DR.BABASAHEB AMBEDKAR
OPEN UNIVERSITY

BBA(AT)

BACHELOR OF BUSINESS ADMINISTRATION
(AIR TRAVEL MANAGEMENT)

BBAATR-303
PASSENGER MANAGEMENT

PASSENGER MANAGEMENT

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AHMEDABAD

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ISBN 978-93-91071-23-3

Edition : 2022

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ROLE OF SELF INSTRUCTIONAL MATERIAL IN DISTANCE LEARNING

The need to plan effective instruction is imperative for a successful distance teaching repertoire. This is due to the fact that the instructional designer, the tutor, the author (s) and the student are often separated by distance and may never meet in person. This is an increasingly common scenario in distance education instruction. As much as possible, teaching by distance should stimulate the student's intellectual involvement and contain all the necessary learning instructional activities that are capable of guiding the student through the course objectives. Therefore, the course / self-instructional material are completely equipped with everything that the syllabus prescribes.

To ensure effective instruction, a number of instructional design ideas are used and these help students to acquire knowledge, intellectual skills, motor skills and necessary attitudinal changes. In this respect, students' assessment and course evaluation are incorporated in the text.

The nature of instructional activities used in distance education self- instructional materials depends on the domain of learning that they reinforce in the text, that is, the cognitive, psychomotor and affective. These are further interpreted in the acquisition of knowledge, intellectual skills and motor skills. Students may be encouraged to gain, apply and communicate (orally or in writing) the knowledge acquired. Intellectual- skills objectives may be met by designing instructions that make use of students' prior knowledge and experiences in the discourse as the foundation on which newly acquired knowledge is built.

The provision of exercises in the form of assignments, projects and tutorial feedback is necessary. Instructional activities that teach motor skills need to be graphically demonstrated and the correct practices provided during tutorials. Instructional activities for inculcating change in attitude and behavior should create interest and demonstrate need and benefits gained by adopting the required change. Information on the adoption and procedures for practice of new attitudes may then be introduced.

Teaching and learning at a distance eliminates interactive communication cues, such as pauses, intonation and gestures, associated with the face-to-face method of teaching. This is

particularly so with the exclusive use of print media. Instructional activities built into the instructional repertoire provide this missing interaction between the student and the teacher. Therefore, the use of instructional activities to affect better distance teaching is not optional, but mandatory.

Our team of successful writers and authors has tried to reduce this.

Divide and to bring this Self Instructional Material as the best teaching and communication tool. Instructional activities are varied in order to assess the different facets of the domains of learning.

Distance education teaching repertoire involves extensive use of self- instructional materials, be they print or otherwise. These materials are designed to achieve certain pre-determined learning outcomes, namely goals and objectives that are contained in an instructional plan. Since the teaching process is affected over a distance, there is need to ensure that students actively participate in their learning by performing specific tasks that help them to understand the relevant concepts. Therefore, a set of exercises is built into the teaching repertoire in order to link what students and tutors do in the framework of the course outline. These could be in the form of students' assignments, a research project or a science practical exercise. Examples of instructional activities in distance education are too numerous to list. Instructional activities, when used in this context, help to motivate students, guide and measure students' performance (continuous assessment)

PREFACE

We have put in lots of hard work to make this book as user-friendly as possible, but we have not sacrificed quality. Experts were involved in preparing the materials. However, concepts are explained in easy language for you. We have included many tables and examples for easy understanding.

We sincerely hope this book will help you in every way you expect. All the best for your studies from our team!

PASSENGER MANAGEMENT

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Dr. Babasaheb Ambedkar Open University Ahmedabad

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Passenger Management

BLOCK 1 : AVIATION PASSENGER & SERVICES

AVIATION PASSENGER & SERVICES

Block Introduction :

The aviation sector is rapidly expanding, and in order to meet the needs of this expanding sector, airports must maintain a nice set of passenger services for both airlines and passengers.

The learner will be introduced to the major airport areas with passenger and airline facilities in this block. Learners must be familiar with the various types of airports in order to comprehend their functionality and major landside-airside areas.

The block will also concentrate on comprehending various passengers at the airport. The various airport facilities for departing and arriving passengers are also discussed here. At the airport, the needs of aircraft and passengers/crew are vastly different. As a result, in unit II of this block, a clear distinction between their facies is also created. Some facilities that are not directly related to airline operations, such as lounges, cargo facilities, and security facilities, are also discussed in detail in this unit.

Unit III discusses the operation of the passenger terminal. This unit discusses various types of terminals with pictorial representations. Along with terminal function, the function of the passenger terminal is also discussed.

Overall, this block will be beneficial in learning about airport passengers, terminals, and various services.

Block Objectives :

The major objective of this block are as follows :

- Airport Types and Functionality
- Airport Facilities and Passengers at the Airport
- Major Areas at the airports
- Airport Passenger Services
- Premium and VIP services are available at airports.
- Freight & Cargo Service
- Internal Transportation Access and Onward Travel
- Security at Airports
- Airport On–Boarding Service Terminals
- Terminal Functions of the Passenger Terminal
- Terminal Management Philosophies
- Direct Passenger Services

Block Structure :

Unit 1 : Major Areas and Facilities at Airport

Unit 2 : Types of Passengers and Passenger Services

Unit 3 : Passenger Terminal Operation at Airport

UNIT 01

Major Areas and Facilities at Airport

UNIT STRUCTURE

1.0 LEARNING OBJECTIVES :

After studying this unit learner will be able to :

- Understand different types of airports and their functional areas
- Find the facilities at the airports
- Explore the major working areas at the airport

1.1 INTRODUCTION:

The range, level, and quality of aviation products, services, and facilities being provided at a general aviation airport can play a key role in achieving the goals established for the airport. Airports are no longer just place for transportation rather entire business place. The learners in this unit get to know about various types of airports and their functional areas in detail. The services are been core of airport operations and gamut of services are increasing day by day to make passengers happy.

The landside and airside are the two major areas of operation for the airport authorities. Landside is the major source of revenue due to shops, lounge, transportation facility after landing and many more. The learner in this unit explores major working areas at airport to acquaint with.

1.2 TYPES OF AIRPORT & FUNCTIONALITY :

Airports have evolved to become fit for local, regional, national, and international demands as they have grown to meet our reliance on air transport as a key element of our modern society.

Airports are built in a variety of sizes and functions, based on their intended purpose and the local needs they are designed to meet. The size of the airport is decided by the amount of air traffic and the type of aircraft that will land and take off from the area.

Most people are unaware that airports are classified based on their kind and purpose, and it is fascinating to learn about the differences between airport types and their responsibilities in air transportation. The following are the types of airports with typical areas there :

1. Primary Commercial Service Airport

The primary commercial service airports are the most common type of airport and serve multiple functions in our towns and areas. These are large–scale airports intended to handle high amounts of passengers and cargo. Many of these airports are also international, regulating the flow of people and goods across international borders.

The amount of passengers processed and transported by these airports need a considerable infrastructure to accommodate the number of people going through the doors. These airports' land sides are similar to retail malls, with stores selling things to travellers, food courts for passengers to dine, and relaxation places for those waiting for flights.

Local and international passengers are normally separated in these airports. Passport and customs control will be available at the international arrival and departure sectors to monitor people entering and exiting the country.

2. Non–Primary Commercial Service Airports

Non–primary commercial service are also called as Non–hub non–primary airports. These are smaller airports with scheduled passenger and freight service that handle between 2,500 and 10,000 paying passengers each year.

These airports can serve as international airports in low–traffic areas if they are near to international boundaries or if the local demand for air traffic only necessitates a smaller airport. These airports may have cargo operations, although they will be substantially smaller than a principal commercial service airport.

Security controls and restrictions are often less stringent at these airports than at larger airports, and the size of the airport limits the size and quantity of aircraft it can handle.

3. Reliever Airports

Reliever airports are typically smaller airports located near primary commercial service airports. In practise, most relief airports ease congestion at cargo service airports, but its definition does not limit them to receiving solely cargo.

Passenger planes can be diverted to these places in specific circumstances if the infrastructure at the reliever airport provides the requisite capacities. If aircraft at larger airports are restricted owing to

congestion, bad weather, or security concerns, freight and passenger flights can be diverted to reliever airports. Reliever airports provide shorter local and regional flights rather than international passengers. These airports are not always managed by the government and may be owned by the government, people, or corporations.

4. Cargo Service Airports

When some primary service commercial airports can also be categorised as cargo service airports provided they carry enough freight, there may be some overlap in the definition and classification of airports.

However, cargo service airports are frequently specialised to processing cargo or freight rather than passenger services. Depending on the airport's location, cargo service airports might be regional, interstate, or international.

To be designated as a cargo service airport, an airport must handle at least 100 million pounds of landing weight cargo every year. Landed weight is the weight of an aeroplane and its cargo, excluding passenger travel.

5. General Aviation Airports

General Aviation Airports is a broad word that encompasses a variety of minor airports with insufficient flight traffic to be classed in any other category. These airports can be either cargo–only or passenger–only, or a combination of the two.

A general aviation airport is defined as a public–use airport that has no scheduled service or has scheduled service with less than 2,500 passenger boardings per year.

Since this category of general aviation airport is so broad, various sub–categories have emerged to better characterise the function of some of these smaller airports, which include the following :

- National
- Regional
- Local
- Basic
- Unclassified

❖ **National Airports**

A national airport is a subcategory of general aviation airports that serves flights throughout the country but has fewer than 2500 passengers per year. National airports often have slightly longer and wider runways to accommodate heavier aircraft.

National general aviation airports help to strengthen the national airport network by connecting communities to national and international markets. National airports serve as transportation hubs for jet–engine, multi–engine propeller, and single–engine aircraft. If the geography and

population size do not merit a commercial service airport, these airports are usually large enough to accommodate national and international travel.

❖ **Regional Airports**

Regional airports are smaller than national airports and are a subcategory of general aviation airports. They can, however, be bustling airports that serve enormous populations.

Regional airports typically cater to shorter–duration flights because they serve a smaller geographical area. Regional airports are primarily utilised for intrastate and interstate travel, but they can also transfer goods and passengers to larger hubs and airports for international travel and cargo.

Regional airports frequently serve to strengthen local economy by connecting towns to regional and national markets. They are often found in urban areas and service large populations. Regional airports are often equipped to serve jet and multi–engine propeller planes.

Regional airports are often located in metropolitan areas with a population of at least 50,000 people or between 10,000 and 50,000 people. These demographic figures are sometimes used to designate an airport as regional.

❖ **Local Airports**

Local airports are often smaller–scale airports that exclusively serve their immediate state. These smaller airports can also help to relieve traffic at regional and national airports, as well as provide more convenient intra–state travel with less red tape and security.

Local airports connect local communities to markets within a state or area. Local airports are typically located in more densely populated areas, but they are not always urban centres. Most local airports only serve piston propeller–driven aircraft, which are used to support local business and public transportation. These airports have limited cargo support, and any freight brought in and out of the airport is transported on similar–sized aircraft as passenger planes.

Flight training schools, emergency flight rescue services, and charter passenger services are frequently available at local airports.

❖ **Basic Airports**

Basic airports are a subset of general aviation airports with limited services and infrastructure. Jet–powered aircraft are not normally accommodated on the runways.

Basic airports connect villages to regional or national airport systems and offer general aviation services such as emergency response and rescue, air ambulance services, flight schools, and personal aircraft flying.

Local airports often feature a single runway and a helipad, although they have limited infrastructure, security, and services.

❖ **Unclassified Airports**

Unclassified airports are airports that do not fit into any of the other airport classifications. Small local landing strips utilised by remote rural communities are typical of airports in this category.

Unclassified airports can be a strip of level land smoothed out by the community to create a simple landing strip for light planes. These airports see intermittent traffic and are frequently used exclusively on demand for products, services, or people transportation.

When a flying service is required, the aircraft are normally summoned through radio from bigger basic or local airports.

These airports are typically very informal, with little to no ground infrastructure to accommodate freight, passengers, or aircraft. Only planes that can handle harsh landing and take–off circumstances are typically suited for servicing these airports.

6. Seaplane Base Airports

Certain geographical regions of the world lack appropriate topography for traditional land–based airport construction. The only accessible venues for air transport in these areas are large bodies of water. Seaplane bases are airports that serve seaplanes and other aircraft that have been converted to land and take off from water.

The stretch of water used for aircraft traffic must be monitored and managed to prevent watercraft and members of the general public from flying into the seaplanes' flight path. These airports might be very small, serving a small local population, or somewhat substantial, serving small communities.

The security around the airport's air traffic side is largely the same as that of land–based airports, with the exception that planes land on water rather than concrete or tarmac runways.

7. Heliport Airport

A heliport airport is one that only serves helicopters and lacks the capacity or equipment to accommodate fixed–wing aircraft traffic.

These airports are often small and serve islands where there is insufficient area to create a runway to handle fixed–wing aircraft.

Heliports typically support both passenger and cargo flights, as well as medical and rescue flights that serve the surrounding area. Heliports are frequently utilised for tourism, transporting visitors on picturesque flights throughout the region.

1.3 FACILITIES AT THE AIRPORT :

An airport is either an intermediate or terminal point for an aircraft during its flight. In simple functional terms, the facility must be constructed to allow an aircraft to land and take off. In between these two activities, the aircraft may unload and load payload and crew, as well as be serviced.

Passenger Management

Airport operations are classified into airside and landside duties. After landing, an aeroplane will use the runway, taxiway, and apron before docking at a packing position, where its payload will be processed through the terminal to the access system. Airport passenger and freight terminals are facilities with three distinct uses.

Change of mode : To establish a link between the air vehicle and the surface vehicle in order to accommodate the operational characteristics of the vehicles on the landside and the airside, respectively.

Processing : To offer the essential facilities for passenger and freight ticketing, documentation, and control.

Change of movement type : Converting continuous shipments of freight by truck of departing passengers by car, bus, cab, and train to aircraft–sized batches that generally depart according to a pre–planned timetable, or the reverse process for arriving aircraft. Large airports must have an organisation that can either supply or manage the following facilities.

The extent to which airports devote themselves to non–aviation activities is likely to be determined by the destination of the revenue generated by such operations. These are delivered straight to the airport and contribute to its profitability. A variety of events can operate as a deterrent to the airport company. Non–aeronautical revenue is paid directly to the national treasury. The duty–free franchise is granted by the government to the government–owned airline. The place where airport operates on a residual cost basis and income from non–aviation sources is used to lessen landing fear for aircraft, but no revenue is generated for the airport.

Airports have the following non–aeronautical facilities :

- Aviation fuel suppliers
- Food & beverage sales (i.e restaurants, bars cafeterias etc)
- Duty paid shopping
- Banks / Foreign exchange
- Airline catering services
- Taxi services
- Car rentals
- Advertising
- Airport /City transport services (i.e buses, limousines etc.)
- Duty free shopping (eg alcohol, tobacco, perfume, watches, optical)
- Petrol/automobile service stations
- Hair dressing/barber shop
- Internet services
- Casinos/gaming machines
- Cinema

- Vending machines for other than food
- Freight consolidators
- Art concerts
- Music concerts
- Souvenir shops

1.4 MAJOR AREAS COMMONLY FOUND AT AIRPORT :

❖ **Landside and Airside areas**

Airports are divided into landside and airside zones. The landside is subject to fewer special laws and is part of the public realm, while access to the airside zone is tightly controlled. Landside facilities may include :

- Publicly accessible airport check–in desks
- Shops and
- Ground transportation facilities

The airside area includes all parts of the airport around the aircraft, and the parts of the buildings that are restricted to staff, and sections of these extended to travelling :

- Airside shopping
- Dining or waiting passengers

Depending on the airport, travellers and personnel must go through security or border control before entering the airside zone. Passengers arriving from an international flight, on the other hand, must go through border control and customs to go to the landside region where they will disembark, unless they are in airside transit. For inter–terminal airside transit, most multi–terminal airports have (variously referred to as) flight/ passenger/air links buses, moving walkways, and/or people movers. Their airlines can arrange for baggage to be delivered directly to the passenger. Most large airports provide employees with a secure keycard, sometimes known as an airside pass, to aid in the reliable, consistent, and efficient verification of identity.

❖ **Terminal Area**

The terminal area is where people and cargo are transferred from the ground to the air. Various ways are utilised to accommodate and convey the public and their goods, whether they arrive by ground or air. The level of growth in the terminal area is determined by the volume of airport traffic, operations, the type of air traffic using the airport, the number of passengers and airport staff to be handled, and how they are served and accommodated. The terminal area is divided into the following sections : Terminal structure, Apron, Automobile Parking Area, and Hangers.

❖ **Landing Area of Airport**

Landing area is the component of airport used for landing and takeoff operations of an aircraft. It is the airport components used for landing and takeoff operations of an aircraft. Landing Area includes Runways and taxiways.

Landing area includes

1. Runways
2. Taxiways

❖ **Runways**

It is the most significant component of an airport, consisting of a paved, long and narrow rectangular strip utilised for landing and takeoff operations. Both sides have turfed (grassy) shoulders. The landing strip is the width of the runway and the space between the shoulders. The runway is in the centre of the landing strip. The landing strip is slightly longer than the runway strip to accommodate the stop method to stop the aircraft in the event of an abandoned takeoff.

The runway's length and breadth should be sufficient to accommodate the aircraft that will most likely use it. The runway length should be sufficient to accelerate the aircraft to the point of takeoff and should be sufficient to bring the aircraft to a stop within 60% of the available runway length if the aircraft clears the runway threshold by 15m. The length of the runway is determined by many meteorological and topographical factors.

❖ **Taxiways**

Taxiway is a paved path that connects a runway to a loading apron, service and maintenance hangers, or another runway. They are used to move aircraft on airfields for a variety of purposes such as exit or landing, exit for takeoff, and so on. The speed of an aeroplane on the taxiway is slower than the speed of the aircraft during takeoff or landing.

The taxiway should be designed to give the shortest possible path while avoiding interference from landed aircraft taxying towards the loading apron and taxiing aircraft running towards the runway. The intersection of the runway and the taxiway should be given special care because it is subjected to heavy loading during turning operations. If it is weaker, the plane may fall off the taxiway. Its longitudinal gradient should be no more than 3%, and its transverse gradient should be no less than 0.5%. It also has a 7.5 m wide shoulder that is paved with bituminous surfacing. The taxiway should be visible from 300m away to a pilot standing 3m above the ground.

- Air Traffic Control Area
- Aviation fuel suppliers
- Food & beverage sales (restaurants, bars cafeterias etc.)
- Baggage/Cargo loading–unloading area

- Duty paid/free shopping area
- Banks/Foreign exchange
- Airline catering services area
- Taxi services

❖ **Aircraft Ramp Servicing**

Most incoming or departing aircraft necessitate ramp services, some of which fall under the purview of the airline station engineer. When substantial service is required, multiple operations must be completed concurrently.

❖ **Fault Servicing**

Minor issues noted in the technical log by the aircraft captain that do not necessitate the aircraft's withdrawal from service are repaired under the supervision of the station engineer.

❖ **Fuelling**

The engineer, who is in charge of guaranteeing the availability and provision of adequate fuel supplies, oversees the aircraft's fuelling, ensuring that the necessary amount of uncontaminated gasoline is given in a safe manner. Mobile truck systems are used for supply to ensure competitive pricing from suppliers and optimum apron flexibility. During the fuelling process, oils and other equipment fluids are replaced.

❖ **Wheels and Tires**

A visible physical examination of the aircraft wheels and tyres is performed to determine that no damage occurred during the previous takeoff/landing cycle and that the tyres are still usable.

❖ **Ground Power Supply**

Although many aeroplanes have auxiliary power units (APUs) that may provide electricity while the aircraft is on the ground, airlines often prefer to use ground electrical supplies to save fuel and reduce apron noise. The usage of APUs is highly prohibited at several airports due to environmental concerns. Ground power is often supplied by a mobile unit under the control of the station engineer.

❖ **Cooling/Heating**

Auxiliary mobile heating or cooling units are required in many climates where an aircraft is on the apron for an extended period of time without the APU operating to maintain an appropriate internal temperature in the aircraft interior. The airline station engineer is in charge of ensuring that such a unit is available.

When using fixed air systems, cockpit controls can assure either internal heating or cooling on an individual aircraft basis, depending on the need. According to studies, the high cost of operating aircraft APUs presently means that fixed air systems can fully recover capital expenditures through savings of two years of normal operation. APUs are still utilised where airlines have infrequent flights to an airport.

❖ **Other Servicing**

Toilet holding tanks are serviced externally from the apron by special mobile pumping units. Demineralised water for the engines and potable water are also replenished during servicing.

❑ **Check Your Progress :**

1. _____ is the width of the runway and the space between the shoulders.

   a. Runway b. Taxiway c. Landing strip d. Apron

2. The designs and layout of the airport depends on the :

   a. Number of passenger b. Amount of Cargo

   c. Airport's intended use d. Size of Airlines

3. The full form of APU is :

   a. Atomic Power Unit b. Auxiliary Power Unit

   c. Auxiliary Petrol Unit d. Automatic Power Unit

4. Ground power is often supplied by a mobile unit under the control of :

   a. Stationengineer b. Captain

   c. Crew member d. None of these

5. The taxiway should be visible from _____ away to a pilot standing 3 m above the ground.

   a. 3 m b. 30 m

   c. 300 m d. None of the above

6. The runway is in the centre of the _____.

   a. Terminal structure b. Landing strip

   c. Apron d. Hangers

7. Landing Area includes Runways and _____

   a. Landing strip b. Apron

   c. Taxiways d. Hangers

8. The terminal area is divided into the _____ sections :

   a. Terminal structure b. Apron

   c. Hangers d. All of these

9. A heliport airport is one that serves

   a. Only Airplanes

   b. Only Airships

   c. Both Helicopters and Airships

   d. Only Helicopters

1.5 LET US SUM UP :

Although airports serve varied purposes, they all have comparable design and specifications to handle air traffic including passengers and cargo conveyed by planes and other aircraft.

All airports feature a landing area that includes runways for aircraft take–offs and landings, taxiways to direct aircraft on the ground, and aircraft parking areas.

Some airports offer hangars where aircraft can be parked for overnight stays or temporary storage while not in use. Aside from the runways, airports contain a variety of structures to manage the movement of people, cargo, and, if the airport is international, border control.

Depending on the size of the airport, security and emergency personnel and equipment will be housed. Despite the fact that all airports have comparable facilities, the designs and layout of the airport will vary based on the airport's intended use.

Airports are divided between rigorous accessibility zones, with the public side referred to as the land side, which has fewer restrictions and movement control. The business side of the airport is the air side, where planes are controlled, loaded, offloaded, and directed. To guarantee public and aircraft safety, this area is subject to stringent laws and restrictions.

1.6 ANSWERS FOR CHECK YOUR PROGRESS :

1. c	**2.** c	**3.** b	**4.** a	**5.** c
6. b	**7.** c	**8.** d	**9.** d	

1.7 GLOSSARY :

1. **Airside :** That area of an airport intended to be used for activities related to aircraft operations and to which public access is normally restricted.
2. **Auxiliary Power Unit or APU :** Allows an aircraft to operate autonomously without reliance on ground support equipment such as a ground power unit, an external air–conditioning unit or a high pressure air start cart.
3. **Landside :** The part of an airport farthest from the aircraft, the boundary of which is the security check, customs, passport control, etc.
4. **Non–Aeronautical Service :** Any service commonly conducted at the Airport which provides service or products which are not associated with aviation.
5. **Runway :** A long piece of ground with a hard surface where aircraft take off and land at an airport.
6. **Taxiway :** A route along which an aircraft can taxi when moving to or from a runway.

1.8 ASSIGNMENT :

1. Enlist the facilities passengers' gets at Indira Gandhi International Airport, New Delhi.
2. Prepare a detailed list of Airports in India and classify them under primary commercial, non–primary commercial, reliever airport, cargo service airport, general aviation and seaplane airport.

1.9 ACTIVITY :

1. Find out the difference between services offered by International Airports and Domestice Airports in India.

1.10 CASE STUDY :

Chicago O'Hare International Airport Best Practices

Chicago O'Hare International Airport (ORD) is considered one of the commercial aviation capitals of the world. It has held that position for the past 30 years. In addition, it is the hub of national air transportation in the United States and the region's number one economic engine. But even today, not everyone realizes the size and scope of this mammoth facility. O'Hare plays a vital role in not only the country's transportation scheme, but also in the local and regional economy.

Statistics

O'Hare Airport handles more passengers and aircraft operations than any airport in the world. Approximately 180,000 travelers pass through O'Hare each day. O'Hare served over 70 million passengers in 1997. The total airport complex covers nearly 7,700 acres with 162 aircraft gates housed in four terminal buildings and has 50 commercial, commuter, and cargo airlines offering frequent service. Chicago's airports generate 339,000 jobs for the region, representing personal income of $13.5 billion a year.

Intermodality

There are several expressways that lead to Chicago O'Hare International Airport depending on one's origin or destination. Table 1 describes freeway access for O'Hare Airport from the Chicago Metro region and neighboring states.

Table 1 : Getting to O'Hare Airport from the Chicago Metro Region

Destination	Expressway
Chicago Downtown	90 East
North Suburbs	294 North
South Suburbs	294 South
West Suburbs	294 South to 88 West
Rockford	90 West
Wisconsin	294 North
Indiana	294 South

Parking

Chicago O'Hare offers several parking options on or near the airport facilities. These options include valet parking, an hourly parking garage, daily parking, international parking, and economy parking.

Valet Parking is located in the parking garage on level 1–A. The cost of valet parking is $30.00/day (first hour, $10). Valet parking is the parking preference of many professionals. Valet parking is a short walk to the terminal and has the comfort of a covered drop–off and pick–up area. Plus, because it provides a dedicated exit lane and eliminates the need to search for parking, valet parking saves valuable time into and out of the airport complex.

Hourly Parking is also located in the parking garage on level 1–A. The cost of hourly parking is $50/day (first hour $3.00 and 4 hours $20.00). It is intended primarily for meeting or dropping off a traveling guest, and offers the convenience of a dedicated exit lane.

Daily Parking is located on the main parking garage on levels 2–6 and Outside Lots B & C. The cost is $21.00/day (first hour $3). Lots B and C are outdoor lots located immediately in front of the garage with access to Terminals 1, 2, and 3.

International Terminal Parking is located in Lot D. The cost is $29.00/day (first hour $3). Lot D is intended for short–term parking, i.e., meeters and greeters only. It is not intended for parking more than a few hours.

Economy Parking Lot E is $12.00/day (first hour $2). Lot E is intended for long–term parking. Passengers use the ATS (people mover) to reach the terminals. Economy Parking Lot F is $8.00/day (first hour $2). Lot F is intended for long–term parking. Passengers take the shuttle bus to Lot E and use the ATS to reach the terminals.

Rail Service

The Chicago Transit Authority (CTA) Blue Line train provides 24–hour service between downtown Chicago and O'Hare International Airport. Lower–level pedestrian passageways inside the airport terminals lead directly to the CTA station. The station is equipped with an elevator to take passengers with mobility impairments to and from the platform.

Blue Line train, operated by the CTA, connects the downtown area from the Dearborn Street subway to O'Hare International Airport, which is located 15 miles to the northwest of the city. Trips take about 35 to 40 minutes from downtown to the airport. There are 15 stations along the line, five downtown subway stations, and through– routing on one of two west–side alignments.

The rail terminal station in the airport opened in September 1984 (Ref 6). That station serves airport–destined traffic almost exclusively, as the station is located below the parking deck, in the middle of the large airport property. Walking distances in this sprawling airport are long

enough to warrant many moving sidewalks, and an automated guideway transit circulator links the four terminals to remote parking. Some air passengers can reach the train station quickly, but the walk from United Airlines Terminal is lengthy and requires attentive routing. Figure 1 summarizes the ground access modes used by air travelers at O'Hare International Airport (Ref 7).

The purpose of passenger air travel was also surveyed at O'Hare Airport. In general, O'Hare is used extensively for business travel purposes. Vacation travel represents 28.5% of travel at O'Hare airport. Table 2 summarizes Chicago O'Hare air travelers' trip purposes.

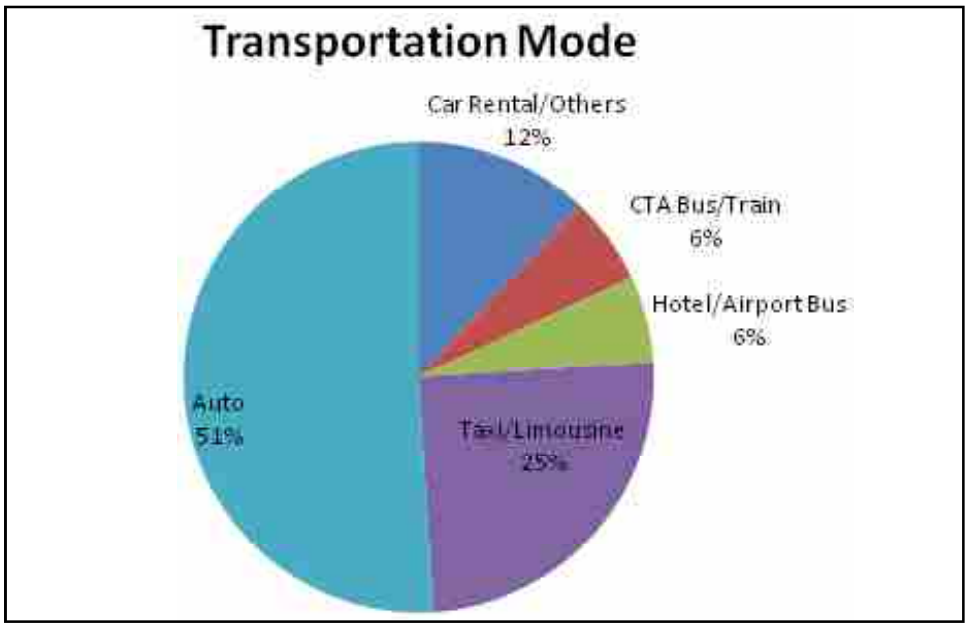


Figure 1 : Modal Splits for O'Hare International Airport

Table 2 : Chicago O'Hare Air Travelers' Trip Purposes

Trip Purpose	Percentage
Business/Convention	52.8
Vacation	28.5
Personal/Family Matters	18.7

Rail transit has become a significant ground access mode for Chicago O'Hare Airport. The potential exists to increase this type of transit travel, in relation to the trend of increased air travel and in relation to improving the service benefits offered by rail transit in comparison with the alternatives.

Future Projects

The parking garage at Chicago O'Hare International Airport is undergoing a $60 million face–lift. Since 1993, the FAA has authorized $2.3 billion in passenger facility charge spending on airport improvements at O'Hare Airport. In 1999, a $1 billion face–lift project rehabilitated the garage so it looks similar to Helmut Jahn's ultramodern design for United Airlines' remote midfield concourse.

Q. 1. Parking at airport has been serious problem at airports. Do airport authorities need to take proactive measure to address this problem ?

Q. 2. What measures must be taken to make airports (especially far from city centre) accessible to the passenger ?

1.11 FURTHER READING :

1. Ashford N J (2016), Airport Engineering 4th Edition : Planning, Design & Development Of 21St Century Airports, John Wiley Press.
2. Asheesh Kumar (2020), Planning And Design Of Airport, Vayu Education of India.
3. S K Khanna (1999), Airport Planning and Design, Nem Chand & Bros Roorkee.

UNIT 02 Types of Passengers and Passenger Services

UNIT STRUCTURE

2.0 LEARNING OBJECTIVES :

Once the learner goes through the content of this unit they will :

- Understand about the passengers at airport
- Explore various services and products use by passengers at airport

2.1 INTRODUCTION :

After determining the demand for aviation products, services, and facilities through the market assessment process, a decision must be made about who–or what–entity is best suited to meet the demand and how–or in what manner–demand will be met.

A private entity can provide aviation products, services, and facilities at a general aviation airport by utilising the private entity's assets and resources. By a private entity that operates under a management agreement with the airport sponsor and uses the airport sponsor's assets and resources. By utilising the airport sponsor's own assets and resources.

Although the entity (private enterprise or airport sponsor) providing products, services, and facilities at a general aviation airport varies by airport, many believe that the private sector is best suited for such activities. In general, private entities have the qualifications, experience, and ability to provide a broader range, superior level, and higher quality of products, services, and facilities. Regardless of the situation at the airport, the market, or the industry, the airport sponsors have the ability to exercise a proprietary exclusive right to engage in commercial aeronautical activities and prevent others from doing so. In this unit, we will look at the various types of passengers at commercial airports and the services they offer.

2.2 PASSENGERS AT AIRPORT :

Passenger means any person, except members of the crew, carried or to be carried in an aircraft with the consent of the carrier pursuant to a valid contract of carriage. Airport Passenger means a person who is transported by air by an air carrier and who pays remuneration, other than token remuneration, to the air carrier.

Types of Passengers in Airline

The passengers in airline are considered on the basis of their age and may be the class of ticket they have purchased. The below mentioned are few category of passenger in airline :

1. **Adult Passengers :** These are the travellers who are of the age 12 and older.
2. **Child Passengers :** These are the travellers aged between 2 to 12 years old. There may be a sub category in this, unaccompanied child. This means child is not accompanied by any adult passenger.
3. **Infant Passenger :** The passengers from the age 0 to 2 years old are considered infants.

Passenger may be classified based on the type of tickets they have purchased. This is generally categorised on the basis of money they send to buy ticket, these are :

1. **Economy Class :** In this passenger had chosen to travel in class which offer few benefits and maximum seats are reserved in this class only.
2. **Business Class :** In this passenger have lot of benefits for instance seats are comfortable, meals are included, access to VIP lounge at airport and many more.

2.3 PASSENGER SERVICES AT AIRPORTS :

A terminal is a building with passenger facilities. Small airports have one terminal. Large ones often have multiple terminals, though some large airports like Amsterdam Airport Schiphol still have one terminal. The terminal has a series of gates, which provide passengers with access to the plane.

Passenger Management

The following facilities are essential for departing passengers :

- Check–in facilities, including a baggage drop–off
- Security clearance gates
- Passport control (for some international flights)
- Gates
- Waiting areas

The following facilities are essential for arriving passengers :

- Passport control (international arrivals only)
- Baggage reclaim facilities, often in the form of a carousel
- Customs (international arrivals only)
- A landside meeting place

There must be a connection between the passenger facilities and the aircraft for both groups of passengers, such as jet bridges or airstairs. A baggage handling system is also required to convey bags from the baggage drop–off to leaving planes and from arriving planes to baggage reclaim.

An apron or ramp is the area where the aeroplane parks to load passengers and luggage (or incorrectly, "the tarmac").

Customs and immigration services are available at international airports. However, because some nations have agreements that allow them to travel between them without having to go through customs and immigration, such facilities are not a need for an international airport. International flights frequently necessitate a higher level of physical protection, while many countries have adopted the same level of security for both international and domestic travel in recent years.

"Floating airports" that might be located at sea are being developed, with designs such as pneumatic stabilised platform technology.

Aircraft	Passengers and Crew	Facilities
Guidance and parking Ground services and handling • Towing • Ground power • Deicing • Lavatory • Potable water Aircraft cleaning • Cabin	Loading and unloading Baggage handling Catering Pilot supplies Ground transportation arrangements • Shuttle service • Crew cars • Rental cars	General aviation terminal buildings Aircraft Parking (ramp) Aircraft Hangars Office Shop Storage Vehicle parking

• Exterior washing and detailing Fuel • Jet, avgas and gas Lubricants • Piston and turbine Technical services • Airframe and power plant • Avionics and instruments • Paint and interior	Concierge reservations of Hotel/motel • Restaurant • Entertainment Flight services / Flight training • Aircraft rental • Aircraft charter • Aircraft management	

Figure : Different kind of services for Aircraft and Passenger & Crew

2.4 PRODUCTS AND SERVICES AT AIRPORT :

Most large airports have shops where you may buy goods and services. The majority of these businesses are household names and these are concentrated in the departure regions. These include clothes boutiques, souvenirs shops, book shops, restaurants and many such shops.

Prices for things offered at these establishments are typically greater than those found outside of the airport. However, several airports are currently regulating their fees in order to maintain them comparable to "street prices." This word is deceptive because prices frequently correspond to the manufacturer's suggested retail price yet are nearly never lowered.

Many new airports have walk through duty–free stores, which require travellers to enter a retail store after exiting security. Airport planners will occasionally include curving roads within these stores so that passengers see more things as they approach towards their gate. Planners also place artwork near the airport's businesses in order to entice passengers to shop there.

Aside from big fast food chains, some airport restaurants serve regional cuisine specialties to passengers in transit, allowing them to enjoy local cuisine without leaving the airport.

On–site hotels built within or attached to terminal buildings are a feature of several airport structures. Airport hotels have gained in popularity as a result of its convenience for temporary passengers and proximity to the airport terminal. Many airport hotels also have partnerships with airlines to supply displaced passengers with overnight housing.

Major airports in nations such as Russia and Japan provide small sleeping units that can be rented by the hour. The capsule hotel, which

is popular in Japan, is the smallest variety. A sleep box is a slightly larger variation.

2.5 PREMIUM AND VIP SERVICES :

Premium and VIP services may be available at airports. Express check–in and specialised check–in counters are examples of premium and VIP services. These services are often reserved for first and business class passengers, premium frequent fliers, and airline club members. Premium services may occasionally be available to passengers who are members of another airline's frequent flyer programme. This might be part of a reciprocal agreement, such as when different airlines are members of the same alliance, or it can be a tactic to lure premium customers away from competitor airlines.

If the airline makes a mistake in managing the passenger, such as unjustified delays or mishandling of checked baggage, these premium services may be extended to a non–premium traveller.

Airline lounges usually provide free or reduced–cost food and beverages, both alcoholic and non–alcoholic. Lounges often include chairs, showers, quiet places, televisions, computer, Wi–Fi, and Internet access, and power outlets for passengers' electronic devices. Baristas, bartenders, and gourmet chefs are employed in several airline lounges.

Airlines may operate multiple lounges within the same airport terminal, providing ultra–premium clientele, such as first class passengers, with facilities not available to other premium passengers. Multiple lounges may also help to keep the lounge facilities from becoming overcrowded.

2.6 CARGO AND FREIGHT SERVICE :

Airports transport freight as well as passengers throughout the globe. Cargo airlines frequently have their own on–site and neighbouring infrastructure for transferring goods between the ground and the air.

Goods Terminal Facilities are locations where international airports must hold their export cargo after customs clearance and before loading the aircraft. Similarly, offloaded import cargo must be in bond before the consignee decides to accept delivery. Airport authorities must set specific areas for the assessment of export and import goods. Airlines or freight forwarding ring agencies may be assigned specific regions or sheds.

There is a landside and an airside at every freight facility. The landside is where exporters and importers distribute and collect shipments, either through their agents or directly, whereas the airside is where loads are carried to and from aeroplanes. Furthermore, cargo terminals are organised into three sections : export, import, and interline or trans–shipment.

2.7 ACCESS AND ONWARD TRAVEL :

Airport parking lots are required for travellers who may keep their cars at the airport for an extended period of time. Large airports will also feature vehicle rental companies, taxi ranks, bus stops, and, occasionally, a train station.

Many significant airports, such as Frankfurt Airport, Amsterdam Airport, Heathrow Airport, Haneda Airport, Tokyo Narita Airport, Gatwick Airport and London Stansted Airport are located near train trunk lines allowing for smooth multimodal transportation connections. It is also typical for fast transit, light rail lines, or other non–road public transportation systems to connect an airport and a city. Some examples include the AirTrain JFK at New York's John F. Kennedy International Airport, the Link light rail system that connects downtown Seattle to Seattle–Tacoma International Airport, and the Massachusetts Bay Transportation Authority's Silver Line T at Boston's Logan International Airport (MBTA). A link of this type reduces the possibility of missing flights owing to traffic congestion. Large airports typically have controlled–access highways ('freeways or motorways') from which motor vehicles enter either the departure or arrival loop.

2.8 INTERNAL TRANSPORT :

The distances that travellers must go within a major airport might be significant. Airports frequently provide moving walkways, buses, and rail transportation systems. Some airports, such as Atlanta's Hartsfield–Jackson International Airport and London's Stansted Airport, include a transit system that connects some of the gates to the main terminal. Airports with multiple terminals, such as John F. Kennedy International Airport, Mexico City International Airport, and London Gatwick Airport, have a transit system that connects the terminals.

2.9 AIRPORT SECURITY SERVICE :

Airport security typically entails luggage inspections, metal screens of individual passengers, and restrictions prohibiting the possession of any object that could be used as a weapon. Since the September 11th attacks airport security has increased drastically and become more stringent than before.

2.10 ONBOARD SERVICING :

While external aircraft service is being performed, onboard servicing activities, primarily cleaning and food, are taking place inside the aircraft. The following methods achieve extremely high levels of cabin cleanliness :

- Exchange of blankets, pillow, and headrests
- Vacuuming and shampooing of carpets
- Clearing of ashtrays and removal of all litter
- Restocking of seatback pockets
- Cleaning and restocking of galleys and toilets
- Washing of all smooth areas, including armrests

Check Your Progress :

1. Adult Passengers are the travellers who are of the age _____.
   a. Below 12 years
   b. 2 years and older
   c. 12 years and older
   d. Older than 60 years
2. Fright Terminal Facilities are locations where international airports must hold their export cargo after _____.
   a. Loading the aircraft
   b. Delivery to the guest
   c. Customs clearance
   d. None of the above
3. Express check–in and specialised check–in counters are examples of _____ services.
   a. Ordinary
   b. Premium
   c. Express service
   d. None of these

4. A _____ is the area where the aeroplane parks to load passengers and luggage (or incorrectly, "the tarmac").

   a. Ramp b. Loading zone

   c. Airport d. Runway

5. The capsule hotel, which is popular in _____, is the smallest variety of sleeping house.

   a. India b. USA c. UK d. Japan

6. "Floating airports" are generally located near _____ are being developed, with designs such as pneumatic stabilised platform technology.

   a. Desert b. Sea

   c. Airports d. Heart of the city

7. _____ are any person, except members of the crew, carried or to be carried in an aircraft with the consent of the carrier pursuant to a valid contract of carriage.

   a. Pilot b. Passenger c. Air hostess d. Flight steward

8. The passengers from the age _____ old are considered infants.

   a. Less than 2 months b. 1 to 5 years

   c. 0 to 2 years d. 0 to 20 months

2.11 LET US SUM UP :

In this unit, we have discussed many categories of passengers who uses commercial airports as well as the amenities and services that cater to them.

The major part in this unit is about services. This starts after completion of the market assessment procedure, a determination must be made regarding who or what entity is best suited to meet the demand for aviation products, services, and facilities, as well as how or in what manner demand will be met. This decision must be made after the demand for these things has been determined.

Although the organisation (private firm or airport sponsor) that provides goods, services, and facilities at a general aviation airport might vary from airport to airport, many people believe that the private sector is the sector that is most suited for such endeavours. In general, private businesses have the qualifications, experience, and ability to deliver a wider range, a higher quality, and a greater degree of products, services, and facilities than public entities do. The sponsors of the airport have the ability to exercise a proprietary exclusive right to engage in commercial aviation activities and prevent others from doing so. This ability exists regardless of the condition at the airport, the market, or the industry.

2.12 ANSWERS FOR CHECK YOUR PROGRESS :

1. c	**2.** c	**3.** b	**4.** a
5. d	**6.** b	**7.** b	**8.** c

2.13 GLOSSARY :

1. **Galley :** Kitchen in an airliner.
2. **Airport Terminal :** A building within an airport where passengers go to depart on a flight, or the building at which they arrive upon landing.
3. **Lounge :** Places where passengers can enter under special cases. Lounges are mostly seen within the accommodation, entertainment and aviation sectors and they are areas much more comfortable than the waiting areas.
4. **Barista :** A person who serves in a coffee bar.
5. **Airline's Frequent Flyer :** A person who often travels by plane, especially someone who usually uses the same airline and belongs to that airline's club, which provides them with special advantages such as free flights.
6. **Sleepbox :** A brand offering a bed and associated facilities in a limited space. It is a larger version of a capsule hotel.

2.14 ASSIGNMENT :

1. Analyse the passenger class in any 3 major airlines of the world and what difference you find there?
2. What are the facilities at Airport Lounge offered at Chatarpati Shivaji International Airport at Mumbai?

2.15 ACTIVITY :

1. Make a list of onboard service offered in Ethiad Airways in all segments.

2.16 CASE STUDY :

Passenger Connection Management – One of the Most Complex Airline Processes

However, passenger management also reflects one of the most complex airline processes. That's why an increasing number of airlines are trying to set up real–time dashboards that are tailored to passenger management. The underlying goal is to visualize passenger streams and related information. And to do that in a way that perfectly supports the passenger connection process.

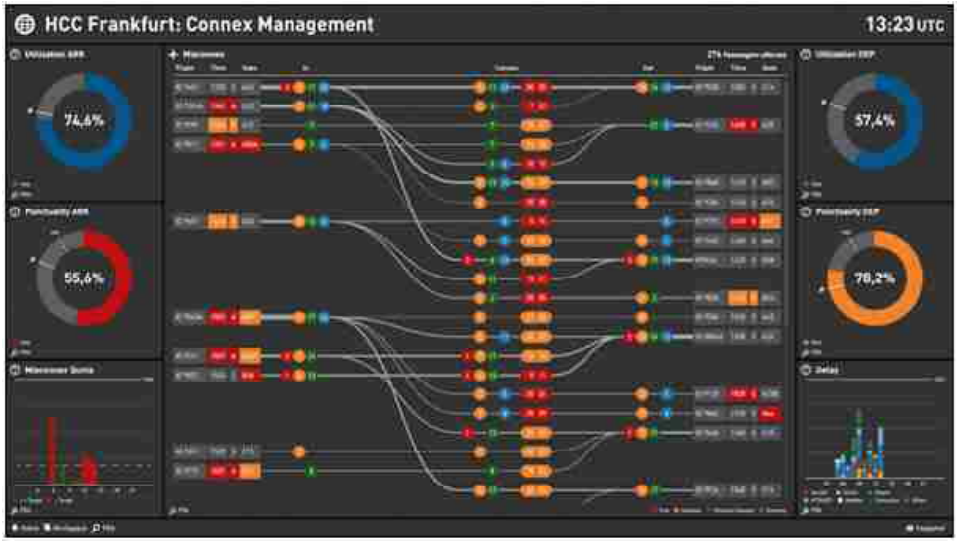
However, after going down that road with airlines, we learned one thing. Passenger management (real–time) dashboards are everything but not trivial. The aspect that mainly drives the complexity is that additional and specific information is required to calculate the relevant KPIs.

Nonetheless, this is of the highest importance to provide a valuable dashboard.

The Essential Information an Airline Passenger Management Dashboard Has To Contain

From our experience, a passenger (connection) dashboard should –first and foremost– visualize the passenger connection streams at a dedicated airport/hub. Therefore, it is essential to design a graphical visualization of these streams. This includes inbound flights, passenger connection streams, and corresponding outbound flights. Additionally, since this is the crucial KPI, the dashboard should contain the Misconnex Quota as the essential quality aspect of connection–driven airline operations.

The airline passenger management dashboard below illustrates our approach to this topic. The connection visualization in the center of the dashboard highlights the following aspects :



The example shows Incoming flights, including the latest times and arrival gates on the left. The flights are accompanied by several connecting passengers (clustered according to compartments – first, business, premium eco, and eco). For example, for the flight at the top, three first–class passengers, nine business passengers, 17 premium eco, and 25 eco passengers connect to outbound flights.

The column in the middle of the visualization shows the number of passengers of a particular connection. Additionally, it shows the required and available transfer time. For example, nine businesses, 11 premium eco, and 12 eco passengers connect to an outbound flight for the first line. The required connecting time is 25 minutes, and the available connecting time is 20 minutes. Since the needed transfer time is higher than the available, those numbers are colored in red.

On the right side, the outbound flights are listed. As additional information, it shows the number of connecting passengers and the latest times and gate information.

Passenger Information

Obviously, the essential information to create an airline passenger management dashboard is about passengers. That means for each passenger, the dashboard requires corresponding inbound and outbound flight information. This information is typically provided by systems such as Amadeus Altea, Galileo, or Worldspan.

Latest Flight Information

To create an airline passenger management dashboard that provides valuable information, it is essential to have the latest flight information available. The most crucial data in this context is about the latest times :

- scheduled time of departure
- scheduled time of arrival
- estimate time of departure
- estimate time of arrival
- actual time of departure
- actual time of arrival

This, of course, is required for both inbound and outbound flights. Usually, this type of data is provided by the operations control system. Sabre Movement Manager, Netline, or AIMS are a few prominent examples. Since Operations Control Systems are typically the primary source for real–time dashboards, this information is usually already available.

Airport Information

Airport Information in this context is about up–to–date information concerning the arrival gate/position of the inbound flight and departure gate/position of the outbound flight. The source system for this information differs from airline to airline. Sometimes the data is provided by CRS, such as Amadeus. Sometimes the operations control system holds this information. In some cases, dedicated other systems have to be connected to the dashboard.

Connecting Times

Probably the most challenging type of information which is required to set up a passenger management dashboard. To highlight critical connections, it is essential to provide the needed transfer time for each combination of inbound and outbound flights.

Some airlines can only rely on very general connection times. For example, average minutes from one terminal to another. However, the value of a passenger dashboard sharply increases as the accuracy of this information improves. Some airlines operated dedicated systems providing detailed connecting times from one gate to another one. This also considers actual waiting times, Schengen/non–Schengen aspects, current infrastructure limitations, etc.

Nonetheless, a possible approach is starting with generic connecting times and continuously improving and detailing the figures.

https ://www.id1.de/2020/02/05/airline–passenger–management–our–essential–dashboard–case–study/

Q. 1. Does passenger management dashboard serves it purpose and makes passenger satisfied with the services ?

Q. 2. What is much harder to manage passenger departure or passenger arrival at airport ?

2.17 FURTHER READING :

1. Edissa Uwayo (2016), Airline and Airport Operations, Notion Press Chennai, 1st edition.
2. Anne Graham (2018), Managing Airports An International Perspective, Taylor & Francis ltd, 5th edition.
3. Dr. Sumeet Suseelan (2019), Airline Airport & Tourism management : Aviation Manual, Notion Press Chennai.

UNIT 03

Passenger Terminal Operation at Airport

UNIT STRUCTURE

3.0 LEARNING OBJECTIVES :

After going through this unit learn will be able to :

- Comprehend about the term terminal with respect to airport
- Understand functionality of passenger terminal
- Know about the terminal management

3.1 INTRODUCTION :

The goal of the terminal operations is to maximise the utilisation of the terminal facilities in the most effective way possible, all while maintaining a positive passenger and experience despite the potential impacts of any disruptions, such as maintenance, construction, or emergencies.

The efficient movement of passengers and their baggage through a terminal is the primary responsibility of a terminal in order to fulfil the requirements of airline operators. In the context of these regulations, the term •terminal facilities• refers to all of the amenities that a motor carrier makes available to the passengers of a motor vehicle that is operated in interstate or foreign commerce as a regular part of their transportation. These amenities include waiting rooms, restrooms, eating and drinking areas, as well as ticket sales facilities.

Airport passenger terminal operations include all of the activities that passengers will experience while in the airport, from being processed to boarding to the plane and the other services available at the terminal facility. These activities will begin when passengers arrive at the airport and end when they leave the airport.

Learners will gain a deeper understanding of the terminals and the roles they play through the course of this unit. In addition to that, they are given information regarding the passenger terminal at this location.

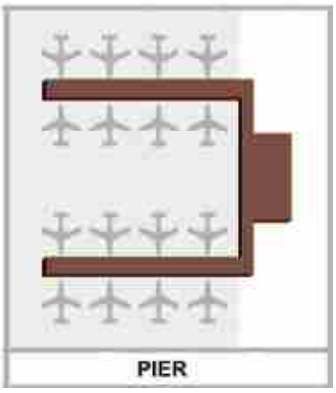
3.2 TERMINALS AT AIRPORT :

An airport terminal is a structure at an airport that connects passengers to ground transportation and the facilities that allow them to board and disembark from planes.

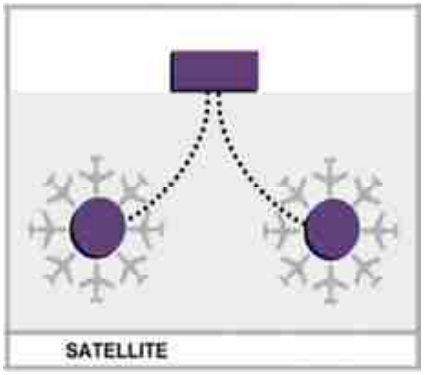
Passengers pay tickets, transfer their luggage, and go through security at the terminal. Concourses are the facilities that offer access to the aeroplanes (through gates). However, depending on the airport's layout, the terms “terminal” and “concourse” are occasionally used interchangeably.

Smaller airports typically have one terminal, but bigger airports may have many terminals and/or concourses. In tiny airports, a single terminal building often acts as both a terminal and a concourse.

❖ Types of Terminals



Pier : A pier is a small, narrow structure with aeroplanes parked on both sides. The one end is linked to a ticketing and baggage claim area. Piers provide high aircraft capacity and ease of construction, but they frequently result in a long distance from the check–in counter to the gate (up to half a mile in the case of Kansai International Airport or Terminal 1 at Lisbon Portela Airport). Piers are found at the majority of major international airports.



Satellite Terminals : A satellite terminal is a facility that is separate from the main airport facilities and allows aeroplanes to park around its complete circumference. London Gatwick Airport was the first to employ a satellite terminal. It connected the satellite to the main terminal by an underground pedestrian tunnel. This was also the inaugural configuration at LAX, however it has since been converted to a pier arrangement. Tampa International Airport was the first to deploy an automatic people mover to connect the main terminal with a satellite, and it is still the industry standard today. Terminals S1 and S2 of Shanghai Pudong International Airport are the world's largest satellite terminals.

Semicircular terminals : Some airports have a semicircular terminal with planes on one side and automobiles on the other. This architecture necessitates long journeys for connecting passengers while drastically reducing travel times between check–in and the aeroplane. Charles de Gaulle Airport (terminal 2), Mumbai's Chhatrapati Shivaji International Airport (former terminal 2), and Jakarta's Soekarno–Hatta International Airport are all based on this plan (terminal 1 & 2).

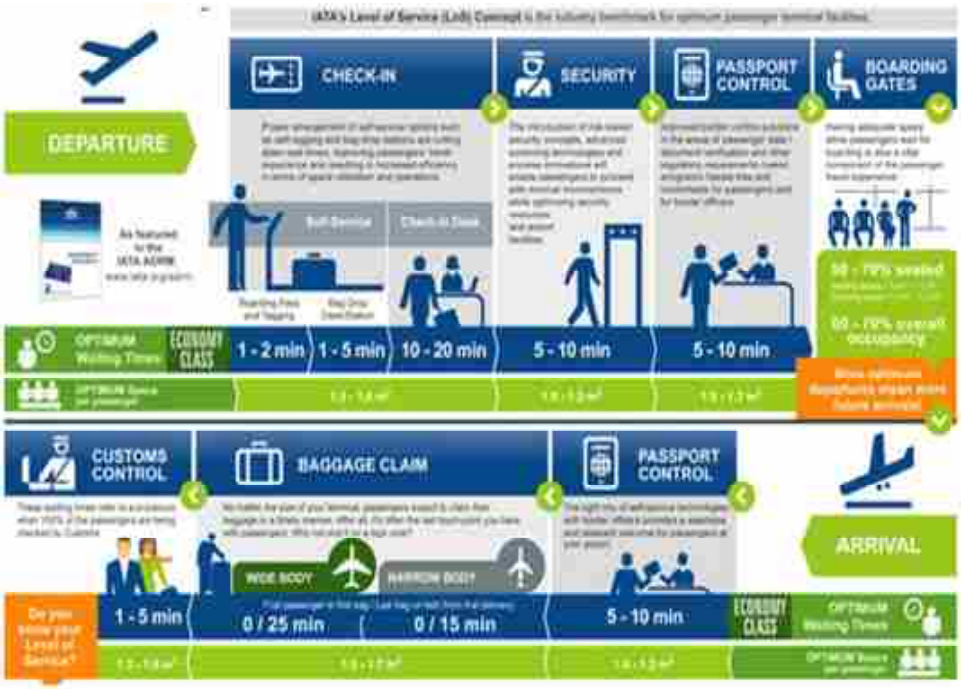
3.3 FUNCTIONS OF THE PASSENGER TERMINAL :

The operation of an airport passenger terminal leads to the three primary transportation functions carried out within the terminal area :

a. Passenger and baggage processing. Ticketing, check–in and baggage drop, baggage retrieval, government checks, and security arrangements are all included.

b. Provision for the need for a change in movement type. Facilities must accept leaving passengers with unpredictable arrival patterns from diverse means of transportation and from various areas within the airport's catchment region at varying times and aggregate them into planeloads. The process is reversed for aircraft arrivals. This role demands a holding function, which is far more important than for any other types of transportation.

c. Facilitating a mode shift. This fundamental role of the terminal necessitates the proper design and smooth operation of terminal amenities of two modes. The aircraft must be accommodated on the airside, and the interface must be operated in accordance with the needs of the air vehicle. Equally crucial is the necessity to fulfil passenger needs for the landside mode of access to the airport.



A study of image, which is admittedly a simplification of the flow procedure for people and baggage through a typical domestic–international airport passenger terminal, provides an indication of the problem's complexity. When looking at a image like this, keep in mind that the representation can only be in broad strokes and that the complexities of operation are introduced by the fact that flows on the schematic of the passenger flow system. The ones on the airside are discrete, while those on the ground are continuous. Because of the rapid rise of air transportation following World War II, many airports across the world are now major operations.

Unlike before 1940, when air transportation was a marginal economic activity, the air mode is now a well–established economic entity. The impact on airports has been severe. More than a dozen huge international airport terminals handle more than 30 million people every year, and the figure is growing. Scale operations are inherently difficult.

The relatively recent growth of significant air passenger loads has necessitated the construction of progressively bigger facilities to accommodate the large peak flows that are experienced on a regular basis. Single terminals built for 10 million passengers per year frequently have internal walking distances of 3,500 feet (1,100 m) between extreme gates. When capacity exceeds 30 million yearly passengers, primarily single–terminal complexes, such as Chicago O'Hare and Schiphol Amsterdam, are expected to have internal gate–to–gate distances in the 5,000–foot range (1,500 m). To address issues like this and to meet International Air Transport Association (IATA) recommendations on passenger walking lengths, many “decentralised” designs, such as those now in use at Kansas City, Dallas–Fort Worth, and Paris Charles de Gaulle II, were developed.

1. Achieves decentralisation dividing the whole passenger terminal operation into many unit terminals with distinct functional tasks (differentiation can be by international–domestic split, by airline unit terminals, by long–haul–short–haul divisions, via airline alliance terminals, etc.)
2. Delegating to the gates a variety of handling operations that were previously consolidated in the departure ticket lobby (e.g., ticketing, passenger and baggage check–in, seat allocation, etc.)

Combining a decentralised operational strategy with a proper terminal physical architecture can result in relatively short passenger walking distances, particularly for routine domestic travellers. Decentralization is less convenient for travellers where there is significant interlining or where the passenger's outward and inbound airlines are likely to differ. For example, Dallas–Fort Worth, one of the early decentralised systems, may be less convenient for an interlining traveller who must change terminals than the later Atlanta configuration. International operations have a considerable impact on the design of terminal facilities and the procedures that are implemented. Out of this perspective, airport planners and operators

must exercise extreme caution when extrapolating from US experience, which, while well recorded, is likely to be based mainly on domestic operations. The addition of regulatory standards necessary for international operations (such as customs, immigration, health and agricultural controls, and, most importantly, security) can significantly complicate the layout and management of a terminal. Separation is required in various European Union countries for operations within and outside the Schengen zone.

The Eurohub terminal in Birmingham, UK, contains a complicated set of interlocking doors to allow for flows between international, domestic, and "common travel" passengers.

3.4 TERMINAL FUNCTIONS :

High–activity centres, as defined by transportation planners, are facilities with a high user throughput, such as airport terminals. During peak hours, the main passenger airports handle well over 10,000 passengers. Considering heightened security measures since 2001, outgoing foreign passengers are anticipated to spend at least 30 minutes in the terminal area, while incoming international travellers spend at least 24 hours. Passengers must engage in a number of processing operations while in the terminal and are likely to use a number of subsidiary facilities installed in the airport for their comfort and convenience, as well as the airport's profit. Before delving into these individual actions, it is useful to divide the terminal activities into five major component groups :

- Direct passenger services
- Airline–related passenger services
- Governmental activities
- Non–passenger–related airport authority functions
- Airline functions

These activities, whether performed directly or indirectly in the passenger terminal area, will entail some duty on the part of the terminal manager.

3.5 PHILOSOPHIES OF TERMINAL MANAGEMENT :

Although the core operational processes of airports in terms of safety are generally similar around the world, the method in which those procedures are carried out and the organisation used to carry them out might vary dramatically. Perhaps nowhere in the airport do operational philosophies diverge more than in the terminal. The two extreme positions can be labelled as

- Airport–dominant
- Airline–dominant

When terminal operations predominate at an airport, the airport authority provides terminal services. Airport authorities handle the apron,

baggage, and passenger handling wholly or largely. The majority of the terminal's services and concessions are likewise operated by the authority. Airport–dominant operations are commonly referred to as the European model, while similar arrangements can be found all throughout the world. Frankfurt is likely the clearest illustration of this type of operation, which entails high airport–authority staffing levels and high airport–authority equipment expenses, with associated benefits to airlines.

Most of the major airports throughout the globe operate on a mixed model, with the airport authority handling some terminal operations and airlines and concessionaires handling others. Competitive facility operating is promoted in several airports in order to preserve the high service standards often provided by competition. European Commission (EC) guidelines are requiring airports in the European Union to create competition at airports that were previously operated by a single entity. This shift away from single–authority operation has been facilitated by the growing trend toward total airport privatisation, either through direct transfer of ownership outside the public sector or through the awarding of long–term concessions for the operation of entire airports. Competitive handling operations are also less subject to a total closure caused by labour unrest. The final operational technique will be determined by a number of criteria, including :

- Philosophy of the airport authority and its governing body
- Local industrial relations
- International and national regulations
- Financial constraints
- Availability of local labor and skills

3.6 DIRECT PASSENGER SERVICES :

Direct passenger services are terminal operations that are offered for the convenience of air travellers and are not directly tied to the operations of the airlines. This category can be further subdivided into commercial and non–commercial services. There is no clear and fast distinction between these two groups, however non–commercial activities are typically seen as fully necessary services that are supplied either for free or at a modest fee.

Commercial activities, on the other hand, are potentially profitable businesses that are either ancillary to the airport's transportation purpose (e.g., duty–free shops) or avoidable and at the discretion of the traveller (e.g., car parking and car rental).

Typically, the airport authorities will provide the following non–commercial activities in a large passenger terminal :

- Porterage
- Flight and general airport information
- Baggage trolleys

- Left–luggage lockers and left–luggage rooms
- Directional signs
- Seating
- Toilets, nurseries, and changing rooms
- Rest rooms
- Post office and telephone areas
- Services for people with restricted mobility and special passengers

Depending on the airport's operating philosophy, commercial facilities will be operated directly by the authority or on a concessionary basis by specialist operators. Typically, in a large airport, the following commercial activities can be expected to play a key role in the passenger terminal's operation :

- Car parking
- Restaurants, cafes, and food bars
- Duty–free and tax–free shops
- Other shops (e.g., book shops, tourist shops, boutiques, etc.)
- Car rental
- Internet service
- Insurance
- Banks and exchange services
- Hairdressers, dry cleaners, and valet services
- Hotel reservations
- Amusement machines, lotteries
- Advertising
- Business–centre facilities

The image above depicts examples of commercial duty–free stores and advertising at airports with aggressive commercial policies. The degree to which airports are commercialised varies greatly. Commercial revenues provide for up to 60% of overall income for airports that have enacted policies encouraging such activity, such as Frankfurt, Singapore, Amsterdam, London, and Orlando. Other airports that do not have a strong commercial development, either as a policy decision or due to a lack of opportunity, can expect up to 10% of their revenue to come from commercial sources.

Early arguments in the aviation world against airport terminal commercialisation are now clearly lost. It is often assumed that such amenities are in high demand due to the large number of passengers who can spend up to two hours in a terminal.

Perhaps just 30% of this time is necessary for processing. The large number of passengers, meeters, senders, and visitors provide a large prospective sales market that can invariably be developed if wanted. Furthermore, commercial operations' profits can cross–subsidize airside operations, which are frequently only moderately lucrative. Passenger terminals are acknowledged as a source of revenue for airports, with the potential to make the facility self–sustaining or even lucrative. Large passenger terminals provide significant economic profits. If the airport is to be commercially used, a number of operational policy decisions must be made. First, a decision on the method of operation must be taken. There are five common ways of operation; these include operating by :

- A department of the airport authority directly
- A specially formed, fully owned commercial subsidiary of the airport authority
- A commercial subsidiary formed by the airport authority and the airlines
- A commercial subsidiary formed by the airport authority and a specialist commercial company
- An independent commercial enterprise

Some publicly owned airports prefer to keep direct control over commercial operations. This choice, on the other hand, is unusual. Most airports with extremely successful commercial operations, such as Dubai, Heathrow, Atlanta, and Frankfurt, prefer to offer restricted concessions to independent businesses with commercial experience in the specific field.

It is also important to compare the methods used to pick concessionaires. Law requires some governmental airport authorities to accept the highest bid for a concession. Amsterdam's Schiphol Airport created a successful commercial philosophy centred on maximising airport control over operating standards and pricing. As a result, the airport authority believes it is better able to achieve its own commercial goals

while still utilising the knowledge of the particular concessionary firms. Airport concessions can be leased in a variety of ways :

- Open tender
- Closed tender
- Private treaty

The second alternative, closed tender, is most likely to meet the standards of a publicly owned airport. Private treaty is likely to be perceived as an overly restrictive method of handling public monies, leading to allegations of preferential treatment. Open tender, on the other hand, while allowing for greater competition, may possibly result in bids from businesses that prove incapable in meeting required performance requirements.

However, in other countries, open tenders are legally necessary when public monies are involved. It is occasionally permissible to create a prequalification arrangement under these conditions to ensure that only competent and financially sound firms enter the bidding process. In privatised airports, the airport can offer concessions using any legal means it sees fit.

❑ **Check Your Progress :**

1. _____ is a small, narrow structure with aeroplanes parked on both sides.

   a. Satellite Terminals b. Semi–circular terminal

   c. Pier d. Mixed Terminal

2. The first satellite terminal was employed at _____.

   a. Shanghai Pudong International Airport

   b. Tampa International Airport

   c. Chhatrapati Shivaji International Airport

   d. London Gatwick Airport

3. Which of the following International Airport was the first to deploy an automatic people mover to connect the main terminal with a satellite ?

   a. Shanghai Pudong International Airport

   b. Tampa International Airport

   c. Chhatrapati Shivaji International Airport

   d. London Gatwick Airport

4. Which of the following Airport airports have a semicircular terminal.

   a. Shanghai Pudong International Airport

   b. Tampa International Airport

   c. Chhatrapati Shivaji International Airport

   d. London Gatwick Airport

5. Which of the following Airport have the world's largest satellite terminals.
   a. Shanghai Pudong International Airport
   b. Tampa International Airport
   c. Chhatrapati Shivaji International Airport
   d. London Gatwick Airport
6. Which of the following is a Non–commercial activity for airport authorities
   a. Car parking b. Rest rooms
   c. Car rental d. Duty–free shops
7. Airport–dominant operations are commonly referred to as the
   a. Shanghai Model b. European Model
   c. Mixed Model d. London Model
8. _____ activities, are potentially profitable businesses that are either ancillary such as duty–free shops or at the discretion of the traveller for example car parking and car rental.
   a. Commercial activities b. Non–Commercial
   c. Both d. None of these

3.7 LET US SUM UP :

Learners have gained knowledge about the terminals as well as the functions that are performed at airport terminals through this unit. In addition, the learner has become familiar with the passenger terminal through the course of this unit.

The overall experience that a passenger has at an airport is significantly influenced by each and every facet of the airport's entire operational life cycle. Airport operations that are not functioning properly may cause delays, which may result in a lack of security clearances and general chaos. This is specifically referring to terminals as well as passenger terminals.

A terminal at an airport is a building at the airport where passengers board and disembark from aeroplanes. A terminal for buses. A passenger terminal is a building located in a port or on a dock that serves as the point of embarkation and disembarkation for passengers travelling on passenger ships such as cruise ships and ferries.

Passenger operations include baggage handling and tagging. The operations of the terminal include the distribution of resources and the management of staff. Airside operations include the landing and navigation of aircraft, the management of airport traffic, the management of runways, and the safety of ground handling operations.

3.8 ANSWERS FOR CHECK YOUR PROGRESS :

1. c	**2.** d	**3.** b	**4.** c
5. a	**6.** b	**7.** b	**8.** a

3.9 GLOSSARY :

1. **Business Centre :** A place where businesses can rent offices or rooms for meetings, events, etc.
2. **Concourse :** a long, rectangular part of the airport, designed to house multiple gates.
3. **Duty–Free Shop** : These are the retail outlet whose goods are exempt from the payment of certain local or national taxes and duties, on the requirement that the goods sold will be sold to travelers who will take them out of the country, who will then pay duties and taxes in their destination country.
4. **Passenger Terminal :** It is a building at an airport where passengers transfer between ground transportation and the facilities that allow them to board and disembark from an aircraft. Within the terminal, passengers purchase tickets, transfer their luggage, and go through security.
5. **Open Tender :** It is the process aimed at acquiring goods or/and services at the lowest price. The belief is to stimulate competition and minimize discrimination.

3.10 ASSIGNMENT :

1. Enlist the functions of passenger terminals at the airports.
2. What are the different airline related services offered at major domestic airports ?

3.11 ACTIVITY :

1. Make a list of International Airports in India and find out the terminal structure of that particular airport.

3.12 CASE STUDY :

Case Study of Aircraft Catering Truck Accident at Changi Airport

Singapore Airlines aircraft Airbus A350–900 was parked at Changi Airport on 09th January 2020 with its catering operation going on after normal parking of the catering truck.

After a while, staff noticed that the catering truck has lowered itself to a level below the aircraft door. It created problem in rolling the meal trolleys between the aircraft and the catering truck.

One of the catering truck operators used the Up Down Toggle switch located in the catering truck front panel to raise the catering truck height back to the level of the aircraft door.

However, it did not work. He went back into the trucks container to try the same with a second rear cabin switch and asked another staff to tell him when the truck is level.

This time the switch operated and the catering truck platform level started raising. The staff on the other side signaled him to stop raising the truck as the required level had reached and further raising the height would result the catering truck platform colliding with the aircraft door.

The operator inside released the switch but the lifting system did not stop. He immediately pressed the emergency switch, however, catering truck platform had already collided with the aircraft door.

The platform deformed and lifted the aircraft door abnormally. The door hinges could not sustain the pressure applied by the catering truck causing deformation.

The safety shoe also got sandwiched and crushed between the catering truck platform and the aircraft door as it experienced excessive compressive forces applied by the raising platform on one side and a fixed aircraft door on the other.

The accident was investigated by Accident Investigated by Transport Safety Investigation Bureau, Ministry of Transport, Singapore. Investigation found that the trucks engine idle speed was not the same as manufacturer's standards at the time of the incident. It was higher.

A higher idle speed of the engine affected the lifting mechanism hydraulics such that the automatic lowering speed of the truck was increased. That was the reason behind truck platform going out of level in the first place.

Secondly, during the lifting operation by operators manual command, the safety shoe did not operate otherwise the accident could have been averted. The reason for non–functioning of safety shoe sensor was the algorithm in which the catering trucks control system worked.

The control system did not consider the signal from safety shoe when manual rising of the platform was being carried out. Due to this reason, while the operators were relying on the safety shoe at the time of the accident, it did not operate because command for raising height was being manually given.

The manufacturer of the catering truck fixed both of the problems and also updated its manuals for future reference. The accident emphasizes the importance of technical and maintenance related functionalities of aircraft catering truck operation.

Safety Precautions During Aircraft Catering Operation

While technology enhances safety, it does not relieve the catering crew from observing safety precautions during the catering operation.

First, Catering truck operator must make sure that chocks have been applied to aircraft wheels. It is important because catering truck is either

positioned right in front of the jet engine or behind it with the aft door of the aircraft.

Unexpected movement of the aircraft can result in a collision between the catering truck and the aircraft wing or engine.

The position of aircraft catering truck during its operation is in front and rear of the aircraft jet engine. Therefore, risk of aircraft jet engine ingestion (when catering truck is engaged with the front door); and risk of jet blast (when catering truck is engaged with the aft door) must also be considered.

That is why it is imperative that flight crew knows through proper communication whether catering truck is parked or removed from the aircraft stand.

If wind conditions are extreme, operation of catering truck must be halted. The technical manual of catering trucks manufacturer must be consulted to check what is the maximum allowable windspeed the truck is designed to sustain.

The outriggers available in the catering truck have a certain capacity to fight winds that may try to unbalance the catering truck. Above its capacity, catering operated must be stopped and catering truck stowed.

Q. 1. What do you think that these types of incidences can be avoided in future ?

Q. 2. Who is responsible for the accident happened in this case ?

Q. 3. What safety measures must be taken before executing any key works before takeoff of airplane ?

3.13 FURTHER READING :

1. Dr. Sumeet Suseelan (2019), Airline Airport & Tourism management : Aviation Manual, Notion Press Chennai.
2. Ashford N J (2016), Airport Engineering 4th Edition : Planning, Design & Development Of 21St Century Airports, John Wiley Press.
3. Asheesh Kumar (2020), Planning And Design Of Airport, Vayu Education of India.

BLOCK SUMMARY

Airports are required to keep a great set of passenger services for both airlines and passengers in order to fulfil the needs of the continually evolving aviation industry. This is necessary so that airports can meet the demands of the aviation sector.

Learning about airport passengers, terminals, and the many services offered at airports will be facilitated by this block.

In this section of the block, the learner will become familiar with the primary airport areas that contain passenger and airline facilities. Learners need to be aware with the different types of airports in order to appreciate the functionality of airports and the primary landside and airside regions at each airport.

The block will also place an emphasis on recognising the various passengers who are engaged at the airport. W e will also go over the several airport amenities that are available to passengers who are both arriving and exiting. At the airport, the requirements of airlines and those of passengers and crew are extremely dissimilar. As a direct consequence of this, a significant divide between their faces is established in the second unit of this block. This unit also devotes considerable attention to facilities like lounges, cargo facilities, and security facilities, all of which are examples of establishments that are not immediately connected to the operations of airlines.

In Unit III, we go over the procedures for running the passenger terminal. This section provides a discussion of many kinds of terminals along with graphical representations of each. In this section, not only does the function of the terminal itself get covered, but also the function of the passenger terminal.

BLOCK ASSIGNMENT

Short Questions :

1. Differentiate between primary commercial and non–commercial airport.
2. Enlist the regional airports in Gujarat.
3. How can we classify between adult passenger and child passenger in aviation sector.
4. Why airport security services are so important in today's world ?
5. Terminal function are highly technological driven these days, explain few functions of the terminals.
6. What are the direct passenger services offered to the passengers at airport ?

Long Questions :

1. Explain in detail the facilities at the airport with special emphasis on non–aeronautical facilities.
2. Write a detailed note on Landing area at the airports.
3. How are passenger arrival facilities are different from passenger departure facilities at airports ?
4. What are the premium and VIP services offered to the passengers at leading airports ?
5. Enlist and explain the different types of terminal formations adopted to construct airports around the world.
6. Discuss the philosophies of terminal management in depth considering airport and airline both.

❖ **Enrolment No. :** ☐

1. How many hours did you need for studying the units ?

Unit No.	1	2	3
No. of Hrs.			

2. Please give your reactions to the following items based on your reading of the block :

Items	Excellent	Very Good	Good	Poor	Give specific example if any
Presentation Quality	☐	☐	☐	☐	_____
Language and Style	☐	☐	☐	☐	_____
Illustration used (Diagram, tables etc)	☐	☐	☐	☐	_____
Conceptual Clarity	☐	☐	☐	☐	_____
Check your progress Quest	☐	☐	☐	☐	_____
Feed back to CYP Question	☐	☐	☐	☐	_____

3. Any other Comments

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PASSENGER MANAGEMENT

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AHMEDABAD

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ISBN 978-93-91071-23-3

Edition : 2022

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ROLE OF SELF INSTRUCTIONAL MATERIAL IN DISTANCE LEARNING

The need to plan effective instruction is imperative for a successful distance teaching repertoire. This is due to the fact that the instructional designer, the tutor, the author (s) and the student are often separated by distance and may never meet in person. This is an increasingly common scenario in distance education instruction. As much as possible, teaching by distance should stimulate the student's intellectual involvement and contain all the necessary learning instructional activities that are capable of guiding the student through the course objectives. Therefore, the course / self-instructional material are completely equipped with everything that the syllabus prescribes.

To ensure effective instruction, a number of instructional design ideas are used and these help students to acquire knowledge, intellectual skills, motor skills and necessary attitudinal changes. In this respect, students' assessment and course evaluation are incorporated in the text.

The nature of instructional activities used in distance education self- instructional materials depends on the domain of learning that they reinforce in the text, that is, the cognitive, psychomotor and affective. These are further interpreted in the acquisition of knowledge, intellectual skills and motor skills. Students may be encouraged to gain, apply and communicate (orally or in writing) the knowledge acquired. Intellectual- skills objectives may be met by designing instructions that make use of students' prior knowledge and experiences in the discourse as the foundation on which newly acquired knowledge is built.

The provision of exercises in the form of assignments, projects and tutorial feedback is necessary. Instructional activities that teach motor skills need to be graphically demonstrated and the correct practices provided during tutorials. Instructional activities for inculcating change in attitude and behavior should create interest and demonstrate need and benefits gained by adopting the required change. Information on the adoption and procedures for practice of new attitudes may then be introduced.

Teaching and learning at a distance eliminates interactive communication cues, such as pauses, intonation and gestures, associated with the face-to-face method of teaching. This is

particularly so with the exclusive use of print media. Instructional activities built into the instructional repertoire provide this missing interaction between the student and the teacher. Therefore, the use of instructional activities to affect better distance teaching is not optional, but mandatory.

Our team of successful writers and authors has tried to reduce this.

Divide and to bring this Self Instructional Material as the best teaching and communication tool. Instructional activities are varied in order to assess the different facets of the domains of learning.

Distance education teaching repertoire involves extensive use of self- instructional materials, be they print or otherwise. These materials are designed to achieve certain pre-determined learning outcomes, namely goals and objectives that are contained in an instructional plan. Since the teaching process is affected over a distance, there is need to ensure that students actively participate in their learning by performing specific tasks that help them to understand the relevant concepts. Therefore, a set of exercises is built into the teaching repertoire in order to link what students and tutors do in the framework of the course outline. These could be in the form of students' assignments, a research project or a science practical exercise. Examples of instructional activities in distance education are too numerous to list. Instructional activities, when used in this context, help to motivate students, guide and measure students' performance (continuous assessment)

PREFACE

We have put in lots of hard work to make this book as user-friendly as possible, but we have not sacrificed quality. Experts were involved in preparing the materials. However, concepts are explained in easy language for you. We have included many tables and examples for easy understanding.

We sincerely hope this book will help you in every way you expect. All the best for your studies from our team!

PASSENGER MANAGEMENT

Contents

Dr. Babasaheb Ambedkar Open University Ahmedabad

BBAATR-303

Passenger Management

BLOCK 2 : PASSENGER SECURITY AND FLOW MANAGEMENT

PASSENGER SECURITY AND FLOW MANAGEMENT

Block Introduction :

Each time you fly by plane, you must walk through a laborious maze of checkpoints and ensure that your luggage passes through as well. Depending on the route you are travelling, the list of prohibited items varies. Passengers are frequently bored by the lengthy safety procedures, many of which appear ineffectual. But the issue is making aviation travel fully safe and secure. Moreover, a steady passenger flow at an airport ensures both safety and an enhanced customer experience.

Passenger Flow Management optimises airport operations by enhancing airport safety and security. It enables for greater control over passenger flows and crowd density by enabling stakeholders to better comprehend passenger groups and behaviours through the use of analytics.

Next, facilitate airport access from in–town and out–of–town locations and streamline the check–in process. This is easily achievable with the right system. The airport access control system facilitates passenger registration at the self–service kiosk. Typically, facial biometrics are employed to identify passengers. The passenger's face is then verified at each level of transit, including baggage drop–off, immigration inspection, Longue access, boarding, etc.

Baggage handling is the process of delivering passenger luggage from a check–in station at a departure airport, to the cargo hold of an aeroplane, and finally to a collecting point at an arrival airport. A baggage handling system (BHS) is comprised of many operations and inspections.

Passenger safety, passenger flow management, airport access, and luggage handling will be discussed in the following section of this unit.

Block Objectives :

After going through this block learner will able to know about :

- Airport Security Procedure for Passengers
- Passenger's Experience of the Current Security Measures
- New Innovations to Enhance the Passenger Experience
- Impact of Security Precautions on the Passengers
- Airport Safety Management System and its Advantages
- Passenger Flow Management
- Objectives and benefits of Passengers Flow Management System
- Passenger Flow Management Module
- Future Innovation in PFM
- Access Users and Modal Choice with Passenger Terminal Operation
- Consequences of Missing a Flight
- Off–Airport and in–town Terminal Access
- Estimation of Number of Aircrafts by Airport Access
- Baggage Handling–Processes
- Equipment, Systems, and Technologies
- Reclaim of Baggage on Arrival

Block Structure :

Unit 1 : Passenger Safety and Security

Unit 2 : Passenger Flow Management

Unit 3 : Airport Access System

Unit 4 : Passenger Baggage Handling Procedure

UNIT 01

Passenger Safety and Security

UNIT STRUCTURE

1.0 LEARNING OBJECTIVES :

After studying this unit, the learners will able to :

- Understand the basics of airport security procedure for passengers
- Study the passenger's experience about airport security measures
- Learn about latest innovation for enhancing customer experience
- Explore about Safety Management System and its advantages

1.1 INTRODUCTION :

The core of every aspect of a flight operating procedure is flight safety and security. Neglecting flight safety and security is one of the factors that contributes to aviation accidents. There is no way that the safety or security of a flight could be compromised. Accidents cannot be entirely eradicated by humans. Humans may reduce accidents, one of which is by following the guidelines for aviation safety and security. The second main threat comes from zealots who wish to endanger ordinary people's lives in order to further their evil goals. The groups that support terrorism are the worst at carrying out such evil deeds.

The achievement of safety standards when using aircraft, airports, air cargo, flight navigation, as well as auxiliary facilities and other public infrastructure, is the definition of aviation safety. In the meantime, the definition of aviation security as stated in is how to integrate human resources, facilities, and processes to secure flights from criminal conduct.

Many people believe that only specific parties, such the government or airline operators, are accountable for the safety and security of flights. In actuality, everyone has a responsibility to ensure that no action is taken that could jeopardise aviation safety and security, even if they are not using any aviation services. As an illustration, unauthorised use of high–powered radio frequencies occurs in Indonesia as a result of the populace's ignorance of aviation safety and security. Obviously, this will disrupt air navigation, such as by cutting off the pilot and ATC officers' conversation. It is forbidden for anyone to directly or indirectly use aviation radio frequencies for anything other than aviation, as this could endanger flight safety. This illustration makes it quite obvious that preserving aviation security and safety is also the responsibility of the general public. This is a factor in why the use of airspace complies with safety regulations.

1.2 AIRPORT SECURITY PROCEDURE FOR PASSENGERS :

The level of airport security has increased significantly in recent years. Most of these security measures were taken due to incidents such as the Lockerbie bombing and the 9/11 attacks. The measures influence all parties involved in the aviation industry. This document focuses on the passenger experience during aviation security checkpoints. Passenger currently experience security checkpoints as the most stressful part of their trip. On the other hand, passengers do not want to enter aircraft without passing at least one security checkpoint.

These counteracting emotions create an environment in which there is a lot of room for development. This fact sheet aims to inform the reader of today's technology and the related passenger experience. It will also discuss technological developments in the aviation security industry, and how they will influence the passenger experience.

Aviation terrorism is not a new issue. Numerous aircraft hijackings have occurred since the end of World War II, resulting in hundreds of casualties. Therefore, security checks are employed to safeguard travellers, employees, and aircraft against harm that may be intentional or unintentional, as well as other dangers. The 19 annexes that make up the international civil aviation laws were created by the International Civil Aviation Organization (ICAO). Each of the contracting governments must adhere to a variety of international requirements for security checks found in ICAO Annex 17, which addresses security. Depending on the nation, there are several ways to meet these standards.

Let's take example of EU regulations. Passenger screening and cabin baggage screening are two different aspects of the screening procedure.

Since this unit is about the passenger's experience about security, it will not discuss hold luggage and freight screening. Passengers must remove their jackets or coats for screening before having them screened as cabin luggage. If necessary, screening staff may ask the individual to take off extra garments, such shoes. Passengers are screened by at least one of the following methods :

- A manual search
- Walk through metal detection equipment (WTMD)
- Dogs that detect explosives
- Equipment for detecting explosive traces (which may be paired with handheld metal detector)
- Security scanners devoid of ionising radiation

Liquids, aerosols, and gels (LAGs), portable laptops, and other significant electrical goods are taken out of cabin luggage before screening starts and are examined individually. LAGs are contained in a single, transparent, resealable plastic bag with a maximum volume of 1 litre. Each LAG is housed in a container that holds less than 100 millilitres. Except for WTMD and scanners that do not utilise ionising radiation, cabin luggage may be screened using X–ray equipment or one of the methods indicated above. The time it takes for each passenger to pass security checks is 15 seconds at best, 25 seconds on average and 60 seconds at worst. This is predicated on an ideal scenario in which all documents are accurate and no further screening is required. The type of screening technology being utilised determines the precise processing timings.

1.3 PASSENGER'S EXPERIENCE OF THE CURRENT SECURITY MEASURES :

A security inspection can boost the trust of an airport passenger. However, a security check is also linked to the highest percentage of unfavourable feelings experienced by a traveller throughout their whole trip, from booking through bag retrieval at the airport of arrival. It is obvious that security precautions make travel less convenient for passengers.

One illustration of this annoyance is the requirement to get to the airport two hours prior to departure. The security measures have an effect on airlines, airports, and passengers in addition to passengers. After the 9/11 security measures were put in place, it was discovered that 6% fewer passengers were on all flights as a result of baggage screening. After three years, the United States saw a recovery in the drop in airport passenger volume. As a result, airlines claimed that they lost billions in ticket sales since some potential passengers decided not to fly. Studies have revealed, meanwhile, that travellers do accept the added hassle and are even willing to pay more to feel safer.

Several terrorist assaults have taken place in and around significant international airports and public spaces over the past few years. Even

if these occurrences didn't necessarily occur at or after the airport security checkpoint, they still have a detrimental impact on the perception of passengers. This highlights the impact of security inspections on travellers' perceptions of safety. The security check is found to have the greatest influence on airport patron happiness, followed by terminal amenities and airport accessibility. The more content travellers are, the more highly they regard the airport. For airports, this might represent a competitive advantage.

Airport security is evaluated by passengers based on :

1. The amount of time needed for a security check
2. The security personnel's professionalism
3. Trust in the security procedure to ensure passengers' safety

Passenger happiness, wait durations, and perceived security quality are all significantly correlated. Greater passenger satisfaction results from shorter wait times and improved perceived security standards.

The degree to which a traveller feels safe is crucial since it affects whether or not they would board flights and shell out money for security checks. Professionalism among security personnel also plays a beneficial role on the perception of safety and the desire to travel farther and more frequently.

More information about the expected processes at security checkpoints can be given to travellers, and their complete cooperation and support can be requested, to boost satisfaction. Images have the power to condense and clarify complex information concerning procedures. To improve travellers' experiences, it was observed that Dallas International Airport began to strengthen its security checkpoints. Use of illustrated signage and floor pointers in place of textual messages was one way to improve communication with passengers. Passengers experienced speedier learning and processing as a result.

1.4 NEW INNOVATIONS TO ENHANCE THE PASSENGER EXPERIENCE :

As stated previously, passengers appreciate security procedures but nonetheless encounter inconveniences throughout their flights. This section focuses on the development of security measures that simultaneously enhance the passenger experience and increase the level of security.

1.4.1 Centralized Image Processing :

In addition to technology, the lead time of the traditional security process is mostly determined by the pace of the passenger and the security operator (s). A quicker speed reduces the lead time. The passenger's pace is determined by the time required to remove all electrical equipment from their luggage (and body) and place their bags on the conveyor belt. Motivation, personnel capacity, the amount of passenger luggage, and the passengers themselves dictate the pace of the security officer. Therefore, both parties can create a delay in the procedure. Centralized Image

Processing (CIP) was introduced to reduce the duration of the security procedure.

The standard procedure at checkpoints requires an X–ray operator at each active lane. CIP operates on the basis of a network connecting the X–ray scanners stationed at security checkpoints to a central location where the film is reviewed. The primary benefit of a centralised location is the ability to simultaneously analyse several security lanes. This innovation increases both productivity and cost–effectiveness. The improved lane throughput also results in a more continuous flow, which results in better use of capacity. The advantages for travellers are shorter wait times and quicker entry to the checkpoint. 180 passengers per hour can be expanded to 450 passengers per hour.

The collected X–ray images are placed in a queue and submitted to an image processing system. This system classifies and transmits photos to the next available security officer. Depending on the contents, the bag is either returned immediately to its owner or diverted for a more complete examination. Both cases facilitate a continuous flow.

1.4.2 Utilization of CT scans in Hand Luggage Screening :

CT scans are commonly utilised in the medical field, but they can also be utilised for cabin baggage screening. In 2015, CT scans were evaluated at London Luton Airport and Amsterdam Schiphol Airport.

The benefit of CT scans is that passengers are not need to remove bulky electronic goods or liquids and gels from their luggage. CT scans can capture sufficient information to identify the potential danger of a bag's contents. These decreases in waiting and processing times, hence enhancing the passenger experience. New technologies and methods aim to improve airport security and passenger satisfaction. Passengers are willing to pay more for the convenience of CT scans despite the fact that they are more expensive than standard X–ray scans. A Travel Association survey indicated that nearly half of flight travellers in the United States are ready to pay up to $150 year for less bother at airports.

1.5 IMPACT OF SECURITY PRECAUTIONS ON THE PASSENGERS :

Prior to the tragedy of September 11, check–in at airports in America and throughout the world was pretty informal. After presenting their IDs to obtain boarding passes and go through a quick security check, passengers boarded the aircraft. You should anticipate significant changes at airport check–in over the coming years as airlines and airports examine safety procedures. Passengers and their luggage must now be checked and go through a security check before boarding the plane. In international airports, the most crucial area is recognised as airline security. As a result, airport security is now handled in a different way with more processes designed to protect not just the airline business and the public's lives but also the country's economy. Travelers who are unfamiliar with these precautions will likely experience a difficult security check process.

The increasing taxes on plane tickets are the direct effects of the additional security measures on travellers. The desire for travel is low given the situation of the economy. Increased ticket taxes that have resulted in a 25–40% increase in total airfare have made matters worse. The demand for air travel has significantly decreased since leisure travel is price–sensitive. As well, some

In anticipation of more attacks like 9/11, travellers have chosen alternative modes of transportation. Due to the general state of the economy and the need to find alternatives to travelling on large airlines, business travel has also decreased. Business travellers frequently choose to fly with low–cost, basic airlines. Others altered their travel habits by buying tickets in advance.

Prior to the implementation of tighter security measures, travellers could arrive at the airport around two hours before a flight and still check in and make it to the gate in plenty of time. Before boarding, passengers must now give themselves plenty of time to wait in the lengthy lines at the check–in desks and the security checkpoints. The bother factor is another name for this. Airport operators and travellers may continue to experience delays and inconveniences as a result of increased security. Airports will have to limit advanced electronic screening during the summer and vacation seasons and switch to less sophisticated screening in order to prevent operational delays. The issue is a clear illustration of the challenges airports face in trying to strike a balance between efficiency and security. On the plus side, queues are now noticeably shorter thanks to airlines' use of kiosk equipment for self–service check–in of travellers with electronic tickets. The question of how early travellers should arrive at the airport to prevent missing their flights continues to annoy and worry them.

In addition to the potential for higher ticket charges, travellers must be ready for a security check before boarding the plane. Due to the trouble, some travellers have stopped travelling altogether or have reduced their flying. Many travellers who would typically prefer a four– or five–hour trip over a one–hour flight now prefer to drive. The demand for air travel is being impacted by this new pattern, particularly in short–haul markets.

Along with the physical checks, flying travellers must get used to more thorough and occasionally intrusive inspections. The increased security measures put passengers' privacy at danger.

1.6 AIRPORT SAFETY MANAGEMENT SYSTEMS :

Historically, aviation safety has been built on the reactive analysis of past accidents and the implementation of corrective actions to prevent those events from occurring again. With today's extremely low accident rate, it is becoming increasingly difficult to improve the level of safety using this approach. As a result, a proactive approach to managing safety has been developed that focuses on process control rather than solely

on inspection and corrective actions on end products. This advancement in aviation system safety is known as a Safety Management System (SMS), and it denotes that safety efforts are most effective when they are fully integrated into business operations.

Most aviation accidents are now thought to be the result of human error. It is tempting to conclude that these errors indicate carelessness or incompetence on the job, but this is not the case. According to investigations, the human is only the last link in a chain that leads to an accident. These accidents will not be avoided simply by changing people; increased safety can only be achieved by addressing the underlying causal factors.

Improving overall safety in the most efficient way necessitates the use of a systems approach to safety management. Every organization's segment and level must adopt a safety culture that promotes and practises risk reduction.

The assumption behind safety management is that there will always be safety hazards and human errors. SMS implements processes to improve communication about these risks and to take action to mitigate them. This strategy will eventually improve an organization's overall level of safety.

A Safety Management System (SMS) is a formal, top–down business–like approach to risk management based on fundamental system safety principles. This section explains those principles, the differences between SMS and traditional approaches to safety, and the benefits of SMS implementation.

The application of engineering and management principles, criteria, and techniques to achieve an acceptable level of safety throughout all phases of a system is referred to as system safety.

The primary goal of SMS is to achieve this definition of system safety. A well–structured SMS provides a systematic, explicit, and all–inclusive risk management process. This process includes goal setting, planning, documentation, and regular performance evaluation to ensure that goals are met.

SMS incorporates several key system safety principles, as illustrated below :

1. **Management commitment to safety :** Since management attitudes and actions have a large influence on the entire staff, it is critical that these leaders commit to the success of an SMS implementation.
2. **Proactive hazard identification :** Early hazard identification and reporting can save a significant amount of time and resources in the long run.
3. **Risk management actions :** A system must be in place to identify logical approaches to counteract known risks to safe operation.

4. **Evaluation of safety actions :** An ongoing assessment of the effects of risk management actions is required to determine whether additional corrective actions are required.

1.7 SECURITY MANAGEMENT SYSTEM (SMS) ADVANTAGES :

The ultimate goal of SMS is clearly increased safety–specifically, fewer accidents and injuries. Furthermore, increasing the level of safety in a system reduces material losses and increases productivity. This supports the argument that safety is good for business.

Other advantages include :

- **Reduced direct and indirect accident costs :** Fines, repair costs, damage claims, and increased insurance premiums are just a few of the potential economic consequences of an airport mishap.
- **Employee morale and productivity are improved :** When communication between management and the rest of the organisation is encouraged.
- **Creating a marketable safety record :** A consistent record of safe operations can be used to attract new business and investment.
- **Prioritization of safety needs based on logic :** SMS prioritises risk mitigation actions that have the greatest impact on both safety and the bottom line.
- **Compliance with legal safety responsibilities :** Airport certification requirements necessitate a number of safety processes and standards, which can be incorporated into an organization's SMS.
- **More efficient maintenance scheduling and resource utilisation :** SMS's effective hazard reporting enables proactive scheduling of maintenance tasks when resources are available, increasing the likelihood that maintenance is completed on time and in a more efficient manner.
- **Avoiding incident investigation costs and operational disruptions :** Better communication and risk mitigation will keep many accidents from happening in the first place.
- **Continuous process improvement :** SMS allows lessons learned to be incorporated into the system, leading to superior operations.

Finally, the International Civil Aviation Organization (ICAO) has announced or proposed requirements or plans to implement safety management systems for air traffic services, airline oversight, and airports. This demonstrates their trust in SMS's safety management capabilities.

Check Your Progress :

1. Annexe _____ that make up the international civil aviation law were created by ICAO.

   a. 17 b. 18 c. 19 d. 20

2. The liquid, aerosols and gels maximum volume carried is _____
   a. 0.5 ltr b. 1 ltr c. 10 ml d. 100 ml
3. The time taken for screen at airport security from ionised radiation/ x–ray equipment is :
   a. Best in 15 second b. Average in 25 second
   c. Worst in 60 second d. All of the above
4. _____ % passenger were took alternate mode of transportation due to intense security check at airport after 9/11 incidence.
   a. 4 b. 5 c. 6 d. 7
5. Airport security is evaluated by passengers based on the criterion :
   a. Time needed for a security check
   b. Security personnel's professionalism
   c. a and b both
   d. None of the above options
6. After 9/11 intense security increased the airport taxes and consequently the fare by _____
   a. 5% to 15% b. 15% to 25%
   c. 25% to 40% d. None of the above options
7. Security Management System is _____
   a. Proactive system b. Reactive system
   c. Passive system d. Non–functional system
8. The goal of SMS is/are to :
   a. Increased safety b. Fewer accidents
   c. Less material losses d. All of the above options

1.8 LET US SUM UP :

In recent years, there have been substantial modifications to airport security. Notably, terrorist operations worldwide have been a major force behind these shifts. Airports are putting in better systems for detecting firearms, explosives, and explosive devices since they are major targets for terrorism and hostile attacks. To safeguard travellers, the general public, and airline and airport staff against armed attacks, hijackings, and explosions, airport security has been greatly updated and improved.

There are several definitions for the words safety and security. The phrase "security" generally refers to the absence of risk, danger, uncertainty, or threat. Passenger security is disallowed as a defence against organised crime, piracy, and/or terrorism. One important aspect affecting the choosing of a trip is the perceived level of comfort with regard to the security of the destination in general and airports.

In this chapter, the words "safety" and "security" are used frequently in reference to aviation, with a focus on passenger safety. More significantly,

companies in the aviation sector are obtaining a competitive advantage by cultivating in the public's mind a positive perception of them as actually caring about the safety of their passengers and staff. This is done with the intention of maintaining safety at a fair price and adhering to the correct safety and security protocols in the aviation environment. The aviation sector shares many characteristics with other high–risk, high–technology businesses including the nuclear, oil and gas, and petrochemical sectors, and as a result, safety issues are shared.

To maintain passenger safety at airports, screening practises have undergone major adjustments since the tragedies of September 11, 2001. The evolution of passenger preferences and expectations, as well as the chance that they would be happy with airport security measures, must all be taken into consideration while evaluating enhancements to airport screening procedures.

1.9 ANSWERS FOR CHECK YOUR PROGRESS :

1. c	**2.** b	**3.** d	**4.** c
5. c	**6.** c	**7.** a	**8.** d

1.10 GLOSSARY :

1. **Centralised Image Processing Equipment :** Centralised Image Processing (CIP) refers to the networking of baggage images generated by X–ray machines.
2. **Safety Management System (SMS) :** It is the formal, top–down, organization–wide approach to managing safety risk and assuring the effectiveness of safety risk controls. It includes systematic procedures, practices, and policies for the management of safety risk.
3. **Walk Through Metal Detection Equipment :** Walk–through metal detectors (WTMD) typically use pulse induction (PI) technology. The PI systems send powerful, short bursts (pulses) of current through the coil of wire. Each pulse generates a short magnetic field. When a piece of metal passes through the magnetic field, a reflected magnetic field is created. WTMD are typically installed at indoor checkpoints to detect illicit material and contraband.

1.11 ASSIGNMENT :

1. Study the Security Management System of a company of your choice and understand the use of technology by them.
2. Find out the security measures after the outbreak of COIVD–19 from medical/health related area.

1.12 ACTIVITY :

1. Enlist the security equipment used at international airport to scan human and their belonging.
2. Enumerate the use of AI in recent security and screening facilities at airports.

1.13 CASE STUDY :

In this case study, there are four examples of cases related to the misunderstanding by aircraft passengers of their actions that threaten the safety and security of aviation.

The first case occurred on September 30, 2013, when the aircraft with flight number JT 775 from Manado to Jakarta, is preparing to taxi. Suddenly a passenger opened the emergency exit door. This action was driven by a delayed flight for almost 1 hour. The air conditioner (AC) inside the cabin did not working properly, and made the temperature in the cabin increased. The passengers then protested to the flight attendant and the pilot to ask to get off the plane, but there were no responses. In such a panicked condition the pilot pushed back the aircraft to the taxi position, but it occurred that the passengers opened the emergency exit (Michel Karundeng, 2013).

The second case occurred in Ngada District, East Nusa Tenggara Province (NTT), on Saturday 21 December 2013, when the Regent of Ngada was about to fly from Kupang to Turelelo–Soa Airport in Bajawa (capital of Ngada regency). The problem was trivial, a day before the departure date (Friday, December 20, 2013), the airline (Merpati) has sold the tickets to Bajawa out, so the Regent did not get a ticket to Bajawa. However, on Friday afternoon Merpati reported there was one available ticket which could be used by the Regent, as there were passengers cancelling their flight. The Regent then purchased the tickets. On the day of departure, prior to departure time, in accordance with international flight procedures, Kupang airport three times announcing boarding calls for the Regent. Until the departure time, the Regent was not in the boarding room, and it was decided that the plane should be departed without having the Regent on board. When the plane had taken off, the Regent asked The Municipal Police to block Turelelo–Soa Airport in Bajawa. As a result, Merpati aircraft from Kupang could not land since the runway was blocked by The Municipal Police. The plane eventually returned to Kupang. Not long afterwards the Regent landed by TransNusa aircraft at Turelelo–Soa–Bajawa Airport (Daniel HT, 2015).

The third case, a young man with the initial MSA (19), on April 7, 2015, recklessly hiding in the wheel well of Boeing 737–800 flight number GA–177 with destination to Soekarno–Hatta International Airport. Without being known by the apron officer of Sultan Syarif Kasim Airport II Pekanbaru, he managed to enter the airport area, after climbing the airport fence. (Denny Irawan, Bakti Munir, Muh Shamil, 2015)

The fourth case, a university lecturer in Makassar, with the initial Dr HI (51), a passenger of Garuda Indonesia flight GA 611 from Makassar to Jakarta, was dropped off from the plane due to saying the following words : "Be careful, it has valuable items in it, but not a bomb". His words were delivered when a flight attendant put in the lecturer's luggage into the cabin baggage compartment. Hearing the word "bomb", the flight

attendant immediately reported it to the pilot who then reported it to Garuda Indonesia security officer. This was occurred on March 3, 2017. (Padmasari, 2017). Still at the same airport, with the initial CW, a first police officer with Superintendent Two rating, also said that he had a bomb in his luggage bag (Cipto, 2016). It was not only once passengers saying that they carry a bomb in their luggage. Based on the data from the Ministry of Transportation, during 2015, there were six cases of aircraft passengers delivering false information claiming that they carried a bomb (Putera, 2015). On the basis of such cases, researcher will conduct a study on passenger motives in doing several actions that could threaten the safety and security of aviation. This study is important, considering that in the last five years, as has been pointed out earlier, there are still many other cases where passengers of airplanes have the potential to become a threat to the safety and security of flight.

Q. 1. In first case do you think action of passenger justifies?

Q. 2. What is opinion about Regent act, is it justified?

Q. 3. Who must be made responsible for passenger's act of hiding in wheel and why?

Q. 4. What do you think, just uttering word Bomb passenger should be de–boarded from flight?

1.14 FURTHER READING :

1. Ashford N J (2016), Airport Engineering 4th Edition : Planning, Design & Development Of 21St Century Airports, John Wiley Press.
2. S K Khanna (1999), Airport Planning and Design, Nem Chand & Bros Roorkee.
3. Edissa Uwayo (2016), Airline and Airport Operations, Notion Press Chennai, 1st edition.

UNIT 02

Passenger Flow Management

UNIT STRUCTURE

2.0 LEARNING OBJECTIVES :

After studying this unit learners will able to :

- Understand basics of Passenger Flow Management & its platform
- Know about the objectives of PMS
- Learn about benefits of passenger flow management system
- Comprehend about the modules of PMS and future innovation in PMS

2.1 INTRODUCTION :

Over the course of the past few years, the requirements for airport safety have become significantly more stringent. Concurrently, passengers, tourists, and airport personnel now anticipate the highest levels of convenience and user–friendliness at the airport. When it comes to dealing with essential passenger procedures, the airport operator and the airlines rely on achieving their highest possible level of productivity. In order to accomplish this, access and control systems need to be intelligent, reliable, and effective. These qualities are necessary so that passenger flow can be managed without any hiccups. However, in the end, the most important concern is safety.

In today's day, airports and airlines that are searching for ways to improve the overall experience of their customers are increasingly turning to technology. Due to these shifts, it is becoming increasingly vital to focus on issues such as a single form of identification (One ID), comprehensive passenger processing, biometric solutions, and an uninterrupted travel experience. The growth of airlines, airports, and businesses based in airports, as well as the innovative procedures that these entities use, are ideal targets for the implementation of sustainable access solutions.

In order to increase their operational efficiency and handle the complex problems given by access control and security, airports and airlines can benefit from passenger flow management. Passenger flow management also assists airports and airlines. The ideal passenger management can be accomplished during each and every step of the modernization or development project you are working on. Years of experience working in the aviation industry and familiarity with current requirements, airport rules, and industry standards can serve as the foundation for this management.

2.2 PASSENGER FLOW MANAGEMENT :

A set of solutions known as Passenger Flow Management (PFM) is used to detect, track, and manage the overall flow of passenger traffic through airport touchpoints. In order to make the most efficient use of airport resources and to provide a pleasant experience for passengers, it is essential to ensure a smooth flow of passengers throughout the entirety of the boarding and arrival processes.

2.2.1 Passenger Flow Management Platform :

The platform encompasses each stage of the travel experience for passengers and assists in the management of the following assets located within the airport :

- Points of Entry, Checkpoints for Safety, and Customs
- Check–in Counters
- Bag Drop and Reclaim Areas
- Retail Areas, Food and Beverage Areas, and Lounges
- Check–in Counters
- Taxi Stands and Bus Terminals

2.3 PRINCIPAL OBJECTIVES OF PMS :

In the recent years, there has been an unprecedented growth in passenger traffic, which is also indicative of the enormous pressure that has been placed on airport facilities worldwide. Airports that are at capacity may respond to increased throughput by either investing in the expansion of their infrastructure or by improving the efficiency of their operations. However, expansion is not (or cannot be) a financially viable option for the vast majority of the world's airports.

In a similar vein, over the course of the past few years, airports have come to the realisation that there is an enormous potential in directly engaging with passengers and in developing revenue streams that are not related to aeronautics. They face a significant challenge in this endeavour because they have very little information on the billions of passenger journeys that take place at their facilities, and airlines have been hesitant to share any data on their passengers. Consequently, they do not have the information that they need.

Passenger Flow Management is the system of management to a group of information technology solutions that are aimed at airport operators. These trends have culminated in the development of these solutions (PFM). The term "passenger flow management" (PFM) refers to a universe of different solutions that are used for the detection, tracking, and overall management of passenger traffic that moves through airport touchpoints. From the sensors that are an essential component of the Internet of Things infrastructure at an airport to the intelligent video analytics and software utilised for line management, demand forecasting, capacity planning, and scenario planning. PFM can also involve the deployment of data platforms in order to integrate any and all data related to passengers and their baggage (movement, loyalty, mobile app, parking, e–commerce, etc.).

The pursuit of these four objectives that motivates airports management companies to make investments in PFM solutions :

1. Ensure that passenger journeys are smooth and uninterrupted throughout the airport by reducing and eliminating bottlenecks; performance is typically measured by passenger wait times, queue lengths at specific touchpoints, footfall and occupancy at specific areas.
2. Enhance the overall travel experience for airport passengers, with customer satisfaction being measured via airport–sponsored and independent surveys, in addition to input from airport ground personnel.
3. Make it possible for airlines to improve their ground operations; this is an element of the supplemental value that airports aim to bring to airline tenants.
4. Create new avenues for financial gain; Technology enables a more direct relationship between airports and passengers, which is important as non–aviation revenue continues to play an increasingly important role.

2.4 BENEFITS OF PASSENGERS FLOW MANAGEMENT SYSTEM :

The need of the hour is to improve passenger flow in order to provide a better experience and a sense of hassle–free and secure travel. The following are some of the reasons why passenger flow management is necessary :

1. **Increased Passenger Satisfaction :** Because the Passenger Flow Management Platform cuts down on waiting times, it makes travel easier and gives passengers more free time, both of which contribute to higher levels of passenger satisfaction.
2. **Better Performance in Lines :** The Passenger Flow Management Platform ensures better line performance by providing accurate real–time counts of the number of people, as well as dwell and wait time analytics.
3. **Key Performance Indicator (KPI) Measurement :** In order to achieve the highest possible level of operational excellence, the following passenger flow metrics are continuously monitored.
   - Number of Passengers in Line
   - Length of the Line
   - Number of passengers in Line
   - The amount of time and volume spent on processing passengers
   - Counter Allocations
4. **Automatic Notifications :** In order to control each stage of the passenger journey, the platform sends automatic notifications every time the predefined KPI threshold is exceeded. These alerts are communicated directly to the relevant employees of the company via the platform's notification system as well as the integrated Teams channel.
5. **Aligned with Health Precautions :** COVID has educated us on a variety of topics pertaining to the health industry, and as a result, our health has become one of our primary concerns. Through the use of cameras, the flow management system maintains a socially acceptable distance between passengers and routinely monitors the air quality to identify any potential health risks.
6. **Increased Revenues from Advertising :** Just like any other type of business, airport management companies are always looking for ways to increase their revenue, specifically from advertising. When selecting locations for advertisement placement, it is simple to zero in on the most active areas first. As a result, you have the opportunity to benefit from an advertisement at its very best.

2.5 PASSENGER FLOW MANAGEMENT MODULE :

To work seamlessly and give better service to the passenger the entire flow of passenger is broken down into smaller parts by management companies. These smaller parts of flow can be called as modules. The Passenger Flow Management Platform incorporates a variety of helpful add–ons or modules.

1. **Dashboard Module :** The Dashboard Module can be personalised for each individual user and presents information in real time about key performance indicators (KPIs) and important metrics. It offers

a comprehensive report of a passenger's journey through the airport, which includes the following metrics :

- Real–Time Notifications
- Density Information
- Waiting Time
- Queue Length
- Most Time Spent Areas
- Most Visited Areas
- Bag Drop Density
- Security Checkpoint Density

2. **Performance Table Module :** The Performance Table Module of the Passenger Flow Management Platform displays a comparison of specific periods in terms of density, waiting time, and queue length.
3. **Passenger Process Module :** The Passenger Process Module presents real–time metrics for a variety of passenger transaction points, including airport entrance, check–in counter, baggage drop, and security checkpoint, among others.
4. **Flights Module :** The Flights Module will display the length of the queue as well as the average amount of time spent waiting for each flight.
5. **Entrance Module :** This module provides information regarding the length of lines at airport entrance gates and X–Ray machines as well as the total amount of time spent waiting.
6. **Check–In Module :** The Check–In Module shows the total number of people in line as well as the current wait time for each check–in counter.
7. **Module for the Security Checkpoint :** The Security Checkpoint Module of the Passenger Flow Management Platform presents the line lengths and total wait times for each individual security checkpoint location.
8. **Configuration Module :** This module assists in the management of the authorization for various users. The alert threshold for each metric can be changed by the staff members. In addition, notifications are made available for viewing on the dashboard and can also be received via e–mail and mobile notifications.

Some of the features airline passengers can expect in future airports include walking pace processing, personalised preferences, and seamless travel authorization.

a. **Real–Time Passenger Map :** Real–Time Passenger Coordinate data can be displayed on a map, allowing airport operators to identify peak and low passenger volumes.

b. **Historical Map :** The historical map allows airport operators to view previous periods' passenger flow. Data from the previous 24 hours is displayed at 30–minute intervals.

c. **Heat Map :** The heat map depicts the density of the passenger coordinates that will be displayed on the map based on the date and period selected.

d. **Prediction Map :** The platform forecasts passenger numbers and wait times for any time in the future. The prediction map depicts these predictions as a flow.

2.6 FUTURE INNOVATION IN PFM :

The PFM sector is also a significant testing ground for applications of cutting–edge technology like biometrics, blockchain, artificial intelligence, and augmented reality/virtual reality.

❖ **Biometrics Applications**

Applications of biometrics concentrate on border control with the goal of eliminating bottlenecks through the automation of processes. To realise the goal of creating seamless passenger trips, the technology is currently being implemented at all touchpoints in the form of identity management for self–service kiosks. In the not too distant future, passengers will be required to enrol their biometric information at the first airport touchpoint, after which they will only need to verify their identity at all subsequent originating airport touchpoints. There is also the possibility that this facility will be extended to touchpoints at destination airports.

❖ **Blockchain Technology**

The usage of blockchain technology, which functions as a reliable network for storing biometric and other types of personal data, can make travel for passengers both more secure and more expedient. Blockchain technology may also prove to be the impetus for a truly collaborative environment within airports, which is currently lacking because airport stakeholders work in isolation. In exchange for valuable customised services and products, passengers may be prepared to disclose even more data about themselves, while blockchain eliminates any security or privacy problems that may arise.

❖ **Artificial Intelligence**

AI is already being utilised in specific applications that are relevant to passengers. These applications range from chatbots to anticipating preferences and offering suitable items and services during the information and pre–travel stages of the passenger trip. It will be employed more frequently in the electronic commerce aspect of an airport, as well as in the process of enabling operators to more effectively manage airport spaces and allocate resources in accordance with optimum flow forecast models.

❖ **Augmented and Virtual Reality**

Finally, augmented and virtual reality (AR/VR) will transition from being a novelty that attracts customers' attention in retail settings to becoming another technology that contributes to the creation of seamless passenger journeys. Already, augmented reality technologies are being integrated into interior mapping smartphone apps with the purpose of directing travellers through airport terminals. Airport staff may also be able to provide better service to passengers if future applications are developed.

PFM should experience exponential growth as an investment area for airport operators as a result of these market trends and the introduction of new technology into the airport environment, which we should see happening soon. In point of fact, the number of PFM start–ups has increased at an exponential rate over the course of the previous few years, which suggests that IT expenditures are being redirected toward passenger–related projects.

Check Your Progress :

1. Who are the main beneficiary of Passenger Management System.
   a. Passenger
   b. Airlines
   c. Airports
   d. All of the above options
2. PMS use to detect, track and manage the flow of passenger traffic at airport touchpoints.
   a. True
   b. False
   c. Can't Say
   d. None of the above options
3. PMS is ideal for managing assets located within the airport like :
   a. Point of entry
   b. Check–in counters
   c. Retail and f&B areas
   d. All of the above
4. Which is not the objective of PMS :
   a. Ensure smooth passenger experience at airport
   b. Booking tickets
   c. Ground operation for airlines
   d. None of the above options
5. Which is not the benefit of PMS :
   a. Helps in KPIs measurement
   b. Improves the passenger experience
   c. Allow customer to book advance tickets
   d. All of the above options

6. Dashboard module includes :
   a. Density information
   b. Waiting time
   c. Bag drop density
   d. All of the above options

7. The _____ shows the total number of people in line as well as the current wait time for each check–in counter.
   a. Check–In Module
   b. Flight Module
   c. Passenger Process Module
   d. Entrance Module

8. Real time map is :
   a. Real map of airport
   b. Data about peak and low passenger volume
   c. Both a and b
   d. None of the above options

2.7 LET US SUM UP :

Airports all over the world are beginning to feel the strain of increased air traffic as a result of increased competition. The new normal is for airports to have overcrowded terminals and curbsides, longer lines and wait times, and a large number of irate passengers. The encouraging news is that more and more airport operators are adopting Passenger Flow Measurement (PFM) systems to assist them in becoming more effective and responsive to the requirements of passengers.

Airports are able to optimise wait times, reduce overhead costs, maximise revenue, and improve the overall passenger experience by first gaining an understanding of passenger volume and activity, as well as how disruptions or changes affect passenger behaviour. On the other hand, many airports are coming to the realisation that developing a solution for measuring passenger volumes and flows can be a difficult and time–consuming challenge. There is no single sensor or category of technology that can fulfil all of an airport's requirements for passenger measurement. When developing a solution that not only satisfies the requirements of the present but can also easily be scaled to meet the requirements of the future, it is necessary to take into account the specific and unique requirements of the airport in question, as well as its existing environment.

2.8 ANSWERS FOR CHECK YOUR PROGRESS :

1. d	**2.** a	**3.** d	**4.** b
5. c	**6.** d	**7.** a	**8.** b

2.9 GLOSSARY :

1. **Artificial Intelligence :** It is the simulation of human intelligence processes by machines, especially computer systems. Specific applications of AI include expert systems, natural language processing, speech recognition and machine vision.

2. **Augmented Reality :** It is the real–time use of information in the form of text, graphics, audio and other virtual enhancements integrated with real–world objects.
3. **Biometrics Applications :** Biometrics are biological measurements – or physical characteristics – that can be used to identify individuals. For example, fingerprint mapping, facial recognition, and retina scans are all forms of biometric technology, but these are just the most recognized options.
4. **Blockchain Technology :** Blockchain is a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network. An asset can be tangible (a house, car, cash, land) or intangible (intellectual property, patents, copyrights, branding).
5. **Key Performance Indicator (KPI) :** A quantifiable measure of performance over time for a specific objective. KPIs provide targets for teams to shoot for, milestones to gauge progress, and insights that help people across the organization make better decisions.
6. **Reclaim Area :** It is an area where arriving passengers claim checked–in baggage after disembarking from an airline flight.
7. **Virtual Reality :** It is a computer–generated environment with scenes and objects that appear to be real, making the user feel they are immersed in their surroundings.

2.10 ASSIGNMENT :

1. Enumerate the benefits of PMS and point out the miss–use of PMS as well.
2. Study the PMS of any reputed company any write down your observation.

2.11 ACTIVITY :

1. Make a list of top companies who provide PMS to the airports around the world.
2. Compare any two PMS and find the pros and cons of each system.

2.12 CASE STUDY :

Case Study : Can an Airline Cut "Turn Times" Without Adding Staff ?

by Ethan Bernstein and Ryan W. Buell

Kentaro Hayashi buttoned his uniform shirt and wondered if he could really pull this off. As president of RSA Ground, the subsidiary of Rising Sun Airlines responsible for servicing its planes at airports across Japan, he'd been under enormous pressure in recent months. Thanks to increased demand for air travel, Rising Sun's flights were now fuller and more frequent than ever before. And yet "turn" times–how long it

took Ken's crews to clean, check, restock, and refuel the planes–had slipped from an average of 12 minutes to 20 in the past year. In a world of intricate flight schedules, tight take–off windows, and fickle fliers, those were costly delays.

Of course, the problem was easily diagnosed : RSA Ground was trying to do more work with the same number of employees. But Ken knew he couldn't just go to the executive committee asking for more money to staff up. The committee would insist that he first try making his crews more efficient. And after several fruitless meetings with the COO, the HR chief, and industry consultants, he'd decided that he needed to investigate the issue himself.

That's why he now wore an RSA Ground uniform. He planned to work undercover as a service crew member for a few days, starting as a cleaner of planes at Narita International, where RSA's bottlenecks were worst. He'd also arranged to spend some time on cleaning and maintenance teams at three other airports–Haneda, Osaka, and Sendai–to get a feel for how his employees were handling all the aircraft in the fleet, from the small jets that served mainly short–haul, domestic commuters to the massive airliners with multiple cabins that flew long–haul international flights.

When Ken had asked Rising Sun's CEO, Daishi Isharu, for permission to do so, his boss had laughed heartily. "I like your initiative, Kentaro–san–not just down in the trenches but down in the toilet bowls!" Then he quickly turned serious. "I will certainly support this research. However, you must make sure it pays off. A week from now, I'd like a proposal for how to get back to 12 minutes, if not down to 10. The faster we can turn these planes, the happier our customers will be and the more profits we will make."

The only person at RSA Ground who knew of Ken's plan was the head of staffing, who'd agreed to assign him to various teams as a "temporary worker" over the next few days.

Waiting on the Narita tarmac with five other cleaners while passengers disembarked, Ken was more nervous than he'd expected to be. He'd studied the manuals for all the different planes and even practiced some procedures–clearing seat pockets, wiping food trays, vacuuming seats. But now he was responsible for half the economy seats in a Boeing 787 and he couldn't imagine completing the task in the desired 10 minutes (leaving two minutes for inspection). Luckily, bathroom duty had gone to someone else–a short, gray–haired man, his protective goggles and plastic gloves already on, who seemed much more seasoned than the others in the group. Ken looked at his watch : 6 :14 AM. When the door to the jet bridge opened, he and the rest of the crew filed into the plane and spread out to their assigned positions.

There Are Tricks

Eighteen minutes later they had finished : not terrible, but not amazing either. The schedule said they had 10 minutes until the next plane arrived, so the workers discarded their gloves and towels in a rubbish bin and retreated to a small waiting room.

"First time?" one of the younger crew members asked Ken.

"Yes."

"I'm Toshi. I've been here only a month myself. It gets better. You'll learn how to do it faster. But not ever as fast as the manager wants!"

"Where is the manager?" Ken asked. She had given him his assignment when he'd clocked in at 6 AM, but he hadn't seen her since.

"Lady Stopwatch oversees another crew in the morning; she's with us in the afternoon."

"Lady Stopwatch?"

"Yes. She holds one up and shouts out times to help us keep pace. Sometimes that helps, but it can also get annoying. They want us to do the turns in 12 minutes. That's fine for a half–full 787. But last week we were on 747s the whole day–with only six people in the crew–and it was just impossible. After the first two turns went overtime, we had to start skipping stuff. The next day Lady Stopwatch was angry and on our backs all day because of the customer complaints."

"So the crews need to be bigger?"

"Yes. Maybe seven people for a 787, 10 for a 747. But listen to me talking about planes! I grew up on a farm, and this was the only job I could find when I moved to Tokyo. I haven't even told my family I'm doing it; they would be embarrassed. I hope to be out of here in another month or two. If you're going to stay longer, you should talk to Nobuo–san." He pointed to the gray–haired man, who was in the corner sipping from a canteen. "He's been here forever."

They still had five minutes left in the break, so Ken walked over. "Hello, Nobuo–san," he said, bowing slightly. "That whippersnapper over there said you're the expert around here."

"That is probably true," Nobuo replied with a small smile.

"Is it good work?"

"Hard work. Dirty work. But it pays the bills. And some of us take pride in doing it well."

"The turns do seem tough. I was working as fast as I could, following all the techniques in the manual, and it still took me 18 minutes."

"I was done with the bathrooms in eight. People could go faster. The more experienced people do. But fewer of us are around now."

Ken winced. Attrition rates had indeed spiked in the past year, along with turn times. Mari Kata, his HR chief, had been rapidly hiring temporary and part–time workers–20 to 30 a month–to pick up the slack, but few of them stayed on. They found the work too difficult and stressful and, like Toshi, were probably eager to find better–paying and more prestigious jobs.

"Why have you stayed?" Ken asked.

Nobuo shrugged. "I have no education or training to do anything else. This is what I know. And I'm good at it. The manager says I'm the only one she trusts with the toilets."

"How did you get so good?"

"There are tricks," he said. "But"–Nobuo's voice dropped to a whisper–"they aren't in the manual."

"Would you share them with me?" Ken asked, unsure why he was whispering too.

"Not now. The next plane's coming. If you're still around next week, we can talk then."

By lunchtime Ken was exhausted. He grabbed the container of cold teriyaki his wife had packed the night before and tried to approach Nobuo again, but Lady Stopwatch intercepted him in the break room.

"How is your first day going?" she asked.

"Very well, thank you," he replied.

"My other crew also has a new temp, and although I would have liked to watch both of you in the morning, I couldn't risk putting two inexperienced workers on one team." She looked at a spreadsheet on the tablet she was carrying. "I see your group is averaging 18–minute turn times so far. The other crew did 16. So we'll see if we can get you down to that." She was cheerful but stern.

Amazingly, in the afternoon Ken's team did cut its time to 16 minutes. He didn't know if that was because everyone had fallen into a rhythm or because Lady Stopwatch's shouting ("Five minutes–half done, team! Let's finish strong!") had inspired them to work just a little bit harder.

After each turn she quickly inspected the plane and pointed to the cleaner who had not only finished in the desired 10 minutes but had done so without any mistakes or oversights. It was Nobuo the first three times, which he acknowledged with a nod and a smile. Another older employee, a woman, won the next two rounds, which left her beaming, and then it was back to Nobuo through the end of the shift. Ken worked faster and more diligently in an effort to win once, but he wasn't sure the competition had the same effect on the rest of the group. During one of Lady Stopwatch's announcements, he thought he'd seen Toshi roll his eyes. And in his brief encounters with the flight crew–shuffling past

them on the jet bridge–he'd sensed that a 16–minute turn was well below their expectations as well. They looked impatient and frustrated and barely acknowledged the cleaners.

As Ken clocked out at 2 :30 PM, the manager told him, "You do good work. And you look familiar. Have you been with us before?"

"Not as part of the cleaning crew, ma'am, but elsewhere in the airport, yes," Ken said carefully.

"Well, I hope you'll be back."

"I think I'm heading to Haneda tomorrow."

"I guess we're all struggling to find good workers," she replied.

Yes we are, Ken thought.

More Nobuos

His stints on maintenance teams at the other airports were similar. Ken met experienced employees, accustomed to grunt work, who knew how to get the job done but seemed discouraged. He talked to newer workers, many of them part–time, who viewed RSA Ground as a distasteful and ideally a brief stopover on their way to better employment. And he saw managers who were effective but spread too thin.

When he called a meeting with his executive team to share these observations, his colleagues were flabbergasted.

"Forgive me, Kentaro–san, but you did what?" Mari sputtered.

"Worked undercover on the crews for four days."

They sat in stunned silence. Finally, Mari spoke up. "Well, sir, I applaud you for understanding how very important the people on the ground are to our business. And I believe that what you saw confirms what I've been saying all along. We need to invest in our personnel–hire more crew members and give them better training and higher wages. We need to make sure that the Toshis learn the ropes quickly and that the Nobuos stick with us. That's the only way we'll get to quicker turn times."

"What sort of budget increase are you suggesting we ask for?" Ken said.

"I'd have to run the numbers, but perhaps 20%."

Ken turned to his CFO, expecting a reaction, and got one : "Respectfully, Mari–san, I would be extremely uncomfortable putting a request of that size to management. We've promised them, and they've promised shareholders, that we're going to improve margins this year."

Ken didn't want to shoot down Mari's proposal immediately, but he agreed with the CFO. He would have to push very hard to win approval for half that amount, and Daishi Isharu would no doubt expect a near–immediate return on it.

"Well, of course we could make headway with less money," Mari said.

Mayuka Mori, the COO, jumped in. "May I offer my perspective? The message I take away from Kentaro–san's report is the importance of managers. The teams perform best when they are following best practices and fully coordinated. Stopwatches and competitions are terrific ideas. If we want to hire people or pay more, it should be at the managerial level. But we could achieve stronger oversight and tighter controls with our current staff if we work at it."

Yoshiyuki Taniguchi, the CTO, spoke up : "I like your thinking, Mayuka–san, but why not use technology to achieve the same result? Make a onetime investment in a system that uses wearable tracking devices to monitor employee performance, including individual and team turn times and the quality of the work performed. We don't need more Lady Stopwatches–we need the next generation of oversight."

Yoshiyuki had mentioned this to Ken before, but like Mari's suggestion, it would require a significant upfront expense. Pilot programs using such systems at other companies had shown some promise, but the results were mixed.

"Aren't there any more creative, less costly ways to solve this problem?" Ken asked. It wasn't the first time he'd put the question to the group, and he'd asked it of himself too many times to count. The "undercover boss" experiment was supposed to have given him some new ideas, but the only one he'd had so far was to clone Nobuo. That proposal would surely make Isharu–san laugh again. But Ken needed a plan that would impress him.

https ://hbr.org/2016/01/case–study–can–an–airline–cut–turn–times–without–adding–staff

Q. 1. What steps should RSA Ground take to improve its turn times ?

Q. 2. What is your take from this case study ?

2.13 FURTHER READING :

1. Ashford N J (2016), Airport Engineering 4th Edition : Planning, Design & Development Of 21St Century Airports, John Wiley Press.
2. Asheesh Kumar (2020), Planning And Design Of Airport, Vayu Education of India.
3. S K Khanna (1999), Airport Planning and Design, Nem Chand & Bros Roorkee.

UNIT 03

Airport Access System

UNIT STRUCTURE

3.0 LEARNING OBJECTIVES :

After study this unit learner will be able to :

- Understand the meaning of access to airport
- Know more about access interaction with passenger and terminal operation
- Comprehend the off–airport and in–town access requirements

3.1 INTRODUCTION :

Few years ago, it was customary for airport operators to consider that the problem of getting to the airport was chiefly the concern of the urban or regional transportation planner and the surface transport operators.

Congestion and difficulties in accessing airports have, as will be seen, very strong implications on their operations. Therefore, the airport administrator has an unavoidable vital interest in the whole area of access and accessibility, perhaps one of the most difficult problem areas to face airport management.

Air transportation is playing vital role in the economy of a country. It is anticipated that the number of passengers flying by air will continue to significantly increase at a good number of the major airports. Ground

access to airports is a crucial function that needs to be provided for not only in the immediate vicinity of the facility itself, but also on a regional scale. The congestion issues that plague airport access is, in some cases, reaching intolerable proportions, which has a negative impact not only on air quality but also on other environmental considerations. Therefore, collaborative effort is required in order to fulfil the requirements of the project.

A comprehensive look at the problems with landside access that are associated with the major airports is necessary to address the challenges and gaps that have been identified above. It will work to improve upon the planning procedures and processes that are already in place in order to cater to the specific requirements of airport traffic demand, which includes demand for both people and goods. To be successful, planning for airport ground access needs to be multimodal and intermodal, take into account issues relating to operational, regulatory, and capital–intensive infrastructure provision, take into account multiple levels of scale and resolution, and acknowledge the one–of–a–kind dynamic aspects of air traffic demand, namely its temporal patterns. The level of motivation and necessity for ground access is quite high, and the approaches and documents that are currently in use are not adequate to meet the requirements for strategic ground access planning of major airports.

3.2 ACCESS USERS AND MODAL CHOICE :

Airport passengers are frequently, but not always, the majority of people entering or exiting an airport. The airport population can be divided into three categories, excluding individuals travelling as suppliers to the airport.

- **Passengers :** Originating, destined, transit, and transfer.
- **Employees :** Airline, airport, government, concessionaires and such
- **Visitors :** Greeters, senders and sightseers

The access system is used by transit and transfer passengers. There is no single figure for how the airport population is divided into these categories. Among airports and is determined by factors such as airport size and type of air service provided. Maintenance and engineering facilities are extensive at large airports with large base airline fleets.

Over the last 50 years, a number of superficial solutions to the access problem have been proposed, many of which involved the use of dedicated high–speed tracked technology to connect the airport with the city centre in an effort to reduce the demonstrated dominance of the automobile.

As a result, during peak hours, airport travellers compete with city dwellers for road space and transit capacity. This means delays for passengers travelling by car, taxi, or bus; for those travelling by urban and intercity rail systems, it means possible difficulties finding seats and handling luggage in crowded facilities.

Rail has successfully linked two major new European airports, Munich and Oslo. The rail connection of Changi Singapore to the Singapore rail network is also a significant success, but the network's length in the island republic is necessarily limited. Experiences in Europe with connecting directly into high–speed rail (HSR) systems have yielded varying degrees of success, even within the same country.

3.3 ACCESS INTERACTION WITH PASSENGER TERMINAL OPERATION :

The method of operation of the passenger terminal, as well as some of the associated terminal problems, are partly dependent on access, as this can affect the amount of time that the departing passenger spends in the terminal. The departing passenger places the greatest strain on the airport terminal system. The length of access time, the reliability of access time, check–in and security search requirements, airline procedures, and the consequences of missing a flight all influence departure dwell times.

Length of Access Time : The amount of time required for a specific access journey to the airport by passenger specially and all those who works at airport in general.

Reliability of Access Trip : The term reliability of access trip means the ability of passenger to safely reach airport terminal without any hassle. The sufficient amount of time where passenger can do check–in, baggage drop and board the aircraft. It is determined in order to board the flight and not miss it due to lack of proper access. It is the measure of consistency and dependability of travel time to reach passenger terminal.

The reliability of access trip time increased during covid–19 outbreak due to long protocol of thermal scanning and social distancing.

Procedures for Check–In : All flights have different check–in requirements. Check–in times for many long–distance international flights are at least one hour before scheduled departure time, whereas for domestic and short–haul international flights, this is usually reduced to 30 minutes. Long–haul passengers spend an additional 22 minutes in the terminal than short–haul passengers. Check–in procedures for chartered and scheduled passengers often differ significantly. Longer closeout times have the effect of increasing passenger dwell time in the terminal prior to departure.

3.4 CONSEQUENCES OF MISSING A FLIGHT :

The passenger's attitude toward arriving after the flight has closed out and thus missing the aircraft will vary depending on the type of flight and the type of ticket. Consider a hypothetical trip planner who takes three different flights from Tampa International Airport. The first flight is a regular scheduled full–fare flight to Miami, the second is a regular scheduled full–fare flight to Buenos Aires, and the third is a special chartered holiday flight to London. The consequences of missing three flights are not the same. If the passenger misses the first flight, there

will be another one soon, and there will be no financial loss. In the case of the second flight, the ticket is still valid, but because the connections have been lost and there may not be an alternative flight available soon, there is significant inconvenience and possibly financial loss. Missing the third flight, on the other hand, could result in a ruined holiday and significant financial loss because the ticket is no longer valid. As a result, the passenger will plan his or her arrival at the airport so that the risk of missing each flight is different.

All of these factors are present in the arrival patterns at individual airports. Its access times were fairly predictable, and the majority of flights were short–haul.

According to research on the effect of access time length and reliability, unreliable access times can cause congestion in the check–in area and long dwell times in the departure lounges.

The manner in which passengers are granted access becomes critical to the operation of airport terminals at many vacation destinations. Airports in the Dominican Republic and Mallorca, for example, have large landside deliveries of passengers at times that have little to do with the scheduled departure time of their flights. It is not uncommon for departing passengers to be delivered to the departures area by fleets of charter buses several hours before their scheduled departure time, even before the check–in desks and baggage–drop facilities for their flights are open.

3.5 OFF–AIRPORT TERMINAL ACCESS :

To reduce airport–generated traffic demand on airport roadways and in the airport's vicinity, satellite parking lots linked to airport terminals via express bus, rail, or ferry services are one option. This connection is usually provided by express buses. Passengers using such terminals, however, must hand over their luggage to the bus driver before boarding, reclaim their bags upon arrival at the airport terminal building, and then carry them to the airline ticket counter.

An off–airport terminal is a facility located away from the airport that provides passenger processing services and is linked to the airport via a dedicated or shared access system. Off–airport terminals encompass a wide range of facilities, from those that provide almost all of the airport's services to those that are little more than bus waiting rooms. As a result, three types of off–airport terminals are identified : full–service, limited–service, and nonservice or access terminals.

Full–service terminals offer all of the typical airport passenger services, such as ticketing, passenger check–in, and baggage claim. In an ideal world, such terminals would allow inbound passengers to check baggage from the point of origin to the point of destination. One option would be to have them claim their luggage at the airport as usual. The West Side terminal in New York City was a full–service remote terminal when it was still in use.

Limited–service terminals only offer a subset of the services listed above. The simplest is passenger ticketing, which can be done by a travel agent. Baggage check is less common because it requires airline participation, though under a joint agreement, one airline could handle baggage for others.

Finally, nonservice or access terminals do not offer any passenger services. These services may be limited to a sheltered waiting area with public telephones and vending machines. Coffee shops, newsstands, and car rental counters are examples of more elaborate facilities.

Off–airport terminals with baggage check–in and/or claim services are available in a number of cities, including Hong Kong, London, and Zurich. Airlines used to operate off–airport terminals in several US cities, including New York, Phoenix, and San Francisco. These terminals have since been decommissioned. However, with renewed interest in intermodal transportation, off–airport terminal development is being considered in several cities, including Boston, Dallas, and Seattle.

Several planning issues must be addressed in order to develop a successful off–airport terminal. The most important of these is terminal location. The terminal must serve a large enough market to be viable, and it must be located far enough away from the airport that the travel time to the terminal is shorter than the total trip to the airport. The relative location of each terminal becomes critical when more than one terminal is proposed. Furthermore, in order to provide a successful off–airport terminal and associated transportation service between the terminal and the airport, the following key challenges must be addressed :

- **Security requirements :** All airports and airlines must adapt and implement the approved FAA Security Program (which primarily addresses passenger and baggage screening).
- **Close–out times :** Passengers arriving at the off–airport terminal have a minimum pre–flight time available for transporting luggage after checking in at the airport; in addition, passengers must account for travel time between the terminal and the airport.
- **Difficulty in providing baggage claims :** For example, who would be liable for lost or damaged baggage under such a system? Aside from customer service issues, such as when a passenger is unexpectedly met by a friend or relative, there is currently no way to prevent checked baggage from being delivered to an off–airport terminal.
    - **Travel time advantages :** To be appealing, the mode of transportation between the terminal and the airport must provide reliable and reduced travel times compared to private auto (e.g., if buses can use high–occupancy vehicle (HOV) lanes or bus pre–emption at traffic signals).
    - Parking availability.
    - Cooperation and support from the airline industry.

3.6 IN–TOWN ACCESS :

There has been a wide range of experience with in–town terminals with check–in facilities. When the West London Terminal serving Heathrow was closed in 1957, only 10% of passengers were using the facility. In addition to being inefficient, it was difficult to maintain consistent connections between the off–airport terminal and the airport due to increasing road congestion on airport access routes. There are more examples of successful in–town airline bus terminals without check–in facilities.

Due to the obvious availability of online ticketing and online check–in, airlines have made little recent progress in remote check–in. Long walking distances with baggage, frequent level changes via stairs, crowded vehicles, and insufficient stowage space can all degrade the convenience level of the traveller.

Factors Affecting Access–Mode Choice

The level of traffic attracted to any access mode is function of the traveller's perception of three main classes of variables :

- Cost
- Comfort
- Convenience

Decisions on these variables are based not only on the level of service provided by a specific mode, but also on the comparative level of service provided by competing access modes.

To explain the modal selection procedure, transportation planners have a variety of models ranging from simple to complex.

Access Modes to Airport

❖ **Automobile**

In most developed countries, the private car is the principal method of accessing airports. Since the inception of commercial air transport, and the situation seems most unlikely to change in the foreseeable future. Airports must integrate a substantial parking capability into their design and operation.

As airports grow in size, it becomes difficult to provide adequate parking space within reasonable walking distance of the terminals. In the case of centralized operations, it is common to divide the parking areas into short–term facilities close to the terminal and both medium–and long–term parking areas often served by shuttle services.

Serious internal circulation congestion can limit the airport's capacity if too many cars attempt to enter the facilities close to the terminal, a condition that has caused problems with the operation of the Terminal 1 at Paris Charles de Galle airport, where parking is integral to the terminal, and access is via a tunnel under the apron.

Major airports relying overwhelmingly on the automobile as the major access mode find that it is not solely in the matter of supplying and operating car parking that this decision materially affects the operation of the passenger terminal. The first solution leads to highly decentralized passenger terminal complex with possible difficulties in interlining, especially for baggage–laden international passengers. The second solution almost certainly will lead to the segregation of departing and arriving passenger flows throughout the terminal building.

❖ **Taxi**

For the air traveller, the taxi is perhaps the ideal method of accessing the airport from all aspects except one–cost. In general, this mode involves the least difficulty with baggage, is highly reliable, operates from a real origin or destination, and provides access directly to the airport curbside.

The airport has an interest in maintaining a reasonable balance of supply and demand of taxis at the airport. Many airports do not permit taxis to pick up a fare on airport property without a special license, for which the taxi operator must pay annually. In the United Kingdom, it is recent common practice for taxis to incur a charge for both a drop–off and a pickup an airport. As airports become large, it is not unusual that they suffer from too many cruising taxis, which cause congestion on the terminal access roads.

❖ **Limousine**

Limousine services, which are reasonably common in the United States and number of other countries, are either minibuses or large automobiles that provide connection between the airport and a number of designated centers (usually hotels) in the city.

In small cities, the limousine usually operates to only one central location; in larger cities, to designated multiple locations.

Operationally, a limousine is similar to a bus, and where bus services are feasible, it is unusual to have limousines as well. The contracts are lucrative to the limousine operator because passenger load factors are high, and therefore, the concessionary fees that go to the airport operator can be high in comparison with the cost of providing facilities. Because limousines are in fact a form of public transport, they relieve road congestion and the need for parking.

❖ **Rail**

In the last 20 years, there has been a great deal of activity at large airports to move in the direction of providing more access by rail. Airports are widely spread across the globe as Chicago O'Hare, JFK, London Heathrow, Hong Kong, Beijing, Singapore, and Seoul Incheon are just some of the airports that have added rail access routes. The rail access facilities fall into three categories.

1. Provision of a connection into an existing rail rapid–transit system for example, Atlanta, Chicago O'Hare, Ronald Reagan Washington National, Paris Charles de Gaulle, and London Heathrow.
2. Direct connection to an existing national intercity rail network for example, Zurich Kloten, Schiphol Amsterdam, Franfurt, London Gatwick, and Brussels.
3. Dedicated link from airport to city center location or locations for example, Munich, Oslo, Beijing, Inchon, and Shanghai.

If rail services is to be successful for all three rail modes (i.e., urban rapid transit, conventional intercity rail, and dedicated links), it requires a compact connection at the airport end. The access rail system and any system to which it connects must be able to accommodate storing of luggage on the trip.

Access time, provided that it is reasonable for the distance covered, is not extremely important to passengers, so the cost of supplying very high speeds may not be worth striving for.

Access journey time does not appear to be critical to air travelers, except in the very shortest hauls with competitive surface modes. The selection of an access mode is much more affected by the ability to cope with inconvenient and heavy baggage and the total cost to the traveling party.

❖ **Bus**

Around the world, virtually all airports carrying reasonable volumes of passengers by scheduled and charter operators are connected by bus to the city center. Normally this is arranged by contract between the bus operator and the airport authority whereby the bus company usually pays the airport a concessionary fee or percentage for the exclusive right to provide an agreed–on scheduled service. Service is supplied to a number of points in large cities but perhaps to only one point in a small urban area.

Buses become extremely important at airports serving many resorts. Bus loading and unloading areas are designated and must be kept clear of taxis and automobiles. Bus parks are as important as car parks, and the airport operator has an interest in ensuring that the bus parks are kept operational and clear.

❖ **Dedicated Rail Systems**

In the area of airport access, nothing has caught the public imagination more than the concept of some form of futuristic high–speed, tracked vehicle, that will convey passengers from the airport to the town center unimpeded by surface–road or rail traffic. High–speed tracked airport–access vehicles on dedicated rights–of–way are unlikely to be built anywhere in the world where the economics of access costs are correctly considered. High–speed links are unnecessary, save little time over trains

operating nonstop at conventional speeds, are likely to cost half as much as the remote airport they purport to serve, and can move passengers only to and from the central city, where most travellers probably have no wish to go. More–over, if they require public subsidy, they raise an ethical question as to whether the air traveller has any right to expect to travel to the urban area at a higher speed than any other traveller. Even so, it is likely that they will continue to receive a disproportionate amount of public and media interest.

3.7 ESTIMATION OF NUMBER OF AIRCRAFTS BY AIRPORT ACCESS :

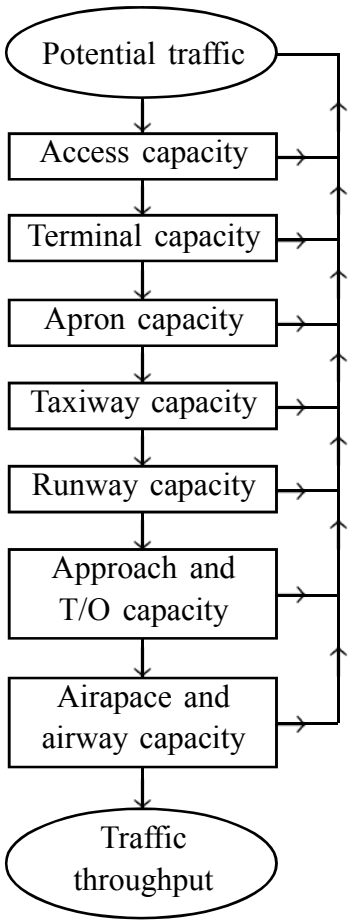
Lack of access capacity is far from being a hypothetical occurrence. Several of the world's major airports already face severe capacity constraints in the access phase of throughput. Using direct traffic–estimation methods, urban transport planners can show that some of the most severe access problems can occur at airports set in the environment of large metropolitan areas, if these airports depend largely on road access.

Department of Airports proposed that the total number of aircraft operations should be determined as follows :

- **AEDT :** Average number of vehicles entering the central terminal area in the prior six months.
- **ANPO :** Average number of annual passengers per actual air operation in the prior six months.
- **ASOP :** Actual number of air operations divided by the proposed number for the prior six months
- **CHTF :** Critical–hour traffic factor, the three–hundredth highest hour of vehicular traffic during the prior 12 months divided by the average number of vehicles entering the central terminal area daily.
- **MTAO :** Maximum Take–off and Approach operations
- **PPV :** Average number of air passengers per inbound vehicle
- **RCAP :** Entering central terminal area roadway capacity in terms of vehicles per hour

This procedure was an attempt to ensure that the scheduled airside activities would not impose unacceptable loads on a landside access system.

At nearly all airports, much of the access system in terms of the highways, the urban bus and rail systems, and taxis is outside the control of the airport administrator, both financially and operationally



Check Your Progress :

1. Access to airport needed by :
   a. Passenger
   b. Airlines Employees
   c. Airport Employees
   d. All of the above options
2. The procedure for check–in for domestic and short haul flight time is reduced to _____
   a. 30 minutes
   b. 40 minutes
   c. 50 minutes
   d. None of the above options
3. Full–service terminals offer all of the typical passenger services like.
   a. Ticketing
   b. Check–in
   c. Baggage Handling
   d. All of the above
4. Limited–service terminals doesn't or less often offer passenger services like.
   a. Baggage Handling
   b. Booking tickets
   c. Ground operation for airlines
   d. None of the above options

5. Which Off–airport terminal doesn't offer baggage check–in/claim facility ?
   a. Indira Gandhi International Airport, New Delhi
   b. Hong Kong International Airport
   c. Heathrow Airport, London
   d. All of the above options
6. Acronym HSR stands for _____
   a. High Speed Rail b. High Specification Railways
   c. High Supreme Railways d. None of the above options
7. Which is not a factor that affect access mode choice ?
   a. Cost b. Comfort c. Convenience d. Closeness
8. Acronym HOV stands for _____
   a. Healthy Occupancy Vehicle b. High Occupancy Vehicle
   c. Heat of Vehicle d. None of the above options
9. Which is most preferred access mode ?
   a. Limousine b. Bus
   c. Dedicated Rail System d. None of the above options

3.8 LET US SUM UP :

This unit has highlighted several aspects of airport access that are pertinent to the users of the airport as a transportation system, and it has reviewed previous studies that are necessary to perform a review of the literature. In addition, this chapter has provided an overview of the airport access research that has been conducted. We took a close look at the research that had been done previously on landside access, public transportation, off–airport terminals, and emerging technologies.

When it comes to providing effective mobility solutions from the point of view of users as well as transportation authorities, transportation systems are up against a number of obstacles. The problem (i.e., traffic congestions, noise, and air pollution) is being addressed by a variety of local policymakers through a number of different initiatives.

pollutions) which is primarily brought on as a result of the widespread use of private automobiles. Due to the fact that more people use air travel each year, one of the challenges that must be overcome is the issue of traffic congestion on the roads leading to and from airports. A multimodal passenger transport system that also includes air transport is one of the concepts towards the sustainable practise that should result in more use of public transport (PT) systems, which should further result in reduction of pollution and alleviation of road congestion. Another concept towards the sustainable practise is a multimodal freight transport system that includes rail transport.

3.9 ANSWERS FOR CHECK YOUR PROGRESS :

1. d	**2.** a	**3.** d	**4.** a	**5.** a
6. a	**7.** d	**8.** b	**9.** c	

3.10 GLOSSARY :

1. **FAA :** The Federal Aviation Administration is the largest transportation agency of the U.S. government and regulates all aspects of civil aviation in the country as well as over surrounding international waters.
2. **Peak Hours :** It is a part of the day during which traffic congestion on roads and crowding on public transport is at its highest. It is also called as Rush Hour.
3. **High Speed Rail (HSR) :** It is a type of rail system that runs significantly faster than traditional rail, using an integrated system of specialised rolling stock and dedicated tracks.
4. **High Occupancy Vehicle (HOV) :** A high–occupancy vehicle lane is a restricted traffic lane reserved for the exclusive use of vehicles with a driver and one or more passengers, including carpools, vanpools, and transit buses. These restrictions may be only imposed during peak travel times or may apply at all times.

3.11 ASSIGNMENT :

1. What are the different types of access terminal at airports?
2. Explain off–terminal and in–terminal services offered at domestic airports in India.

3.12 ACTIVITY :

1. Find and list the different mode of access for Sardar Patel International Airport, Gandhinagar, Gujarat.
2. Enlist different airports in India having metro rail access to airport.

3.13 CASE STUDY :

Case Study of a Remote Terminal Operation in Airport Access

In recent years, there has been a growing interest in the concept of remote airport terminals as a means of alleviating congestion on the landside of metropolitan airports. When determining whether or not the concept of a remote terminal is appropriate for a given airport, determining whether or not it is economically feasible is one of the most important factors to take into account (i.e., can it bring in enough customers and be run efficiently enough to be profitable?). The costs associated with running the FlyAway bus system, which is an express bus service that connects Los Angeles International Airport with a suburban region that accounts for approximately 15 percent of the airport's passenger traffic. Other services, such as ticketing, are provided on a limited basis, and

expansion to a full–service remote terminal is a distinct possibility in the future. Although it does not offer baggage check–in, other services, such as ticketing, are provided. In order to provide planners with assistance in determining the costs of such systems for other airports, the goal is to identify actual costs relative to all aspects of the operation of the airport. The following are some of the overviews that are included : physical characteristics, operational problems, passenger market segment, airport and bus patronage growth rates, cost–revenue ratios of bus operation and terminal maintenance, bus fuel price impacts, foregone income from bus terminal site rental, break–even patronage, facility replacement costs, and a prognosis for future activity. After five years of business, many of which were marred by difficulties, it would appear that FlyAway is finally succeeding. According to the findings of a recent passenger survey, a significant portion of the system's appeal is attributable to the fact that it offers inexpensive fares, frequent headways, low–cost parking, and dependable service. The introduction of remote terminals represents the best hope for reducing airport congestion on the ground as the number of passengers using airports continues to increase and the capacity of roadways continues to be exceeded by design standards. FlyAway demonstrates not only that their services are useful, but also that they are useful in an efficient and cost–effective manner.

Q. 1. What do you think remote airports can ease the access to airport or create problems?

Q. 2. "Dedicated transportation system can solve the problem of airport access and increase the number of passengers", comment on the statement.

3.14 FURTHER READING :

1. Dr. Sumeet Suseelan (2019), Airline Airport & Tourism management : Aviation Manual, Notion Press Chennai.
2. Ashford N J (2016), Airport Engineering 4th Edition : Planning, Design & Development Of 21St Century Airports, John Wiley Press.
3. Asheesh Kumar (2020), Planning And Design Of Airport, Vayu Education of India.

UNIT 04

Passenger Baggage Handling Procedure

UNIT STRUCTURE

4.0 LEARNING OBJECTIVES :

After learning through this unit learners will able to :

- Deals with baggage handling at airports from process, system, and organizational
- Baggage–handling equipment and systems
- Management and performance metrics for baggage handling

4.1 INTRODUCTION :

Baggage handling is a critical component of airport operations, but as with other utility functions, it is frequently overlooked until something goes wrong. Failure can have a wide range of consequences, from a few passengers not receiving their bags when they arrive at their destination to widespread disruption of airport operations, including flight cancellations, and all that this entails for airlines and passengers.

Historically, baggage was near the top of the list of passenger complaints, but this is no longer the case. An examination of customer complaints from 2009 to 2012 reveals that baggage–related issues accounted for less than 5% of all complaints. Only 0.3 percent of complaints are attributable to terminal operations (the baggage–handling systems themselves), while 3.8 percent are attributable to third parties (airlines and their handlers).

This advancement is the result of an industry–wide recognition of the costs associated with poor baggage–handling performance, combined

with global investments in advanced, automated baggage systems. Nonetheless, the cost to the airport and airline communities (and thus the travelling public) is significant–the International Air Transport Association's (IATA) top official stated that the global cost of mishandled bags was $3.8 billion.

Even though baggage handling is typically handled by an airline or its designated handler, this distinction is frequently lost on passengers. As a result, if they experience baggage issues or delays, passengers will believe it is the airport's fault, endangering its reputation. In practise, both airports and airlines play important roles, and a collaborative approach to managing baggage handling benefits all parties.

4.2 BAGGAGE–HANDLING PROCESSES :

Check–in, reclaim, and flight build facilities–also known as makeup facilities–are common airport baggage processes; only major airports typically have any sizable transfer–baggage facilities. A major interterminal transfer process connecting passengers and their luggage arriving at one terminal with their departing flights in a second terminal may be present at hub airports with several terminals. When bags enter the system through a bag drop, they are typically processed in the departure terminal before being transferred to a flight build output or, optionally, being kept. After that, they are placed onto the leaving aeroplane.

Bags that arrive at a terminal will be delivered to reclaim for travellers to pick up. The contents of terminating bags may be checked for illegal things in several situations and jurisdictions.

Transfer luggage that arrives at a terminal is routed to the departing terminal by the baggage system. After arriving, the procedure is the same as for locally checked–in baggage. The next sections each provide a description of one of the key components of this procedure.

❖ Bag Drop

Numerous options exist for off–airport check–in, including services facilitating check–in and bag drop at hotels, check–in desks at downtown railway stations, and in–town airline offices. For instance, in Hong Kong, both Kowloon and Hong Kong Stations have check–in desks for the majority of airlines. Passengers on the Airport Express can check in and leave their luggage at these locations, freeing them up to explore the city the remainder of the day before departing for the airport without having to lug their luggage about. You may check in for a flight and drop off your bags without having to go through the busy airport building by using the car–park and curbside check–in options. Typically, they work as follows :

- Drive up to a booth in a parking lot or a curb near the departure terminal, show the agent your photo ID, the confirmation number, the destination, the flight number, or the e–ticket number.

- Hand over your checked bags to the agent, take your boarding card and baggage receipt, and head straight to security.

The second wave is a bag drop where passengers can drop off hold baggage. Physically, these bag drops resemble traditional check–in desks and are manned similarly; they are only utilised for accepting bags, however.

Self–service bag drops, where customers can check bags without assistance from workers, are becoming more popular. Qantas was a pioneer in using this strategy for domestic travel. In this setup, bag tags are printed and applied at a check–in kiosk (or frequent fliers utilise permanent Radio Frequency Identification (RFID) tags) so that the passenger only needs to put the bag onto the receiving conveyor when they arrive at the bag drop. The process takes about 20 to 30 seconds per bag on average. There are very rarely lines of passengers waiting to drop off their bags because of the quick process time (as opposed to 1 to 2 minutes or more for traditional check–in and bag drops), multiple bag drops, and the ability to handle additional tasks like taking payment for excess baggage or rebooking. A bag drop typically entails one or more of the following :

- At check–in, agents size–check all bags to identify anything that won't fit in the cabin.
- Size restrictions on luggage imposed during passenger screening, requiring the previous check–in of items that cannot be transported in the cabin.
- Agents spotting passengers waiting in and around gate areas with unsuitable baggage so that the items can be tagged and loaded before boarding begins.
- Since they were screened alongside the passenger during the procedures necessary to get to the gate, gate baggage typically do not need to be rescreened.

❖ **Hold Baggage Screening**

In–line x–ray devices, also known as explosive–detection systems or EDS, are typically used to screen bags after they have entered the luggage system to make sure that no dangerous or forbidden items are present. A level 1 Hold Baggage Screening System (HBSS) device inspects unopened bags. Usually, these machines can process more than 1,000 bags per hour. The device will release the bag if the image processing system is able to detect that there is no threat. The image will be sent to a human operator for a level 2 decision for about 30% of bags when the image processing algorithm may not be able to confidently clear the bag. Most of the time, the bags will then be approved, but generally 5% of all inbound bags will still have issues that need further investigation. These bags will be transferred to a level 3 HBSS device, which produces a three–dimensional image using computed tomography and enables a more

in–depth examination by an operator. 150 bags per hour are the normal throughput for level 3 equipment. Most of the time, there won't be any threat, so the operator will release the bag. Only a very small percentage of the time will level 3's imaging prove to be inconclusive, in which case the bags will be transferred to level 4 for a physical inspection. The following is the multilayer protocol that was used in :

Explosive Detection System (EDS) devices are used for Level 1 screening. Level 1 screening is used for any bags that can physically fit in an EDS unit and is done there. Level 2 screening applies to all bags that trigger an automatic level 1 alarm. Transportation Security Administration (TSA) employees view alarm bag images from the level 1 EDS scan during level 2 screening and exclude any bags whose status can be determined visually. Level 3 screening is used for all bags that cannot be resolved at level 2 and all bags that cannot be directed to level 1 due to size limitations.

Manually opening the bag and using explosive–trace–detection (ETD) equipment are both required for level 3 screening. A local law enforcement officer either resolves or disposes of bags that fail level 3 screening (usually, a small portion of all bags).

❖ **Bag Storage**

Bags for a flight were only taken at check–in when the flight makeup spots were open for usage, usually two to three hours before the scheduled departure time. Originally, baggage–handling systems did not need to include bag storage. The demand for more bag storage has grown over time. One contributing problem is the increase airport transfer traffic, which can cause an outbound flight and its connecting luggage to arrive far before the scheduled flight makeup spots for the incoming flight are open. Another justification is the aim to let travellers check their bags whenever they like. Additionally, bag storage are being utilised more frequently to control and slow down the flow of bags to the flight makeup locations, allowing for the more effective utilisation of personnel and equipment or even the support of robotic loading systems.

Particularly for small, non–containerized aircraft with few bags to load, the flight construction procedure can be relatively straightforward. For airlines with increasingly sophisticated items and larger, containerized aeroplanes, the flight build requires making sure that bags are sorted and loaded by segregation. There may be some or all of the following segregations :

- Premium terminating
- Economy terminating
- Crew bags
- Short–connect transfers
- Long–connect transfers

- Inter–terminal transfers (by departure terminal)
- Onward transfers (by transfer destination)

The speed and convenience of handling at downstream stations are aided, albeit at a cost, by loading bags according to various types of segregation. Some Unit Load Devices (ULDs) will only be half filled, the filling efficiency of ULDs will generally be worse as the flight build procedure grows larger and more complex. As a result, building segregation regulations are based on airline priorities and products, handling procedures, and facilities at the airports of origin, destination, and transfer. Reclaim Arrivals.

Reclaim job is to connect travellers with their belongings. The reclaim hall serves as a holding area for passengers and bags to wait for one another because the arrival procedures for passengers and baggage are significantly different.

At baggage reclaim, passenger and bag appearance profiles ought to be same. By doing this, it is ensured that neither the baggage reclaim mechanism nor the passenger reclaim hall become overly crowded.

4.3 EQUIPMENT, SYSTEMS, AND TECHNOLOGIES :

This section of unit describes the equipment, systems, and technologies that are used to implement and support the processes outlined earlier.

❖ Baggage Handling System Configurations

The layout of the outbound luggage system can be significantly impacted by the design of the passenger terminal complex itself.

Conventional centralised pier finger airports run on one or more central bag rooms in the main terminal area, including Chicago O'Hare, Schiphol Amsterdam, and Manchester International. These call for complex sorting methods yet can make good use of employees who are let go when not needed during off–peak times. Numerous decentralised bag rooms are intimately related to a few gates in decentralised facilities like Frankfurt (Germany) and Dallas–Fort Worth. These makeup sections don't require much sorting, but because the demand varies greatly between peak and off–peak hours when operations are decentralised, it is more challenging to employ workers effectively. The remote bag room is the third idea for the luggage makeup area. There is a lot of cross–apron action in an airport like Atlanta, where transfer traffic accounts for three–quarters of all travel.

Remote bag rooms enable the intricate sorting required without requiring the return of all luggage to the main terminal.

❖ Check–in and Bag Drop

The traditional check–in and bag–drop counters at an airport can be set in a variety of different ways, including the following :

- Linear
- Island
- Flow–through

The drawback of both linear and island check–in is that traffic exiting the desks may interfere with lines of those waiting to access the counters. However, flow–through methods circumvent this issue but are only practical in terminals with enough room for vertical bag movement within the check–in floor plate.

❖ **Sorting**

Once luggage enters a system (apart from the most basic), it must be sorted. Equipment for screening, manual encoding stations, and facilities for luggage storage or flight changes are among the destinations. The decision of which method to use for sorting bags is determined by a number of criteria, such as :

- Space
- Cost
- Required capacity

Conveyor–based merges and diverts can be used for low–capacity applications. Since they can turn over quickly enough to allow neighbouring bags to be sorted to two different locations with a throughput of more than 1,000 bags per hour, vertical sorting and merging units may be employed for slightly bigger capacity.

When processing loose baggage, every merging, divert, slope, and sorter input or output has the potential to catch or trap a bag, creating a risk of system and/or bag damage. The system must be properly constructed and calibrated to eliminate this risk; otherwise, there would be frequent system outages and the associated cost of hiring personnel to remove clogs.

❖ **Hold–Baggage Screening**

New and improved screening equipment becomes available as screening technology advances. This is incorporated into regulations by the control authorities to ensure the greatest chance of threat identification. Three x–ray screening equipment standards have been determined thus far in Europe :

- Standard 1–a single–view technology
- Standard 2–a multi–view technology
- Standard 3–a computed tomographic technology

❖ **Bag Storage**

There are various ways to store bags. A manual store is the most basic type, where luggage are manually arranged by flight or departure time. Little more is needed for this than a flat area of ground or racks to hold the bags. Functionality varies between automated retailers. At the

other end of the spectrum, they only automate the manual procedure by gathering groups of bags in conveyor lanes by flight or build open time. One specific bag cannot easily be retrieved from such a store; instead, an entire lane of bags must be freed in order to reach one single bag.

More upscale shops permit arbitrary access to any specific bag. These establishments typically rely on bags being carried in totes since it makes them easier to handle and track. In one style of store, lengthy conveyor belts are put up, on which the dragged bags move slowly. The bags can be redirected to exit the store as they pass outputs. Another kind of retailer employs a racking and warehouse crane strategy. Cranes are used to pick up toted bags as they enter the store and arrange them in a slot in a lane of racks. The most adaptable storage solution is provided by this, which also makes single bags retrievable.

❖ **Flight Build**

There is a wide variety of manual makeup devices, each with their own distinct type and configuration, including :

- Chutes
- Carousels
- Laterals

Each one comes with its own individual mix of benefits and drawbacks. It is possible to arrange chutes in a space–efficient manner, which will result in a one–to–one mapping between each chute and the corresponding ULD and/or trailer. On the other hand, their handling ergonomics are not nearly as good as those of laterals. The ergonomics of picking up bags from a moving device can be a cause for concern, despite the fact that carousels provide a flexible means of distributing bags to a number of different makeup positions. Laterals can be adjusted to a height that is most comfortable for operators, and they are compatible with the most up–to–date manual handling aids.

It has been decided to implement new methods of dealing with flight build, which will call for the use of different makeup devices. Build cells that are completely automated and based on robots are particularly noteworthy, as are batch–building devices that are only partially automated.

In order to receive a bag from the baggage–handling system, a build cell makes use of a robotic arm that is equipped with a specialised handling tool. Then, with the assistance of a machine vision system, the build cell will place the bag inside of a trailer or a ULD. The work rate that can be achieved by such systems is typically between three and four bags per minute. While this is not necessarily faster than a human operator, it is sustainable indefinitely and relieves workers of the physical load they are carrying. A build cell cannot operate unsupervised.

4.4 RECLAIM :

The carousel is the most common type of device used to reclaim baggage, and there are several variations of this device. The two primary options are as follows :

- Flatbed or inclined
- Direct or indirect infeed(s)

Process and System Design Drivers

❖ **Appearance Profiles**

An essential aspect that affects the requirement for facilities to be open and accessible (such as check–in and transfer inputs) as well as the requirement for bag storage is the appearance profile of baggage at an airport. The appearance profiles for the main categories of destinations are obtained from a European hub airport. The data initially seem to indicate that the earlier the luggage arrive, the longer the voyage.

❖ **Bags per Passenger**

Bag per passenger ratios, which differ significantly depending on the kind of passenger, are a major element in the design principles for luggage facilities.

Parameter	Value
Check–in process	1–2 minutes per person
Bag drop process	0.5–2 minutes per bag (pre–labelled to full–service)
ULD build rate	3–4 bags per minute
ULD break rate	8–12 bags per minute
In–line baggage–screening rate	15–20 bags per minute per machine (Standards 1 and 2)
Aircraft ULD un/loading process	3 minutes per pair of AKE ULDs (one hold)
Reclaim input rate	20 bags per minute

Processing Times Table

❖ **Processing Times**

The processing times associated with a particular facility will determine the number of facilities needed to service a certain demand. This number of facilities will depend on the demand that is being met. The preceding table provides a listing of several crucial parameters.

❖ **Arrivals Delivery Performance**

The primary indicator of handler performance is the rate of delivery of bags from an arriving aircraft to either a reclaim device (for terminating bags) or the input of the baggage handling system (for transfer bags). Historically, this has been determined by the first and last bag delivery

times, such as the first bag on reclaim within 15 minutes and the last bag on reclaim within 25 minutes of aircraft arrival on chocks. Such measures have the advantage of simplicity and can be used to encourage good handler performance, but three trends are causing some airports to require more refined goals :

- An increase in the number of very large aircraft
- A desire to reduce minimum connection times
- An increase in the size of airports and hence distances between facilities

These trends' repercussions are described in succession. First, a performance standard based on the delivery of, say, 250 bags from a medium–sized aircraft becomes difficult to meet for a very large aircraft carrying 500 or more bags. Second, the need to achieve reliable, short transfer connection times (especially from very large aircraft with numerous transfer bags) necessitates the application of a stricter performance standard to time–critical transfer bags while allowing more time for non–time–critical transfer bags. Thirdly, large airports (without distributed arrival baggage systems) inevitably result in longer driving times from some stands to reclaims than others, rendering a "one size fits all" standard inapplicable.

To accommodate the increase in size and scope, different priorities can be assigned to the four primary categories of inbound baggage :

- Premium terminating (e.g., first class, business class, frequent– flyer cardholders)
- Economy terminating
- Short–connect transfers (with scheduled connection times of less than about 2 hours)
- Long–connect transfers (with scheduled connection times of more than about 2 hours)

Logically, premium bags should be delivered before economy bags, and short–connect bags before long–connect bags. The only remaining option is whether or not to prioritise premium bags over short–connect bags. Long–connect bags should always receive the lowest priority. Obviously, the ability to fine–tune the delivery of these various categories is contingent on the proper separation and loading of the incoming aircraft.

For baggage reclaim, it is desirable to establish delivery targets in relation to passenger arrival in the reclaim hall. For instance, the goal may be to deliver all premium bags prior to the arrival of the first passenger in the baggage claim area, so that no premium passengers must wait for their bags. There could be a maximum waiting time target for economy passengers. This can be difficult to measure and control in practise. While processes and systems can be implemented to record when a bag is delivered to the reclaim device, it is significantly more difficult to monitor the arrival times of specific passengers.

Check Your Progress :

1. Baggage related issues accounts for less than _____ % of total issues at airport.
   a. 3% b. 4%
   c. 5% d. None of the above options
2. What was the IATA's estimation of cost for mishandling baggage ?
   a. $3 billion b. $3.4 billion c. $3.8 billion d. $4 billion
3. Which is not part of baggage handling process ?
   a. Check–in b. Security Check
   c. Reclaim d. Flight build facilities
4. Which is the option for off–airport bag drop ?
   a. Hotel b. Check–in desk of railway station
   c. In–town office of airline d. All of the above options
5. What is the average time taken to process baggage at airport ?
   a. 30 seconds b. 40 seconds c. 50 seconds d. 60 seconds
6. In–depth examination/screening of bags by operator per minute is _____
   a. 100 b. 150 c. 200 d. 250
7. Which is not a factor that affect access mode choice ?
   a. Cost b. Comfort c. Convenience d. Closeness
8. Bags are sorted and loaded by segregation, which are the segregation of baggage ?
   a. Premium terminating b. Crew bags
   c. Long connect transfer d. All of the above options
9. Which is not the check–in baggage counter design at airport ?
   a. Linear b. Island c. Flow–through d. Free style
10. What are the criteria for sorting baggage at airport check–in counter ?
    a. Space b. Cost
    c. Capacity d. All of the above options

4.5 LET US SUM UP :

The baggage handling system is responsible for ensuring that the luggage of passengers who arrive at the airport is transported securely to baggage trolleys or containers after check–in, checking the luggage for security, security screening, sorting, and storage. In addition, the baggage handling system is responsible for ensuring that the baggage of passengers who depart the airport is transported securely to baggage trolleys or containers. The primary objective of the screening process as a whole is to identify and remove any possible dangers (baggage) that may be concealed within any item that makes its way onboard the

aeroplane. The handling of checked luggage is a complicated operation that involves multiple steps.

A baggage handling system, often known as a BHS, is comprised of a variety of distinct procedures and inspections. It is designed to scan bag information automatically, transfer bags along a conveyor belt system at an airport, screen suitcases for safety reasons, count bags, check the weights of bags, and balance loads. In this unit, the complete process is covered in detail.

4.6 ANSWERS FOR CHECK YOUR PROGRESS :

1. c	**2.** c	**3.** b	**4.** d	**5.** a
6. b	**7.** d	**8.** d	**9.** d	**10.** d

4.7 GLOSSARY :

1. **Baggage Sorting Area :** It is a space in which departure baggage is sorted into flight loads.
2. **Explosive Detection System (EDS) :** It is a non–destructive inspection process to determine whether a container contains explosive material. Explosive detection is commonly used at airports, ports and for border control.
3. **Hold Baggage Security Screening (HBSS) :** It is a multi–level security system used to prevent baggage that contains prohibited items from entering the aircraft.
4. **Radio Frequency Identification (RFID) :** It uses electromagnetic fields to automatically identify and track tags attached to objects.
5. **Unit Load Device (ULD) :** It is a container used to load luggage, freight, and mail on wide–body aircraft and specific narrow–body aircraft.

4.8 ASSIGNMENT :

1. Explain the stages of baggage handling process in detail.
2. What is the latest technology use to tag and track baggage at airport ?

4.9 ACTIVITY :

1. Enlist the specification of baggage for check–in luggage and hand bags.
2. Examine the rules of baggage and items one can carry in check–in baggage.

4.10 CASE STUDY :

Case Study : Cases of baggage theft at Mumbai Airport

On October 10, 2001, in Mumbai, a video camera and wristwatch belonging to Sonia Vikramlath, a passenger on Jet Airways travelling to

Aurangabad, were taken from her checked luggage. Gold and diamond jewellery worth Rs 1.5 lakhs was taken from traveller Venkatesh Bagwale's luggage on December 2nd, 2001, on his way to Dubai. Both situations are being looked into. These thefts are, according to airport police officers, an unusual occurrence. At the domestic and international terminals of the Mumbai city airport, 11 similar cases were reported in 2001. But according to reports, a number of incidents were undetected. Before being carried aboard the aeroplane, checked baggage, also known as registered baggage, must be inspected by airline security or the employees of the handling agency for indications of tampering, according to a police official from the Sahar Police Station. Police can take action based on suspicion and keep watch over airport property. On February 8th, three loaders were detained by the Sahar police after they were frisked and silver jewellery, a camera, and other stuff were discovered on them. The employee unions are aware of this even though there may just be a few "black sheep" employees who are engaging in this crime. According to Kiran Pawaskar, Secretary of the Bharatiya Kamgar Sena, which manages the unions at Jet Airways and Cambatta Aviat, neither the union nor the airline management provided legal support to individuals detained for thefts. Mr. Pai, a consumer watchdog, blamed the thefts on airlines' and their handling firms' inadequate monitoring, despite the fact that both the loading process and the luggage make up area in the airport were closely watched by airline authorities. According to Mr. Pai, some thefts may not have been recorded because the inconvenience of filing complaints turned off some passengers. He added that although thefts and cases of lost luggage must be reported to the airlines at the airport, occasionally victims do not become aware of the crime until they get home. When outbound travellers' bags are stolen, complaints can be made to the local police at the place of arrival, who thereafter report the incidents to the Mumbai Police. That is one of the reasons complaints are filed sometimes days after the crime really occurred, and other times passengers only notify the police by mailing in applications. Sanjay Barve, the deputy commissioner of police for the airport zone, told the TNN that passengers could also send their concerns and grievances via email. Airlines must receive a written declaration from travellers checking in luggage containing cash, jewellery, or other valuables. Airlines compensate travellers with cash for lost baggage based on the weight of the item. An Indian Airlines official advised customers to pack any valuables or cash they are carrying in their checked luggage. The traveller can notify the airline's baggage department and request reimbursement if he discovers that his luggage has been tampered with after landing, he continued.

Q. 1. Who is responsible for theft from passenger baggage, airport authority of passenger himself ?

Q. 2. What action must be taken by Union in order to curb these incidences ?

Q. 3. How passengers can be encouraged to report these thefts in order to take corrective measures.

4.11 FURTHER READING :

1. Edissa Uwayo (2016), Airline and Airport Operations, Notion Press Chennai, 1st edition.
2. Anne Graham (2018), Managing Airports an International Perspective, Taylor & Francis ltd, 5th edition.
3. Dr Sumeet Suseelan (2019), Airline Airport & Tourism management : Aviation Manual, Notion Press Chennai.

BLOCK SUMMARY

Learners have delved deeply into the topics of airport passenger safety, passenger flow management, airport access, and baggage handling throughout the course of this unit.

When travel by plane, you are required to go through a lengthy and time–consuming maze of checkpoints at the beginning of each trip, and you must also ensure that your luggage passes through all of them. The route that you are travelling on will determine a new set of limitations on what kinds of belongings you are permitted to bring on board with you. The elaborate safety procedures, many of which appear to be ineffectual, can leave passengers feeling bored and frustrated. However, this raises the question of how entirely safe and secure air travel can be made. In addition, a healthy passenger volume at an airport is a prerequisite for both passenger safety and a positive travel experience there.

Airports can improve their safety and security thanks to Passenger Flow Management, which also helps them run more efficiently. It is possible to have a greater amount of control over passenger flows and crowd density if analytics are provided to stakeholders so that they can have a better understanding of passenger segments and habits.

The next step is to make it easier to get to the airport from both in–town and out–of–town locations, and to finish checking in without any problems. Using the appropriate system, this can be accomplished with relative ease. It is now much simpler for travellers to register themselves at the check–in kiosk machine thanks to the airport access control system. It is normal practise to employ facial biometrics for the purpose of identifying passengers. After that, the passenger's face is verified at each stage of the journey, such as when the luggage is dropped off, when immigration is checked, when access is granted to the Longue, when boarding, etc.

The process of carrying passenger luggage from a check–in station at an airport that is departing, onto a plane's cargo hold, and then to a collecting point at an airport that is arriving is referred to as baggage handling. A baggage handling system, often known as a BHS, is comprised of a variety of distinct procedures and inspections.

BLOCK ASSIGNMENT

Short Questions :

1. What are the main components of airport security system, explain ?
2. Enlist the innovation in the field of safety in recent years.
3. Explain the objectives of Passenger Flow Management System.
4. How to choice right mode for airport access ?
5. What is baggage reclaim system? Explain the process of reclaim.

Long Questions :

1. Explain the Safety Management System importance to passenger and airport authority. Also write few advantages of this system.
2. What is the future innovation in passenger flow management, explain with example ?
3. Explain off–airport terminal access and in–town access with example.
4. Enlist the different modules of passenger flow management with examples.
5. How is the baggage handling procedure ? Mention the equipment use for baggage handling at major international airports.

❖ **Enrolment No. :** ☐

1. How many hours did you need for studying the units ?

Unit No.	1	2	3	4
No. of Hrs.				

2. Please give your reactions to the following items based on your reading of the block :

Items	Excellent	Very Good	Good	Poor	Give specific example if any
Presentation Quality	☐	☐	☐	☐	_____
Language and Style	☐	☐	☐	☐	_____
Illustration used (Diagram, tables etc)	☐	☐	☐	☐	_____
Conceptual Clarity	☐	☐	☐	☐	_____
Check your progress Quest	☐	☐	☐	☐	_____
Feed back to CYP Question	☐	☐	☐	☐	_____

3. Any other Comments

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PASSENGER MANAGEMENT

DR. BABASAHEB AMBEDKAR OPEN UNIVERSITY
AHMEDABAD

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ISBN 978-93-91071-23-3

Edition : 2022

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ROLE OF SELF INSTRUCTIONAL MATERIAL IN DISTANCE LEARNING

The need to plan effective instruction is imperative for a successful distance teaching repertoire. This is due to the fact that the instructional designer, the tutor, the author (s) and the student are often separated by distance and may never meet in person. This is an increasingly common scenario in distance education instruction. As much as possible, teaching by distance should stimulate the student's intellectual involvement and contain all the necessary learning instructional activities that are capable of guiding the student through the course objectives. Therefore, the course / self-instructional material are completely equipped with everything that the syllabus prescribes.

To ensure effective instruction, a number of instructional design ideas are used and these help students to acquire knowledge, intellectual skills, motor skills and necessary attitudinal changes. In this respect, students' assessment and course evaluation are incorporated in the text.

The nature of instructional activities used in distance education self- instructional materials depends on the domain of learning that they reinforce in the text, that is, the cognitive, psychomotor and affective. These are further interpreted in the acquisition of knowledge, intellectual skills and motor skills. Students may be encouraged to gain, apply and communicate (orally or in writing) the knowledge acquired. Intellectual- skills objectives may be met by designing instructions that make use of students' prior knowledge and experiences in the discourse as the foundation on which newly acquired knowledge is built.

The provision of exercises in the form of assignments, projects and tutorial feedback is necessary. Instructional activities that teach motor skills need to be graphically demonstrated and the correct practices provided during tutorials. Instructional activities for inculcating change in attitude and behavior should create interest and demonstrate need and benefits gained by adopting the required change. Information on the adoption and procedures for practice of new attitudes may then be introduced.

Teaching and learning at a distance eliminates interactive communication cues, such as pauses, intonation and gestures, associated with the face-to-face method of teaching. This is

particularly so with the exclusive use of print media. Instructional activities built into the instructional repertoire provide this missing interaction between the student and the teacher. Therefore, the use of instructional activities to affect better distance teaching is not optional, but mandatory.

Our team of successful writers and authors has tried to reduce this.

Divide and to bring this Self Instructional Material as the best teaching and communication tool. Instructional activities are varied in order to assess the different facets of the domains of learning.

Distance education teaching repertoire involves extensive use of self- instructional materials, be they print or otherwise. These materials are designed to achieve certain pre-determined learning outcomes, namely goals and objectives that are contained in an instructional plan. Since the teaching process is affected over a distance, there is need to ensure that students actively participate in their learning by performing specific tasks that help them to understand the relevant concepts. Therefore, a set of exercises is built into the teaching repertoire in order to link what students and tutors do in the framework of the course outline. These could be in the form of students' assignments, a research project or a science practical exercise. Examples of instructional activities in distance education are too numerous to list. Instructional activities, when used in this context, help to motivate students, guide and measure students' performance (continuous assessment)

PREFACE

We have put in lots of hard work to make this book as user-friendly as possible, but we have not sacrificed quality. Experts were involved in preparing the materials. However, concepts are explained in easy language for you. We have included many tables and examples for easy understanding.

We sincerely hope this book will help you in every way you expect. All the best for your studies from our team!

PASSENGER MANAGEMENT

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Dr. Babasaheb Ambedkar Open University Ahmedabad

BBAATR-303

Passenger Management

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UNIT 3 : AIRPORT OPERATIONAL SYSTEM

UNIT 4 : AIRPORT GROUND HANDLING OPERATIONS AND MANAGEMENT

AVIATION OPERATIONS MANAGEMENT

Block Introduction :

Airport operations are a set of complex tasks executed by a team of experts to induce efficiency in managing airline operations. Unit 1 highlights the different certifications and compliances laid down by ICAO and adherence to the same by airports. You shall also learn about the different operational challenges that are faced by airports as part of operations. Unit 2 acquaints you with peak hour operations and scheduling policies undertaken by airports to manage peak hour operations. Unit 3 highlights National Airport Systems and managing systems of airports under this structured system. Unit 4 takes an insight into ground handling operations that are important for managing the operations at an airport.

Block Objectives :

The major objective of this block are as follows :

- To list airport certifications, compliances and operational constraints at airports.
- To enumerate on Air traffic management and aspects for operational efficiency.
- To list the nature of airline scheduling policies, peak hours and different methods used by airport operators for calculation of peak time operations at airports.
- To explain the aspect of National Airport System and operating functions of airports.
- To enumerate on various airport operating functions, nature of management, ground handling operations for airport efficiency.

Block Structure :

Unit 1 : Airport Operational Challenges

Unit 2 : Airport Traffic Management

Unit 3 : Airport Operational System

Unit 4 : Airport Ground Handling Operations and Management

UNIT 01 AIRPORT OPERATIONAL CHALLENGES

UNIT STRUCTURE

1.0 LEARNING OBJECTIVES :

- To list airport certifications and compliances that is required internationally.
- To enumerate on different aspects of operational constraints at airports.
- To list tasks for airfield inspections and maintenance management.

1.1 INTRODUCTION :

The most important task of airport operators is to ensure safe, reliable and fast movement of aircrafts, passengers and cargo from the airside to the landside and vice versa. To manage the entire operations, airport operators undertake a systematic approach to ensure readiness in all the areas concerned at all times. In this unit you shall learn about different challenges associated in different areas of an airport and their management that ensure air travel to be one of the safest mode of transportation. The criteria of state of "readiness" require a lot of commitment, responsibility and team work.

1.2 AIRPORT COMPLIANCE AND CERTIFICATION :

To manage operations safe and efficient there are international standards laid down for compliance. These standards and processes are designed and governed by International Civil Aviation Organization (ICAO) and implemented by governments and bodies associated with the government within the member countries. The standards and processes are uniform across all the member countries of the ICAO. The countries need to put in place an Aerodrome Certificate for operating international commercial service. The ICAO has put in place the guidelines and regulations for the certification. The compliance requirements themselves are contained in Appendix 14 to the Chicago Convention of 1944, which is published as a separate manual (Annex 14) with worldwide distribution. Annex 14 contains the standards and recommended practices (SARPs) for safe operations, including required facilities, services, and operating conditions, for international airports of all sizes. In the United States the certification is compulsory in all the airports for commercial as well as charter aircrafts. The aerodrome certificate holder has to satisfy the authorities on aspects related to

- Safety of airport operating areas and areas around the vicinity of the airport.
- Facilities are appropriate as per the compliances and standards laid down by the ICAO according to the type of operations.
- There is adequate equipment required to manage the operations safely and efficiently.
- Staff members are trained and competent to handle operational aspects of the airport.

The conditions that fall short of safety requirements for a given airport may result in reduced or halted air operations. All airport programs related to operational readiness feature a strong safety component. Safety–relevant programs include Aeronautical Information Services (AIS), apron management, vehicle/pedestrian control, access control, foreign–object–debris (FOD) control, wildlife–hazard management, hazardous–material handling (including fuel spills), construction safety, and maintenance, among others. Emergency operations are actions designed to control the negative effects of an unplanned disruption or accident that also can be considered relevant to safety.

1.3 OPERATING CONSTRAINTS :

Airports across the globe undertake and face a lot of challenges or constraints in operations that may be unplanned or unforeseen. Some of these constraints can be predicted and the level of readiness to combat the same in managing the operations smoothly is in place. Often it is the unpredicted challenge that creates a lot of disruption in operations. You shall study about the different types of constraints that are encountered

by airports and the preparedness undertaken according to global procedures to combat them in order to manage efficient operations.

1.3.1 Visibility :

Visibility is a very important function in air traffic navigation and operation. Visibility often pose a lot of challenge for aircrafts during take offs and landing leading to operational inefficiency.

- Air traffic moves under either visual flight rules (VFRs) or instrument flight rules (IFRs) depending on weather conditions and prevailing traffic densities. VFR operations are possible where weather conditions are good enough for the aircraft to operate by the pilot's visual reference to the ground and to other aircraft.
- Operational runways are classified according to the weather conditions in which they can operate. The worse the condition in which a runway is to operate, the greater is the amount of visual and instrument navigational equipment that are required.

❑ **Check Your Progress – 1 :**

1. SARPs for safe operations was published by ICAO in Annexure
   a. 11 b. 12 c. 13 d. 14
2. The acronym FOD stands for
   a. Foreign Observed Debris b. Fuel Object Debris
   c. Foreign Object Debris d. None of the options
3. The acronym AIS stands for
   a. Airplane Integrated System
   b. Aeronautical Information System
   c. Airline Information System
   d. Aeronautical Integrated System
4. The acronym VFR stands for
   a. Visual Flight Rules b. Visual Face Rules
   c. Visual Flight Regulations d. Visual Fare Rules

Runways can be classified according to their ability to accept aircraft at different degrees of visibility (ICAO 2010) and are categorized as

- **Non–Instrument runway :** A runway intended for the operation of aircraft using visual approach procedures only.
- **Instrument–approach runway :** A runway served by visual aids and non–visual aids providing at least directional guidance for a straight–in approach.
- **Precision–approach runway, Category I :** An instrument runway served by an instrument landing system (ILS) and visual aids, intended for use in operations down to a decision height of 200

feet (60 m) and visibility of no less than 2,600 feet (800 m) or a runway visual range (RVR) of 1,800 feet (550 m).

- **Precision–approach runway, Category II :** An instrument runway served by ILS and visual aids, intended for use in operations down to a decision height of 100 feet (30 m) and an RVR of 1,000 feet (300 m).
- **Precision–approach runway, Category III :** An instrument runway served by ILS to and along the runway with further subcategories.
- **Category IIIA :** This is intended for operations down to an RVR of 575 feet (175 m) and zero decision height using visual aids during the final phase of landing.
- **Category IIIB :** This is intended for operations down to an RVR of 160 feet (50 m) and zero decision height using visual aids for taxiing.
- **Category IIIC :** This is intended for operations without reliance on visual reference for landing or taxiing.

Runway visual range (RVR) is defined as the distance over which the pilot of an aircraft on the centreline of the runway can see the runway surface markings or the lights delineating the runway or its centreline.

Decision height is defined as the minimum height at which the pilot will make the decision either to land or to abort the attempt to land. Low visibility and ceilings can, in addition to presenting safety challenges, result in reduced airfield capacity. Often airports become economically unviable for aircrafts due to persistent visibility challenges and inadequate instrument facilities.

1.3.2 Crosswinds :

Cross winds are a severe challenge at many airports and may cause disastrous consequences. Airports located near sea coasts are highly prone to cross winds that even cause turbulence to big aircrafts. Runway layout designs play an important part in terrains affected by crosswinds. Modern heavy transport aircraft are able to operate in crosswind components of up to 30 knots without too much difficulty, but for operational purposes runway layouts are designed more conservatively. To manage the challenge of crosswinds ICAO annexure 14 requires an orientation of runways that permits operations at least 95 percent of the time with crosswind components of 20 knots (37 km/h) for Category A and B runways, 15 knots (27.8 km/h) for Category C runways, and 10 knots (18 km/h) for Category D and E runways (ICAO 2010). The usability factor is based on reliable wind–distribution statistics collected over as long a period not less than 10 consecutive years. As aircraft have become heavier, the provision of crosswind runways has become less important at large hubs, where there is a generally prevailing direction of wind. However, crosswind runways are still operated at many airports when winds vary strongly from the prevailing direction or where light aircraft are operated. Designing of

runways in the right direction to manage the challenge is a very important aspect in planning and managing of the challenge.

1.3.3 Bird Strike Control :

Birds have been a hazard to aviation since the invention of aircrafts. Minor to fatal accidents have occurred by bird strikes at different airports around the globe. The turbine engine aircrafts tend to ingest the bird leading to distorted airflow in the engine. Birds are unable to manoeuvre through faster aircrafts and possess a major constraint in operations. Loss of life through bird strike may be unusual, but airport operators must be aware that the potential for a disaster can exist in the vicinity of an airport where aircraft are operating at the low altitudes at which they are likely to come in contact with birds. International and national aviation regulating bodies therefore have prepared advisory documents that guide airport operators in methods of reducing the risk of bird hazards through programs of bird strike control (ICAO 2011). ICAO recommends that the airport authorities should appoint a wild life officer to study the species of the birds, their size, weight, behavioural patterns as airports often become a transit for migratory birds because of the facilities available. Successful bird strike control largely depends not on driving birds off but on creating an environment on the airport and in its immediate vicinity that is not attractive to birds in the first place. Countermeasures include garbage control near airport and control of other major food sources near the airport. Elimination of stagnant surface water storages reduces the inflow of water birds. Cereal cropping especially in open areas in the vicinity of the airport attracts a lot of mammals. Vegetation that discourages the presence of birds is a good measure to manage greenery. The buildings of the airport are to be designed not to allow the nesting of a lot of birds like sparrows, swallows etc. Apart from prevention measures there are other measures that are undertaken on a daily basis to drive away birds. Some of these measures are

- Pyrothechnic devices like firecrackers, rockets, shells etc
- Recorded distress calls.
- Model aircrafts and kites,
- Trappings
- Usage of Prey birds like falcons
- Poison (used in uncontrollable circumstances in consultation with necessary authorities)

Airports that fall under the zones of wildlife need to act in consultation with necessary wild life authorities.

1.3.4 Pavement Surface Areas :

It is essential that the surfaces of pavements, especially runways, be kept as free as possible of contaminants and debris to ensure safe aircraft operations. A contaminant is defined as "a deposit (such as snow, ice, standing water, mud, dust, sand, oil, and rubber) on an airport

pavement, the effect of which is detrimental to pavement braking conditions" (FAA 2010). Debris, on the other hand, refers to lose material such as sand, stone, paper, wood, metal, and pavement fragments that could be detrimental to operation by damaging aircraft structures or engines or by interfering with the operation of aircraft systems. The potential detrimental pavement surface conditions include

- Deterioration of pavements leading to holes, cracks, depressions on the pavement that can produce debris like stones. According to global norms, cracks and holes more than 3cm should be repaired immediately. There might be severe effect on the aircraft during takeoff and landing due to cracks and debris resulting in accidents.
- Water covered runways. Jet aircraft are highly susceptible to the effect of precipitant drag, which occurs on slush–or water–covered runways, seriously affecting the ability of aircraft to obtain flying speed safely on takeoff. Airports normally follow ICAO guidelines regarding the same through extension of runway end–safety areas (RESA)–graded, obstacle–free zones to safely stop aircraft that have exited the runway end. At a very busy airport that frequently experiences conditions where braking might be impaired by contaminants, an adequate level of runway cleaning equipment must be maintained.
- Equipment also must be available to check the results of cleaning by measuring friction and drag. Appendix 2 of Part 2 of the ICAO Airport Services Manual contains an inspection guide for the visual estimate of rubber deposits accumulated on the runway (ICAO 2002). ICAO recommends that airports with more than 210 landings per week should conduct detailed inspections weekly. If rubber contamination is excessive, the rubber can be removed by methods like high pressure water cleaning, chemical removal and even sand blasting.
- At airports that regularly experience heavy snowfalls, for example, in northern Europe and North America, clearance might have to be discontinued for a short while during a storm to permit some operations to continue. Runways are unlikely, in such conditions, to be completely clean. There are also likely to be local slippery patches. The airport authority will need to measure and assess surface conditions to inform pilots of the overall condition and to determine the areas requiring more cleaning treatment.
- Recognizing that an airport authority must be in a position to evaluate the level of runway friction, assessment of pavement condition should never take precedence over the clearance operations themselves. Within the operational areas, safety and efficiency require observing the following clearance priorities for the various areas involved like runways, taxiways, Aprons, holding bays etc.

- Debris presents a separate and different problem at airports. Jet turbine engines are extremely susceptible to damage from ingestion of solid particles of debris picked up from the pavement surfaces. Tire life is also reduced by wear and cuts induced by sharp objects on the pavements, deteriorating pavement surfaces and edges, and poor, untreated pavement joints. Problems arising from debris can be reduced by regular inspections of the pavement surface condition of all operational areas and by establishing a sweeping and cleaning program that sets up priorities and frequencies.
- Snow is a major challenge at many airports and clearance is frequently coordinated through the operation of the snow committee, consisting of members from the airline operators, meteorology, air traffic system (ATS) services, and airport administration. Clearance is laid down in a snow plan that ensures that agreed–on procedures exist for the provision and maintenance of equipment; for clearance according to stated priorities; for installation of runway markers, snow fencing, and obstruction marking; and for providing for manoeuvring aircraft.

1.4 AIRFIELD INSPECTIONS :

Inspection of airports is one of the major tasks of airport operators. ICAO (2001) requires that airport operators document several kinds of inspection and maintenance activities on the airside. ICAO has also mentioned the remedial actions to be undertaken for each activity on a priority basis and the schedules for maintenances. They include inspection of

- Movement areas and areas with obstacle limitations
- Lighting systems and electrical systems
- Obstacle limitation surfaces
- Radars, navigational aids and other equipment

During the inspection process special emphasis is given on

- Surface conditions of runways, aprons , taxiways, stopways etc
- Presence of accumulated water, snow, oil, sand, rubber deposits etc
- Presence of debris on any part of movement area.
- Status of materials for any work in progress at the airport.
- Growth of grass, plants or hedges that may pose as an obstruction.
- Light frames and glasses of the lights across airport.
- Presence of birds, animals or any unauthorized persons at the airport.

In the event of any objects being discovered that are identified as coming from an aircraft, immediate steps would need to be taken to check recent departures with ATC, who will decide if it is necessary to send a message. Prior to darkness, an inspection to check the operation of

all lighting systems should be carried out if night operations are to take place. This inspection will be particularly aimed at an examination of

- Runway/taxiway lighting
- Obstruction lights
- Airport rotating beacon/identification beacon
- Traffic lights guarding the operating/movement area
- Visual approach slope indicators (VASIS)
- Approach lights visible from within the airport boundaries. A full approach lighting inspection can be carried out only by means of a flight check. With larger lighting systems, some form of photographic record has to be made.

1.5 MAINTENANCE MANAGEMENT :

The primary concern of operations management is to ensure the continuous availability of all operational services. To achieve this, a systematic approach to maintenance management is called for, the extent of which will depend on the types of operations at a particular airport. The most important aspects as maintained by all airports are

- A documented schedule of routine maintenance.
- Comprehensive schedule of maintenance records.
- Equipment maintenance related to technology that enables flight operations like radio communications, telephones, radio, radar, lighting, fire, power distribution etc always need to be in a working mode without failures.
- The process of preventive maintenance is a very important aspect concerned mainly with regular inspection of a system and all its component parts with the objective of detecting anything likely to lead to a component or system failure and taking appropriate action to prevent that happening. Such action might involve cleaning or replacing parts on a predetermined schedule.
- Safety aspects are very important element in the entire process and must be taken into account in relevance to the standard norms and procedures.
- Major airside repairs will be necessary at some time inspite of good maintenance. Repairs introduce construction activities in the movement area. The visual guidance systems on the airside, which ensure the safe and expeditious flow of aircraft, vehicles, and personnel, are not designed to accommodate construction activities creating additional risk factors that need management.

Every airport needs to implement a Safety Management System as per international protocols and regulations of the country to identify and mitigate the elements of risk that may lead to hazards. Some of the aspects that are important and need to be considered are

- Isolation of work areas with earmarked barriers.
- Use of reflective vests by personnel working.
- Use of all protective gear that are essential.
- Safety briefings to personnel related to work limits, access routes, communication procedures and probable dangers.
- Assignment of works coordinator for continuous communication with the ATC.
- Protection of all loose material from natural hazards
- Adherence to all security measures and protocol.

❑ **Check Your Progress – 2 :**

1. Runway intended for only visual approach procedure for aircrafts is known as
   a. Instrument Approach runway b. Category 1 Runway
   c. Category 2 Runway d. Non Instrument Runway
2. The acronym RVR stands for
   a. Runway Vertical Range b. Runway Visual Reality
   c. Runway Visual Range d. None of the options
3. The acronym ILS stands for
   a. Instrument Landing Software b. Instrument Landing System
   c. Instruction Landing System d. Instruction Landing Software
4. The acronym RESA stands for
   a. Runway End Safety Areas
   b. Runway End Strategic Areas
   c. Runway Elevation Safety Areas
   d. Runway Elongated Safety Areas
5. The acronym VASIS stands for
   a. Visual Arrival Straight Indicators
   b. Visual Arrival Slope Indicators
   c. Visual Approach Slope Indicators
   d. None of the options

1.6 LET US SUM UP :

Systematic air operations is undertaken to manage safe, reliable and fast movement of passengers, cargo and goods from the airside to the landside and vice versa. The operations are complex and are carried out by the airport operators as per the SARPs laid down by the ICAO. The standards emphasize on safe operating areas, facilities, compliance of standards, equipment and trained manpower to handle the same. The unit highlights the management of operating constraints faced by the airport operators like visibility, cross winds, bird strikes, surface area maintenance

etc. There are frequent inspections that are crucial to operations and documented schedule of maintenance both proactive and reactive are carried out to manage the operations.

1.7 ANSWERS FOR CHECK YOUR PROGRESS :

Check Your Progress – 1 :

1. d **2.** c **3.** b **4.** a

Check Your Progress – 2 :

1. d **2.** c **3.** b **4.** a **5.** c

1.8 GLOSSARY :

1. **Debris :** Pieces from something that has been destroyed.
2. **VFR :** Visual Flight Rules. These are a set of regulations under which a pilot operates an aircraft in weather conditions generally clear enough to allow the pilot to see where the aircraft is going.
3. **Precision :** Exact
4. **Crosswind :** Wind that has a perpendicular component to the line or direction of travel.
5. **Knots :** A knot is a unit of speed that equals one nautical mile per hour. It is a common measure for the airspeed of an aircraft.
6. **Turbulence :** The disruption in the air current which helps a plane to fly results in shakes and it is referred to as turbulence.
7. **Pyrotechnic :** Relating to fireworks

1.9 ASSIGNMENT :

1. List 5 airports having major challenge of presence of birds on the airport and in its vicinity. Study and enumerate on the steps undertaken by the airport authorities in prevention of bird strikes.

1.10 ACTIVITY :

1. The de–icing fluid used at airports that have challenges of snow fall is a major contaminant if the same drains into water storage areas. List the steps that airports undertake to prevent any contamination.

1.11 CASE STUDY :

At an airport just after darkness when an aircraft was about to land a herd of fox were seen on the runway running around. As the aircraft was at the approach, there could nothing be done by the ground staff. The ATC alerted the pilot but by then the aircraft had touched the runway. The herd could be seen running on the runway with the approaching airbus after them. The pilot took a split second decision for a go around just after touch down and the flight again took off. The ground staff immediately moved in to ensure that the fox leave the runway area and move away.

The aircraft again landed after 10 minutes. Though the incident was very normal to the airport, there was a major element of risk and it was the pilot who in that situation took the right decision again to take off.

Q. 1. What are the elements of concern that the airport authorities did not adhere to make sure that there is no obstruction on the runway ?

Q. 2. What steps should the authorities undertake to ensure that incidents like above are not repeated ?

1.12 FURTHER READING :

1. Airport Operations by Norman Ashford
2. Airline and Airport Operations by Edissa Uwayo
3. Aviation Management : Global and National Perspectives
4. www.wikipedia.org

UNIT 02

AIRPORT TRAFFIC MANAGEMENT

UNIT STRUCTURE

2.0 LEARNING OBJECTIVES :

- To enumerate on Air traffic management and its need for operational efficiency.
- To list the nature of peak hours and different methods used by airport operators for calculation of peak time operations at airports.
- To explain the external and internal factors and constraints of airline scheduling policies.
- To list IATA policy on scheduling of airlines.

2.1 INTRODUCTION :

Managing of air traffic at any airport, usually busy airports is a set of complex tasks that involve different departments and areas with a lot of manpower support, equipment, machines, technology and satisfaction

to the end user at every step. The management of air traffic is labour and cost intensive operation that requires detailed monitoring and analysis on a daily basis. The unit shall acquaint you with the nuances of the complexity of air traffic management.

2.2 INTRODUCTION TO AIR TRAFFIC MANAGEMENT :

Airports are areas that have variations in demand levels and they are dependent on

- Monthly peaks in an year
- Daily peaks
- Hourly peaks in a day

The variations are very important part of the analysis at an airport as the same results in planning and provision of facilities. With evolution of air traffic and growing mode of this form of travel, airport operators globally are working on coping with volumes and providing services. The planning depends on both long term perspective where infrastructure and facility building is considered and also on short term operational planning for management of different aspects on a day to day basis. Cargo operations at many airports play a major role and facility planning for cargo operations has also become a key element in the operational planning process.

Airline passenger transport is complex and different from other modes of transport because Peak Time management depends on a variety of circumstances that include

- Different needs of passengers.
- Different travelling condition of passengers.
- Different demands of passengers from the system.
- Different interrelationship of the passenger with the airline, the airport and often more than one airline.
- The difference in the aim of the airport and the airline. The airport operator necessarily tries to spread the demand for the airport evenly throughout the day to decrease the need of supply of more facilities due to peak time.
- There is always an area of conflict between the airline satisfying its customer, the passenger and the airport trying to influence the demands of its principal customer, the airline.

2.3 PEAK TIME OPERATIONS :

Peak time operations are considered to be the period of time when an airport is very busy and often operates beyond its stipulated carrying capacity. The peak time operations in an airport are dynamic. Any airport operating at high volumes round the year also have some hours in a year when there is no traffic. It may also operate some hours in a year when

it surpasses its carrying capacity. These peak volumes result in severe inconveniences, delays and bad situations. There are several methods of describing and measuring peak time operations. The methods discussed are as

2.3.1 Standard Busy Rate (SBR) :

Standard Busy Rate has been widely used in Europe and especially in the United Kingdom by the British Airport Authority. The design of the Standard Busy Rate is based on the concept that facilities will not operate beyond its capacity for more than 30 hours per year. 30th is the highest hour taken into consideration for calculation to decide the peak.

2.3.2 Busy Hour Rate (BHR) :

Busy Hour Rate is considered as the hourly rate above which 5% of the traffic is handled. The operational volumes are ranked in order of magnitude and computed according to cumulative sum of the volumes. The Busy Hour Rate is also known as the 5% Busy Hour Rate.

2.3.3 Typical Peak Hour Passengers (TPHP) :

The method of calculation for peak hour is undertaken by the FAA authorities in USA for its airports. The measurement is defined as the peak hour of average peak day of the peak month. The calculation is very close to the Standard Busy Rate and is followed in lot of countries.

2.3.4 Busiest Time Table Hour (BTH) :

The method of calculation is applicable to small airports. The method is simple and use load factors or projected time tables for calculation. The method often leads to numerous errors in forecasting, rescheduling due to variations in average load factors.

2.3.5 Peak Profile Hour (PPH) :

The same is also known as the Average Daily Peak. The peak month is selected and for each hour average hourly volume is computed across the month. The result is Average hourly volume for average peak day. The calculation is also very close to Standard Busy Rate.

❑ **Check Your Progress – 1 :**

1. Peak time management involves
   a. Needs of passengers
   b. Demands of passengers
   c. Travelling condition of passengers
   d. All the options
2. The acronym SBR stands for
   a. Standard Business Rate
   b. Sub Busy Rate
   c. Standard Busy Rate
   d. Super Busy Rate

3. The acronym TPHP stands for
   a. Typical Post Hour Passengers
   b. Typical Peak Hour Passengers
   c. Typical Peak Hour Plans
   d. None of the options
4. The acronym PPH stands for
   a. Peak Profile Hour b. Peak Passenger Hour
   c. Post Profile Hour d. Post Passenger Hour

2.4 NATURE OF PEAK HOURS :

The nature of peak hours depends on a lot of factors at different airports across the globe. The most important factors include

- The ratio between domestic flight and international flight. Domestic flights operate on a daily working pattern with a larger fleet and more proportion of travellers whereas an international flight follow staggered operational patterns in majority of the cases with a lesser proportion of travellers. Airports that have different terminals for domestic and international flights will have peak hours very differently. If you consider Ahmedabad airport that has separate international and domestic terminals, you will see that the peak at the domestic terminal is especially in the morning and evening till late night and the same happens daily. On the other hand the international terminal has a peak from late evening till morning and the peak is not similar for all the days.
- Slot systems at majority of the airports across the globe have helped in distributing the peak period across the day. Low Cost Carriers are competitive airlines that often tend to compete in peak hour periods. Chartered flights do not operate at peak periods.
- Short haul flights are frequently scheduled to maximize the usefulness of the day at the airport.
- Long haul flights are scheduled based on the convenient arrival time. The crew rest period is taken into consideration during the schedule and in many airports where there are night curfews; the same is taken into consideration.
- Geographic locations and time zones are seen between cities to avoid any confusion on arrival. A flight departing from North America to Europe will schedule a preferable evening departure to avoid night curfews at many European airports.
- The catchment area decides the peak. There are many destinations that have a steady flow round the year; especially commercial places and also there are destinations that are seasonal.

2.5 FACTORS AND CONSTRAINTS ON AIRLINE SCHEDULING POLICIES :

There are numerous factors that have to be taken into consideration before the formulation of policies related to scheduling of aircrafts at airports and especially busy airports. Some of the key issues are

- There are severe challenges in scheduling at an airport that acts as a Hub airport with a lot of connecting flights. Flights have to work on schedules where wait time for a passenger for a connecting flight is minimal and also within the time limits enough to carry out the processes for the next flight.
- Utilization and load factors are essential in scheduling of aircrafts. An aircraft can do a turnaround for different destinations and be utilized, however, the load factor is important to decide the breakeven. Turnaround with less than breakeven passenger load impacts its utilization. Modern aircrafts that can carry more passenger loads need to have high load factor on long haul flights.
- Reliability is a very crucial element in scheduling. Utilization without reliability leads to passenger dissatisfaction. Reliability is dependent on a lot of factors of which serviceability of the aircraft with precision and time bound at various destinations is very important. Punctuality at the destinations is the second most important aspect of reliability of airlines. Computer models are used these days to schedule airlines for efficient turnarounds and destination servicing.
- Runway slot systems are very important factors in the entire scheduling system. Runways at busy airports run full capacity across the globe. The capacity calculations of the runways are based on strict protocols of safety. The slot allocation at different airports is undertaken for a fixed number of arrivals or departures by the airport authorities in coordination with airlines and IATA slot conferences. It is difficult for an airline operator with a particular slot for a scheduled period to change its slot. The scheduling policies of the airlines are highly dependent on the airport slots.
- Terminal constraints affect scheduling. The airport passenger terminal and apron capacity is decided by the airport authorities. The carrying capacity of a terminal is calculated on an hourly basis by the airport operators which lead to scheduling challenges for the airline. If we consider the example of Rajkot airport which is a small airport with no slot system and a limited carrying capacity. The peak hour can service only 2 aircrafts at a time. The same leads to a scheduling challenge for the airline company to operate several flights from the city to other different destinations that airline companies want to start but are unable to do the same.
- Long Haul crew constraints also play a role in scheduling. The maximum hour of duty for flight crew is 14 hours including pre and post flight time. The minimum rest period is 12 hours. Crew

are changed at slip airports in long haul flights. The timings in the schedule prepared by the airlines must match fresh crew availability at slip airports for relieving.

- The crew availability is considered as an important aspect in scheduling. It is done based on availability at various stations. A mix of short and long haul is prepared on the basis of the same.
- Short haul flights carry business travellers who want to return on the same day to the source destination of their travel. If the airline company is unable to provide the same in scheduling the flight, it becomes very difficult for the airline company to market the flight.
- Availability of aircrafts is crucial to scheduling. There are maintenance schedules carried for aircrafts based on the notifications of the aircraft manufacturer and regulatory authorities like the DGCA in India. The scheduling of airlines is based on taking into consideration the service schedule of aircrafts. An airline company with limited number of aircrafts catering to many destinations will have challenge in this aspect while preparing a schedule. Aircraft service is also based on geographic location, number of operational cycles and many other factors.
- Marketability of schedules prepared by airline companies is an important element in the entire process. Schedules prepared must be marketable by an airline company. Planning of schedules that are marketable are big challenges in event of connecting flights. Flights scheduled for late night at many cities are not marketable due to non availability of public transport at the destination.
- Seasonal variations lead to increase and decrease in demand at certain destinations leading to difficulty in preparation of schedules.
- Landing fee pricing policy which are high during peak periods according to the policies adopted by different airport operators also is a factor considered during scheduling.

2.6 INTERNAL FACTORS THAT AFFECT SCHEDULING OF AIRLINES :

There are many factors within the airline company that are to be considered before the process is undertaken. To enumerate on some of the factors, they are

- Scheduling is a process that cannot be undertaken by a single person. Airline companies operate flights to and from multiple destinations. There is a team of people who are involved in the process. Software with decision making ability and artificial intelligence play a major role as an aid to the entire process.
- The team involved in the scheduling process is bifurcated under different heads performing varying tasks. In the scheduling process, the Commercial Economist takes advice from the Market Research team of the airline on particular routes and their planning which

in turn needs to be considered viable operationally. After the route plan is chalked out in consultation the same is forwarded to the operations and route division for ratification. A scheduling process is a team work of different departments working cohesively towards a route plan that is commercially and operationally viable.

- Route capacity is one of the major areas that need to be assessed while planning a schedule. An airline may have 3 slots at a hub destination and scheduling of that destination cannot be undertaken by the airline more than its slot capacity though the same may be commercially viable.
- Type of aircraft also decides route planning. If we take an example of Rajkot airport where the airline company servicing its operations to and from Delhi is operating an ATR. The planning has been done by the aircraft company after calculation of the demand over days and months. The airline company is saving a lot of operational expense by flying the ATR instead of the bigger Boeing. The aircraft operates from a terminal in Delhi where it pays lesser Aeronautical fee compared to Terminal 3.
- The fare structure also decides the scheduling of the aircraft. On Ahmedabad– Kolkata route aircraft companies have fixed slots operating 3 to 4 flights in a day at average fare structure in the lean season. During holidays and season the number of flights increases due to huge demand and fares double up.
- Competition between different airline companies also is a big factor for internal scheduling. On a busy route like Mumbai Ahmedabad or Mumbai Delhi there is huge competition and every airline company try to schedule their aircrafts at premium slot timings on these routes. There is always a huge competition on routes between important cities of business round the year.
- Often political understanding between nations and social need leads to memorandum of understandings under which flights operate between two countries. The commercial value of operating the flight in such events is given a lesser priority than the political value.
- The length of the haul decides the type of aircraft to be flown taking into account the commercial aspect. A dream liner or Airbus 380 on a long haul route is more efficient and commercially viable to be flown rather than a Airbus A320 or Boeing 737. Many airline companies do not have bigger aircrafts and many airline companies have multiple long haul routes with limited number of bigger aircrafts.
- Special Events often require aircrafts to be scheduled and flown. Any airline company also has to consider these special events as a part of their scheduling. Airline companies fly to Mecca for Haj pilgrims during a particular period from different cities of India as a special event. Recently evacuation procedures for students studying

in Ukraine were undertaken from Poland by different airline companies. Many airline companies were pressed into service for transportation of Oxygen concentrators and medical supplies during the Covid 19 crisis.

- Maintenance procedures are an important aspect of the airline industry and jeopardizing with safety may lead to disastrous consequences. Every airline company must have extra flights to combat emergencies arising due to technical snags and maintenances. Many aircraft companies undertake lease agreements with different carriers and operate their aircrafts. Many aircraft companies undertake different strategies like code sharing to compensate for surplus aircraft inventory and maintenances.
- Availability of crew members for schedules undertaken is an internal consideration of the airline company. Crew include personnel from technical, engineering, cabin and flight that are essential for the operations of the aircraft on a particular route.
- Acceptability of service schedule at the airport is also essential in the process of scheduling. A long haul flight permitted to land at a particular airport post midnight may not get the necessary services as required according to the policies of the airport at that destination.
- Country clearances are very important aspects in scheduling for long haul flights. If a country is not having a bilateral agreement with another country for the usage of its airspace for overflying or usage of its airports for technical reasons; schedules may be hampered.

2.7 IATA POLICY ON SCHEDULING OF AIRLINES :

IATA developed a general policy on scheduling through its Worldwide Scheduling Guidelines (2010). According to the IATA guidelines the coordination between regulatory authorities, airports and airline companies leads to an agreed upon recognized set of priorities that leads to the formation of an agreed schedule without much disagreement. The priorities that IATA upholds are

- Historical slots are awarded to the same carriers. These are slots held by any carrier for a long period.
- A vacant slot competed by more than one carrier is awarded to the carrier that intends to operate from the slot for a longer period of time.

IATA policy states that coordination aims at

- Resolution of problems with minimal recourse to government intervention.
- Operators to get equitable opportunity in order to satisfy their scheduling requirements.
- Agreed schedules leading to minimal economic problems to the operators.

- Reduction of any inconvenience to passengers.

Airports too have their own view point on scheduling. To enumerate airports work towards management of

- Interest of passengers as a priority.
- Carrying capacity for serviceability.
- Safety and order.
- Security without any compromise.
- Minimal delays and efficiency of operations.
- Ease of operations.

❑ **Check Your Progress – 2 :**

1. The following factors decide peak hour at an airport
   a. Catchment Area
   b. Ratio of international and domestic flights
   c. Slot Systems
   d. All the options
2. The acronym BHR stands for
   a. Bottom Hour Rate b. Busy Hour Rule
   c. Busy Hour Rate d. Big Hour Rate
3. _____ is a very important element of scheduling
   a. Responsibility b. Reliability
   c. Reasonability d None of the options
4. The maximum hours of duty for flight crews is _____
   a. 14 b. 12 c. 10 d. 8

2.8 LET US SUM UP :

The management of air traffic at any airport, and particularly at busy airports, is a set of complicated tasks that involve a variety of departments and areas, a significant amount of manpower support, equipment, machines, and technology, and the provision of complete satisfaction to the final user at each step. The management of air traffic is a labour and cost expensive activity that requires extensive monitoring and analysis on a regular basis. Managing air traffic also requires constant attention to detail.

2.9 ANSWERS FOR CHECK YOUR PROGRESS :

Check Your Progress – 1 :

1. d **2.** c **3.** b **4.** a

Check Your Progress 2

1. d **2.** c **3.** b **4.** a

2.10 GLOSSARY :

1. **Staggered :** Arranged in a way so that they do not all happen at the same time.
2. **Slot :** A planned and time bound occasion for a particular happening.
3. **Chartered Flights :** A non–scheduled commercial flight which can be utilised for personal use.
4. **Short Haul :** Short distance
5. **Long Haul :** Long distance
6. **DGCA :** Directorate General of Civil Aviation
7. **Jeopardize :** To do something that may damage something or put it at risk

2.11 ASSIGNMENT :

1. Study the slot system of 3 international airports and list the processes and rules followed by these airports in implementing the slot system.

2.12 ACTIVITY :

1. List the security procedures and management of personnel during peak hours at any two international hub airports.

2.13 CASE STUDY :

An airport with a lot of short haul flights had majority of its traffic from 5 : 30 AM in the morning to 8 : 30 AM and again from 5 : 30 PM to 10 : 30PM. During these peak traffic hours departures were slotted every 3 to 4 minutes and so was the arrival. During the entire day the traffic was lean. The airport terminal was average sized with 8 gates. The waiting lounge after the security check area was relatively small and could not seat more than passengers of 6 flights. The morning hours were a total chaos with enormous lines at the security check areas. Often passengers missed their flights due to long queues. Airline personnel were always on paging for passengers in frantic mode during the peak hours. The operational staff scheduling for the airport was also very complex leading to lean staffing sometimes during peak hours and often during non peak hours. The airport had built a repute of high waiting time and passengers were afraid to arrive just on time in fear of missing their flight.

Q. 1. What are the areas of concern at the airport ?

Q. 2. What are the measures that the airport can take to correct the existing problem during peak hours ?

2.14 FURTHER READING :

1. Airport Operations by Norman Ashford
2. Airline Operations and Scheduling by Massoud Bazargan
3. Aviation Management : Global and National Perspectives
4. www.wikipedia.org

UNIT 03 AIRPORT OPERATIONAL SYSTEM

UNIT STRUCTURE

3.0 LEARNING OBJECTIVES :

- To explain the aspect of National Airport System and its functioning in India.
- To enumerate on various airport operating functions with emphasis on passenger terminals and its complexities.
- To list the nature of management and operating structure of airports globally.

3.1 INTRODUCTION :

Airports are essential part of air transport system. It is a physical place that allows the transfer of people from one mode of travel to another mode. Airports are point of meeting for

- Commercial activity owners and partners having stake in the airport.
- Airlines and
- Users of the airport

The smooth exchange of interaction at different levels between the stake holders that meet at an airport lead to an efficient operational system. Eg. The unprofessional attitude and higher processing time for baggage by an airline at an airport leads to detrimental feedback for the airport too in regards to inefficiency. In modern times the presence of social media leads to operational inefficiencies getting highlighted faster and easier.

Inefficient operations in a competitive environment lead to decline in the scale of operations and managing the airport. The same propagates and further leads to

- Multiple deficits at the airport.
- Deficit operations of airlines at an airport.
- Unsatisfactory work conditions.
- Insufficient flight supply for operations.
- Issues of safety in operations.
- Higher cost of Operations.
- Low demand by passengers.
- Higher levels of delay for airlines and passengers.
- Reduction of employment opportunities.

3.2 THE NATIONAL AIRPORT SYSTEM :

There are many stake holders associated with the principal stake holders. To enumerate they are

Airport Operator : Stake holders associated

- Local Authorities
- Government
- Concessionaires
- Suppliers
- Utilities
- Police
- Ambulance
- Fire
- Air Traffic Control

Airline : Stake Holders associated

- Fuel Suppliers
- Engineering Team
- Catering Team
- Sanitary Services Team
- Other Airline operators

Users and Non Users : Stake Holders associated

- Passengers
- Visitors
- Meeters and Senders
- Local Community
- Residents
- Environmental groups

Modern airports require very big infrastructure, equipment and technology. Airports across the globe require huge investments. In majority of the countries the investments are undertaken through public investments and are part of a National Airport System designed and financed to gain maximum benefit from public funding. Each Country has its own National Airport System model design based on a lot of factors like economy, geography, policies and political philosophy.

3.2.1 National Airport System in India :

In India the Ministry of Civil Aviation, Government of India is responsible for designing the National Airport System. The policy of Government of India is centred on up gradation and modernization of infrastructure and its efficient use. The same is crucial for sustainable development of transportation, trade and tourism. Airports contribute to the economy of the country and international competitiveness. The objectives of the National Airport System model as designed by the Ministry of Civil Aviation, Government of India are

- Providing boost to trade and tourism.
- Enhance image of India among global fraternity.
- Provide airport capacity ahead of demand to handle volume air traffic.
- Enhance facilities at the airport to make airports more user friendly leading to high customer satisfaction.
- Complete safety and security of the airport operations through construction of state of the art Air Traffic Control facilities, security systems and related aspects.
- Bridge all gaps pertaining to resources and increase the efficiency in operations.
- Introduce private capital and management skills in all areas of airport operations.
- Development of infrastructure for remote areas.

3.2.2 Directorate General of Civil Aviation (DGCA) :

The Directorate General of Civil Aviation (DGCA) is the regulatory body in the field of Civil Aviation, primarily dealing with safety issues in India. It is responsible for regulation of air transport services to/from/

within India and for enforcement of civil air regulations, air safety, and airworthiness standards. The DGCA also co–ordinates all regulatory functions with the International Civil Aviation Organisation (ICAO).

Private operators were allowed to provide air transport services. However, no foreign airline could directly or indirectly hold equity in a domestic airline company. By 1995, several private airlines had ventured into the aviation business and accounted for more than 10 percent of the domestic air traffic. Today, Indian aviation industry is dominated by private airlines and these include low cost carriers, who have made air travel affordable. The Government nationalized nine airline companies vide the Air Corporations Act, 1953. These government–owned airlines dominated Indian aviation industry till the mid–1990s. In April 1990, the Government adopted open–sky policy and allowed air taxi– operators to operate flights from any airport, both on a charter and a non charter basis and to decide their own flight schedules, cargo and passenger fares. As part of its open sky policy in 1994, the Indian Government ended the monopoly of Indian Airlines and Air India in the air transport services. Private operators were allowed to provide air transport services. However, no foreign airline could directly or indirectly hold equity in a domestic airline company. By 1995, several private airlines had ventured into the aviation business and accounted for more than 10 percent of the domestic air traffic. Today, Indian aviation industry is dominated by private airlines and these include low cost carriers, who have made air travel affordable.

- Registration of civil aircraft.
- Formulation of standards of airworthiness for civil aircraft registered in India and grant of certificates of airworthiness to such aircraft.
- Licensing of pilots, aircraft maintenance engineers and flight engineers, and conducting examinations and checks for that purpose.
- Licensing of air traffic controllers.
- Certification of aerodromes and CNS/ATM facilities.
- Granting of Air Operator's Certificates to Indian carriers and regulation of air transport services operating to/from/within/over India by Indian and foreign operators, including clearance of scheduled and non–scheduled flights of such operators.
- Conducting investigation into accidents/incidents and taking accident prevention measures including formulation of implementation of Safety Aviation Management programmes.
- Carrying out amendments to the Aircraft Act, the Aircraft Rules and the Civil Aviation Requirements for complying with the amendments to ICAO Annexes, and initiating proposals for amendment to any other Act or for passing a new Act in order to give effect to an international Convention or amendment to an existing Convention.

- Coordination at national level for flexi–use of air space by civil and military air traffic agencies and interaction with ICAO for provision of more air routes for civil use through Indian air space.
- Keeping a check on aircraft noise and engine emissions in accordance with ICAO Annex 16 and collaborating with the environmental authorities in this matter, if required.
- Promoting indigenous design and manufacture of aircraft and aircraft components by acting as a catalytic agent.
- Approving training programmes of operators for carriage of dangerous goods, issuing authorizations for carriage of dangerous goods, etc.

❑ **Check Your Progress – 1 :**

1. The low demand of passengers at an airport is _____ operation
   a. Efficient b. Prudent c. Timely d. Inefficient
2. _____ is a stake holder associated with airport operator
   a. Wholesaler b. Retailer
   c. Concessionaire d. None of the options
3. _____ fund is the most common form of funding for developing airports
   a. Private b. Public c. Bank d. Partnership
4. The Open Sky policy was adopted by Government of India in
   a. 1990 b. 1991 c. 1992 d. 1993

3.3 FUNCTIONS OF THE AIRPORT :

Airports are the intermediate point for aircrafts in between its flight. During the process it loads and unloads goods, passengers, crew that needs to be serviced. Airport operations are divided between the Landside and the Airside. The division leads to higher efficiency and bifurcation of tasks. The airport passenger and cargo have several distinct tasks. They are

- Change of Mode of travel– This is the physical linkage between an aircraft to the surface vehicle.
- Processing involving necessary facilities for ticketing, documentation and control of passengers and freight.
- Facilitation of change in several mode of transport involved in the process.
- Service, maintenance and engineering of aircrafts and facilities associated with aircraft operations.
- Office functions involving various stake holders.
- Service to businesses that provide service to passengers and required for economic purpose of the airport.

- Air Traffic Control and Aviation support facilities.
- Managing government and regulatory functions

3.4 PASSENGER TERMINALS :

Passenger terminals are important areas crucial to passenger satisfaction. The operation and administrative structure of passenger terminals depend on design of the airport. The structure is normally categorized under 2 distinct heads

- Centralized
- Decentralized

The older terminals across the globe are designed based on the Centralized concept. There is a main terminal building with access to the aircraft gates via satellite or apron transport. Examples of Centralized terminal include Schipol, Tampa, Majority of the airports in India.

There are a lot of airports that started as centralized facilities but with increased scale of operations became decentralized. Eg. Heathrow, Madrid etc.

Many modern terminals were designed decentralized with a number of unit terminals. Eg. IGI Airport, New Delhi, India, Charles De Gaulle Airport, France and JFK Airport, New York,USA.

There are many airports that are hybrid with centralized and decentralized layouts combined together. Eg Kuala Lampur Airport.

3.4.1 Advantages of a Decentralized Airport :

Modern airports are more or less designed as decentralized facilities. The advantages of a decentralized airport layout are

- It reduces walking distances for passengers. IATA regulation suggests walking distance should be 100 metre from curbside to the Check in counter for a passenger. The same has led to the evolution of the Gate Arrival Concept followed by a lot of modern airports of the world. Dallas and Kansas city airports were the first to implement the concept.
- The volume of passengers are scattered between terminals.
- Operation handling and supervision of operations become easy.
- With scattered parking lots the congestion is less.
- More Revenue earning opportunity from land side rentals.
- Opportunity for building multiple facilities for passengers.

There are however, a lot of challenges that encompass a decentralized facility. To enumerate

- The requirement of manpower to meet operational requirements is much higher than a centralized facility.
- The operational expense is higher than a centralized facility.

- The requirement of equipments is more both on the landside and the airside.
- Duplication of facilities has to be undertaken.
- Introduction of additional transport facility for interlining passengers.
- Often there is a loss of capacity of the airport due to assignment of terminals or airports to particular airlines. Some airlines do bulk business and some do not.

3.5 COMPLEXITY OF AIRPORT OPERATIONS :

When airports came into existence the management of the airports were undertaken by governments. The same was done at the expense of public money with very less commercial activity. The focus was on the safety and operations on the airside. From 1970's commercial revenues became an important aspect of airport's income. Aeronautical income started covering the airside expenses only. Airports evolved as complex business models and increased in size in terms of Carrying Capacity and Non Aviation revenues. The increasing non–aviation activities required professional management and operating structures and change became an inevitable component of airport function. Airports today are managed by expert organizations to maximize commercial revenue. The major non–aeronautical activities comprise of

- Aviation Fuel Supply
- Food and Beverage Sales / Vending Machines
- Duty Free Shopping/ Duty Paid Shopping
- FOREX services
- Banks
- Taxi and Car Rental Services/ Automobile Services
- Advertising and Promotional Boards
- Kiosks
- Bus Services
- Hotels / Casino / Cinemas / Gaming Zones
- Internet Services
- Freight Forwarding Agents
- Art Exhibitions / Music Concerts
- Souvenir Shops

The non–aeronautical area development depends on the volume of traffic at the airport, city, revenue the destination at which the airport is located generates. Many airports use non– aeronautical revenue to reduce aeronautical cost of operations. However, the model do not accrue revenue to the airport and often becomes a de–motivating factor for the airport management to push non–aeronautical revenue sales.

3.5.1 Management and Operation Structures :

There is no single form of airport managing structure applicable to all airports. The model of managing airports in majority of the countries started with management undertaken by the governments of the respective countries. The same followed for many years but the model changed with privatization and many countries adopted the private model of operation of the airports. In India also a lot of airports have been privatized and is operating on a new model. The Indira Gandhi International Airport, New Delhi is managed by a consortium known as DIAL in which the government is a stake holder having specific functions to undertake. Across the globe airports follow different structures for operation and may be operated by

- Part of a Government department. Eg Sacramento Airport, USA.
- By an autonomous Airport Authority. Eg. Rajkot Airport, India operated by Airports Authority of India.
- Part of Transport authority handling various modes of transportation Eg. New Jersey Airport, USA.
- Part of Civil Aviation department. Eg. Abu Dhabi Airport
- Private Airport with government stake. Eg. Ahmedabad Airport, India
- Single Private Airport. Eg. Knock Airport, Ireland.
- Partially Government Owned airport. Eg. New Castle Airport, United Kingdom
- Part holdings by Multiple Airport operators. Eg. Cardiff Airport, United Kingdom
- Subsidiary Company to conglomerate. Eg. Heathrow Airport, London, United Kingdom
- Government owned but leased on concession. Eg. Lima Airport, Peru

The management structure of the airports depends on the airport operational model. A lot of airports undertake facilities like baggage transfer, interlining transport facilities, apron transport etc. Some airports assign the responsibilities to corresponding airlines and handling companies. A government intervention in an airport shall have a different structure for operations and a private body would have a different structure.

❑ **Check Your Progress – 2 :**

1. An airport with a main terminal building is a _____ airport.

   a. Decentralized b. Common c. Annexe d. Centralized

2. IATA regulation on walking distance from curb side to Check in counter should be

   a. 60 metre b. 80 metre c. 100 metre d. 120 metre

3. FOREX services is a part of _____ activity in an airport
   a. Aeronautical b. Non aeronautical
   c. Banking d. All options
4. _____ airport is part of civil aviation department of a country
   a. Abu Dhabi b. Heathrow c. Knock d. Sacramento

3.6 LET US SUM UP :

Airports are physical structures that allow transfer of people and goods from one medium of transport to another. This transition is a complex process and involves various stakeholders for efficient operations to be undertaken in a stipulated time. Poor handling leads to multiple inefficiencies and bad repute for the airport. National Airport Systems are designed to manage airports systematically in every country and the models of the system are based on several factors pertinent in the country. The unit also highlights the type of airport whether centralized or decentralized and the advantages of the same in terms of providing services.

3.7 ANSWERS FOR CHECK YOUR PROGRESS :

Check Your Progress – 1 :

1. d **2.** c **3.** b **4.** a

Check Your Progress – 2 :

1. d **2.** c **3.** b **4.** a

3.8 GLOSSARY :

1. **Conglomerate :** Large firm made up of several different companies.
2. **Autonomous :** Having the right or power of taking decisions.
3. **Subsidiary :** Connected with something but less important than it.
4. **Deficit :** Shortfall or loss
5. **Utilities :** Something useful to an organization eg. Telephone
6. **Linkage :** The action of inking different tasks.
7. **Stake Holder :** Person/body with an interest with a concern in business.
8. **Fraternity :** Group of people with similar work or interest

3.9 ASSIGNMENT :

1. List the areas in which airports engage third party service providers.
2. What are the advantages and disadvantages in hiring third party service providers.

3.10 ACTIVITY :

1. List 5 internationally acclaimed airports of the world and study their staffing patterns in relation to the services provided.
2. List the services managed by the airport authorities and airlines.

3.11 CASE STUDY :

An airport operated by the civil aviation authorities had all facilities that were managed by the airport authorities. This included apron bus facility, fuelling of aircrafts, marshalling, towing and other that served as an aid to any aircraft during its period of stay at the airport. The employees working for these facilities had a strong union that represented their voice and there was ongoing problem related to increase of wage between the union and the authorities. One day the authorities suspended an union employee on grounds of misconduct and there was a flash strike of all employees involved in all services at the airport. All aircrafts were stalled and the dilemma let to even cancellation of many flights due to unavailability of services. The airport came in the limelight globally and the government had to intervene immediately from the topmost level to resolve the issues and resume operations.

Q. 1. In the above incident what were the aspects that went wrong ?

Q. 2. What strategies should the government adopt to meet such emergencies and ensure such situations do not recur ?

3.12 FURTHER READING :

1. Airport Operations by Norman Ashford
2. Airline and Airport Operations by Edissa Uwayo
3. Aviation Management : Global and National Perspectives
4. www.wikipedia.org
5. www.civilaviation.gov.in

UNIT 04

AIRPORT GROUND HANDLING OPERATIONS AND MANAGEMENT

UNIT STRUCTURE

4.0 LEARNING OBJECTIVES :

- To list the scope of ground handling operations at an airport.
- To enumerate on passenger and ramp handling processes across airports.
- To list ramp servicing activities at airports.
- To enumerate on control ground handling efficiency at airport.

4.1 INTRODUCTION :

Ground Handling is an operation at the airport that incorporates efficient flow of passengers and cargo between two distinct interfaces points the air and the ground mode. Within the context of these interfaces, the movement of passengers, baggage, and cargo through the terminals and the turnaround of the aircraft on the apron are achieved with the help of those involved in the ground handling activities at the airport (IATA 2012). These activities are carried out by some mix of the airport authority, the airlines, and special handling agencies depending on the size of the airport and the operational philosophy adopted by the airport operating authority. Ground handling operations can be classified under terminal and airside operations. In this unit you shall be learning about

the different ground handling activities undertaken at an airport and role of different stake holders in undertaking the activity.

4.2 SCOPE OF GROUND HANDLING OPERATIONS :

Theoretically ground handling operations may seem to be an easy movement of passengers and cargo from one place to another but technically the same is a very difficult task and involves a lot of management of different aspects. The aspects involve people from various agencies and stake holders and only a well coordinated effort between all involved can ensure a smooth and efficient ground handling operation. The scope of ground handling pertains to the terminal and the airside. To enumerate the different tasks and areas under these two heads the scope encompasses

❖ **Terminal**

- Baggage Check
- Baggage Handling
- Baggage Claim
- Check In procedure and Ticketing
- Boarding and Deplaning of passengers
- Handling of transit passengers
- Handling elderly and differently abled passengers
- Information systems
- Government Controls
- Load Control
- Security
- Cargo

❖ **Airside**

- Ramp Services (Supervision, Marshalling, Start up, Moving and towing aircraft, Safety measures)
- On Ramp Aircraft Servicing (Repair of faults, Fuelling, Wheel and Tyre check, Ground power supply, De–icing, Cooling, Heating, Toilet Servicing, Potable Water Supply, De–mineralized water supply, Routine and non routine maintenance, Cleaning of cockpit windows, wings, cabin windows etc)
- On board Servicing and Cleaning
- Catering
- In–flight entertainment
- Servicing of cabin fittings
- External Ramp Requirement (Passenger steps, Catering loaders, Cargo Loaders, Crew Steps on freight aircrafts, Mail and equipment loading etc.)

4.3 PASSENGER HANDLING :

- Passenger handling in the terminal is almost universally entirely an airline function or the function of a handling agent operating on behalf of the airline.
- In most countries of the world, at the major air transport hubs, the airlines are in mutual competition and to project a passenger friendly service oriented image, the passenger contact is almost entirely with the airline, except for the governmental controls of health, customs, and immigration.
- Airline influence is perhaps seen at its extreme in the United States, where individual airlines on occasion construct facilities (e.g., the old United terminal and the new Jet Blue terminals at New York JFK). In these circumstances, the airlines play a significant role in the planning and design of physical facilities that they will operate.
- Even where there is no direct ownership of facilities, industry practice involves the designation of various airport facilities that are leased to the individual airlines operating these areas. Long–term designation of particular areas to an individual airline results in a strong projection of airline image, particularly in the ticketing and checks in areas and even at the individual gate lounges.

An Airline designated Check in area of Virgin Atlantic

- Airlines lease designated areas in the terminal, but to have a large proportion of the ground handling in the ramp area carried out by the airport authority, a special handling agency, or another airline.
- At a number of international airports, the airline image is considerably reduced in the check in area when common–user terminal equipment (CUTE) is used to connect the check in clerk to the airline computers. Use of the CUTE system can substantially reduce the requirements for numbers of check in desks, particularly where there are a large number of airlines and some airlines have very light service schedules or the airline presence is not necessary throughout the whole day.

Passenger Management

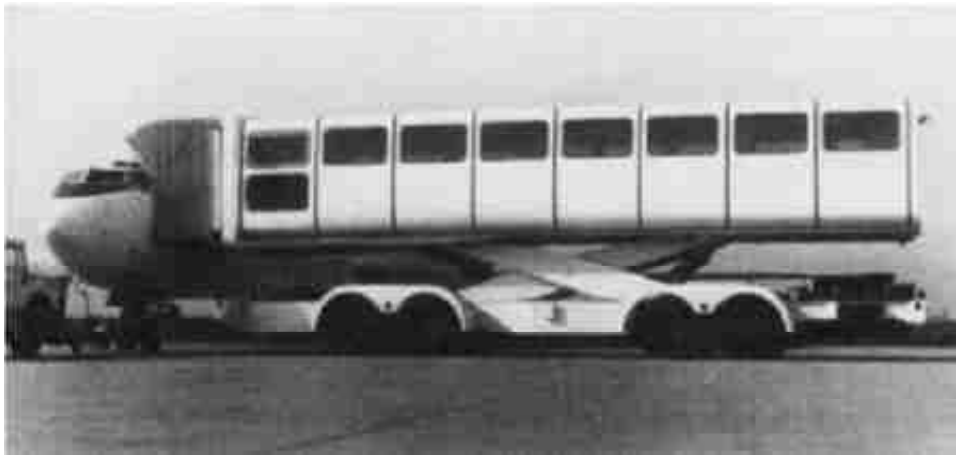
- Desks are assigned by resource managers on a need basis. Check in areas are vacated by one airline and taken up by another based on departure demand.
- The airline's presence at check in desks is displayed on overhead logo panels that are activated when an airline logs onto the CUTE system
- Common Use Self Service or CUSS is a shared kiosk offering check in facilities to passengers without the need for ground staff. The CUSS kiosks can be used by several participating airlines in a single terminal.
- The airside passenger–transfer steps and loading bridges might be operated by the airline on a long–term leasing arrangement or by the airport authority or handling agency at a defined hiring rate to the airlines, depending on the operational model of the airport.
- With the advent of very large aircraft (e.g., the A380), multiple loading bridges are required to cope with passenger flows to and from a single aircraft. They require experienced handling, but even these are normally operated by the airlines.
- Apron passenger–transfer vehicles are usually of the conventional bus type. Both airline and airport ownership and operation are common, airline operation being economically feasible only where the carrier has a large number of movements.

Computer assigned CUTE passenger check in desk

Elevating Passenger Air Bridge

Multi loading bridge configuration system for Airbus 380

Apron Passenger Transport Bus



Mobile Lounge for passenger transport across the apron

❑ **Check Your Progress – 1 :**

1. De–icing is a part of _____ function

   a. Landside b. Aircraft c. Airway d. Airside

2. The immigration counter at an airport is a facility managed by

   a. Airports b. Airlines

   c. Government d. None of options

3. The acronym CUTE stands for
   a. Common User Term Equipment
   b. Common User Terminal Equipment
   c. Common User Terminal Extraction
   d. Code User Terminal Equipment
4. A CUSS is a _____ kiosk for facility to passengers
   a. Shared b. Owned c. Leased d. Purchased

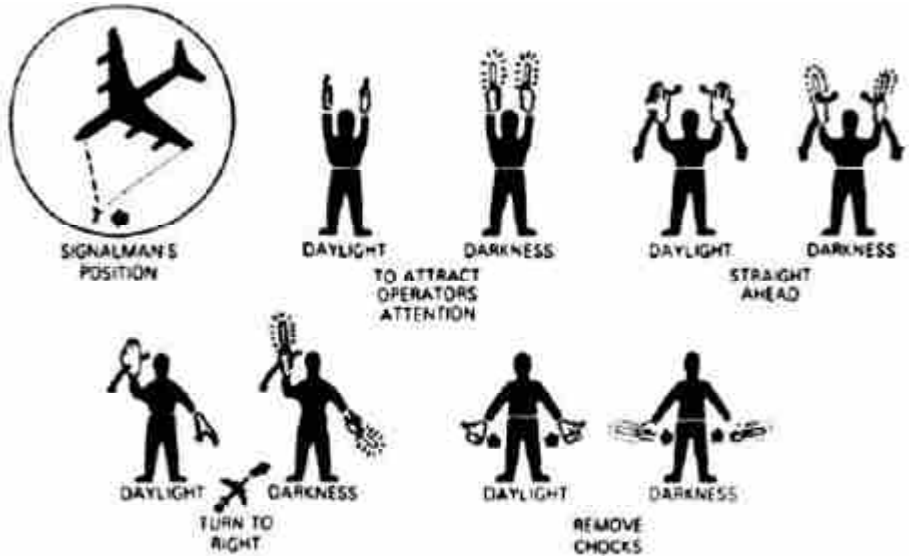
4.4 RAMP HANDLING :

During the period that an aircraft is on the ground, either in transit or on turnaround, the apron is a centre of considerable activity (IATA 2004). Some overall supervision of activities is required (ICAO 2010) to ensure that there is sufficient coordination of operations to avoid unnecessary ramp delays.

- The process is normally carried out by a ramp coordinator or dispatcher who monitors departure control.
- Marshalling is provided to guide the pilot for the initial and final manoeuvring of the aircraft in the vicinity of its parking stand position.
- In the delicate process of positioning the aircraft, the pilot is guided by internationally recognized hand signals from a signalperson positioned on the apron.
- Where nose–in docking is used next to a building, self–docking guides such as the Aircraft Parking and Information System (APIS) using optical moiré technology or the Docking Guidance System (DGS) using sensor loops in the apron pavement enabling the pilot to bring the aircraft to a precise location to permit the use of loading bridges (Ashford et al. 2011).
- Marshalling includes the positioning and removal of wheel chocks, landing–gear locks, engine blanking covers, pitot covers, surface control locks, cockpit steps, and tail steadies.
- Headsets are provided to permit ground–to–cockpit communication, and all necessary electrical power for aircraft systems is provided from a ground power unit.
- When the aircraft is to spend an extended period on the ground, the marshalling procedure includes arranging for remote parking or hangar space.
- The ramp handling process also includes the provision, positioning, and removal of the appropriate equipment for engine starting purposes.
- Safety measures on the apron include the provision of suitable fire fighting equipment and other necessary protective equipment, the provision of security personnel where required, and notification of

the carrier of all damage to the aircraft that is noticed during the period that the aircraft is on the apron.

- Frequently there is a necessity for moving an aircraft, requiring the provision and operation of suitable towing equipment. Tow tractors might be needed simply for pushing out an aircraft parked in a nose–in position or for more extensive tows to remote stands or maintenance areas. It is normal aircraft–design practice to ensure that undercarriages are sufficiently strong to sustain towing forces without structural damage. Tow tractors must be capable of moving aircraft at a reasonable speed [12 mi/h (20 km/h) approximately] over considerable taxiway distances.
- As airports grow larger and more decentralized in layout, high–speed towing vehicles capable of operating in excess of 30 mi/h (48 km/h) have been developed, although speeds of 20 mi/h (32 km/h) are more common. Usually aircraft that are being towed have taxiway priority once towing has started. Therefore, reasonable tow speeds are necessary to avoid general taxiing delays.



Ground signalman marshalling an aircraft (Source : IATA)

Mobile apron engine air–start vehicle

Aircraft Tow Tractor

4.5 AIRCRAFT RAMP SERVICING :

Most arriving or departing aircraft require some ramp services, a number of which are the responsibility of the airline station engineer. When extensive servicing is required, many of the activities must be carried out simultaneously. They are

- **Fault Servicing**

Minor faults that have been reported in the technical log by the aircraft captain and that do not necessitate withdrawal of the aircraft from service are fixed under supervision of the station engineer.

- **Fuelling**

The engineer, who is responsible for the availability and provision of adequate fuel supplies, supervises the fuelling of the aircraft, ensuring that the correct quantity of uncontaminated fuel is supplied in a safe manner. Supply is either by mobile truck or from the apron hydrant system. Many airports use both systems to ensure competitive pricing from suppliers and to give maximum flexibility of apron operation. Oils and other necessary equipment fluids are replenished during the fuelling process.

- **Wheels and Tyres**

A visual physical check of the aircraft wheels and tires is made to ensure that no damage has been incurred during the last takeoff/ landing cycle and that the tires are still serviceable.

- **Ground Power Supply**

Although many aircraft have auxiliary power units (APUs) that can provide power while the aircraft is on the ground, there is a tendency for airlines to prefer to use ground electrical supply to reduce fuel costs and to cut down apron noise. At some airports, the use of APUs is severely restricted on environmental grounds. Typically, ground power is supplied under the supervision of the station engineer by a mobile unit. Many airports also can supply power from central power supplies that connect to the aircraft either by apron cable or by cable in the air–bridge structure.

❖ **De–icing and Washing**

A typical multiuse vehicle suitable for spraying the fuselage and wings with de–icing fluid and for washing the aircraft, especially the cockpit windows, wings, nacelles, and cabin windows. This self–propelled tanker unit provides a stable lift platform for spraying or for various maintenance tasks on conventional and wide–bodied aircraft. According to ICAO, apron drainage facilities must permit the recapture and recycling of de–icing fluid.

De–icing /washer vehicle

Apron Cable Electricity Supply

Fuelling from Apron Hydrant System

Fuelling from Apron Tanker System

❖ **Toilet Servicing**

Toilet holding tanks are serviced externally from the apron by special mobile pumping units. Demineralized water for the engines and potable water are also replenished during servicing.

❖ **Onboard Servicing**

While external aircraft servicing is being carried out, there are simultaneous onboard servicing activities, principally cleaning and catering. Very high levels of cabin cleanliness are achieved by

- Vacuuming and shampooing of all carpets.
- Removal of all litter.
- Re stocking of seat back pockets.
- Cleaning of all smooth areas including armrests.
- Exchange of blankets, pillows and headrests.

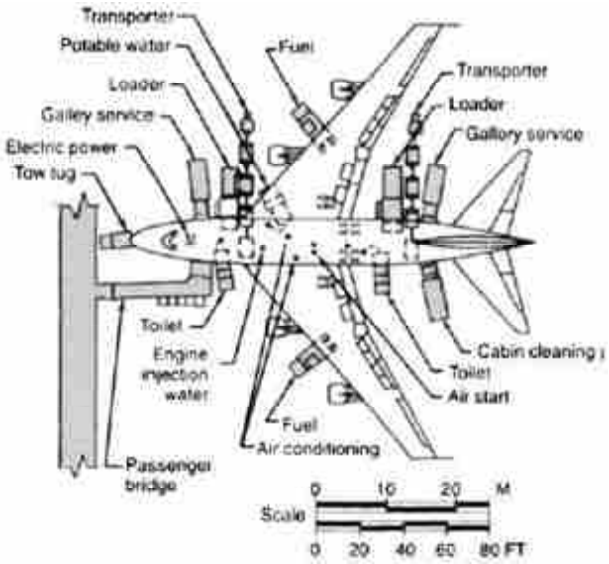
❖ **Catering**

Personnel clear the galley areas immediately after disembarkation of the incoming passengers. After the galley has been cleaned, it is restocked, and a secondary cleaning takes care of spillage during restocking. Internationally agreed standards of hygiene must be met in the handling of food and drink from their point of origin to the passenger. The loading operation happens from a catering truck. These trucks are usually constructed from a standard truck chassis with a closed–van body that can be lifted up by a hydraulic scissor lift powered by the truck engine. Two different types of catering trucks are available : low–lift vehicles suitable for servicing narrow–bodied aircraft up to 11.5 feet (3.5 m) doorsill height and high–lift vehicles for loading wide–bodied jets.

4.5 RAMP LAYOUT :

During the design phase of a commercial air transport aircraft, considerable thought is given to the matter of ramp ground handling.

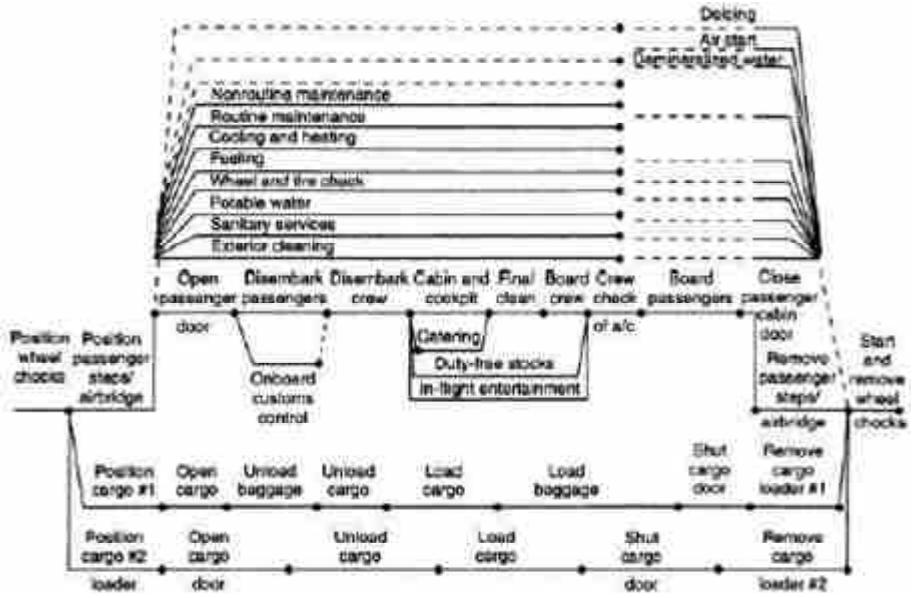
- Modern aircraft are very large, complicated, and expensive. Therefore, the apron servicing operation is also complicated and consequently time–consuming.
- Ramp servicing procedure can be performed efficiently, with many services being carried out simultaneously, to reduce turnaround times, increase staff utilization, productivity of the aircraft and earn more revenue.
- The ramp coordinator is required to ensure that suitable equipment and staff numbers are available for the period the aircraft is likely to be on the ground. Complicated
- The arrival of low–cost carriers (LCCs) has put considerable pressure on ramp efficiency with the demand for very short turnaround times. Some LCCs have negotiated contracts with the airport company that stipulate forfeiture of landing charges when a turnaround time of as low as 20 minutes is exceeded.
- The compatibility of apron handling devices with the aircraft and other apron equipment is very important in the operation. Transporters must be able to load and unload at both the aircraft and the terminal onto beds and loading devices that are compatible with the vehicles' direction of handling. Many transporters can load or unload in the one direction.
- Maintenance of ramp equipment is essential for efficient operations and preventive maintenance is undertaken for successful apron handling.
- Safety measures are very important in ramp operations as audible safety cues are unheard due to noise. Safety protocols to be always followed as per guidelines.



Ramp layout for servicing a B747SP. Note : Under normal conditions, external electrical power, air–start, and air conditioning are not required when the auxiliary power unit is used. (Courtesy : Boeing Airplane Company.)

4.6 DEPARTURE CONTROL :

The financial effects of aircraft delay fall almost entirely on the airline. The impact of delays in terms of added cost and lost revenue can be very high. The functions of departure control, which monitors the conduct of ground handling operations on the ramp (not to be confused with ATC departure), are almost always kept under the control of the airline or its agent. Where many of the individual ground handling functions are under the control of the airport authority, there also will be general apron supervision by the airport authority staff to ensure efficient use of authority equipment. The ramp coordinator in charge of departure control frequently makes decisions that trade off payload and punctuality.



Critical path of turnaround ground handling for a passenger transport aircraft taking cargo.

4.7 CONTROL OF GROUND HANDLING EFFICIENCY :

The ground handling function is not an area of considerable profit for an airport authority. Labour and equipment costs are high, and in general, either revenue barely cover attributable expenses or, as in many cases, are actually less than costs. These losses often are cross–subsidized using revenues from other traffic areas, such as landing fees or non traffic concession revenues. The extreme complexity of the ground handling operation requires skilled and efficient management to ensure that staff and equipment resources are used at a reasonable level of efficiency. The same is achieved through a system of control. The method of control used at any individual airport depends on whether the handling is carried out by the airline, a handling agency such as another airline, or by the airport authority. The tools used for reporting help in decision making for changes in the operation. Some of the tools used are

- **Monthly complaint report :** Each month, a report is prepared that shows any complaints attributable to ground handling problems. The report contains the complaint, the reason behind any operational failure, and the response to the complainant.
- **Monthly punctuality report :** Each month, the manager in charge of ground handling prepares a report of all delays attributable to the ground handling operation. In each case, the particular flight is identified, with its scheduled and actual time of departure. The reason for each delay is detailed. The monthly summary indicates measures taken to reduce similar future delays. A standard aircraft servicing standards are 30 to 60 minutes for a transit operation and 90 minutes for a turnaround. Where LCC operations are involved, these times may be reduced considerably.
- **Cost analysis :** The actual handling organization will, at least on a quarterly basis, analyze handling costs. These costs should include capital and operating costs. Variances between budget and actual expenditure require analysis.
- **General operational standards audit :** To ensure an overall level of operational acceptability, periodic inspections of operations and facilities are made which is especially important for airlines. Inspections ensure that agreed standards are maintained and highlight areas where standards are less than desirable.

Passenger Management

Passenger services: Check-in
Operational adequacy of general check-in desks
First-class check-in service
Waiting time at check-in
Seat selection procedure
Information display
Courtesy and ability of check-in staff
Passenger acceptance control
Standby control, late passengers, overbooking, rebates
Acceptance of excess, special, and oversized baggage
Baggage tagging, including transfer, first class
Security of boarding passes/ticketing/cash and credit vouchers
Minimum and average check-in times
Preparation of passenger lists
Control of catering orders
Ticket issues and reservations
Passenger services: Security
Personal search or scan efficiency
Hand baggage search efficiency
Inconvenience level and waiting times
Passenger services: Escort and boarding
Effectiveness of directions and announcements
Staff availability for inquiries at waiting and boarding points
Assistance at governmental control points
Control of boarding procedure
Liaison level between check-in and cabin staff
Service levels of special waiting lounges for premium ticket holders
Special handling: Minors, handicapped
Passenger services: Arrivals
Staff to meet flight
Information for terminating and transfer passengers
Transfer procedures
Assistance through government control points
Special passenger handling: Minors, handicapped
Baggage delivery standards
Assistance at baggage delivery
Passenger services: Delayed/diverted/canceled flights
Procedures for information to passengers
Procedures for greeters
Messages including information to destination and en-route points
Procedures for rerouting and surface transfers
Meals, refreshments, and hotel accommodations

Checklist for monitoring efficiency of ground handling

Ramp handling: Postdeparture
Accuracy and time of dispatch of postdeparture records and messages
Cargo handling: Export
Acceptance procedures
Documentation: Procedures and accuracy
Reservations: Procedures and performance
Storage: Procedures and performance
Makeup of loads: Procedures and performance
Check weighing
Palletization and containerization: Procedures and performance
Cargo handling: Import
Breakdown of pallets/containers: Procedures and performance
Customs clearance of documents
Notification of consignees
Dwell time of cargo
Lost/damaged cargo procedures
Proof of delivery procedures
Handling of dangerous goods procedures
Handling of restricted goods procedures
Handling of valuable consignments procedures
Handling of live animals procedures
Handling of mail
Administration of ground handling
Office appearance
Furniture and equipment condition
Inventory records: Ramp equipment/vehicles/office equipment/furniture
Budgeting: Preparation and monitoring
Control of cash/invoices/tickets/accounting/sales returns/strongboxes/keys/ airport records/stationery
Complaints register
Staff appearance
Condition of manuals/local instructions/emergency procedures/standing orders/general office file
Passenger services: Baggage facilities
Compilation of loss or damage reports
Baggage tracing procedures
Claims and complaints procedures
Passenger services: Equipment
Check security and condition of all equipment: Scales, reservations printer, seat plan stand, ticket printer, credit-card imprinter, calculators, etc.
Condition and serviceability of ramp vehicles
Serviceability and appearance of ramp equipment
Maintenance of ramp equipment and vehicles
Control of ramp equipment and vehicles
Driving standards and safety procedures
Communications: Telephones, ground-air radio, ground-ground radio

Ramp handling: Aircraft loading/unloading Care of aircraft exteriors, interiors, and unit load devices Adequacy of loading instructions and training Ramp equipment planning and availability Positioning of equipment to aircraft Loading and unloading supervision Securing, restraining, and spreading loads Operation of load equipment Operation of aircraft onboard systems Securing partial loads Ramp security Ramp safety Pilferage and theft
Ramp handling: Cleaning/catering Standard of cockpit and cabin cleaning/dressing Toilet/potable-water servicing Catering loading/unloading Availability of ground air Air-jetty operations
Ramp handling: Load control (for airline only) Load sheet accuracy and adequacy of presentation Load planning Advance zero-fuel calculation and flight preparation
Ramp handling: Aircraft dispatch Punctuality record Turnaround/transit supervision Passenger release from aircraft Passenger waiting time at boarding point Logs and message files Accuracy of records of actual departure times Flight plan, dispatch meteorological information

Checklist for monitoring efficiency of ground handling

❑ **Check Your Progress – 2 :**

1. Monthly Punctuality Report is a _____ measure of ground efficiency

   a. Criminal b. Correspondence

   c. Convenient d. Control

2. A catering truck reaches the aircraft door with the help of

   a. Air Pressure b. Ladder

   c. Hydraulic Scissor lift d. None of options

3. The acronym APU stands for

   a. Arm Power Unit b. Auxiliary Power Unit

   c. Auxiliary Performance Unit d. Armature Power Unit

4. The acronym DGS stand for

   a. Docking Guidance System b. Docking Guidance Sensor

   c. Docking Guard System d. Docking Guard Sensor

4.8 LET US SUM UP :

Ground handling operations are set of tasks undertaken that determine the efficiency of an airport. Through a series of complex multiple operations, aircrafts are readied for the next safe flight within a stipulated time period. There are multiple stake holders involved in passenger and ramp operations who work together to ensure hassle free movement of passengers, cargo and maintenance of the aircraft. Ground handling operations can be undertaken by the Airline Company, airport operators or agencies in coordination with both, depending on the policy and regulation at the airport. The critical aspect in the entire operation is safety, security, time, efficiency and coordination of all the stake holders involved.

4.9 ANSWERS FOR CHECK YOUR PROGRESS :

Check Your Progress – 1 :

1. d **2.** c **3.** b **4.** a

Check Your Progress – 2 :

1. d **2.** c **3.** b **4.** a

4.10 GLOSSARY :

1. **Critical Path :** The critical path (or paths) is the longest path (in time) from Start to Finish; it indicates the minimum time necessary to complete the entire project.
2. **Hydraulics :** Hydraulics is a technology and applied science using engineering, chemistry, and other sciences involving the mechanical properties and use of liquids.
3. **Marshalling :** Aircraft marshalling is visual signalling between ground personnel and pilots on an airport, aircraft carrier or helipad.
4. **Potable :** Safe to drink.
5. **Ramp :** Areas on the Airport intended to accommodate aircraft for purposes of loading or unloading passengers or cargo, refuelling, parking, or maintenance.
6. **Apron :** The apron is an airplane's parking area, normally located off the airport runway and taxiway.

4.11 ASSIGNMENT :

1. List the activities that happen inside an aircraft undertaken by different agencies between deplaning of passengers on arrival and boarding of passengers for the next flight.
2. Indicate the documents and checklists used in the entire process.

4.12 ACTIVITY :

1. List some airports across the globe that provides ramp services.
2. List the ramp services provided by the airport operators and charges levied from airlines in lieu of these services.

4.13 CASE STUDY :

A full service flight got delayed from its schedule departure time due to the late arrival of the catering off loader. The Off loader though was on time at the airport gate, was denied entry into the apron due to permit issues. Once on the apron, the hydraulics of the off loader failed. The entire meal packed in trolleys had to be carried through the ramp. The flight missed its slot and was 45 minutes behind schedule for takeoff. The airline was charged a penalty by the airport authorities and the same was passed on by the airline company to the catering company. A legal suit was filed by the catering company stating the cause of delay being created by the airport authorities on pretext of permit. The matter is sub–judice and decision for the same is pending.

Q. 1. What went wrong on the part of the catering company?

Q. 2. What steps should be taken by the catering company to ensure that such incidents do not recur ?

4.14 FURTHER READING :

1. Airport Operations by Norman Ashford
2. Airline and Airport Operations by Edissa Uwayo
3. Aviation Management : Global and National Perspectives
4. www.wikipedia.org

BLOCK SUMMARY

In this block you have been acquainted to Airport operations executed by a team of experts to induce efficiency in managing airline operations. The units highlight the different certifications and compliances laid down by ICAO, the different operational challenges that are faced by airports as part of operations, peak hour operations and scheduling policies undertaken by airports to manage peak hour operations. The units also acquaint you to National Airport Systems and managing systems of airports under a structured system. The final unit 4 makes you aware about ground handling operations that are important for managing the operations at an airport.

BLOCK ASSIGNMENT

Short Questions :

1. List the operating constraints in an airport with reference to Bird Strike, Visibility and Crosswinds ?
2. List the different methods to calculate peak time operations at airports ?
3. What are National Airport Systems ? List the importance and objectives of National Airport Systems ?
4. Explain the Ground Handling processes undertaken at airports ?

Long Questions :

1. How is snow an operational constraint and what measures are undertaken at airports to combat the same ?
2. Enumerate on Airfield Inspections as part of operational efficiency ?
3. List the importance of maintenance management in operations management ?
4. Factors and constraints on airline scheduling policies ?
5. Explain the role of DGCA in India ?
6. Enumerate on the scope of Ground Handling Operations ?

❖ **Enrolment No. :** ☐

1. How many hours did you need for studying the units ?

Unit No.	1	2	3	4
No. of Hrs.				

2. Please give your reactions to the following items based on your reading of the block :

Items	Excellent	Very Good	Good	Poor	Give specific example if any
Presentation Quality	☐	☐	☐	☐	_____
Language and Style	☐	☐	☐	☐	_____
Illustration used (Diagram, tables etc)	☐	☐	☐	☐	_____
Conceptual Clarity	☐	☐	☐	☐	_____
Check your progress Quest	☐	☐	☐	☐	_____
Feed back to CYP Question	☐	☐	☐	☐	_____

3. Any other Comments

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PASSENGER MANAGEMENT

DR. BABASAHEB AMBEDKAR OPEN UNIVERSITY
AHMEDABAD

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ISBN 978-93-91071-23-3

Edition : 2022

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ROLE OF SELF INSTRUCTIONAL MATERIAL IN DISTANCE LEARNING

The need to plan effective instruction is imperative for a successful distance teaching repertoire. This is due to the fact that the instructional designer, the tutor, the author (s) and the student are often separated by distance and may never meet in person. This is an increasingly common scenario in distance education instruction. As much as possible, teaching by distance should stimulate the student's intellectual involvement and contain all the necessary learning instructional activities that are capable of guiding the student through the course objectives. Therefore, the course / self-instructional material are completely equipped with everything that the syllabus prescribes.

To ensure effective instruction, a number of instructional design ideas are used and these help students to acquire knowledge, intellectual skills, motor skills and necessary attitudinal changes. In this respect, students' assessment and course evaluation are incorporated in the text.

The nature of instructional activities used in distance education self- instructional materials depends on the domain of learning that they reinforce in the text, that is, the cognitive, psychomotor and affective. These are further interpreted in the acquisition of knowledge, intellectual skills and motor skills. Students may be encouraged to gain, apply and communicate (orally or in writing) the knowledge acquired. Intellectual- skills objectives may be met by designing instructions that make use of students' prior knowledge and experiences in the discourse as the foundation on which newly acquired knowledge is built.

The provision of exercises in the form of assignments, projects and tutorial feedback is necessary. Instructional activities that teach motor skills need to be graphically demonstrated and the correct practices provided during tutorials. Instructional activities for inculcating change in attitude and behavior should create interest and demonstrate need and benefits gained by adopting the required change. Information on the adoption and procedures for practice of new attitudes may then be introduced.

Teaching and learning at a distance eliminates interactive communication cues, such as pauses, intonation and gestures, associated with the face-to-face method of teaching. This is

particularly so with the exclusive use of print media. Instructional activities built into the instructional repertoire provide this missing interaction between the student and the teacher. Therefore, the use of instructional activities to affect better distance teaching is not optional, but mandatory.

Our team of successful writers and authors has tried to reduce this.

Divide and to bring this Self Instructional Material as the best teaching and communication tool. Instructional activities are varied in order to assess the different facets of the domains of learning.

Distance education teaching repertoire involves extensive use of self- instructional materials, be they print or otherwise. These materials are designed to achieve certain pre-determined learning outcomes, namely goals and objectives that are contained in an instructional plan. Since the teaching process is affected over a distance, there is need to ensure that students actively participate in their learning by performing specific tasks that help them to understand the relevant concepts. Therefore, a set of exercises is built into the teaching repertoire in order to link what students and tutors do in the framework of the course outline. These could be in the form of students' assignments, a research project or a science practical exercise. Examples of instructional activities in distance education are too numerous to list. Instructional activities, when used in this context, help to motivate students, guide and measure students' performance (continuous assessment)

PREFACE

We have put in lots of hard work to make this book as user-friendly as possible, but we have not sacrificed quality. Experts were involved in preparing the materials. However, concepts are explained in easy language for you. We have included many tables and examples for easy understanding.

We sincerely hope this book will help you in every way you expect. All the best for your studies from our team!

PASSENGER MANAGEMENT

Contents

Dr. Babasaheb Ambedkar Open University Ahmedabad

BBAATR-303

Passenger Management

BLOCK 4 : PASSENGER SERVICE SYSTEM

PASSENGER SERVICE SYSTEM

Block Introduction :

The first unit of this block describes the CRS, Airline Inventory System, and Departure Control System, the three most important parts of the complicated passenger service system. The second unit emphasizes the problem of getting to the airport by any passenger and its impact on the operations of the airport. Unit second of this block will take learners to the aspects of reservation and booking issues using PSS. The unit will also discuss and analyse market of PSS in some major countries of world. The third unit gives you an insight into the operational aspects of modern airports that determine service levels at airports through various relevant aspects. The last unit enlightens you with three case studies related to customer service and service delivery. A case on business model of Airline within airline (AWA) is also explained for you to understand the changes in the business and operational structure of airline companies.

Block Objectives :

- To explain the different aspects of passenger services system including CSR, Airline inventory system and departure control system
- To list top companies of PSS and explain the working function of these companies
- To understand the use of PSS in reservation, airline booking and the challenges using PSS
- To Analyse market of PSS on the basis of country and competitive environment
- To list the strategic context of operational performance levels of service at airports and enumerate the determinants of service effectiveness at airports
- To explain the tactical approach to administration of airport operations and the key factors for High Performance airport operations

Block Structure :

Unit 1 : Passenger Service System – I

Unit 2 : Passenger Service System – II

Unit 3 : Operational Performance and Services

Unit 4 : Case Studies

UNIT 01

Passenger Service System – I

UNIT STRUCTURE

1.0 LEARNING OBJECTIVES :

- To learn about the meaning of Passenger Service System (PSS)
- To understand about the three main components of PSS
- To articulate about the three pillars of PSS & get in–depth about NDC
- To discuss about top market leaders in PSS

1.1 INTRODUCTION :

Hundreds of flights have been cancelled. Thousands of passengers are stranded at airports. Family gatherings were missed. Vacations have been ruined. Travel arrangements were messed up. Million–dollar transactions failed. It is a real–life scenario caused by minor flaws in a computer system. This is something that happens quite frequently nowadays.

British Airways recently cancelled more than 100 flights and delayed another 200 due to IT outages involving two components of their passenger service software – one responsible for online check–in and the other for flight departure.

It wasn't just another occurrence. It was yet another reminder of the overall fragility of aviation IT, which was caused by a variety of factors ranging from ageing technologies to poor communication between different components to the introduction of immature solutions.

This unit will discuss airline software suites, their major modules, and available modern solutions designed to improve the current state of affairs.

1.2 MEANING OF PASSENGER SERVICE SYSTEM (PSS) :

If travellers are stranded at the airport due to IT outages, the passenger service system (PSS) is most likely to blame. PSS is a software suite that helps carriers and their customers with everything from ticket reservations to boarding. Its mission is to keep operations running smoothly, and failures in its work can result in tens of millions of dollars in lost revenue for airlines.

SABRE (Semi–Automated Business Research Environment) was the first CRS to appear in the 1960s, and it later evolved into one of three major global distribution systems (GDSs). The first system, developed by IBM for American Airlines, could update seat occupancy in real time, create passenger name records (PNRs), and print tickets. American Airlines spent $40 million (nearly $348 million in 2019 prices) on the innovation, which took 400 man–years to prepare functional requirements, write programme specifications, and complete coding.

It is not surprising that, following the introduction of the first CRS, other airlines preferred to leverage IBM's expertise rather than reinvent the wheel. SABRE's heirs benefited from the same operating system, known as Transaction Processing Facility (TPF), which was designed to handle a high volume of transactions on mainframe computers.

1.3 THREE GENERATIONS OF PSS :

In commercial aviation, three generations of PSSs coexist.

The First Generation : Legacy Systems

Many early adopters of passenger service software continue to use Transaction Processing Facility (TPF) in their day–to–day IT operations. On the one hand, legacy systems continue to meet basic industry requirements : they process large volumes of transactions while remaining extremely fast, dependable, and secure. On the other hand, the "antiquated" technologies are costly to maintain, rigid, and difficult to integrate with newer applications that the airline could use.

However, the main issue with legacy systems is that they prevent airlines from increasing profits. Modern travellers expect mobile access, convenient payment methods, rich content, a high level of personalization, loyalty programmes, and other commodities that outdated systems simply

cannot provide. As a result, airlines miss out on new revenue opportunities from providing additional services.

The Second Generation : Patchwork of Old and New Technologies

The transition to a new PSS could take years and cost millions of dollars. As a result, many airlines are attempting to strike a balance between legacy systems and customer pressure.

Carriers use middleware, or software that allows them to link new applications and interfaces to their mainframe programmes, to leverage technologies from the previous century and urgent passenger needs. This approach resulted in the rise of second–generation platforms, which are essentially a patchwork of integrations that are not always correctly synced and perfectly adjusted. While the second generation of PSSs is more passenger–friendly overall, it lacks reliability due to component inconsistencies.

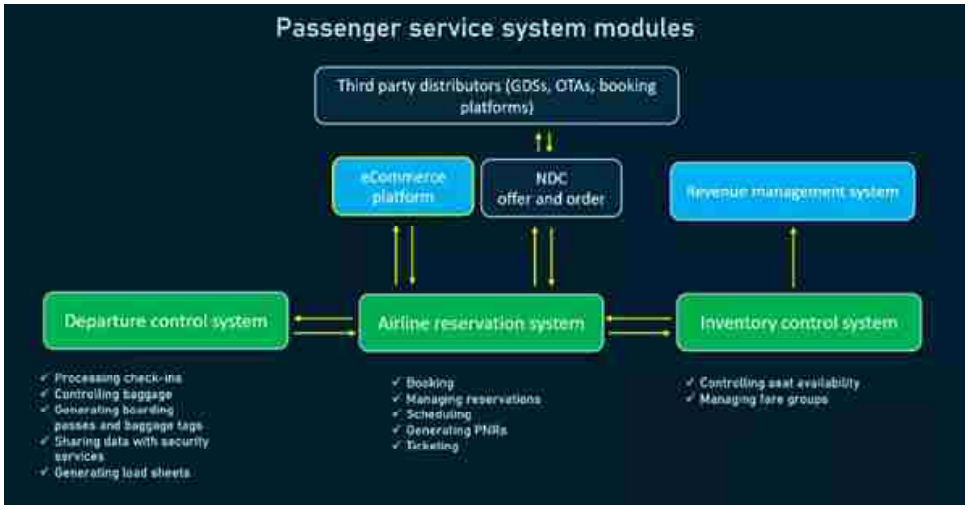
The Third Generation : Service–Oriented Approach

PSS providers are currently transitioning from monolithic to service–based design – either Service Oriented Architecture (SOA) or microservices. This approach enables the development of complex applications as suites of small, scalable, independently maintained and deployed modules. When necessary, airlines can add, update, or change components without disrupting the entire system.

Software components in the SOA scenario communicate with one another via Enterprise Service Bus (ESB) messaging protocols. Microservices are frequently regarded as the next step in the evolution of SOA : components are completely autonomous, use separate databases, and exchange data via HTTP–based REST or Thrift APIs.

1.4 THREE PILLARS OF PASSENGER SERVICE SYSTEM MODULE :

The three pillars of passenger services are the main PSS modules. Every PSS has a customer–facing solution to communicate with users, whether it's a website, mobile app, chatbot, or airport kiosk. However, the most important aspect of operations occurs behind the scenes. The PSS's primary daily tasks are divided among three subsystems : an airline or central reservation system, an airline inventory system (AIS), and a departure control system (DCS). Each of them deserves a little more thought.



Passenger Service System Structure (Main and Additional Components)

Central Reservations System (CRS) :

An airline's or central reservation system's core function is to serve as a database for flight schedules, available seats, fares and rules for each booking class, and passenger profiles. Apart from storing flight–related data, its primary functions are as follows :

- Control over reservation requests and cancellations
- Display flight schedules, available seats, and prices in response to passenger or intermediary requests (travel agents, call centres, General Distribution Systems or GDSs, Online Travel Agencies or OTAs);
- Passenger Name Records (PNRs) – personal codes containing data on travel dates and itineraries, ticket details, baggage, and the passenger's name and contact information; and
- Ticketing entails issuing tickets (either paper or electronic) and keeping track of ticket sales.

The CRS is integrated with a flight booking engine and interfaces with passenger touchpoints such as the airline's website, GDSs, OTAs, and third–party booking platforms to perform its functions.

Departure Control System (DCS) :

Passengers are handled at the airport by a departure control system (DCS), from check–in to boarding. It specifically streamlines the following operations :

- Passenger check–ins from all touchpoints – service counters, self–check–in kiosks, mobile and web apps
- Weighing and controlling luggage;
- Making and printing boarding passes and luggage tags
- Information sharing with security services; and
- Generating load sheets containing weight and balance data for a specific flight (including the weight of the aircraft, fuel, crew, passengers, baggage, cargo, mail, and pantry).

To confirm and update information on passengers and bookings, the DCS communicates with the airline reservation system.

Airline Inventory System (AIS) :

An airline inventory system's primary goal is to control the availability of seats in various cabins and to manage fare groups or buckets. The AIS opens and closes fare buckets based on the rules established by an airline. It is worth noting that the AIS is frequently (but not always) included as part of the airline reservation system. Otherwise, the two modules constantly exchange information to ensure that it is up to date.

1.5 ADDITIONAL PSS : CREATING A ONE–STOP SHOP FOR TRAVELLERS :

Modern airlines frequently supplement their critical PSS modules with software that streamlines other critical operations. Here are some of the most useful (and thus popular) integration solutions for the core system.

Revenue Management System :

Airlines, like hotels, strive to maximise revenue by "selling the right seats to the right passengers at the right price and at the right time." As previously mentioned, the inventory system checks occupancy and assigns prices to seats based on predefined rules. Airlines delegate this task to revenue managers and revenue management systems (RMS) equipped with the following features :

- Gathering and analysing historical booking and sales data in order to identify buying patterns and trends
- Forecasting demand based on historical data and other inputs such as changes in customer behaviour, market trends, and competitor strategies; and
- Advising on booking limits to maximise expected flight revenue

Carriers can develop an effective pricing strategy by combining deep domain expertise with the power of machine learning.

Retail Platform at Airport :

According to an IATA report, as of mid–2019, airlines generated an average of $189 in revenue per departing passenger, which included the base fare, cargo payments, and ancillary services. Simultaneously, they spent nearly $183 on fuel, salaries, and operating expenses to get each traveller to their destination. So the net profit was only $6.12 per passenger, which is slightly more than the price of a Big Mac in the United States ($5.58).In a highly competitive environment, a carrier cannot dramatically raise base fares without losing customers to competitors. As a result, ancillary revenue, or revenue generated from products and services other than core transportation, is the most promising and consistent source of profits in the modern airline industry.

In 2019, average revenue from ancillary services has already reached $24 per passenger, representing a 10% increase over 2018. Fees for excess baggage, extra legroom seats, or onboard WiFi will become an even more important component of an airline's success in the future.

Airlines should shift from selling bare tickets to selling flight experiences in order to increase revenue. The first step toward achieving this goal is to transform websites and mobile apps into intelligent eCommerce platforms. The following are typical must–have features that provide a competitive advantage :

- Payment options that are convenient
- Catalogues of available ancillaries with extensive content
- Catalogues with a wealth of information about complementary products and services, such as car rentals, excursions, attraction tickets, travel cards, and so on;
- and shopping cart functionality
- AI–powered tools that use dynamic pricing and bundling to personalise offers, loyalty programmes, and recommendations.

1.6 NEW DISTRIBUTION CAPABILITY (NDC) :

E–commerce websites enable airlines to sell additional services to their customers directly. However, in order to market tailored offers through third–party channels, they must enable the IATA's New Distribution Capability (NDC). This standard is being developed to deliver rich content related to flight options and additional services via an XML message suite. More information about the advantages of NDC can be found in our article – NDC in Air Travel.

The airline integrates its existing software into the NDC environment via the NDC offer and order management system, which runs concurrently with the airline's PSS. A carrier can either hire a tech team to create a customised platform that complies with the NDC Standard, or it can connect its reservation system to a third–party solution such as FLX NDC API, t–Retail, or NDC Gateway. Many leading providers of passenger service software include an NDC–enabled offer and order management module with their PSSs or sell it as an add–on component that easily integrates with the core system.

When deciding between NDC–enabled offer and order management platforms or PSSs, IT providers should consider NDC certificates issued by IATA. The certificate level demonstrates a technology's true ability to receive and send NDC messages (offers and orders).

Level 1 is no longer available, leaving three options.

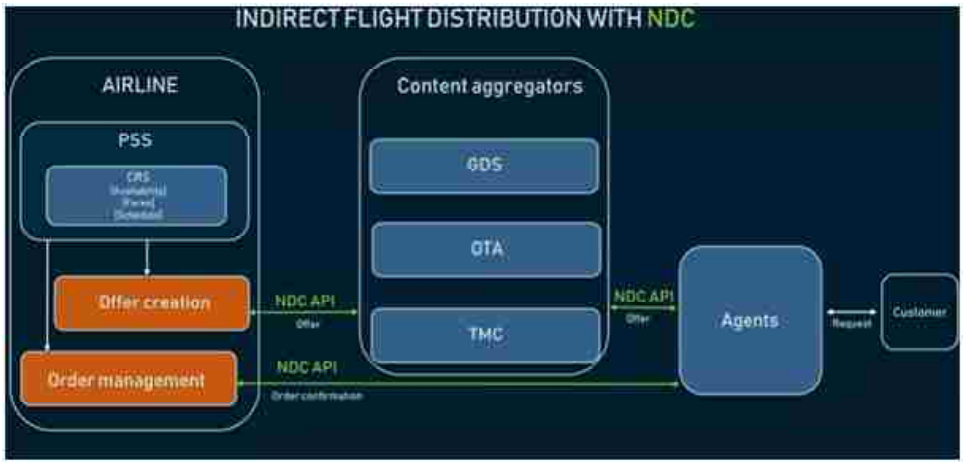
Level 2 : Offer management enables airlines to distribute rich content (texts, videos, and images) and sell not only traditional seat/fare pairs, but also :

- Ancillaries,
- Options for luggage,
- Options for seating, and
- Flights with additional services included

Level 3 : Offer and order management in addition to the benefits of level 2, it allows carriers to :

- Finalise an offer price, taking into account additional information such as frequent flyer points or credit card fees
- Create orders from offers and show them to customers
- Order changes and updates, and
- EMDs are issued (Electronic Miscellaneous Documents, introduced by IATA to sell ancillary services).

Level 4 : Full offer and order management : provides an airline with complete control over shopping, booking, payment, and ticketing, as well as order cancellation.



Indirect flight distribution with NDC : Airlines have offer and order management systems that interact with their PSS

One Order Certification : IATA announced the One Order Certification programme in January 2019. The ONE Order concept involves combining all current passenger–related records (PNR, e–ticket, and EMD) into a single reference order. ONE Order is still a concept at the time of writing, but several airlines and IT providers have already received corresponding certificates. SABRE, Amadeus, Lufthansa Systems, and JR Technologies were among the early adopters.

1.7 LEADERS OF PASSENGER SERVICE SYSTEM :

A PSS is not your typical application that you can download from Google Play or commission from an outsourced development team. While many IT companies offer separate passenger–related software solutions or can assist you with integrations, only a few companies offer off–the–shelf full–scale systems. We'll compare three market leaders who control more than 60% of the air reservation market.

ALTÉA SUITE BY AMADEUS :

Air Canada, Austrian Airlines, Bangkok Airways, British Airways, Brussels Airlines, Cathay Pacific, Cyprus Airways, Flybe, IAG, Japan Airlines, KLM, Lufthansa, Qantas, Southwest Airlines, Swiss International Airlines are among the key clients.

No technology is without flaws. However, Amadeus, the world's largest GDS, clearly makes efforts to alleviate passenger pain while minimising airline losses. Not for nothing does its PSS include a number of innovative solutions to prevent customer dissatisfaction or address problems proactively at all stages.

Altéa Reservation : Enables partner airlines to share fares, customer and booking information, and ensures seamless integration. It makes connecting flights easier, which improves the customer's travel experience. Furthermore, the reservation system provides passengers with real–time flight information, notifying them of delays and cancellations.

Altéa Inventory : It includes revenue management tools that enable live experts to set optimal prices, identify high–value customers, and respond instantly to competitor actions. It automates schedule management operations, updates seating and wait–list access rules based on customer value, and finds the best flights if a passenger needs to be re–accommodated, in addition to inventory control.

Departure Control (DC) : This system assists passengers throughout their journey, from online check–in to printing bag tags and receiving a boarding pass directly on a smartphone. The technology also monitors the luggage with an innovative "track and trace" solution. The compensation management tools are the best part of the DC module. The software quickly calculates the appropriate repayments for each customer based on traveller profiles and data about the type of disruption. Such a proactive approach makes stranded passengers feel a little better.

Flight Management Component : controls and optimises load distribution within the aeroplane to achieve perfect balance and reduce fuel costs.

It covers all ticket management functions, such as issuing electronic and paper tickets, ticket changes, and generating EMDs from ancillary sales.

Amadeus Altéa NDC Solution : enables end–to–end NDC shopping as well as offer and order management. Amadeus holds a dual Level 4 certificate as an aggregator and an IT provider, giving it complete control over offer and order processes.

SABRESONIC CUSTOMER SALES & SERVICE (CSS) :

Clients include large full–service airlines such as Aeroméxico, Aeroflot, Alaska Airlines, American Airlines, Ethiopian Airlines, LATAM Airlines, and Vietnam Airlines, as well as large low–cost carriers such as JetBlue, Volaris, and WestJet.

The second–largest PSS is in the process of transitioning from mainframe computers to microservices architecture. It intends to replace middleware solutions that do not always work well with a unified cloud–based platform. The migration has taken over a decade, and as of 2019, approximately 11% of Sabre's code remains in–house data centres. SabreSonic CSS is expected to migrate entirely to the cloud by 2023. Airlines can now take advantage of a number of modernised modules and new integrated tools.

The Reservation System : It includes sophisticated customer–management tools for recognising repeat customers and implementing frequent flyer programmes. The module, like Amadeus Altéa, supports carrier alliances and partnerships, resulting in more convenient flight connections for travellers. It also gives airline managers access to comparative market data, allowing them to make informed decisions and adjust their strategies.

The Inventory Module : It provides inventory control and data exchange in real time. It facilitates O&D revenue management techniques such as advanced fare qualification and interline proration. It includes a new check–in solution that allows airline personnel to track their passengers at each point of service. It is linked to a weight and balance application, ensuring efficient flight loading.

The Ticketing Component : Not only does it issue e–tickets and EMDs, but it also handles exchange and refund operations and allows airlines to track all sales activities through convenient reporting and reconciliation tools. It facilitates interline partnerships through an electronic ticketing hub and allows passengers to pay with credit cards, PayPal, e–Bank, and other methods.

SabreSonic Web is an NDC–enabled eCommerce platform with an integrated booking engine and ultra–fast shopping. It includes tools for targeted ancillary merchandising across all check–in channels – mobile apps, websites, and kiosks. Pricing add–ons, loyalty solutions, built–in analytics, and revenue reports are also available to airlines. Sabre was awarded a Level 3 NDC certificate as both an aggregator and an IT provider.

NEW SKIES NAVITAIRE :

AirAsia, Eurowings, FLY ONE, Gol, IndiGo, Italo, JetStar, LEVEL, Ryanair, Scoot, Swoop, Transavia, TUI, Vueling, and Wizz Air are among the early adopters.

New Skies, which is owned by Amadeus Group, meets the needs of low–cost airlines that rely heavily on revenue from ancillary services. Navitaire's PSS is positioned as a digital "e–commerce first" platform, complete with merchandising, personalization, and analytics tools. Key modules will be mentioned below.

The Reservation System : It is based on the highly scalable Internet Booking Engine. It integrates with customised booking applications, allowing you to avoid GDS fees. The system takes full advantage of Amadeus' extensive airline partnerships.

Schedule Manager : This application synchronises schedules with inventory, generates enhanced seat maps, and performs real–time updates.

Fare Manager : This programme generates and modifies fares based on predefined rules and ATPCO (Airline Tariff Publishing Company) standards. The tool supports multi–currency fares to improve the passenger experience.

Travel Commerce : It is a powerful e–commerce platform that is tightly integrated with the reservation system and the NDC environment (Navitaire has a level 3 NDC certificate). It assists airlines in selling standalone ancillaries as well as fare and ancillary bundles through a variety of distribution channels. Furthermore, the platform integrates travel services from third–party suppliers, allowing carriers to generate revenue by selling event tickets, city tours, car rentals, and other services.

The Advanced Payment : Engine allows for real–time payment processing by connecting directly to credit card networks. Airlines can easily add additional payment options to accommodate their passengers' preferences. The engine includes a number of useful tools and services, such as fraud detection and dynamic currency conversion.

Check–In Solution : It allows passengers to check in using their smartphones, tablets, or kiosks. They can also pay baggage fees and purchase ancillaries.

New Skies PSS does not include departure control or revenue management systems in order to adhere to the low–cost business model. They are sold as separate modules, and carriers can purchase and install them at any time.

❑ **Check Your Progress :**

1. Which was the first CRS in airline industry ?
   a. Amadeus b. Saber
   c. New Skies Navitaire d. None of the above options
2. Which is not the three pillar of PSS ?
   a. Computer Reservation System
   b. Airline Inventory System
   c. Departure Control System
   d. Off Airport Acess
3. Diparture Control System includes _____
   a. Passenger Check–in process b. Baggage handling process
   c. Sharing security information d. All of the above options

4. Revenue Mangement System in part of PSS.
   a. Yes b. No c. Can't Say d. *******
5. Average revenue from ancillary services per passenger from retail in 2019 was _____
   a. $21 b. $22 c. $23 d. $24
6. NDC acronym stand for _____
   a. Non–Durable Capability b. New Distribution Capability
   c. Non–Distribution Capability d. None of the above options
7. In NDC the level 3 is _____
   a. Offer Management b. Order Management
   c. Both a and b options d. None of the above options
8. Saber, Amadeus and New Skies navitaire control _____ of the air reservation market.
   a. 50% b. 60% c. 70% d. 80%

1.8 LET US SUM UP :

A passenger service system (PSS) is a collection of critical systems that airlines use. Typically, the PSS consists of an airline reservations system, an airline inventory system, and a departure control system (DCS). In general, the PSS is made up of modules that are used to manage various aspects of the airline's operations. The airline reservations system allows an airline to sell their inventory (seats). It contains schedule and fare information, as well as a database of reservations (or passenger name records) and tickets issued (if applicable). The inventory system of the airline may or may not be linked to the reservation system. The system contains information on all of the airline's flights as well as available seats. The inventory system's primary function is to define how many seats are available on a specific flight by opening or closing an individual booking class in accordance with the airline's rules. Airlines and airports use the departure control system (DCS) to check in passengers. This unit discusses all of the components in detail, as well as the market leader in PSS.

1.9 ANSWERS FOR CHECK YOUR PROGRESS :

1. b **2.** d **3.** d **4.** a
5. d **6.** b **7.** c **8.** b

1.10 GLOSSARY :

1. **Application Programming Interface (API) :** It enables companies to open up their applications' data and functionality to external third–party developers and business partners, or to departments within their companies.

2. **Electronic Miscellaneous Document (EMD) :** It is an International Air Transport Association standard for electronically documenting ancillary revenue; that is, all other sales and transactions between airlines and passengers besides electronic tickets.
3. **Enterprise Service Bus :** An implements a communication system between mutually interacting software applications in a service–oriented architecture.
4. **Global Distribution System :** It is a worldwide reservation system that acts as a conduit between travel bookers and suppliers, such as hotels, other accommodation providers and other travel related services.
5. **Service Oriented Architecture :** It is a method of software development that uses software components called services to create business applications.
6. **Transaction Processing Facility :** An operating system for IBM mainframes specialized for large transaction processing systems such as airline reservations.

1.11 ASSIGNMENT :

1. Explain the three pillars of PSS with examples.
2. What is New Distribution Capability's offer & order management ?

1.12 ACTIVITY :

1. Find out which airline companies uses Saber or Anadeus CRS.
2. Examine the features of different CRS and rate them on the basis of their better user experience.

1.13 CASE STUDY :

An elderly couple had to board a connecting flight with no code share from Terminal 3 of a particular airport. The aircraft they arrived landed at Terminal 1 of the airport and was delayed by 20 minutes. The couple had around 1hour 30 minutes time for the next flight. On arrival they could not make out their way to Terminal 3. They asked few people and security who directed them to catch a coach running between terminals. With all the luggage they stood for the coach and the same arrived in 5 to 7 minutes. The coach had 3 stairs to climb and as elderly people with no assistance from the coach service to manage their luggage, it was a difficult scenario. Somehow with the help of other coach passengers they boarded. The journey took them 15 minutes as the distance between the terminals was 5 km. Once they reached Terminal 3, they had to walk down a long way until they could find a baggage trolley. There was only 45 minutes left to the departure of the flight once they entered the terminal 3. The time remaining at hand was very insufficient for an elderly couple as they had to follow baggage, security and immigration procedures.

Q. 1. What are the elements of concern that the airport authorities should look into to make passenger experiences like above better ?

Q. 2. What steps should the authorities undertake to ensure that passengers do not get troubled ?

1.14 FURTHER READING :

1. Airport Operations by Norman Ashford
2. Airline Operations and Scheduling by Massoud Bazargan
3. Aviation Management : Global and National Perspectives

UNIT 02

Passenger Service System – II

UNIT STRUCTURE

2.0 LEARNING OBJECTIVES :

After learning this unit, the learns will be able to :

- Understand about the use of PSS in reservation and airline booking
- Know the challenges using PSS
- Analyse market of PSS on the basis of country and competitive environment

2.1 INTRODUCTION :

The Central Reservation System (CRS), or booked inventory, an airline inventory system (free inventory), and a departure control system are typically part of the Passenger Service System (DCS). It is essentially the technology required for an airline to operate successfully. The CRS is the system through which an airline sells its inventory (seats). It contains schedule and fare information, as well as a database of reservations (or passenger name records) and issued tickets. The airline inventory system might or might not be linked to the CRS. The system contains information on all of the airline's flights as well as available seats. The inventory system's primary function is to define how many seats are available on a specific flight by opening or closing an individual booking class in accordance with the airline's rules. Airlines and airports use the departure control system to check in passengers. The DCS is linked to the reservation

system, allowing it to determine who has a valid reservation on a given flight. The DCS is used to enter customs or border security information and to generate the boarding document. Furthermore, the DCS can be used to dispatch cargo and optimise aircraft weight and balance.

PSSs, particularly the CRS portion, are still typically built on mainframes running the Transaction Processing Facility (TPF) operating system. However, CRS providers are moving away from such mainframes (at least in part) to allow for greater flexibility, open source, and cloud–based solutions. In the travel industry, those mainframes and TPF are frequently referred to as "antiquated technology," which is true; however, they are extremely reliable, secure, and extremely fast. This technology was invented by IBM in the 1960s, and it is still used by banks, retailers, and insurers – in any field that requires the handling of high volumes of transactions by a large number of users. However, operating such mainframes is costly : it is difficult to find developers, there is no community of developers providing free services to the public, and the price of the hardware itself usually has an additional digit. This is the primary reason why businesses are attempting to replace such technology. Companies have developed automated migration technology to enable (in this case, banks, but also travel systems) to migrate away from such costly technology.

2.2 PSS FOR RESERVATION & AIRLINE BOOKING :

For end–to–end development solutions, companies are developing an airline passenger management system that streamlines the ticketing and reservation system process. Custom changes to airline reservation and booking software scale fare algorithms, seating management, baggage check–in, and other features.

Reservation Management System for Airlines : Customizable safety management applications such as Passenger Name Records (PNR) and No–Fly List data are included in airline reservation software. It combines direct ticketing channel management, GDS and e–commerce interface programming, as well as fairs and pricing algorithms.

App Development for an Airline Ticketing System : The businesses create self–service software systems for websites, kiosks, and mobile apps. We offer boarding pass APIs for mobile check–in, baggage fees, in–flight amenities management, and airport transfer booking software systems as part of our airline ticketing and reservation solutions.

Flight Reservation Software : Passenger Name Records (PNRs) programming is used by airlines to manage traveller data. Companies create cross–platform applications to improve the UI and UX of your airline's passenger management system.

Services for Airline PSS Migration and Integration : Airlines' ticketing and reservation systems, DCS, and inventory software interfaces are being consolidated into a single, user–friendly PSS platform. Our

engineers and software developers integrate complex data model reporting capabilities into airline PSS architecture using SAP and Sabre Technologies.

2.3 CHALLENGES OF USING PSS :

Requirement for Customisation and Localisation :

In most cases, an airline's ability to ensure conversions and repeat sales is hindered by their lack of a comprehensive grasp of their consumers, including their particular preferences and the potential worth of their business. The strategy of airline companies to allow each customer to create their own travel experience required a PSS that could manage reservation operations in a centralised manner and will allow client recognition at relevant touch points to provide personalization and localised communications. This strategy required a PSS that could manage reservation operations in a centralised manner.

The strategy of airline companies to allow each customer to create their own travel experience required a PSS that could manage reservation operations in a centralised manner and will allow client recognition at relevant touch points to provide personalization and localised communications. This strategy required a PSS that could manage reservation operations in a centralised manner.

Airline businesses have identified a number of air and non–air ancillary items in order to generate one–of–a–kind offerings and to make air travel more pleasurable for customers.

Keeping Excellent Customer Service and Hospitality Standards :

The goal of the airline firms was to persuade customers to sign up for extra offers and updates, and then use the information they gathered to provide a more satisfying experience for the end user. For this reason, it was absolutely necessary for customer service businesses to receive accurate information regarding customers' expectations and preferences in order for these organisations to proactively manage the customer experience.

Prototyping over Comprehensive Design Documentation :

The comprehensive design was validated with the help of API collaboration tools, and questions about the interface documentation were answered. This enabled a rapid evaluation of the amount of work that has to be done in development as well as the technological obstacles that must be overcome. This allowed for increased predictability of delivery schedules as well as more efficient communication of design and functional goals.

Rapid Iterations over Big–bang Delivery :

Planning the delivery of the project in iterations helped to continuously engage the customers and partners, which contributed to an early realisation of value in the implementation lifecycle. A solution that actually worked made it easier for customers to include their partners and performing

teams in defining their expectations more precisely and accelerated the pace at which implementation activities were carried out.

Frequent Sync–Ups as 'One–Team' Over Periodic Status Reporting :

Due to the scattered nature of the team, it was necessary to hold frequent sync up meetings in order to align the responsible teams and build a consistent understanding of the work priorities as "ONE–team." By taking this technique, risks and difficulties could be identified more precisely and were resolved more successfully.

Overcoming the challenges Brought by the Pandemic :

COVID–19 presented a number of significant difficulties in terms of managing delivery obligations and preserving relationship continuity with key partners who were working on the interfaces. Maintaining strong coordination between the project team, the customer, and the partners while handholding the dependent work was essential to the project's successful completion. This was accomplished by ensuring continual focus and agility to support internal and external partners remotely.

2.4 THE BENEFITS OF AUTOMATED PASSENGER SERVICE SYSTEM :

Profitable airline operations require effective streamlining, simplification of the passenger travel experience, and low operating expenses. When airlines are poorly managed, they not only see a decline in profitability, but also a rise in flight delays, long check–in ques, and unhappy passengers. Integrated airline reservation software was developed to assist airlines in resolving and avoiding these issues by storing, retrieving, and reserving information pertaining to air travel business operations, resulting in happier airline staff and passengers. Following are the benefits of passenger service system :

Early Check–In :

A reservation system for airlines allows travellers to check in up to 24 hours before their flight, select their seats, and print boarding passes from the convenience of their own homes. This provides passengers with a much smoother and more convenient travel experience, which is also advantageous for airlines. By having less workers at the airport, airlines are able to save money, and passengers are pleased because they may avoid long queues and spend less time at the airport overall.

Convenience for Airline Passengers :

Online booking of airfare allows airline passengers to do it at any time of day and from any location. Using a laptop or a smartphone, users can book a flight at home, in the office, or even on the way to the gym. By purchasing a flight online, airline consumers do not have to worry about finding a parking spot at their travel agent's office, waiting for assistance, or feeling rushed to book a flight without first considering their options.

Comprehensive Answer for Airlines :

Modern passenger reservation software offers airlines a comprehensive hosting solution. The developers of this type of software use cutting–edge technology to provide airlines with a system to manage all aircraft reservations on a platform that is durable, flexible, and adaptable to any airline type. The contemporary airline reservation system also provides a secure and stable solution. They are perfect for the aviation sector, which frequently requires a huge number of passengers to concurrently access and use the system. With all system users having access to the software at all times, the airline corporation can maintain track of inventory and passenger bookings in a real–time setting.

Reduces the Cost of Hiring :

Modern passenger reservation systems are designed with a user–friendly interface that is always simple to comprehend. These types of software provide airlines with modern, adaptable reservation and inventory management systems, such as call centre, travel agency, internet, GDS, etc. By using an automated passenger reservation system, airlines may ensure that only their own employees are able to make bookings, eliminating the need to hire additional personnel to manage the passenger reservation process.

Additional Benefits of PSS :

The reservation software can also be used by an airline to make flight arrangements, view current reservations, and verify passenger lists, among many other things, all from a computer.

A reservation system for airlines provides airlines with modern, flexible reservations. Standard airline passenger reservation systems on the market provide a fairly simple interface for quick passenger check–in and real–time reservation access.

2.5 PASSENGER SERVICE SYSTEM MARKET ANALYSIS :

In this section of unit, we will do market analysis of Passenger Service System by service type (Airline Reservation System, Airline Inventory System, Departure Control System, Internet Booking Engine Passenger Service System, and Loyalty Layer Passenger Service System) and by Region – Global Forecast 2022–2032 Analysis of the Passenger Service System market in 30+ countries, including the United States, Canada, the United Kingdom, Germany, France, the Nordics, GCC countries, Japan, and South Korea, among others.

Passenger Service System Market Outlook (2022–2032) :

Between 2022 and 2032, the global passenger service system market is anticipated to expand at an astounding CAGR of over 9.4%, reaching a value of $21.9 billion.

In FY 2021, the market was valued at $7.9 billion, and it is expected to increase by 12.7% year–over–year to $8.8 billion in 2022.

As the number of travellers and passengers increases, new technologies and services are being created all over the world to enhance the safety, efficiency, and effectiveness of the sector. The increase in international passenger traffic has resulted in the constant emergence of new needs and requirements for maintaining the safe and efficient flow of passengers.

2015–2021 Revenue Analysis of Passenger Service Systems versus 2022–2032 Future Prospects :

As the number of air travellers continues to rise, major aviation companies intend to use advanced software solutions to streamline operational processes and automate a significant number of processes in the service system market.

This has created a favourable environment for the proliferation of providers of passenger service systems in recent years. Market research and competitive intelligence, the industry grew at a CAGR of 10.7% between 2015 and 2021.

Despite the pandemic crisis halting global passenger movement, the airline passenger service system market expanded rapidly as governments streamlined existing operational capabilities, resulting in a rise in the deployment of intelligent solutions. Due to the pandemic, airports were able to facilitate hassle–free or seamless travel during the pandemic.

It is anticipated that the airline industry's growth will accelerate in the coming years, as the planned infrastructure expansion is anticipated to begin in 2021. Due to the near elimination of global travel restrictions, global air travel has resumed in full force, necessitating an increase in passenger service system deployment. During the period of analysis, 2022–2032, the global passenger service system market is anticipated to increase by 2.5.

How does Industry 4.0 contribute to the increase in demand for sophisticated software solutions ?

As the 21st century approaches rapidly, industry leaders are deploying advanced software–based management solutions by leveraging trends such as big data, process automation, artificial intelligence, machine learning, and a variety of other innovations.

The increasing operational complexity of the aviation industry is one of the primary factors influencing the rise of innovative operations management solutions, such as autopilot systems, SaaS solutions, and flight management solutions, which provide enormous future growth potential for the passenger service system (PSS) market.

Automated Attack Prevention Creates Opportunities for Growth in Reservation Systems ?

Passengers' boarding passes collect a significant amount of personal information, posing a risk that malicious actors could exploit technological flaws in reservation systems to steal sensitive data.

Companies are investing in bot protection mechanisms to prevent such automated attacks, and software developers are introducing features that limit the maximum number of transactions in a given time period to prevent bot attacks.

How does Expense Reduction Promote Passenger Service System Development ?

Rapid incorporation of information technology into the aviation industry has led to an increase in the industry's use of passenger service systems. Through online booking, inventory control, and reservation services, these investments have resulted in highly automated airline operations.

On the market for passenger service system platforms, both low–cost and hybrid operations are being catered to. In addition to ensuring high productivity, these platforms will lessen the market's reliance on individual vendors. Over the past decade, software developers have primarily focused on fares, ancillary fees, automatic departures, and service quality.

A growing number of end users are booking flights online via the internet, which is driving the development and adoption of passenger service systems. IATA research indicates that 51% of worldwide flights were booked online via smartphones or tablets in 2019. This led to the introduction of highly efficient booking platforms designed specifically to meet the needs of passengers in this industry.

Increasing levels of competition in the commercial transportation sector have made in–flight services, particularly food delivery and trash collection, one of the most important competitive strategies for attracting passengers over rivals. These services benefit passengers directly and indirectly during a flight, which influences their perception of the airline's overall service quality.

In the field of passenger service system development, companies offer dependable, custom–built software platforms for aircraft management as sustainable solutions. Increasing competition and operational pressure in the airline industry have necessitated the implementation of these measures. Through airline parking reservation and ticketing services, companies in the passenger service system market generate stable revenue streams.

2.6 ANALYSIS ON THE BASIS OF COUNTRY :

How Profitable Is the Market for Passenger Service Systems in the United States ?

According to Airlines for America, the U.S. aviation industry generates over 10 million jobs and nearly two trillion dollars in economic activity annually. Therefore, leading airlines are investing in streamlining their operations in order to boost their growth. Global air transportation systems are comprised of ever–changing, complex networks and alliances. The

majority of international passengers travelling to and from the United States make at least one connection before reaching their final destinations.

Academic and research programmes have developed and deployed initiatives to teach and learn about the technical aspects of aviation, a development that has led to an increase in the market's use of both on–premise and cloud–based passenger service management solutions. During the forecast period, the market for passenger service systems will increase at a CAGR of 6.5% to reach $3.2 billion.

How do China and Japan view the future of Passenger Service Systems ?

The passenger service systems market in China is anticipated to experience the highest revenue growth over the forecast period, at a CAGR of 9.4%. During the forecast period, the market is expected to reach a value of US$ 1.7 billion. The rise in per capita GDP and the convenience of domestic air travel have accelerated the growth of per capita income.

Due to the large number of potential customers in the region, rapid expansion is anticipated to continue. According to industry 4.0 initiatives, the Chinese government is allocating a significant portion of its budget to streamlined aviation infrastructure that facilitates the movement of people and goods, a development that is anticipated to significantly contribute to the improvement of passenger services.

As business activities expand, aviation stakeholders are implementing a greater amount of large–scale automation, virtual reality, and big data analytics to manage operations. China Southern Airlines, for example, began using paperless boarding passes and online seat selection on all domestic flights in 2019, significantly enhancing operational efficiency.

Japan is projected to grow at a CAGR of 8.6% over the forecast period, according to the research. Despite favourable regulations, the market growth will be affected by the low cost of living and increased tourism, particularly in developed nations. In addition, the growth of the airline ticket booking industry in South East Asia and customer awareness of easy booking options are significant contributors to the increase in PSS demand.

Why is the United Kingdom such an Opportunistic Market ?

The market for passenger service systems in the United Kingdom is anticipated to reach $838.8 billion by the end of the forecast period. The market is anticipated to expand by 8.1% during the forecast period. In addition to rising disposable incomes, loyalty programmes can be more effective at attracting passengers than other forms of marketing for airlines.

A growing number of CARGO businesses are expanding their operations throughout the nation. There are still numerous growth opportunities in the market, and the UK market for passenger service

systems will not be an exception due to the influx of investments in airline inventory management systems. As a result, passenger service systems are in high demand on the market.

Category–Specific Insights :

Web–based booking solutions have enabled the consolidation of data from multiple airlines through the use of global distribution systems and airline reservation systems. Customers and travel agents have access to the system's inventory and rates in real time. The market for airline reservation systems is anticipated to expand at a CAGR of 8.6% during the forecast period.

Assisting airlines with a variety of management tasks and ensuring customer satisfaction from initial booking to flight completion will drive demand for airline reservation systems. The widespread use of smart phones and the increasing popularity of the internet have contributed to the expansion of airline reservation systems. Increasing digitization and convenient online payment options contribute to the expansion of the airline reservation system market. Cloud–based airline reservation systems are in high demand as a result of the proliferation of modern technology and technological advancements. In addition to these factors, market demand for airline reservation systems is increasing.

2.7 COMPETITIVE ENVIRONMENT :

The rising demand for passenger service systems is primarily attributable to a rise in product functionality. In order to introduce new products to the market, market participants are increasing their spending on R&D. In addition, acquisitions & mergers, collaborations, and regulatory approvals are also essential growth factors.

- Biman implemented SabreSoni's Passenger Service System in September 2021, enabling it to transform into a digital airline, increase its revenue, and enhance the passenger experience. With the assistance of the new contract, Biman will implement the SabreSonic Passenger Service System, which will assist them in transforming their business, driving revenue growth, and enhancing passenger experiences. As part of the deal, Biman has also selected a number of Sabre solutions and renewed its global distribution agreement with Sabre to help meet the needs of modern–day travellers, to make their services available at all points of sale, to optimise the acquisition of new customers, to increase the value of its loyalty programme, and to stimulate demand as the high–stakes market recovery gains momentum.
- Amadeus Altéa Departure Control for Ground Handlers, an advanced check–in management system, was introduced in December 2021 at Pulkovo International Airport in St. Petersburg, which welcomed nearly 20 million passengers in 2019. The SaaS (software as a service) model of the Amadeus solution enables airlines to utilise

an integrated check–in system without hosting their own systems at Pulkovo Airport. The Amadeus system offers a single, modern interface that enables ground handling companies to provide services to any airline.

❑ **Check Your Progress :**

1. PSS technology was invented in _____

   a. 1950s b. 1960s c. 1970s d. 1980s

2. Flight reservation system is working on to improve _____

   a. UI & UX

   b. Airline passenger management system

   c. Both a and b options

   d. None of the above options

3. What are the challenges using PSS ?

   a. Requirement of localisation b. Customisation

   c. Instant Sync–up d. All of the above options

4. Between 2022 to 2032 PSS market is anticipated to grow by _____

   a. 8% b. 8.4% c. 9% d. 9.4%

5. The market value of PSS in 2022 was _____

   a. $8 Billion b. $8.8 Billion c. $9 Billion d. $9.8 Billion

6. According to research Japan market is expected to grow by _____

   a. 8% b. 8.6% c. 9% d. 9.6%

7. The Chinese market is valued at _____ for the forecasted period.

   a. $1.7 Billon b. $2.7 Billon c. $3.7 Billon d. $4.7 Billon

8. Biman implemented _____ PSS in 2021

   a. Amadeus b. Sabre

   c. Galileo d. None of the above options

2.8 LET US SUM UP :

A passenger service system, often known as a PSS, is the most important component of an airline's information technology infrastructure. Because it typically includes a reservation system, an airline inventory system, and a departure control system (DCS), a passenger service system (PSS) is an essential component of an airline's end–to–end operations. It is possible for airlines to sell seat tickets thanks to the reservations system. While the DCS is responsible for checking people in to a flight, the inventory system is the one that decides how many seats are available on a trip across the various booking classes. However, do not be misled by this oversimplified description; the system in question is actually quite complex.

In spite of the fact that there are hundreds of PSS suppliers, the overwhelming majority of significant airlines only use a limited few of them. In this unit, we went over in great depth the difficulties, benefits, and potential for future expansion of PSS. The market study of PSS and ways to improve it was also studied in this unit.

2.9 ANSWERS FOR CHECK YOUR PROGRESS :

1. b	**2.** c	**3.** d	**4.** d
5. b	**6.** b	**7.** a	**8.** b

2.10 GLOSSARY :

1. **Synchronize :** To make something happen or work at the same time or speed. For example, Synchronize footage so that the audio and video components play together in correct alignment.
2. **User Interface (UI) :** It is the point of human–computer interaction and communication in a device. This can include display screens, keyboards, a mouse and the appearance of a desktop. It is also the way through which a user interacts with an application or a website.
3. **User Experience (UX) :** It is the process design teams use to create products that provide meaningful and relevant experiences to users. UX design involves the design of the entire process of acquiring and integrating the product, including aspects of branding, design, usability and function.

2.11 ASSIGNMENT :

1. Enlist the key issues and challenges faced by Indian aviation companies to successfully implementing PSS.

2.12 ACTIVITY :

1. Make a detail analysis of any airline PSS and its future expansion plan for better user experience.

2.13 FURTHER READING :

1. Airport Operations by Norman Ashford
2. Airline and Airport Operations by Edissa Uwayo
3. Aviation Management : Global and National Perspectives

UNIT 03 *Operational Performance & Services*

UNIT STRUCTURE

3.0 LEARNING OBJECTIVES :

- To list the strategic context of operational performance and levels of service at airports.
- To enumerate the determinants of service effectiveness at airports.
- To explain the tactical approach to administration of airport operations, organizational considerations and elements of service delivery plan.
- To list the key factors for High Performance airport operations.

3.1 INTRODUCTION :

Airport operations or airport logistics are entire series of activities that take place to process passengers and goods from surface and air transport modes to the aircraft. These activities also are extended to accommodate users and merchandise transiting through the airport to connect to other flights. Airport operations activities include guiding aircraft for landing, takeoff, manoeuvring through the runways to parking

positions at various sections of an airport; servicing aircraft; clearing international passengers and goods through government inspection services; passenger and luggage check in; security screening processes; VIP handling; maintenance and upkeep of facilities for safety and convenience; snow removal and de–icing (in some parts of the world); provision of ground transportation services; and so on. Operational activities cover the entire physical space of an airport.

3.2 THE STRATEGIC CONTEXT OF OPERATIONAL PERFORMANCE :

The responsibility of operational tasks within an airport primarily lie with the airport operator, however, the processes involved in execution of the tasks involve a lot of players with delimited areas of jurisdiction to deliver the required services. With commercialization globally airports across the globe operate under complex business environments. Airports to become sustainable in the current context need to focus on the following management aspects that are dynamic

- Better Commercial models
- Capacity Constraints
- New Technology
- The role of the Private sector
- Advent of Low Fare Carriers
- Consolidation of airlines through various strategies
- Priority on Security and safety

With modern business models the full or partial privatization was essentially brought about by the need for large infrastructure investments that governments of different countries could no longer afford relative to other pressing societal demands such as health care and education. As a result, the landscape of the governance of aviation–sector enterprises has evolved in a radical manner, especially in the airport sector. The same include long–established entities such as Aéroports de Paris, British Airports Authority (BAA), Fraport AG, Vancouver Airport Services, and others that have entered the field more recently on a relatively large scale, such as GMR from India, Malaysia Airports Holding Berhad, and TAV from Turkey. Different models of strategic airport operations are followed across the globe from entire privatization to Build Operate Transfer (BOT) schemes tp Public Private Partnership (PPP) arrangements.

It has been seen that in managing airports no model fits all. There are evidences of some state–owned enterprises that run highly successful airports. The interaction between governance models and performance is a complex topic that has been drawing increasing interest and priority for academic and empirical research. Irrespective of governance, the operational performance of airports in terms of level of service (LOS) delivered to users is essentially a function of two dimensions : the quality/

adequacy of the infrastructure and the effectiveness of the overall logistics management.

3.2.1 Level of Service at Airports :

From a strategic perspective, it is taken into consideration that is a wide variety of airports in terms of their purpose and mission. Some airports are major hubs with a high proportion of connecting passengers, others exist primarily to provide access to major tourist destinations, some are located in important political or financial centres, some provide a vital link to remote areas, and others serve as a base for large global courier companies. Obviously, infrastructural and operational requirements for each airport will vary depending on its particularity, although a common goal exists with respect to the provision of an optimal level of service (i.e., best possible LOS at an appropriate cost). To optimize the levels of service any airport shall adhere to the following aspects

- The Strategic Business Plan (SBP) of the airport vis a vis its mission is considered to be the foundation of level of service for the airport. A Strategic Business Plan is defined as a comprehensive, action–orienting, top–level corporate plan which clearly defines, following a thorough analysis of the business environment in which it operates, the specific vision, mission, areas of excellence and the mission–critical objectives of the enterprise, the means to realize them and measure results as well as the financial implications of the overall corporate strategy (P. Coutu, Krems Danube University, Austria).
- Purpose of the airport is important as it influences strategic decisions. A publicly owned and operated airport would focus on public service whereas a privately owned and operated airport would deliver and cater to the needs of the passengers.
- The Scope of Operations is a key factor for functioning of the airport as it helps the airport operators to plan, execute and monitor the transfer of passengers and goods through the airport platform in a safe, secure, environmentally friendly, efficient, cost–effective, and financially sustainable manner for the benefit of airport users under normal and emergency conditions.
- Development of policies, procedures, and processes described in airport operations higher–level– plan program (i.e., an integrated service–delivery plan) and aligned on the overall corporate strategy enunciated in the airport SBP.

❑ **Check Your Progress – 1 :**

1. Sustainable airports need to focus on dynamic aspects like
   a. Low fare carriers b. Capacity Constraints
   c. Technology d. All the options
2. The acronym BAA stands for
   a. British Aero Academy b. British Aerodrome Authority
   c. British Airports Authority d. None of the options

3. The acronym LOS stands for
   a. Lower Service b. Level of Service
   c. Level of Schedules d. Level of Standards
4. The acronym SBP stands for
   a. Strategic Business Plan b. Strategic Business Power
   c. Strategic Burden Plan d. Strategic Bell Plan

3.2.2 Determinants of Service Effectiveness at Airports :

There are several challenges that airport operators face in delivering quality service

- The presence of many entities that have jurisdiction over specific segments of the airport processing system. In the absence of strong coordination mechanisms and cooperation incentives, this can lead to chaotic and possibly conflicting situations.
- The tendency of airport functional departments to operate in silos.
- Cost management inefficiencies.
- Poor leadership frameworks.

There are defined parameters that encompass Service Effectiveness of organizations. The determinants that distinctly quantify the same can be enumerated as

Determinant	Definition
Reliability	Consistency of Performance leading to dependability.
Competence	Required skills and knowledge to perform the service
Responsiveness	The willingness and positive attitude to provide the service
Access	Ease of contact and approachability for the service
Courtesy	Mannerisms of people delivering the service
Communication	Listening to customers and addressing customer needs through an understandable language
Credibility	Trustworthiness
Security	Freedom from any danger
Tangibility	Physical evidence of delivery of service

3.3 TACTICAL APPROACH TO ADMINISTRATION OF AIRPORT OPERATIONS :

The implementation of a successful airport operations management program that would yield high–performance results with generally accepted industry benchmarks needs to tackle the challenges described earlier and position the efforts of all parties toward an optimal service delivery. From a tactical perspective, the administration of airport operations should be

subdivided in two different dimensions handled ideally by two different organizational units :

- Development and monitoring of airport operations program (Planning program)
- Execution of Airport Operations program (Implementation program)

The 2 different dimensions require different levels of expertise on the integrated but discrete tasks. The tactical approach is also dependent on factors like

- Policy formulation through specialized team in complex areas of operation and execution.
- Need for deployment of multidisciplinary personnel in the management of operational response to incidents in normal and emergency situations.
- Coordination at every step of execution of the processing functions for passengers and goods at the airport.
- Real time monitoring and resolution of inefficiencies that may affect operations.

The airport operations programs are generally executed under the leadership of a Head of Operations. The components of an airport operations program might include

- Air Traffic Services plan
- Airport Emergency plan
- Commercial Services plan
- Usage of facilities plan
- Environment Management plan
- Ground Handling Management plan
- Ground Transportation Services plan
- Incident occurrence and management and reporting system
- Internal inspection plan
- Operational stakeholders engagement plan
- Public Relations and Communication plan
- Safety Management System
- Security Plan
- Terminal Operations Management plan

It should be noted that some of these plans may not be under the direct control of the airport operator and, as a result, will require consultation with the responsible individual entities. In addition, some of these plans are components of the aerodrome manual required by International Civil Aviation Organization (ICAO) standards and recommended practices. Collaboration and coordination frameworks are essential in an integrated effort towards performance.

3.4 ORGANIZATIONAL CONSIDERATIONS FOR AIRPORT OPERATIONS :

Traditionally airport organizational structures were designed around only the key functional areas such as operations, maintenance, engineering, finance and administration headed by an Operations Head or a Chief Executive Officer. With airports moving towards an entrepreneurial model, the functional areas and other areas incorporated are working as Strategic Business Units (SBUs). An SBU functions as an autonomous organizational unit with control over factors that affect the performance of the SBU in the short and long term. The modern structures

- Provides more empowerment to individual SBUs to take decisions that shall benefit the SBU and the airport.
- Better commercial oriented results.
- Motivate airport management to be more responsive to its customers by creating a larger series of focal points that are accountable for balancing costs and customer satisfaction.
- Minimizes Bureaucracy to serve customers better.
- Emphasizes on better processes, policies and technology to serve customer needs.

Airports are continuously working on different models for operation oriented towards the customer. Many airports have performed organizational impact assessments and implemented stakeholder management plans, in terms of genuine customer orientation. Hybrid functions that are a mix of SBU and functional operations have been implemented at many airports to overcome the challenges of both the models and implement the best practices. Many airports irrespective of their structures have incorporated Customer Service as a strategic area of importance. The Service Workforce Instant Feedback Transformation (SWIFT) introduced at the Auckland airport at New Zealand works on a feedback mechanism that directly is linked to the management at various touch points of the airport related to customer service. A performance–based compensation system at Greater Toronto Airport Authority (GTAA) also contributed to the improvement of performance results. The compensation system at GTAA takes into consideration individual and collective performance to avoid competition among employees and encourage teamwork. Forty percent of the assessment is based on group performance; therefore, there is an incentive for an individual manager and the whole team to meet the targets and improve organizational performance. Together with improvement in performance, the communication levels increased among the organizational units with implementation of the system.

3.4.1 Elements of a Service Delivery Plan :

There are many elements embedded in a Service Delivery Plan. To enumerate they can be categorized as

- Clear statement of purpose
- Hierarchical and functional linkage between vision– mission– strategic objectives–areas of excellence– Level of Service policies– strategic level KPI's
- Customer experience map across the airport
- Real time service index and KPI dashboard for fulfilment of service delivery
- Service delivery decision making and support system
- Customer Experiences for all functional areas
- Service Delivery mechanisms and Levels of Service
- Training Programs
- Technology for enabling customer experiences
- Result related quality output for third parties involved in service delivery
- Measurement of performance standards
- Adaptation of best practices and techniques in service delivery
- Incorporation of innovative and cost effective practices
- Maximize competition, enhance values and competition

3.5 OPERATIONS PROGRAM EXECUTION :

The execution part of an airport operations program must recognize that airports differ from many other enterprises in a number of aspects that affect their performance. The aspects are

- The end product of airports is delivery of service and not any manufactured product and cannot be rectified once delivered.
- The process involved is complex and requires a lot of coordination.
- The environment for operations within an airport is highly regulated and delivery needs to happen within the perimeters of the environment.
- The framework of operations involves a lot of political forces and often multi lingual and international.
- The operations incorporate a lot of technological input for performance.
- The operations at an airport never cease and happen round the clock
- Emergency preparedness is very essential as the same may be encountered any time.

It is commonly known that airport user satisfaction correlates highly with matters related to process effectiveness, comfort, freedom from danger, courtesy and helpfulness of staff, and so on. It therefore would follow that "best–in–class" airport operators make real–time management of airport logistics a formally identified strategic area of excellence.

3.6 OPERATIONS PROGRAM CONTROL :

Monitoring the operational performance of an airport can be divided into internal and external assessments. The purpose of the first type of control is to inform the airport management and the board of directors (or its equivalent) of the extent to which the strategic and tactical objectives of the enterprise are being met, and the driver behind the second type of assessment is usually to respond to a regulatory requirement or to benchmark the performance of one airport against another comparable facility for the purpose of competitive analysis or even pure marketing, as in the case of outstanding results. Most of these assessments call for the use of Key Performance Indicators (KPI's) or their equivalent, such as key success indicators (KSIs). Key Performance Indicators (KPI's) can be defined as a series of metrics that an organization uses to measure its achievements against its key strategic objectives in the context of its chosen areas of excellence. The characteristics of effective KPIs was developed by W.Wayne Eckerson and they are

- KPIs are always aligned to the business strategy and objective.
- KPIs are always owned by individual or group that is accountable for the outcome.
- KPI's are drivers of business value and are predictive.
- KPI's are actionable so that performance can be improved at the right time.
- KPI's should be easy to understand and execute.
- KPI's are standardized.
- KPI's are linked to each other and balance each other.
- KPI's trigger change positively in any organization when monitored.
- KPI's are reinforced with incentives.
- KPI's need to be periodically reviewed and reframed.

3.7 KEY FACTORS FOR SUCCESSFUL AND HIGH–PERFORMANCE AIRPORT OPERATIONS :

The following list provides some of the key success factors required for achieving high performance in airport operations :

- Recognition of the strategic implications of the changes in the airport business environment. The same includes the strategic role of the private sector, the approach to the management of airport operations and the assessment of the related performance.
- Alignment of Operations Program to the Business Plan, the vision, mission, strategic objectives and the areas of excellence.
- Design and implement the operations policies, plans, procedures, processes, and organizational framework around the needs of airport customers and users.

- Implement service–delivery plans to tackle the management of customer service in an integrated manner.
- Bifurcation of the tasks of airport operations planning/ monitoring from those of executing the operations program in the field. Optimization of both aspects and their interface.
- Application of proven best practices in the selection key performance indicators. Prioritization of internal assessments through time over industry benchmarking schemes.
- Implementation of effective leadership, coordination, and consultation mechanisms for interfacing with entities involved in various phases of service delivery to airport users.
- Creating an operational work environment that welcomes continuous–improvement processes and innovation.
- Studying the practices of top–ranking airports regarding customer service delivery and how they nurture their "areas of excellence."

❑ **Check Your Progress – 2 :**

1. Poor leadership makes service at airports

   a. Effective b. Efficient c. Exclusive d. Non–Effective

2. Reliable Service includes

   a. Inconsistency of performance b. Not listening to customers

   c. Consistency of performance d. All the options

3. SBU stands for

   a. Sub Business Unit b. Strategic Business Unit

   c. Strategic Bearing Unit d. Strategic Business Umbrella

4. The acronym GTAA stands for

   a. Greater Toronto Airport Authority

   b. Greater Trinity Airport Authority

   c. Global Treaty of Airport Authorities

   d. None of the options

5. The acronym KPI stands for

   a. Key Parameter Indicator b. Key Performance Indicator

   c. Key Performing Indicator d. Key Program Indicator

3.8 LET US SUM UP :

Airport operators are series of activities that take place to process passengers and goods from surface and other modes to the aircraft. The strategic context of operational performance is based on different aspects that are dynamic and on different business models. The level of service depends on strategic business plans, scope of operations of the airport, purpose, policies and procedures. There are defined parameters that encompass the service effectiveness of the organization. With airports

moving towards an entrepreneurial model, the functional areas and other areas work as Strategic Business units. Service Delivery plans embed a lot of elements that are relevant to airports. The plans should encompass the difference between other organizations and an airport in service delivery. The Key Performance Indicators (KPIs) are business oriented, standardized and actionable. The unit acquaints you to a lot of factors that are for successful and high–performance airports in terms of service delivery.

3.9 ANSWERS FOR CHECK YOUR PROGRESS :

Check Your Progress – 1 :

1. d **2.** c **3.** b **4.** a

Check Your Progress – 2

1. d **2.** c **3.** b **4.** a **5.** b

3.10 GLOSSARY :

1. **Real time monitoring :** A technique that allows you to determine the current state of queues and channels within a queue manager.
2. **Jurisdiction :** The official power to make legal decisions and judgements.
3. **Sustainable :** Able to be maintained at a certain rate or level.
4. **Framework :** A basic structure underlying a system, concept, or text.
5. **Tactical :** Relating to or constituting actions carefully planned to gain a specific end.

3.11 ASSIGNMENT :

1. List the Service delivery standards in event of the following for some of the airports across the globe.
   a. Differently Abled Passengers
   b. Passengers on Stretchers.
   c. Kids travelling alone.
2. What are the advantages and disadvantages in hiring third party service providers.

3.12 ACTIVITY :

1. List the mechanisms used by different airports to capture customer service feedback at every touch point of an airport.
2. Mention the contribution of various software used by different airports in the enablement of the above exercise.

3.13 CASE STUDY :

A paraplegic passenger on a motorized wheelchair was supposed to commence his journey from a particular airport. His family had written to the airline related to the medical condition and sent the necessary relevant documents for the same. A clearance to fly the passenger was received from the airline through a phone call of the airline office. Once the passenger and his accomplice arrived at the airport they were stopped at the airline counter for check in due to the condition suffered by the passenger and the unpreparedness of the aircraft to carry the passenger. As there was no written confirmation that the passenger had from the airline or the airline having the same from its call centre, the airline did not undertake necessary action and preparedness. A long exchange of discussions went on between the accomplice and the airline authorities at the airport. By the time the scheduled flight departed. The airport authorities too were called and finally the passenger was accommodated in another airline going to the same destination.

Q. 1. In the above incident what were the aspects that went wrong on part of the airline ?

Q. 2. What strategies should be adopted to accommodate emergency responses by all the stake holders to ensure such situations do not recur ?

3.14 FURTHER READING :

1. Airport Operations by Norman Ashford
2. Airline and Airport Operations by Edissa Uwayo
3. Aviation Management : Global and National Perspectives
4. www.civilaviation.gov.in

UNIT 04

Case Studies

UNIT STRUCTURE

4.1 CASE STUDY 1 : SERVICE DELIVERY :

"The airline industry is, by its very nature, a service industry. In a free market the success or failure of an airline is largely dictated by the quality of service it provides."

Joseph Pillay, Ex Chairman, Singapore Airlines

➢ **Introduction :**

The biggest difference that any airline can make is through the service it delivers. Mistakes and incidents pertaining to operational areas happen in a complex operation like airlines but owing up to be responsible for actions, speak about the concern that any organization has for its customers. The ownership value and the steps towards quick resolution in the face of challenges bring back the smiles lost. Quality Customer Service brings loyalty and increases profits. Harvard Business Review in its research has pointed out that even small actions like responding to tweets immediately and efficiently by an organization can enhance the value proposition of the organization and also increase the money people are willing to pay to do business with the organization. The under mentioned excerpts are narratives of how airline companies can do business better through their service recovery mechanisms.

➢ **The Incident :**

In 2017, two Air Transat flights were diverted to Ottawa due to technical reasons. The airline company or the pilot of the airline had no control for the diversion as it was a government decision. Both the aircrafts stood on the tarmac at Ottawa airport for nearly 4 hours. The airline had to shut off its air–conditioning. There was no food or water on the airline to be served to passengers. The crew were clueless and was not even in a position to respond to the call of the passengers for help. The pilot locked himself up in the cock pit and did not address the passengers or coordinate with any authorities for the predicament. The situation was absolutely getting out of hand as one or two passengers started falling sick. One of the passengers out of fear dialled 911 for emergency help and rescue. He wanted that the airline do something meaningful for them. The 911 team from the United States reacted and contacted the authorities in Canada where the flight was stranded. The

Canadian authorities came under pressure and the soon necessary action was taken. The incident became a big issue and gave a very bad name to Air Transat. The matter went up for trial in the court where the airline authorities and the airport authorities of Ottawa airport fought a blame game. The airline was penalized with a hefty fine and the matter was published in different newspapers. A lot of passenger forums vowed never to fly Air Transat and boycott it. Air Transat made a blunder and above all failed to provide basic comfort and necessities to the customers in the crisis situation. The airline could never resolve the issue with the authorities nor communicated with its passengers about the cause of delay and diversion. In a nutshell the airline failed to take ownership and responsibility of the blunder committed.

The second excerpt highlights how service recovery can establish a brand as a global leader. Singapore International Airlines (SIA) is a role model for service delivery in the aviation sector. Customer satisfaction is the topmost priority for the airline company. Innovation in service is the key component to retain existing customers and attract new customers. They follow the principle of Customer Delight and in the effort have been awarded with different awards for its inflight and ground services. It has won "Airline of the Year", "Best Trans Pacific Airline", "World's Best Service", "Best Long–Haul Airline"," Best First Class", "Best Economy Class", "Best Foreign Airline", "Best Crisis Management" and many other awards. A study on airline reputation by the "Reputational Institute" and Haris Interactive (a global internet research firm) found that Singapore Airlines topped the list of international airlines in the categories of Safety and Trust; Customer services and Food. The analysts concluded that superior customer service of Singapore Airlines is the primary reason for its profitability over the years than its competitors. Passengers do not mind paying a premium to Singapore Airlines because of its exceptional customer service.

In October 2000, Singapore Airlines flight SQ006, Boeing 747 with 179 passengers on board, crashed in Taiwan. It was the first major accident in 28 years of the airline operations for the company. The crash led to the death of 81 passengers on board. Singapore Airlines immediately announced a compensation of $ 25,000 to the kin of the dead even before formal investigations started to find out the reason for the crash. In the investigation it was found that the reason for the crash was due to an error committed by the pilot. Singapore Airlines immediately offered $ 4,00,000 to the kin of the dead. The amount was 5 times more than the initial amount offered by Singapore Airlines. The then Deputy Chairman and CEO of Singapore Airlines said that the company took full responsibility of the accident. No airline company ever had accepted and come to public taking full responsibility and paying so much of compensation. The incident further strengthened the brand values of Singapore Airlines followed by a global positive media coverage for the steps undertaken by Singapore Airlines in the hour of crisis.

4.2 CASE STUDY 2 : IMPORTANCE OF CUSTOMER SERVICE :

- **Introduction :**

The excerpt of the case that shall be narrated below is a common practice for many airline companies across the globe. The only difference where an airline company win is their positive attitude, empathy and their procedures for handling such situations. Many a times altercations between airline staff and passengers are common but it is the training that airline staff get to handle difficult situations and negotiate, makes them create pleasurable moments for the passengers and the airline. Incidents like the same bring global disrepute for the airline and also force governments of the country to intervene and take strict actions. With social media being the quickest form of information transmission, incidents like below spark an outrage within hours globally. An improper way of dealing a situation by a flight crew member may lead to diplomatic intervention between governments of different nations.

- **The Incident :**

In 2017, United Airlines operating as United Express Flight 3411 from Chicago was still at the gate when the authorities decided to de–plane four passengers, who had paid full fare for their seats, to accommodate four crew members of the airline company Republic, a subsidiary of United, who were to reach an unmanned aircraft and attend to the same at the destination airport. The staff members of the ground crew, a supervisor, entered the aircraft and announced in a very rude tone that there are United Airline employees who need to be flown to Louisville and the flight will not move until four passengers volunteer to get off the aircraft. United was offering vouchers of $400, hotel stay and a flight scheduled 21 hours later to passengers who will get off. Passengers from their narrative said that the behaviour of the crew supervisor who announced was very rude and after her announcement the passengers did not volunteer or moved from their seats. With no volunteers United Airlines increased the offer of travel voucher to $ 800 but still no one moved from their seats. When there was no volunteers a manager from United Airlines boarded the aircraft and announced that the name of the 4 passengers who have to de–plane will be randomly selected by a computer. The computer selected a couple, a lady who and Dr. David Dao Duy Anh, a Vietnamese American, a pulmonologist and folk musician. The couple and the lady left the aircraft but Dr. Dao did not vacate his seat. He said that the next morning he was supposed to attend to his patients and the same was important and urgent. He protested against the action of the airline company as he had paid full fare for his seat and had polite verbal altercations with the airline staff refusing to vacate the seat. The United Airlines staff requested the help of Chicago Department of Aviation Security. The authorities dragged Dr. Dao from his seat and in the process Dr. Dao was injured as the officers threw him against an armrest which led to a nose injury and heavy bleeding. Though he became unconscious,

he was dragged through the aisle of the aircraft by the authorities and de–planed. According to passenger eyewitness accounts, the officers laughed as Dao was dragged off the plane. Four United employees then sat in the vacated seats. Shortly afterward, Dao managed to board the aircraft again, repeatedly saying, "I have to go home" and "Just kill me." Eventually he collapsed in a seat and was removed from the aircraft on a stretcher. The remaining passengers were then deplaned while Dao's blood was removed. Many passengers refused to travel by the aircraft for the behaviour shown by the staff of United and the authorities. The passengers recorded the entire event on their smart phones and the videos were widely circulated over the social media.] Dr. Dao was taken to the hospital with non–life–threatening injuries including a broken nose, loss of two front teeth, sinus injuries and "a significant concussion"; the injuries required reconstructive surgery according to Dao's lawyer.

➢ **Post Incident Happenings :**

There were a lot of repercussions that happened around the globe after the incident and the video footage of the incident becoming viral.

- The politicians expressed concern on the action and forced the government to officially investigate the matter and take strict action against the airline.
- The then President of the United States, Donald Trump criticized the airline and called the treatment of Dr Dao as horrible.
- The CEO of United Airlines, Oscar Munoz issued a statement justifying the removal of Dr Dao for re–accommodating the crew that was necessary.
- Munoz also sent an email to all the staff members of United justifying the action of the crew members as Dr Dao's behaviour was "disruptive" and "belligerent".
- The eyewitnesses in their statement denied Dr Dao of being belligerent with the crew or the authorities and were speaking politely to them.
- The email sent to the staff members by Oscar Munoz went viral leading to sarcastic remarks, memes and huge trolling of United along with Oscar Munoz.
- United Airlines stocks crashed at the stock market leading to huge losses in billions of dollars for the company.
- A poll of 1,900 people conducted three days after the incident suggested that all else being equal, 79% of prospective fliers who had heard of the incident would choose a non–United Airlines flight. 44% would choose a non–United Airlines flight even if it cost US$66 more and took an additional three hours.
- A lot of airlines started launched advertisement campaigns against United. Among them the lead players were Emirates, Royal Jordanian and others. Many airlines banned their crew from flying United. Southwest Airlines after the incident stopped overbooking for their

flights. American Airlines implemented a policy of no removal of any passenger from their seats in an aircraft. A world–wide change started happening.

- The White House's "We the People" webpage received 100,000 petition signatures in one day–exceeding the threshold needed for official review–demanding a government investigation into the incident.
- The Chinese government criticized the American government for treating people from South East Asia badly.
- With furore moving across the globe, an official statement was again released by Oscar Munoz. He described the incident as "horrific" and expressed and understanding of the "outrage, anger, disappointment" felt by many. He took full responsibility and apologized, adding that "No one should ever be mistreated this way." He promised to conduct a thorough review and release a report.
- During a television interview further, Munoz announced that, effective immediately, United Airlines would no longer use police in involuntary bumping situations : "We're not going to put a law enforcement official, to remove a booked, paid, seated passenger." He apologized to Dao and his family and said, "That is not who our family at United is. You saw us at a bad moment; this can and will never happen again on a United Airlines flight. That is my promise." Asked if Dao was at fault in any way, Munoz hesitated, then replied, "No, he can't be ... no one should be treated that way, period.
- Post the television interview United Airlines decided to compensate all passengers aboard flight 3411 equal to the cost of their tickets. An email obtained by CNN stated that this compensation was in the form of a $500 voucher toward future travel on United Airlines.
- United internally announced a policy change to ensure that flight crews are booked "at least 60 minutes prior to departure.
- Munoz could not become the Chairman of the airlines because of the incident.
- United and Dr Dao reached to a confidential settlement with a lot of legal clauses.
- The airline announced ten policy changes in response to the incident. These included raising the maximum amount of travel vouchers to passengers "bounced" from flights to up to $10,000 and a $1,500 "no questions asked" fee for permanently lost luggage, and the airline promised to reduce overbooking.

The entire incident and the handling of the incident by the airline and even by the CEO of the airline was a surprise to the entire world for a company in delivering Customer Service. The view of the entire press was that Munoz could have moved more swiftly and apologetically to restore the name of United. The entire world mocked on United and

their attitude in the whole incident. The levels of Service, its delivery and recovery are crucial to any airline in this modern age of communication and choices.

4.3 CASE STUDY 3 : SUSTAINABILITY OF AIRLINE WITHIN AIRLINE (AWA) BRANDS. :

➢ **Introduction :**

Aviation is a fast moving, dynamic and everchanging industry that requires airlines to constantly be innovating and pre–empting events in order to remain competitive. Over the years the airline industry has been challenged by occurrences from within the industry such as industrial action and improved technology as well as from external sources like government directives, regulatory bodies, the environment and terrorism. The advent of the low–cost carrier (LCC) in the early 1970 ?s had a profound effect on the airline industry and the way that network airlines operated (Detzen et al., 2012). LCC's had clear future orientated strategies that could easily adapt to the changing market conditions. At the core of LCC strategies were simple streamlined product offerings, high capacity aircraft, mono–aircraft fleets, and efficient crewing methods (Button and Ison, 2008, Graham and Vowles, 2006). The cumbersome network carriers struggled to compete with these fast–moving carriers with their low overheads and high customer satisfaction. As a result, these network carriers had to significantly alter their own operations in order to remain relevant and survive (Graf, 2005). Their response was to create an **Airline–Within–Airline (AWA)**.

- AWAs became a common method of competing with the world's growing number of LCCs during the 1980s and particularly the 1990s (Doganis, 2006).
- Within a short time of its advent, the high failure rate of numerous AWAs over the years suggested that these operations are far more complicated than many network carriers originally believed. AWAs required a significant number of resources, personnel and market understanding to be implemented correctly and allow for sustained operations to occur.
- One of the first successful AWA cases was that of Jetstar, which was established in 2003 and is the low–cost subsidiary of the Qantas Group.
- Seven years later in 2010 the Singapore Airlines Group acquired a majority stake in Tigerair for low–cost short–haul operations. The following year, Scoot was created which would serve as the group's low–cost medium to long–haul option. Tigerair became a fully owned subsidiary of the Singapore Airlines Group in 2016.
- All of these AWAs continue to be in existence, and allow their respective Group's access to an ever increasing pool of lucrative budget travellers and middle income passengers that they would not

have had access to if they relied on their previous premium–only strategies (Merket and Pearson, 2014).

- Ultimately, these AWAs have allowed the Qantas and Singapore Airlines Groups to attract short–haul and long–haul passengers at both ends of the price spectrum, which is a significant advantage over their competitors, particularly when premium demand softens during the periods of economic uncertainty.

➢ **Challenges faced by AWA's :**

There are several reasons for failure of AWAs especially in the USA. AWAs operate under severe challenges for operational success and some of the challenges enumerated are as

- Lack of Vision and Strategic direction in management of dual or multi–brand operation.
- Cannibalism within its own share of customers. American AWAs suffered a lot from the problem. Instead of complimenting the parent airline, AWAs started competing leading to cannibalism. The same happened with United States AWAs of brands like United Airlines, Continental Airlines.
- AWAs were initially offered poor and re–configured fleet of aircraft from parent company which led to customer dissatisfaction.
- Staffing challenges as the AWA had moved staff from parent brand to AWAs. In USA in majority of cases, the unions would also limit AWA block flying hours and the number of aircraft that they could operate, thus hindering the competitiveness of the AWA.
- Less autonomy from parent airline leading to poor and quick decision making for the AWA brand.
- Incompatible networks for AWAs often leading to mirroring of LCC strategy.
- No Cohesive and coordinated approach to each market segment is maintained.
- Improper branding of the AWA from the parent airline.

➢ **Successful Business Model for AWA :**

One of the most critical developments to occur during the observed period was the introduction of Scoot, the final airline to be added to the Singapore Airlines Group's AWA strategy, allowing for medium to long–haul low–cost flights to be launched to destinations where the existing Singapore Airlines and Silkair products would not be suitable, or where the market was large enough to support a carrier at either end of the price spectrum. Scoot began operations with a fleet of second–hand Boeing 777 aircraft leased from Singapore Airlines, and later transitioned to an all new Boeing 787 fleet. This transition to the Boeing 787 fleet reinforced the long–term commitment of the Singapore Airlines Group in entering the low–cost long–haul market, and the realisation that

in order to be competitive in this challenging low–cost segment then the most efficient and modern aircraft are a necessity. In addition, Scoot applied for an anti–trust immunity agreement with Tigerair in an effort to improve and strengthen coordination, pricing, and connectivity between the two airlines and allow for seamless passenger journeys. This resulted in an increase in transfer passengers between the two airlines. A further development is the integration of the two airlines' booking systems to create a single platform and further reduce operating costs.

In 2002, the Qantas Group launched Australian Airlines, its first AWA that provided mono–class full service long–haul economy flights to leisure destinations in Asia the airline's main purpose was to operate flights that were previously served by mainline Qantas, as well as destinations that Qantas itself would not be able to achieve acceptable returns. This AWA venture was independently managed from Qantas; however, it aimed to complement the existing mainline Qantas services

In May 2004, the Qantas Group launched Jetstar as its second AWA. Jetstar was initially a domestic only LCC operating a fleet of second–hand Boeing 717 aircraft to major leisure destinations in New South Wales and Queensland. These Boeing 717s were rapidly replaced with more efficient with Airbus A320s, A330s and later Boeing 787s. Jetstar's purpose was to complement existing Qantas operations, allowing the group to compete more effectively with LCCs such as Virgin Blue and Tigerair Australia, and provide the group with an airline in each of the two remaining core travel markets (short–haul and long–haul low–cost air travel), as well as opening up air travel to the new and rapidly growing price–sensitive/budget market segment. The arrival of Airbus A330s allowed for the launch of Jetstar's long–haul dual cabin product which included a business cabin that was similar to domestic business class offered on Qantas flights with recliner seats, improved catering, and complimentary inflight entertainment, all of which was located in a small cabin at the front of the aircraft.

The Airbus A330 enabled Jetstar operated flights to popular destinations in Asia and the Pacific region, including Bali, Honolulu and Phuket. The Airbus A330s were later returned to Qantas following the arrival of the Boeing 787s which were highly regarded aircraft due to their improved fuel efficiency, operating credentials and passenger comfort.

On the ground, Jetstar introduced its self–service check–in option with kiosks and automated bag drops in a number of cities, thus reducing check–in times for passengers and operating costs for the airline. A lounge product was also launched at the airline's largest hub at Gold Coast Airport in an effort to improve the airline's appeal to the business travel market. Access to the lounge was complimentary to passengers travelling in Jetstar's business class or available to any passengers for a fee. Jetstar also retimed its domestic flights at Gold Coast Airport and its other major international gateways in an effort to make transfers to international flight simpler and faster.

In conjunction with Qantas, the two airlines provide comprehensive, convenient and competitive schedules and product and service offerings for both the domestic and international travel markets, with networks that cover all the major business and leisure routes in Australia, and key overseas destinations.

➢ **Attributes of Successful AWA Strategy :**

- High levels of autonomy between mainline and AWA.
- The product and service offerings between the AWAs of the two airline groups do not overlap
- With multiple airlines each airline group can grow markets at either end of the price spectrum (e.g. premium and low–cost travellers).
- Complimentary rather than competing networks between the mainline carrier and the AWA.
- The AWA strategy allows routes to be swapped between carriers where necessary. Flexibility between group airlines is essential.
- Cabins at all airlines are updated regularly to remain relevant. Technology and automation enablement is undertaken to reduce operational costs.
- Measures like minimising turnaround times, flight Rotation, fast passenger processing, on board food, In–flight entertainment are some of the key strategies to be implemented for operational success.

The AWA strategy can be a useful strategic management tool for airlines to combat the continuing growth of LCCs and flexibility for industry downturns. The strategy should be adopted with caution as it can be a costly drain on resources as well as potentially harm an airline group's brand and reputation if implemented incorrectly. The Singapore Airlines Group and the Qantas Group have successfully proven that dual or multiple airline brands can be operated simultaneously without damaging other airlines within the same group, which in turn has allowed the two groups to successfully compete against the fierce low–cost competition in the Asia–Pacific region. This strategy has given each group increased operational flexibility to tailor their respective products and services to individual market segments rather than expecting the markets to accept a single premium product which they could only offer previously. However, this desirable result could only be achieved due to the significant number of resources, knowledge and careful strategic planning that went into the creation of each airline group's respective AWAs.

BLOCK SUMMARY

The block highlights the complex passenger service system in detail covering it major three components, CRS, Airline Inventory System and Departure Control System. Learners have demonstrated an understanding of the many parts of reservation and booking concerns by utilising PSS in the second unit of this block. Additionally, the unit studied and analysed the market for PSS in some of the most important countries in the world. An insight into the operational aspects of modern airports that determine service levels at airports through various relevant aspects are also critical for your understanding as a student of aviation and the same has been explained. The last unit gives you an insight to three case studies related to customer service and delight.

BLOCK ASSIGNMENT

Short Questions :

1. Explain the working of Amadeus PSS ?
2. Enumerate on the airline related operational functions ?
3. What is access ? Explain the role of access interaction in passenger terminal operation ?
4. Enumerate on the determinants of Service Effectiveness at airports ?
5. Discuss the major features of PSS software of any 3 companies of your choice.
6. What are the challenges using PSS to airline companies ?
7. Analyse the Japanese and Chines market of PSS.

Long Questions :

1. Discuss the three major components of PSS in detail with example ?
2. Enlist and explain the direct passenger services offered by an airport ?
3. Enumerate the aids for movement of passengers at an airport highlighting their effective use ?
4. What are the factors that affects access mode choice for passengers ?
5. Describe the factors for strategic context of airport operational performance.
6. Enumerate on the elements of Service Delivery Plan ?

❖ **Enrolment No. :** ☐

1. How many hours did you need for studying the units ?

Unit No.	1	2	3	4
No. of Hrs.				

2. Please give your reactions to the following items based on your reading of the block :

Items	Excellent	Very Good	Good	Poor	Give specific example if any
Presentation Quality	☐	☐	☐	☐	_____
Language and Style	☐	☐	☐	☐	_____
Illustration used (Diagram, tables etc)	☐	☐	☐	☐	_____
Conceptual Clarity	☐	☐	☐	☐	_____
Check your progress Quest	☐	☐	☐	☐	_____
Feed back to CYP Question	☐	☐	☐	☐	_____

3. Any other Comments

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