handling. The following is data serviceability and Service Level Motorized Year 2015 starting from January to December, the data source used is monthly data called FS 23, which is monthly report data from the maintenance division for the use of ground support equipment motorized equipment.

Tabel 1. Serviceability Dan Service Level Motorized Data Year 2015

NO	PERIODE (MONTH)	SERVICEABILITY (Xi)	SERVICE LEVEL (Xi)	AVERAGE	□
1	JANUARI	70	75	76	25
2	FEBRUARI	77	80	84	9
3	MARET	78	80	85	4
4	APRIL	88	89	95	1
5	MEI	83	85	90	4
6	JUNI	84	87	91	9
7	JULI	84	87	91	9
8	AGUSTUS	84	85	91	1
9	SEPTEMBER	81	75	87	36
10	OKTOBER	80	73	86	49
11	NOVEMBER	85	76	91	81
12	DESEMBER	84	75	90	81
	TOTAL	978	967	88.22	309
	AVERAGE	150	149		

	MODUS	84	75		
	MEDIAN	84	87		
	STANDAR DEVIASI		6	6	

In table 1. serviceability and motorized servicelevel above average of the smallest achievement in January was 76, continued in February averaging 86, and March 85, while the highest was in June, July, November 2015 of 91. In January, February and March the average is smaller than in other months due to the fact that there are still many GSE Motorized appliances that have not been returned by other branches, so the Soekarno Hatta branch also lacks equipment and has to borrow from other ground handling.

With a median value of 84 for serviceability and 87 servicelevel for grounded equipment support equipment motorized shows that achievement is not achieved in accordance with the company's target of 90%. Value mode for serviceability of 84 and servicelevel of 75, with the value of the company's target has not reached 90%. While the total value of servicelevel and serviceability (X) is 88.28. Where the value of X is higher than the median value ( $88.28 > 87$  and  $84$ ) which means the overall condition of serviceability and service level are in a good position.

As for the standard deviation value of motorized serviceability and service level equipment is equal to 6 where it shows small and insignificant differences to the lack of tools to the level of service and ability of the company. This is because the condition of the tool that can not be used for several reasons, such as borrowed tools, tools are damaged, and the tool is under repair.

Here is data serviceability and Service Level Non Motorized Year 2015 starting from January to December, the data source used is monthly data called FS 23, which is monthly report data from the maintenance division for the use of ground support equipment non motorized equipment.

Table 2. SERVICEABILITY DAN SERVICE LEVEL DATA NON MOTORIZED TAHUN 2015

NO	PERIODE (MONTH)	SERVICEABILITY (Xi)	SERVICE LEVEL (Xi)	AVERAGE □	□
1	JANUARI	80	85	87	25
2	FEBRUARI	80	85	87	25
3	MARET	80	85	87	25
4	APRIL	90	95	98	25
5	MEI	90	90	98	-
6	JUNI	95	95	103	-
7	JULI	95	95	103	-
8	AGUSTUS	95	95	103	-
9	SEPTEMBER	90	80	97	100
10	OKTOBER	90	85	97	25
11	NOVEMBER	90	85	97	25

12	DESEMBER	90	82	97	64
	TOTAL	1065	1057	96.09	314
	AVERAGE	164	163		
	MODUS	90	95		
	MEDIAN	95	95		
	STANDAR DEVIASI	5	5		

In table 2 serviceability and non motorized servicelevel above the lowest average achievement in January to March of 80, while the highest was in May, June and July 2015 amounted to 95. In January to March occurred due to the tools, Non-Motorized GSE tools have shortage of tools although not many because of the many requests and there are not yet returned by other branches, so the branch of Soekarno Hatta also lack of equipment and have to borrow to other ground handling.

With a median value of 95 for serviceability and 95 servicelevel for grounded equipment motorized equipment shows that achievement exceeds the company target of 90%. The mode value for serviceability is 90 and the servicelevel is 95, with the company's target value reached 90%. While the total value of servicelevel and serviceability (X) is 96, where X value is higher than median value ( $96 > 95$ ) which means overall serviceability and service level conditions are in very good position.

As for the standard deviation value of motorized serviceability and service level equipment is 5 where it shows small and insignificant differences to the lack of tools to the level of service and ability of the company. This is because the condition of the tool can not be used for several reasons, such as a high demand tool but the company does not have the availability of tools, tools borrowed, tools damaged, and the tool is under repair.

Supported by research from (Rajagopalan et al., 2003) Power quality is the increasing use of electric ground support equipment (GSE) can negatively affect the quality and reliability of the airport power system. The penetration of large nonlinear loads at airports, (eg 400 Hz electric units, preconditioned air systems, computer equipment, and increasing use of electric vehicle chargers) raises the potential for power quality, power delivery and energy consumption concerns for power providers. This paper reports on the key findings of a project that examines the impact of power quality of GSE charging systems on airport power distribution systems. The effect of reduced electrical power on the GSE tool causes damage to some devices, although the damage is not significant but found the defective equipment thus reducing serviceability and service level ground support equipment.



Picture 1. GSE Non Motorized (Wheel Chock)  
Used to withstand aircraft tires from high winds.



Picture 2. GSE Motorized ( Ground Power Unit). Used for electrical power for aircraft

## CONCLUSION

Maintenance Equipment Tools Ground Support Equipment categorized based on Motorized and Non Motorized, the ground equipment support department performs routine maintenance programs ie preventive maintenance, Heavy maintenance, Line Maintenance, GSE Non Motorized so that GSE is always ready for use in accordance with the needs in every flightnya. Demand management Ground Support Equipment department Ground support equipment managing based on schedule flight consisting of Schedule and Non schedule so that the availability of Ground Support Equipment Motorized and Non Motorized Equipment can be fulfilled according to the requirement of every flight and always on time performance, customer satisfaction, and efficiency.

Service level Ground Support Equipment as a whole has not been in accordance with the company's expectations because GSE Motorized is still much that has not been returned by other branches, so the branch of Soekarno Hatta also lack of equipment and must borrow to other ground handling. Although it has been reached but it also depends on the existing flight schedule but overall.

GSE airport Soekarno Hatta should be more availability than the number of schedule of the existing flight schedule and non schedule.

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