

Turnaround Process in Passenger Aircrafts - A Time Study

Biju M. K.

Assistant Professor, School of Management and Business Studies,
Mahatma Gandhi University, Kottayam – 686 560

Praveen M.

IV MBA, IGNOU, New Delhi

Abstract

Turnaround operations include all the operations which make the flight ready for the next service at an airport. This operation is critical as it has to be done fast and accurate for an airline to be customer centric and efficient in its operations at the same time. These operations are offered to the airline companies by two service providers at Calicut International Airport viz., Air India and Bhadra International India Pvt. Ltd. This paper evaluates and compares their performances in Turnaround operations using Time Study. Some suggestions also are provided.

Key words

Turnaround Process, Ground Handling, Time Study, Gantt Chart, Break down

Introduction

The passenger satisfaction of an airline company is closely related to the comfort provided to the passenger in all activities in relation to the service. After the initial activities like ticket booking and updating them with proper information, all major activities happen in the airport. For providing all these comfort to the passengers a large number of background processes are to happen timely and effectively. This operation is called Ground Handling. The airlines outsource this operation to established service providers. The operations include Passenger handling, Ramp handling, Cargo Handling and Aircraft servicing. The main aim of ground handling operation is to reduce the time it takes to provide all the necessary services to an aircraft from its landing to departure.

There are two companies providing Ground Handling services to airlines operating in Calicut International Airport viz., Air India (hereafter referred as AI) and Bhadra International India Pvt. Ltd. (hereafter referred as BI). As time and safety is critical in these operations, the companies have to

perform to the best possible level, which helps them to keep the customer airlines with them. In this business, as the old saying goes, time is money.

The most critical success factor in these operations is the Turnaround Time taken by the service provider. The Turnaround process starts with the arrival of the aircraft when it is marshalled to the designated bay by the marshaller and on halt chokes were provided to the aircraft wheels for keeping it stationary. The turnaround time is measured from the moment the chokes were provided to the flight to the time when chokes removed. After the chokes were on and the anti-collision light of the aircraft is off, the ramp handling equipments such as Mobile Passenger steps, Container pallet loaders, Mobile bulk freight loader were attached simultaneously. Passenger alighting, luggage offloading are done. If Aerobridges are not used the alighted passengers are transported to the terminal building using Passenger Coaches. The offloaded luggage is loaded in baggage trolleys, containers and pallets and these were towed using Tractors and transported to the airport terminal building. Potable water service is provided and after that Toilet service is done. After offloading, luggage loading will be done. Aircraft Cabin Cleaning and Catering uplift are done after passenger alighting and after this passenger boarding will start. Refuelling is done once all the ramp handling equipments were attached to the aircraft. On completion of luggage loading the CPL and MBFL were removed and cargo hold doors are closed. Passenger Step ladder is removed after passenger boarding and completion of refuelling and then passenger doors are closed. The Push back tractor for pushing back the aircraft is connected after all the doors are closed and the choke is removed from the aircraft wheels and this is counted as the last activity for calculating the turnaround time. Now the aircraft is ready for departure.

This study aims to analyse the turnaround time taken by the two service providers using time data.

Problem

Since the inception of the Calicut International Airport, AI was the only service provider in ground Handling operations for the airlines there. There was a number of new entrants in to the business as the Central Government declared its Open Sky Policy by the beginning of this decade. BI opened its services at Calicut International Airport and quickly became a strong competitor to AI. As the survival in the market depends on performance on the Turnaround Process, the companies need to study about their efficiency in these operations. This paper explains how the Time Studies were conducted on the Turnaround Process for AI and BI, and used that data for assessing their performances.

Objectives

The objectives of this paper are stated below

- To carryout Time Study to analyse the performances of AI and BI in turnaround process.

- To assess the average age of Ground Handling equipments used by AI and BI.
- To provide suggestions to improve the on time performance and quality of turnaround process of AI and BI.

Literature Review

- The surveys viz., *CAA Passenger Survey Report 2011, A survey of passengers at Birmingham, East Midlands, Gatwick, Heathrow, Luton, Manchester and Stansted*, have been designed to obtain information of a kind that could not be collected on a routine basis from the air transport industry. These surveys have included questions on journey purpose, final and intermediate surface origins/destinations, means of transport to and from airports, route flown, country of residence and income. This information is used in assessing the type of market served by airports and consequently for forecasting air transport demand and for planning airport facilities. These reports provided the researcher the information required to prepare the questionnaire to collect the data from passengers travelling through Calicut International Airport.
- *International Air Transport Association Ground Operations Manual (IGOM), Supplement to Airport Handling Manual, 2nd Edition, Montreal, Geneva*, defines Ground Handling Standards for airlines and ground service providers to ensure ground operation activities are safely efficiently and consistently accomplished. Procedures reflect the minimum standards as identified by the aviation industry.
- *European Commission Proposal for a regulation of the European parliament and of the council on ground handling services at Union airports and repealing Council Directive 96/67/EC.*, gives a frame work to enhance the efficiency and overall quality of ground handling services for users (airlines) and end-users (passengers and freight forwarders) at EU airports.
- *Airport Research Centre, 2009 - Study on the impact of Directive 96/67/EC on Ground Handling services 1996-2007*, analyses the effect of Directive issued by the European Union in liberalizing the ground handling market.
- *DGCA A/C SL.No.3/2010 dated 2nd June 2010 Grant of permission for providing Ground Handling services at Airports other than those belonging to the Airports Authority of India*, provides a picture about the ground handling regulations in India.
- *Ground handling simulation with CAST, a thesis by Sara Sanz de Vicente, Department of Automotive and Aeronautical Engineering, Hamburg University of Applied Sciences*, is a research on ground handling operations looking for an aircraft optimized to reduce Direct Operating Costs.

This master thesis is focused on the analysis of ground handling processes and the description and application of the simulation program Comprehensive Airport Simulation Technology.

- *Differences in Ground Handling in Global Market* authored by Yik Lun Tan, Department of Automotive and Aeronautical Engineering, Hamburg University of Applied Sciences, is a part of the project Aircraft Design for Low Cost Ground Handling, (ALOHA). ALOHA tries to optimize the aircraft for ground handling operations. Optimised ground handling is also one of the key factors in the business model of Low Cost Airline, LCA. LCA have optimized ground handling operations, reduced turnaround time and ground handling cost.

Research Methodology

This Research follows Descriptive research type of study. Both Primary and Secondary sources of data will be collected for this study. Primary data were collected through observation. Time required for various ramp activities were collected directly at site. The Ramp handling operations were observed by the researcher and noted down the timings for various activities. Secondary data were collected from published sources like International Air Transport Association's ground handling manual, journals, magazines and websites. Judgment sampling is used for choosing one flight each for AI and BI for observations. The population under this research contains AI's own flights, its customer airlines and customer airlines of BI. Customer Airlines are those which are in contractual agreement with AI for Ground handling their aircrafts operating through Calicut International Airport. These include both passenger and cargo airlines. Time study was used to analyse the time required for movements on ramp side such as baggage movement from aircraft baggage hold to conveyor belt on terminal building from where passengers collect their baggage. The scope of the study is defined as this paper focuses on Ramp side Ground Handling activities related to the Airlines Operating in Calicut Airport. Also, it compares and evaluates services provided by AI and BI, the two ground handling agencies at Calicut International Airport.

The paper has some limitations which include the restrictions on time and other resources, which limited the researcher to observe only one aircraft per service provider.

Analysis

The analysis of data was done through tools like Time Study.

(a) Time study

Time Study is used to analyse the Turnaround time taken for the flights served by AI and BI. Turnaround Time is the time required to do all the ground handling activities for an aircraft which is terminating a flight and subsequently originating another flight following a complete change of load.

The various processes to be completed for a turnaround flight are: (a) Passenger Disembarking and Boarding, (b) Baggage/Cargo offloading and loading, (c) Aircraft Cleaning, (d) Potable Water servicing/ Toilet Servicing, (e) Refueling and (f) Catering offloading and loading.

The turnaround time of flights were measured by physically observing the process and noting down the time taken to complete each process. Since the scope of study deals with ramp services provided by the ground handling agencies, refueling time and catering up lift time were avoided during the study as these services were provided by separate agencies such as fuelling companies and catering companies who had direct contract airline operators.

(1) Turnaround time measured for AI handled flight

Activity times for passenger disembarking viz., boarding, baggage/cargo offloading-loading and aircraft servicing were noted down for the flight handled by AI. The flight selected was B777-200.

Table 1: Turnaround Time for AI Handled B777-200 Flight

Sl. No.	Process	Start Time	End Time	Time taken for the Process in minutes
1	Positioning Pax Steps/Aero bridge	00	03	03
2	Disembarking	04	14	10
3	Cleaning	14	30	16
4	Boarding	30	70	40
5	Removal Pax Steps/Aero bridge	70	72	02
	Forward Cargo Hold			
6	Positioning CPL	00	02	02
7	Door Opening /Closing FWD	02	04	02
8	Offloading loading	04	36	32
	Rear Cargo Hold			
9	Positioning CPL	00	02	02
10	Door Opening/Closing Rear	02	04	02
11	Offloading/loading	04	69	65
12	Bulk Hold Offloading/loading	02	60	58
13	Potable water Service	10	20	10
14	Toilet water service	20	25	05

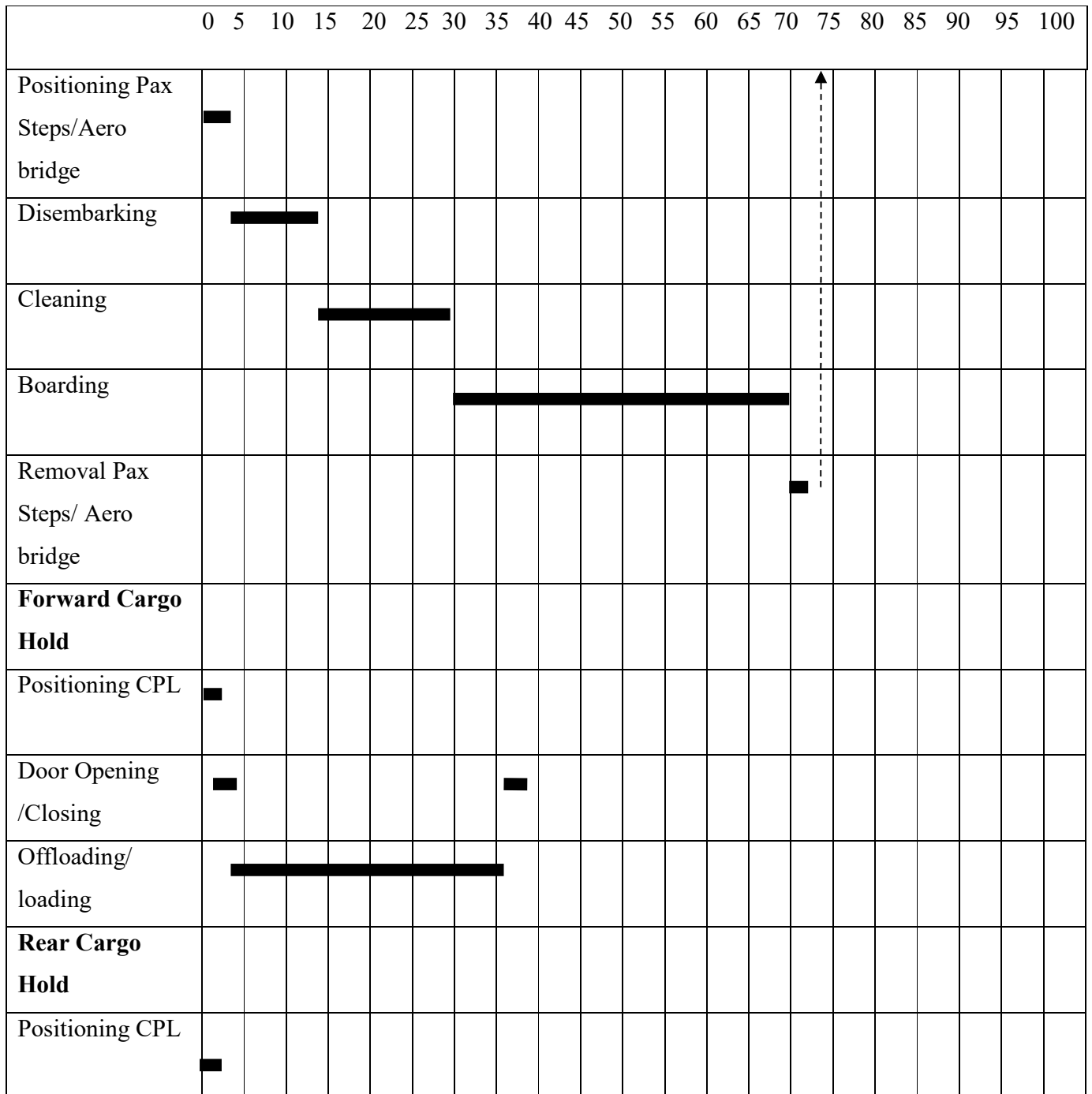
15	Connecting Push Back to aircraft	71	73	02
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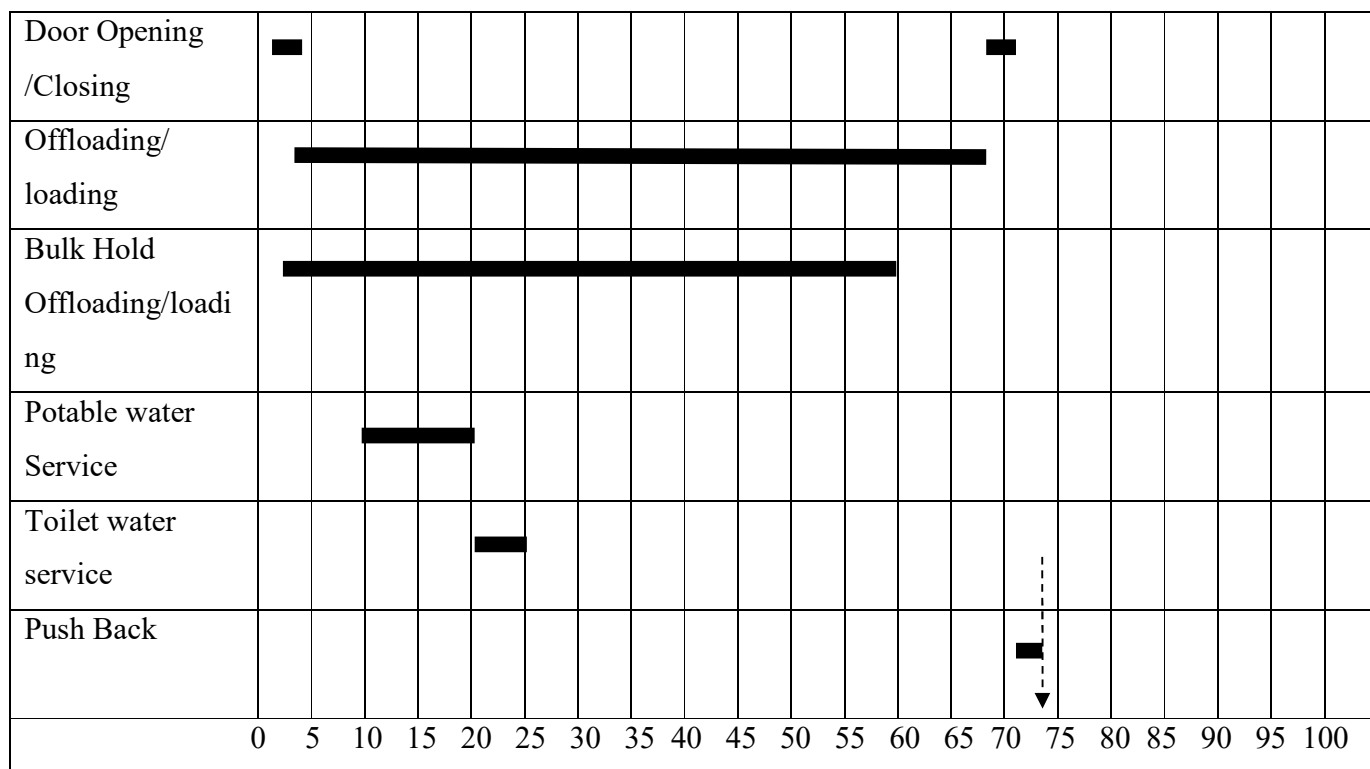
Source: Primary Data

Gantt Chart

Gantt chart is drawn for the collected data.

Figure 1: Turnaround Gantt Chart of B777-200 Aircraft handled by AI





Source: Primary Data

The scheduled turnaround time of the flight is 90 minutes.

Observations made by the researcher during Time Study of turnaround activity

- It takes 16 minutes to deliver the first passenger baggage to the airport terminal conveyor belt. This shows that AI took 9 minutes more than that of 7 minutes which is specified by IATA Airport Handling Manual (AHM 804 IATA System SLA Sensitization, 11th February 2010)
- During offloading of baggage/cargo from the cargo hold, the activities were halted for 8 minutes due to rain as the staff doing the loading work does not have the rain coat.
- Containers were not loaded in the order of loading to the aircraft in the dolly trains. This consumed more time during container loading activities as the tractor towing the dolly trains had to move many times to bring the correct container for loading.
- Passengers were found waiting for the Passenger coaches to travel to the Airport terminal entry gate after disembarking from the flight. Adequate number of passenger coaches not available for the passengers to travel on the ramp side.
- From the table and Gantt chart it is found that all the ramp activities were completed in 73 minutes. This is well before the scheduled ground time of the aircraft which is 90 minutes. Also the maximum time taken for the baggage/cargo offloading-loading activity after the arrival of the flight

is 69 minutes and these activities were completed before the completion of passenger boarding which took 70 minutes.

Turnaround time measured for BI Handled flight

Activity times for passenger disembarking viz., boarding, baggage/cargo offloading-loading and aircraft servicing were noted down for the flight handled by BI.

Table 2: Turnaround time measured for BI Handled flight

Sl. No.	Process	Start Time	End Time	Time taken for the Process in minutes
1	Positioning Pax Steps/Aero bridge	00	03	03
2	Disembarking	04	15	11
3	Cleaning	15	32	17
4	Boarding	32	95	63
5	Removal Pax Steps/ Aero bridge	97	99	02
	Forward Cargo Hold			
6	Positioning CPL	00	02	02
7	Door Opening /Closing	02	04	02
8	Offloading/ loading	04	64	60
	Rear Cargo Hold			
9	Positioning CPL	00	02	02
10	Door Opening /Closing	02	04	02
11	Offloading/ loading	04	80	76
12	Bulk Hold Offloading/loading	02	82	80
13	Potable water Service	08	18	10
14	Toilet water service	20	28	08
15	Connecting Push Back to aircraft	100	102	02

Source: Primary Data

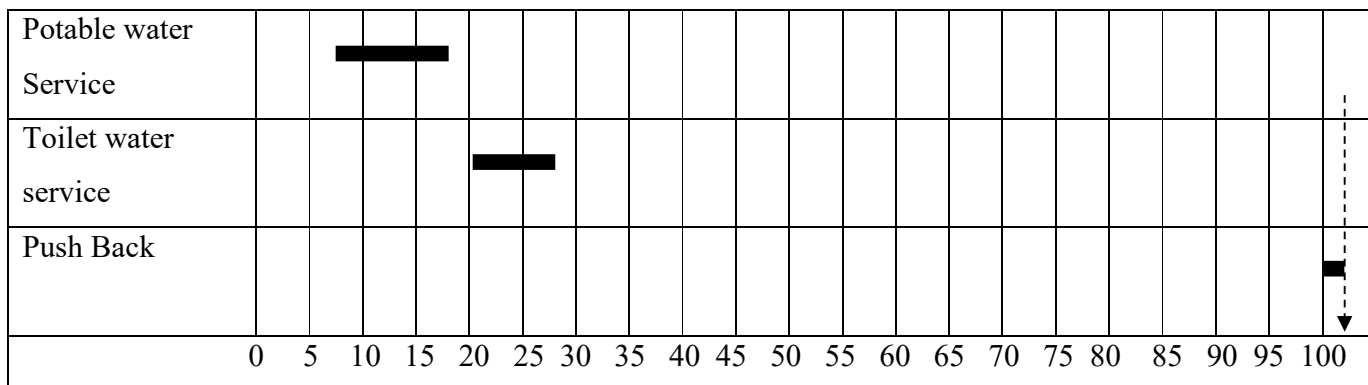
Gantt Chart

Gantt chart is drawn for the collected data.

Figure 2: Turnaround Gantt Chart of Aircraft handled by BI

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Positioning Pax Steps/Aero bridge	■																			
Disembarking	■	■	■																	
Cleaning			■	■	■															
Boarding						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Removal Pax Steps/ Aero bridge																			■	
<u>Forward Cargo</u> <u>Hold</u>																				
Positioning CPL	■																			
Door Opening /Closing	■											■								
Offloading/ loading	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
<u>Rear Cargo</u> <u>Hold</u>																				
Positioning CPL	■																			
Door Opening /Closing	■																		■	
Offloading/ loading	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Bulk Hold Offloading/loadi ng	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■



Source : Primary Data

The scheduled turnaround time of the flight is 105 minutes

Observations made during Time Study of flight handled by BI

- All the required equipments with operators were available well before the arrival of the flight.
- Time taken to deliver the first passenger baggage to airport terminal conveyer belt was 9 minutes. This is better than that of AI’s performance.
- The flight handled by BI had a planned turnaround time of 105 minutes which is more than that of the flight handled by AI. All the ground handling activities were completed in 102 minutes which is within the turnaround time.

(b) Analysis based on technical details of the machineries

Data related to the technical aspects of the equipments were collected and analyzed.

(1) Average age of Ground Handling equipments

Manufacturing date of equipments was observed and collected from the Name plates. Average ages of equipments were calculated for both AI and BI.

Table 2: Average Age of Equipments

Service Provider	AI	BI
Average Age of Equipments	8 years and 6 months	3 years

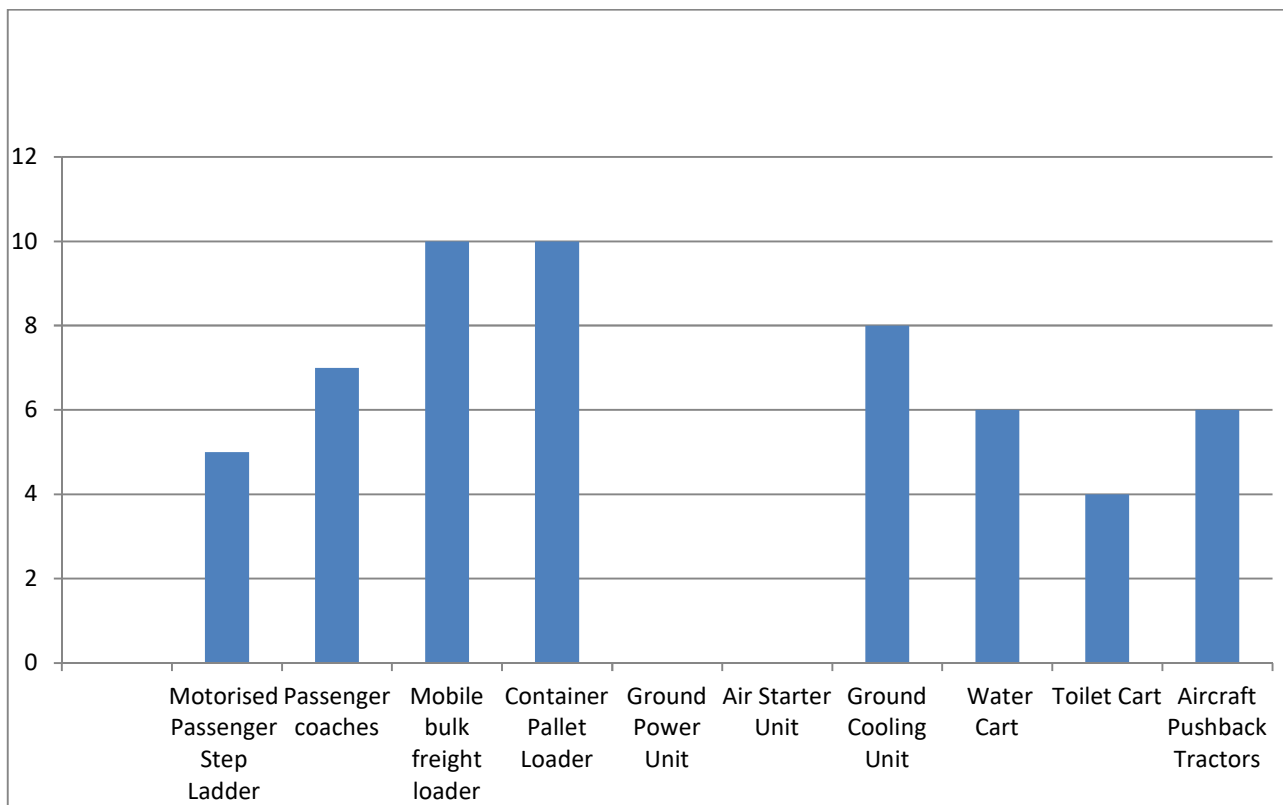
Source: Primary Data

The age of AI’s Ground handling equipments is much higher than that of BI. This may lead to larger number of break downs for AI.

(2) Frequency of equipment break down during operation

Data related to the equipment break downs are collected from the records as secondary data. The data on frequency of breakdown during operations as provided by Airline Operators availing ground handling service from AI is analysed.

Figure 4: Frequency of equipment breakdown during flight handling by AI



Source: Secondary Data

From the graph it is observed that Mobile Bulk Freight Loader (MBFL) and Container Pallet Loader (CPL) is having the highest number of break downs during aircraft handling by AI. These equipments are critical equipments in ground handling as the baggage loading and off-loading is done using these equipments. The breakdown of these equipments during flight handling will affect the smooth operation and on-time performance. So, to achieve the on-time performance and to reduce the complaints from customer airlines, the Serviceability and reliability of MBFL and CPL and also other equipments require to be improved through effectively implementing preventive maintenance. This is critical for AI as their equipments are much older compared to BI. This could be due to the fact that AI was there in the business here many years earlier than BI. In any case, keeping the equipments in working condition and reducing break downs are critical.

Suggestions

The following suggestions are proposed by the study.

- Availability of adequate number of equipments is a concern of the customer Airlines of AI. Also it is found during the study that the average age of AI's equipments are 8 years and 6 months. Considering this there is a need to induct new ground support equipments to the present strength. This will help to improve the availability of the equipments and also will increase the reliability

during ground handling operation as the break down frequency will be very less or nil for new equipments.

- Through implementing effective preventive maintenance the break down frequency of equipments during flight handling can be reduced. This will help to achieve the on time performance for Ramp handling. For example if an equipment such as Container Pallet Loader fails during handling the time required to remove the loader and to position another will add to the turnaround time and in effect the turnaround time will increase. So with effective preventive maintenance the on-time performance can be improved.
- In maintenance Special care should be given to Container Pallet Loader and Mobile Bulk Freight loader as these equipments are continuously working during the ramp handling and can be termed as critical equipments and any break down will adversely affect the achievement of on time performance.
- The equipments outlook and condition can be improved by cleaning daily, painting at least once in a year and changing the upholstery of passenger coaches.
- During observation it is found that passengers were stranded on the tarmac after disembarking the flight through Passenger step ladder on arrival.
- This can be avoided by providing sufficient Passenger coaches by coordinating with commercial department and collecting the details of number of passenger in an arrival flight.
- AI is able to complete the flight handling before the scheduled turnaround time. The study shows that even though the scheduled turnaround time for AI handled flight is much lesser than the BI handled flight, it completed the ground handling before the stipulated time. This shows AI's ability to compete with anyone in the market. The only thing needed is to provide and additional care for its customer airlines by providing a dedicated person and if possible a dedicated team for handling each third party airline. The performance of this dedicated team should be assessed on daily basis from the feedback of customer airlines and necessary corrective actions should be initiated on day to day basis.
- The time taken to deliver the offloaded baggage to the conveyor belt of the terminal is much higher than the standard time specified by IATA. From the observation during the study it was found happening because the tractor drivers were waiting for the baggage trolley to be fully loaded with the offloaded baggage. This can be avoided by educating the tractor drivers to take a little care to transport the offloaded baggage to the terminal conveyor as soon as possible by not waiting for the

baggage trolleys to be fully loaded. This action will satisfy both the passengers as well as customer airlines.

- The time taken to load the containers to the aircraft can be reduced by arranging the containers in the order of loading in the dolley trains as per the load plan. This will eliminate the time taken to make a round by the tractor towing the container dollies to bring the right container for loading.
- The halt of luggage handling due to rain on ramp can be avoided by making arrangements to provide the rain coats as soon as the rain starts. Some rain coats should be kept in the custody of Ramp Supervisor so that it can be provided to the ramp side staff during sudden rain. This arrangement will help to avoid any delay in Ramp handling due to rain.

Conclusion

The market for Ground Handling services is very competitive and there are companies which provide excellent services to the customer airlines. The passenger satisfaction is critical for the airlines for the sustained relationship with the passengers. Thus, the airlines will never compromise on the services they need to get from the Ground Handling companies. This makes it important for AI to improve their equipments and the services offered by them.

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