

Lecture 8

University of Anbar

Civil Engineering Department

MSc- Highway Engineering

Railway and Airport Engineering

Introduction to Airports

- Introduction
- Airport Classification

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Introduction

- The world's first airport was built in 1928 at Croydon near London (England). It was the main airport for London till it was closed down in 1959, after World War II. It is now open as a Visitor Centre for aviation.
- **According to ICAO (International Civil Aviation Organization) define.**
- **Airport Engineering:-** Involves design and construction of a wide variety of facilities for the landing, takeoff, movement on the ground, and parking of aircraft, maintenance and repair of aircraft, fuel storage, and handling of passengers, baggage, and freight.
- **Aerodrome (Airport):-** Is a defined area on land or water including any buildings, installations, and equipment intended to be used either wholly or in part for arrival, departure and surface movement of aircrafts.
- **Aerodrome Reference Point :-** The designated geographical location of an aerodrome, the aerodrome reference point shall be located near the initial or planned geometric center of the aerodrome and shall normally remain where first establish the position of the aerodrome reference points shall be measured and given to the nearest second latitude and longitude.
- **Aircraft:** A device that is used or intended to be used for flight in the air.
- **Aircraft stand:-** A designated area on an apron intended to be used for parking an aircraft.

Introduction

- **General Aviation Types:**

- 1- Business flying
- 2- Commercial flying
- 3- Personal flying
- 4- Instructional flying

- **Typical Air Trip:**

Origin – walking – taxi - Parking – walk - Ticket - counter check in - walk - Gate - walk or bus – Aircraft - Taxiway – Runway.

- **Advantage:**

- 1- Rapidity
- 2- continuity
- 3- Accessibility

- **Limitations**

- 1- Operating expenses
- 2- Weight carrying capacity
- 3- Weather conditions
- 4- Flight rules

Airport Classification

- **According to Community Size:**

- 1- Small (population < 25000)
- 2- Medium (25000 < population < 250000)
- 3- Large (population > 250000)
- 4- Global centers

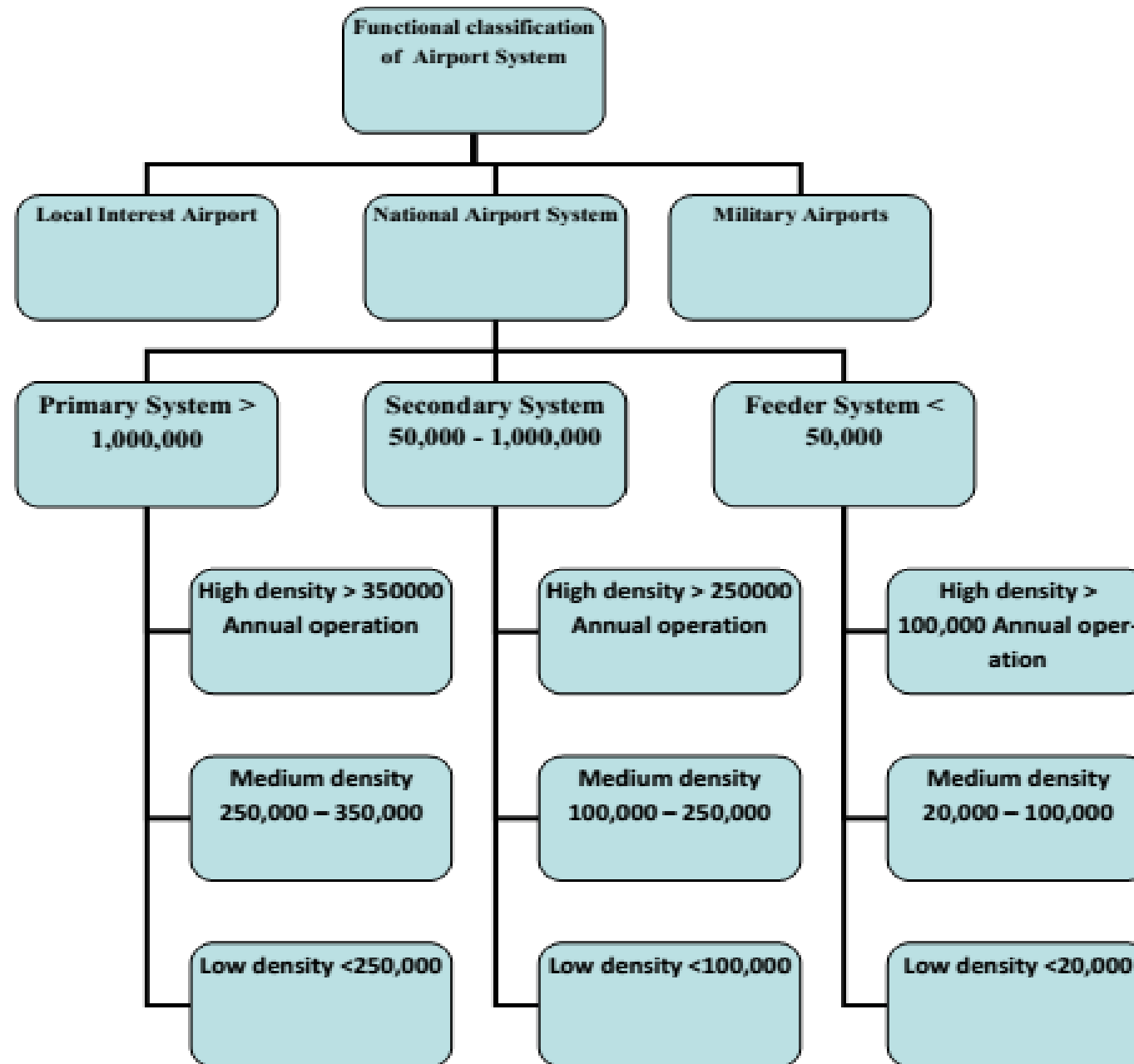
- **According to Type of Service**

- 1- With scheduled services: Including passenger, exports, low cargo, airmail, taxi-service.
- 2- With non-scheduled services: Including private & business flying, air training school, sport, travel, aerial photogrammetric, industrial flight, helicopter.
- 3- With mixed services (scheduled and non-scheduled).

- **Functional Classification**

- 1- Military
- 2- Local interest
- 3- National system

The national system airport can be divided according to public service level classified by plane according to (Annual Operation).



Functional Classification of Airport according to Annual Operation of Aircrafts

Airport Classification

- Airport Classification for the Purpose of geometric Design standards
 - ✓ For the purpose of design standards for the various sizes of airports and function which they service, letter and numerical codes or word used to descriptors have been adopted to classify. The ICAO now used two elements (reference code to classify the geometric design standard for airport). The code elements consist of (Numerical and Alphabetical).
 - ✓ 1) Numerical, the code number (1, 2, 3, 4) classify the length of the runway available.
 - ✓ 2) Alphabetical, the code letter (A, B, C, D, E) classify the wing span and outer main gear wheel span for aircraft for which the airport has been designed.
 - ✓ Gear span: - It is the distance between outside edges of the main wheel gear.

Code Element No.1		Code Element No.2		
Code No.	Reference field length for Runway	Code Letter	Wing Span	Outer Main Gear Span
1	Less than 800 m	A	Up to but not including 15 m	Up to but not including 4.5 m.
2	800 m – up to but not including 1200 m	B	15 m - up to but not including 24 m.	4.5 m - up to but not including 6 m.
3	1200 m – up to but not including 1800 m	C	24 m - up to but not including 36 m.	6 m - up to but not including 9 m.
4	1800 m and over	D	36 m - up to but not including 52 m.	9 m - up to but not including 14 m.
		E	52 m - up to but not including 60 m.	14 m and over

Airport Elements

- **Airport elements include:**

1- Runway 2- Taxiway 3- Apron 4- Terminal building 5- Hangars 6- Tower

- **Runway:-** It is the long strip of ground (rectangular area) with a hard surface which an airplane takes off from or lands on.



Airport Elements

- **Taxiway** : It is a path for aircraft at an airport connecting runways with aprons, hangars, terminals and other facilities. They mostly have a hard surface such as asphalt or concrete.



Airport Elements

- **Apron:-** It is the area of an airport where aircraft are parked, unloaded or loaded, refueled, or boarded. ... The apron is designated by the ICAO as not being part of the maneuvering area. All vehicles, aircraft and people using the apron are referred to as apron traffic.



Airport Elements

- **Terminal building:** An airport terminal is a building at an airport where passengers transfer between ground transportation and the facilities that allow them to board and disembark from aircraft.
 - ✓ Within the terminal, passengers purchase tickets, transfer their luggage, and go through security. The buildings that provide access to the airplanes (via gates) are typically called concourses. However, the terms "terminal" and "concourse" are sometimes used interchangeably, depending on the configuration of the airport.
 - ✓ Smaller airports have one terminal while larger airports have several terminals and/or concourses. At small airports, the single terminal building typically serves all of the functions of a terminal and a concourse. Some larger airports have one terminal that is connected to multiple concourses via walkways, sky-bridges, or underground tunnels.



Airport Elements

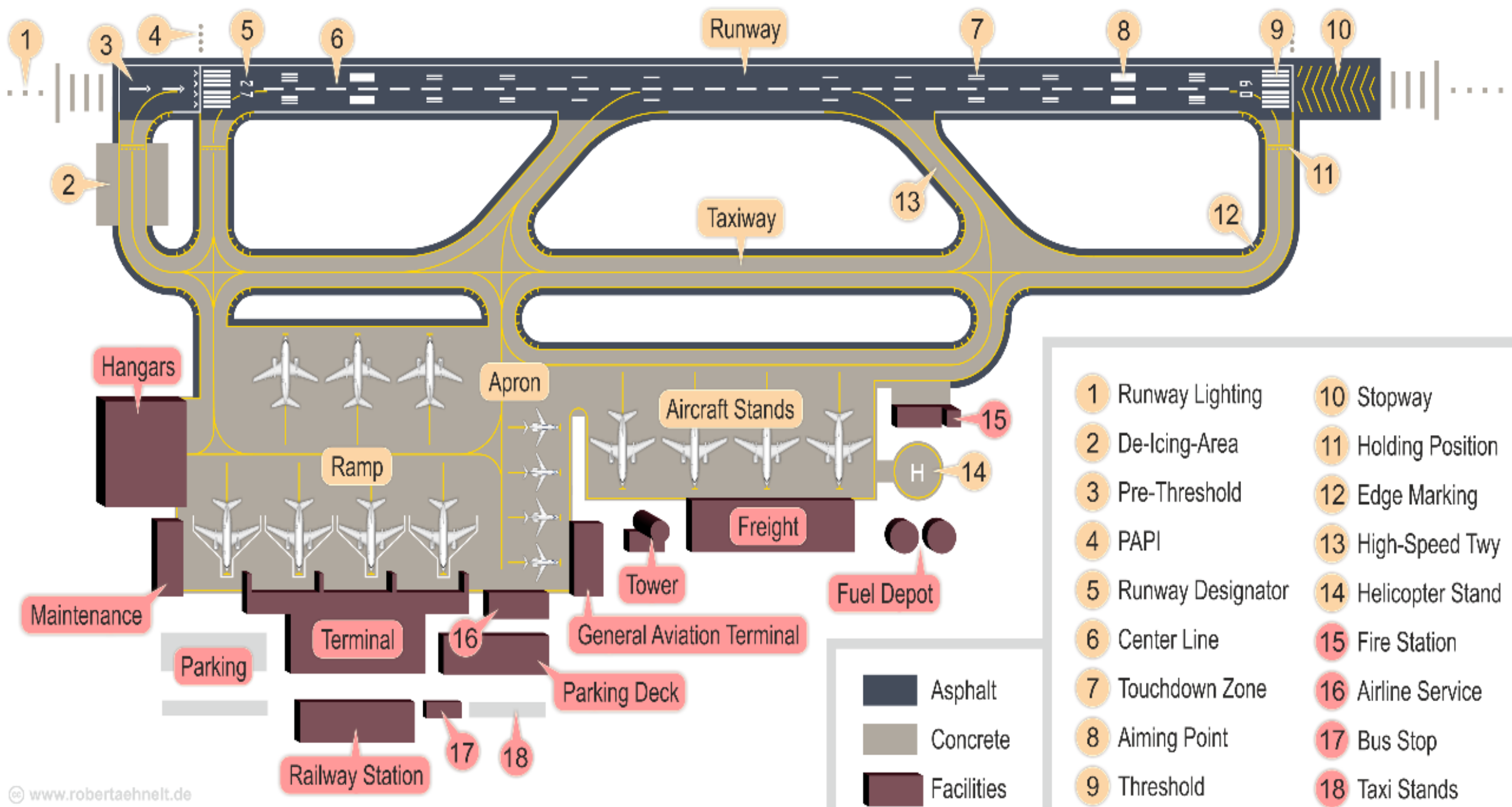
- **Hangars:**

A hangar is a closed building structure to hold aircraft, or spacecraft. Hangars are built of metal, wood and concrete.



- **Control Tower:** A control tower is a building at an airport from which instructions are given to aircraft when they are taking off or landing.





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|---------------------|---------------------|
| 1 Runway Lighting | 10 Stopway |
| 2 De-Icing-Area | 11 Holding Position |
| 3 Pre-Threshold | 12 Edge Marking |
| 4 PAPI | 13 High-Speed Twy |
| 5 Runway Designator | 14 Helicopter Stand |
| 6 Center Line | 15 Fire Station |
| 7 Touchdown Zone | 16 Airline Service |
| 8 Aiming Point | 17 Bus Stop |
| 9 Threshold | 18 Taxi Stands |

Aviation Organizations

- International Civil Aviation Organization , ICAO
- Federal Aviation Administration ,FAA
- Experimental Aircraft Association (EAA)
- International Air Transport Association (IATA)

