Synergizing Air Cargo Operations Efficiency through Effective Implementation of Logistical Processes

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Abstract **- With the airline's cargo business doubling up in the last couple of years, the organization is laying special emphasis on its cargo segment. In the present scenario, the business competition between airlines" is very high and all the time it has been found that there is a dearth of passenger load compared to the cargo load, where proper servicing from the warehouse to accommodate cargo management is poor. The present compensation charges that Jet Airways has to bear on an yearly basis is around Rs. 30 lakhs. By improving the warehouse efficiency, it is aimed that the discrepancies of offloading can be plugged and an approximate Rs. 20 lakh to Rs. 30 lakh can be saved. It is expected that the present unsystematic operations of warehouse can be structured effectively, improvement in the work efficiency can be achieved by avoiding the offloading, the yearly compensation loss can be stopped resulting in further business enhancement. To gauge the loopholes in the present operational system, a detailed analysis of International Cargo and domestic cargo was undertaken and the stage-wise "CRITICAL PROBLEMATIC AREAS of the cargo warehousing functions were identified, with the purpose to solve the said problems on the basis of proposed recommendations. Based on the analysis of CPAs, the outcome of demand analysis was realized by virtue of repositioning the cargo inventory vis-à-vis service. It was found out that in some of the flights maximum off loadings takes place regularly and in some group of flights there is maximum space wastage on regular basis which ultimately results in loss of business for the airline. A automated tracking system is recommended whereby it is proposed to develop an integrated online software system enabling the agencies involved to have a direct access with each other, resulting in a transparent interchange of data and knowledge on exact status of cargo at each stage, thereby locating its traceability. The success of this tracking system is largely dependent on the Bar-Coding System of the Inventory software. The proposed results of implementing revised tracking system would be the additional revenue generation for the airline, which is based on the Saving of compensation due IT implementation. The research details the total compensation savings of Rs. 28 lakhs after IT implementation in the warehousing operations and this would be saved straightaway by overcoming the discrepancies and moreover, the same would be plugged at the point of occurrence itself.**

Index Terms **- Airline warehousing, supply chain management, information technology, cargo inventory, cargo tracking system, bar-coding system, manpower utilization and productivity**

INTRODUCTION

The research is conducted at Jet Airways NSCB International Airport Kolkata. Jet Airways is the largest airline of India, flying to fifty-nine destinations globally and having a fleet of 53 aircrafts. It is largest in terms of revenue – for both passenger and cargo. With the airlines' cargo business doubling up in the last couple of years, the organization is laying special emphasis on its cargo segment. The purpose is to develop it as a global air cargo market leader by way of emulating the cargo systems of International giants like Lufthansa Cargo and British Airways World Cargo.

In the present scenario, the business competition between airlines is very high and all the time it has been found that there is a dearth of passenger load compared to the cargo load, where proper servicing from the warehouse to accommodate cargo management is poor. This not only makes it difficult for the company to guess the improvement of the high volume of passengers but also at the same time it is worried about the lack of management in the warehousing operations causing substantial financial loss. Therefore the organization feels that a proper study has to be made to improve the

warehouse efficiency so that the offloading of cargo can be stopped and in consequence a substantial reduction in yearly compensation can be made. The airline also feels that by plugging the discrepancies, number of new customers can be increased.

The present compensation charges that Jet Airways has to bear on an yearly basis is around Rs. 30 lakhs and the internal escalation of the other operating costs is approximately Rs. 20 lakhs. By improving the warehouse efficiency, it is aimed that the idle capacity of the space can be filled up by 25% to 30% and by plugging the discrepancies of offloading, an approximate Rs. 20 lakh to Rs. 30 lakh can be saved. Since the magnitude of the problem is very high, the airline proposed the researcher to make a study in the above area. For such reasons, the research was undertaken to have a detailed view of the problem and to analyze the gaps where there is scope for improvement in the efficiency of warehousing operations.

It is expected that with the help of this research study the present unsystematic operations of warehouse can be structured effectively, improvement in the work efficiency can be achieved by avoiding the offloading and by optimizing the manpower utilization with highest possible productivity, the yearly compensation loss can be stopped resulting in further business enhancement. The total expectation will be nearly sixty lakh rupees earning to Jet Airways.

The research work proposes to achieve the following objectives:

a) To find out the present critical problematic areas / gaps in warehousing operations.

b) Protection of loss of revenue / cargo / business due to the present system.

c) Reasons and remedial measures to overcome operational problems.

d) Recommend optimal manpower utilization with maximum productivity.

e) How Information Technology can be the backbone in implementing the remedial measures.

f) Recommend remedial measures with IT application.

g) Cost Benefit Analysis with IT implementation.

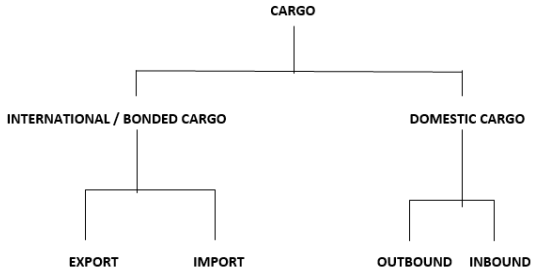
AREA OF WORK AND DATA COLLECTION CENTRES

1. Jet Airways Kolkata Airport Warehouse (Domestic Cargo).
2. Kolkata Airport International Customs Warehouse.
   a. Export Terminal.
   b. Import Terminal.

ANALYSIS OF PRESENT CARGO OPERATIONAL SYSTEM

To study the present cargo operational procedure in the aviation warehousing industry, we first have to classify and distinguish between the types of cargo which will be the basis of our study.

CLASSIFICATION OF CARGO



We will start by discussing the step-by-step explanation of the above procedures and identify the CRITICAL PROBLEMATIC AREAS (CPAs) or GAPS of the cargo warehousing functions in each stage. The solutions or proposed recommendations to solve the said problems will be discussed in the subsequent chapters.

OPERATIONAL PROCEDURES

EXPORT CARGO

Step 1

Exporter books the cargo with the international airline and informs them about its exact nature and quantity. The exporter has to take various factors into consideration before selecting a particular international airline among the available competing airlines". These factors are the detrimental aspects for the competing airlines since these are the reasons why they lose the business from the exporter. This is the CRITICAL PROBLEMATIC AREA NO. I which needs to be addressed by the international airlines' immediately in order to avoid the loss of business from the exporter.

FACTORS:

i) Immediate international connection or minimum waiting time at the transit station.

The exporter before giving a booking, always sees which international airline have an immediate flight from origin station to the destination or in case of a transiting flight, which airline have a minimum waiting time at the nodal point. Here, the airline having an immediate connection with minimum transiting time gets the business from the exporter.

ii) Optimal expenditure with relation to total journey time, subject to exceptions.

The exporter before making a booking has two choices.

1. Select the airline which has least total journey time but having a steep cargo fare charge.
2. Select the airline which has comparatively cheap cargo fare but having a long journey time from origin to destination.

Here the exporter selects the airline which optimizes his expenditure with the total journey time, though there is exception to this factor. For example, the exporter of perishable cargo (frozen meat, vaccines, live fish, fruits etc.) would always give priority to a minimum journey time than the expenditure.

iii) Tariff rates offered by competing airlines- keeping other factors constant, the exporter would always prefer to give business to the international airline whose rates are cheaper.

iv) Quality of service – The exporters' previous experience viz., positive or negative, with the respective airlines plays a vital role in getting the business.

Exporters' experience can be negative, if :-

1. OFFLOADING For example, if the exporter gives a booking of 2 tonnes to a airline and the airline is able to uplift only 1.5 tonnes, then the offloading of 500kgs may result in loss of future business from that exporter.
2. DISCREPANCIES Exporters who witness high cargo discrepancies from a particular airline, would avoid giving business to that airline.
3. DOCUMENTATION ERROR Airline having high documentation errors would fail to attract or retain the exporters, since because of mistakes the cargo gets struck at origin / transit / Customs point.

Step 2

International airline after getting booking, confirms it only after analyzing certain factors. These are the detrimental factors for the airline which does not confirm the booking. These factors are CRITICAL PROBLEMATIC AREA NO. 2 , which needs to be addressed in order to retain the business from the exporter.

i. SPACE AVAILABILITY : The aircraft space for cargo is limited because out of the whole space the passenger baggage is given foremost priority and the remaining space is allocated for cargo. If only the available space for cargo is sufficient, then only the airline accepts / confirms booking for cargo from the exporter.

ii. PRIOR COMMITMENTS : Even if the cargo space is available then also sometimes fresh bookings from exporters are denied because of backlog cargo commitments from the previous exporters.

iii. URGENCY / NEED FOR IMMEDIATE CONNECTION : Sometimes shipper book cargo on the condition of immediate connection to the destination or in other words some shipments require urgent transportation. But if the airline do not have a immediate connecting flight to the respective destination, then the airlines refuse the booking.

iv. PRIORITY INCASE OF EXCEPTIONAL CARGO : The airlines' charge very high tariff rates for exceptional cargo such as gold , jewellery, ornaments, silver or foreign currency. The rates are much higher than that of general cargo. So if a airline gets booking for these shipments, they are given maximum priority. Here even if space is not available or backlog commitments are huge, then also previous bookings are offloaded and the exceptional cargo is sent in its place.

Step 3

After the international airline confirms booking on the basis of above criteria, it sub- contracts the booking with the domestic airline – like Jet Airways or Air India. For the purpose, the international carriers have an INTERLINE AGREEMENT with the domestic airlines.

INTERLINE AGREEMENT : It is an arrangement where the international airlines' cargo is transported within India by domestic airlines, due to the reason of international carriers not having routes on those specified domestic sectors.

As soon as the domestic airline gets booking from the international carrier, it confirms the same only after analyzing certain criteria. This confirmation criteria is same with the international airlines confirmation criteria.

Step 4

Once the booking is confirmed by the international and domestic airlines', the shipper or his agent deposits the cargo at the Customs Export Warehouse in the NSCB International Airport.

Steps In Depositing :

1. The exporter or his agent documents the AIRWAYBILL of the international airline.

It is a document which records all the cargo details namely nature, quantity, quality, packaging details, payment details, exporter / importer details and operating airline name.

2. Exporter attaches the GENERAL CARGO SECURITY DECLARATION, which mentions the cargo contents and its safety in shipping by air.

3. On the basis of the above two documents, the Customs inspects the cargo contents and approves the CARTING ORDER. It is like a no-objection certificate or permission by Customs to air-ship the cargo.

4. Once the Carting Order is approved, the Customs warehouse issues a GREEN COPY and SHIPPING BILL to the exporter. Green copy is a document by which the domestic airline takes out cargo from the Export Warehouse. Shipping Bill contains an unique shipping bill number which is a identification number for that particular cargo.

5. The exporter hands over the above / following documents to the international airline.

- Airwaybill.
- General Cargo Security Declaration.
- Carting Order.
- Green Copy.
- Shipping Bill.

6. International airline transfers the above documents to the domestic airlines by executing AIR CARGO TRANSFER MANIFEST. It is a cargo transferring document which records the details of each cargo types.

7. Domestic airline prepares the CARGO MANIFEST and on its basis and on the basis of the documents mentioned in point 5, the cargo is taken in custody by domestic airlines from Customs.

8. Thereafter the EXPORT GENERAL MANIFEST NUMBER (EGM No.) is obtained from Customs, which is a registration number for each flight's export cargo. On the basis of this number , Customs identifies the cargo at the transit as well as in destination.

9. The cargo is loaded in the respective destination aircrafts of domestic airline.

10. At the transit station, the same is transferred to the international airline as per the interline agreement.

OFFLOADING

Offloading is a major problematic area that needs to be addressed by the aviation industry in order to attract / retain the cargo business from the exporters. EXAMPLE : Jet Airways flight 9W616 for Mumbai at 1800 hrs. is a major cargo flight. Bulk of the Mumbai international cargo moves in that flight. Say, if out of 4 tonnes of manifested load only 2.5 tonnes get uplifted and rest 1.5 gets bumped-off , it will have an adverse effect on the business of Jet Airways because the exporter who holds this cargo will not only be unsatisfied but also will miss the international connection or fail to deliver it to the importer at the right time and thereby incur additional costs. Because of the failure on the part of the airlines, the exporter will be unwilling to give the subsequent businesses to the same airline, in this case Jet Airways. Offloading may be due to various reasons which are the CRITICAL PROBLEMATIC AREAS / GAPS in the cargo operations and which needs to be addressed at the earliest to avoid loss of business from the shippers.

REASONINGS

1. SHORTAGE OF SPACE

(CRITICAL PROBLEMATIC AREA No. III)

I. HEAVY BAGGAGE / COURIER LOAD

As the aircraft space is limited for cargo and is subject to baggage and courier load, a heavy movement of this would make reduced space for loading cargo.

II. SMALLER SERIES OF AIRCRAFT

There are various series of aircraft operated by different airlines all over the world, signifying varying degree of sizes and space. Therefore if high amount of cargo is there for a particular flight in comparison

to relatively smaller size / series of aircraft then there is offloading due to space shortage.

2. SHORTAGE OF TIME
(CRITICAL PROBLEMATIC AREA No. IV)

Sometimes cargo is offloaded due to the time constraint. On an average the ground time for each Jet Airways‟ flight is 30 minutes, which means the flight after coming to the station stays for 30 minutes and then departs for the destination. In these 30 minutes, the incoming load viz., baggage, courier and cargo is offloaded and then the outgoing load is loaded.

I. LATE CARGO ARRIVAL

Herein if the outgoing cargo comes in late from the warehouse, it is offloaded partly / fully due to the time constraint.

II.LATE FLIGHT ARRIVAL / REDUCED GROUND TIME

Sometimes the incoming flight itself comes late whereby the ground time is reduced, which results in time constraint and ultimately cargo is offloaded.

III.HEAVY INCOMING BAGGAGE, COURIER AND CARGO LOAD

When the flight comes in to the station, the procedure is to offload the incoming load of baggage cargo and courier and then load the outgoing load. Here if there is heavy incoming movement, then there's reduced time to load the outgoing load, resulting in offloading of outgoing cargo.

3. NON / LATE ARRIVAL OF EQUIPMENTS
(CRITICAL PROBLEMATIC AREA No. V)

Equipments such as mechanized conveyor belt / manual conveyor belt, closed and open trolleys are required for loading and offloading the cargo and courier. Sometimes due to non-availability or late availability of the same, the outgoing cargo is offloaded.

4.DELAY AT INTERNATIONAL WAREHOUSE
(CRITICAL PROBLEMATIC AREA No. VI)

There are large instances where the cargo is offloaded due to the late release of the same from the international warehouse. Delay at the international warehouse can be due to the following reasons :

I. DOCUMENTATION PROBLEM

Delay in handing over the documents.

Documents handing over delay can be by the international airline to the domestic airline or by the cargo agents to the domestic airline or by the domestic airline to the export warehouse.

Customs Delay

Customs delay can be due to the inspection / cross – checking of the cargo or due to the verification or matching of the cargo with its documents.

Documentation error.

Cargo also gets struck due to the documentation errors of :

- Domestic airline.
- International airline.
- Exporter.
- Indian Customs.

II.WAREHOUSE OPERATIONAL DELAY

The procedure at the export warehouse is that the airline which comes first to take delivery of the cargo is released first by the warehouse and vice-versa. But during the peak season viz., September to 25th December (till Christmas) when major exports takes place to the European countries, there is delay in getting delivery of cargo by the airlines from the export warehouse because the airlines‟ who are ahead in the queue if they hold high volume of cargo then the airlines‟ down the line have to wait for considerable time before getting the cargo and if their flight arrival time clashes with the cargo receiving time there is a offloading.

III.LATE ARRIVAL OF WAREHOUSE EQUIPMENTS

Equipments required for operating cargo at the warehouse are hand trolleys, rotating trolleys and pallets. Sometimes due to its late arrival at the loading site there's delay in releasing the cargo from international warehouse to the tarmac.

IV.EXCEPTION IN FOLLOWING 'FIRST IN FIRST OUT (FIFO)' POLICY

As per the normal procedure, the airline which submits the documents first to the warehouse is released first. But the FIFO policy is not in use for the airline who

hold perishable cargo. Here if the airline submitting documents last has perishables, then they are released first due to the nature of their cargo. So the airline who is first in the queue and who has an immediate flight gets cargo delivery late and there is delay in releasing the cargo from the international warehouse resulting in offloading at the tarmac.

OPERATIONAL PROCEDURE – IMPORT CARGO

With the arrival of incoming flight, the import cargo and its document are offloaded and segregated. The following documents are checked and matched with the import cargo.

1) IMPORT CARGO MANIFEST.
2) AIRWAYBILL.
3) CONSOL CARGO MANIFEST.

At the destination after tallying the shipments with the documents, a Customs Import General Manifest Number (IGM No.) is obtained by the airlines. It is a registration or identification number for each flight's import cargo. The documents and the cargo is deposited at the import terminal where the Warehouse Cargo Officer verifies and inspects the shipments and issues a acceptance certification. After the above formalities, the Cargo Arrival Notice (CAN) is sent to the importer by the airlines on the basis of which the importer takes the delivery from the import warehouse.

OPERATIONAL PROCEDURE – DOMESTIC OUTBOUND CARGO

Jet Airways has its own domestic cargo warehouse at the Kolkata airport. For each flight, the warehouse gets a cargo allocation. It is the available space for cargo in each destination sector flights. On the basis of the allocated cargo space, booking is accepted for the respective sectors. As soon as the full space is booked, the cargo acceptance is closed. The shipper then submits the Instruction for Despatch of Goods‟ (IDG), which mentions the nature, quantity, packing details and the consignor / consignee addresses. The IDG is verified by the warehouse and decision is made whether the cargo is to be charged on weight or volume basis. The high density cargo is charged on weight basis and the volumetric cargo – which does not hold comparatively much weight is charged on volume basis. The warehouse prepares the airway bill and the corresponding Airway bill number sticker is put on the consignment as a mark of identity. This is followed by preparation of Cargo Manifest and screening of the shipment by X-ray. Then the cargo is tallied with the cargo manifest and loaded in the respective flight's cargo trolleys. This is a major critical area on cargo discrepancies in origin station at loading point (CRITICAL PROBLEMATIC AREA No. VII). Also the manifest with each airway bill is loaded in the cargo jacket. The cargo and jackets are sent to the respective flight's tarmac for loading in the aircraft.

OPERATIONAL PROCEDURE – DOMESTIC INBOUND CARGO

Incoming flight's cargo and cargo jacket is offloaded in the tarmac and is sent to the domestic warehouse. The warehouse tallies and inspects the cargo with reference to its documents and reports back the discrepancies or documentation errors to the origin station.

Following types of discrepancies can be detected at the destination station which is a CRITICAL PROBLEMATIC AREA / GAP No. VIII and needs to be addressed to avoid the compensations which are made to the customers due to discrepancies.

1. Airway bill received without cargo.
2. Cargo received without airway bill.
3. Both airway bill and cargo not received.
4. Manifest showing wrong airway bill number.
5. Excess Landing (pieces or weight).
6. Short landing (pieces or weight).
7. Misrouted cargo.
8. Damaged cargo.
9. Wrong airway bill number sticker on cargo.
10. Missing / Theft / Pilferage.
11. Over-carry.

After the cargo is tallied at the destination and discrepancies if any, are reported to the origin station, a CAN is sent to the consignee and on their arrival cargo delivery is made at the warehouse.

HIGHLIGHTS

I. ANALYSIS OF PRESENT SYSTEM

1. Classification of cargo types.
2. Operational procedure for each cargo types.
3. Factors that enhances / reduces the cargo business for the airline.
   - The reducing factors are the critical problem areas and overcoming of those will enhance the airline's cargo business.
4. Types of documents and documentation procedures.

II.ANALYSIS OF CRITICAL PROBLEMATIC AREAS / GAPS

1. Detrimental factors while taking booking.
2. Detrimental factors while booking confirmation.
3. Offloading due space shortage.
4. Offloading due time constraint.
5. Offloading due late arrival of equipments.
6. Offloading due delay at international warehouse.
7. Discrepancies in origin station at loading point.
8. Various discrepancy types.

RESEARCH FINDINGS (Stage –I)

OUTCOME OF DEMAND ANALYSIS – REPOSITIONING CARGO INVENTORY VIS-À-VIS SERVICE

Jet Airways operates three series of aircrafts at Kolkata airport, namely :-

- Boeing 737 800 Series (Biggest with maximum space).
- Boeing 737 700 Series (Smallest with minimum space).
- Boeing 737 400 Series (Medium sized in between above two).

By the demand analysis study it is found that in some of the flights maximum offloading takes place regularly and in some group of flights there is maximum space wastage on a regular basis which ultimately results in business loss for the airline.

OPTIMAL MANPOWER UTILISATION WITH MAXIMUM PRODUCTIVITY

Hence on the above 8 critical flights, along with repositioning the aircrafts as per the load requirements, if we can also reposition the manpower, the problem of space wastage and cargo offloading can be stopped without incurring additional manpower costs as both the present and proposed system require the same headcount of 116 aircraft personnel.

RECOMMENDED AUTOMATIC TRACKING SYSTEM

THE RESEARCH WORK PROPOSES TO DEVELOP AN INTEGRATED ONLINE SOFTWARE SYSTEM WHEREBY THE AGENCIES INVOLVED IN THE CARGO OPERATIONS VIZ., INDIAN CUSTOMS, DOMESTIC AIRLINES, INTERNATIONAL AIRLINES, EXPORTERS AND DESTINATION WILL HAVE A DIRECT ACCESS WITH EACH OTHER AND EACH ESTABLISHMENT'S DATABASE WILL BE SHARED BY ALL THE STATIONS, RESULTING IN A TRANSPARENT INTERCHANGE OF DATA AND A KNOWLEDGE ON EXACT STATUS OF CARGO AT EACH STAGE AND THEREBY ENABLING ITS TRACEABILITY.

©Rs. 28,25,152 is the total compensation amount that would be saved after the implementation of Information Technology in warehousing operations. In the previous table (viz., Jet Airways Cargo Discrepancies for Year 2007), it is realized that a compensation of Rs. 28,25,152/- was made by Jet Airways in 2007 due to the occurrence of various types of discrepancies. In the above table , the break-up of customers who suffered due to the discrepancies vis-à-vis their respective compensation amount for the year 2007 is mentioned.

With the proposed implementation of Revised IT Cargo Tracking System, it is expected that the said compensation of Rs. 28,25,152/- would be saved straightaway by overcoming the discrepancies and that the discrepancies would be plugged at the point of occurrence itself.

RESEARCH FINDINGS (Stage II)

- Implementing the proper tracking system of cargo.
- Plugging the discrepancies.
- Saving the Compensations.
- Completing the whole supply-chain loop.

CONCLUSION

The study in its course has identified the major loopholes in the cargo operations of Jet Airways which resulted in loss of business for the airline. On

the basis of it, a IT enabled automated tracking system is suggested to overcome not only the operational problems but also to eliminate the compensations. The study also has devised remedies to stop the offloading, which otherwise creates a negative impact in the market and suggested ways to plug the discrepancies at the point of occurrence itself. The work recommends the flight- wise aircraft series planning and allocation based on the load so that there is minimal space wastage and /or offloading. The research proposes to incorporate automated BAR-CODING SYSTEM to keep track of each cargo shipment for the respective destination sectors.

SALIENT FEATURES OF CONCLUSION

A. Compensations would be saved to the tune of Rs. 28 lakhs.

B. Optimal manpower utilization with maximum productivity in the critical Jet Airways flights of Kolkata Airport.

C. Critical Problematic Areas / Gaps in warehousing operations are identified and remedial measures suggested to overcome the existing compensations which are made to the customers.

D. Repositioning of Cargo Inventory vis-à-vis aircraft series planning and allocation is suggested to minimize offloading and space wastage.

E. Cargo tracking system is planned to be incorporated with the assistance of bar- coding system.

F. Savings on compensations is anticipated by plugging the discrepancies at the point of occurrence itself.

G. An integrated online database sharing software system is suggested to track the transparent interchange of data and to trace the physical movement of cargo from origin till destination.

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