

Name- Sarishma Bhandari

Roll no: 103117086

Assignment 3: Airport

APRON

Overview

Apron is a paved area located adjacent to the terminal building which is used for parking as well as holding aircraft for loading and unloading of passengers, cargo and fuel.

Components

Proper drainage facilities are provided with suitable slope of pavement. Sufficient clearances are provided for aircrafts to bypass each other. The size of the apron depends upon size of the gate, number of gates and system of aircraft parking.

Brief Explanation

Gate is the parking space for an aircraft located adjacent to the building. The size of gate depends on the size of the aircraft and thus influences the apron area. The number of gates needed is designed according to the expected hourly flow of aircraft which can be conveniently handled. Also the different methods of parking such as nose-in, nose-out, angled nose-in, angled nose-out, parallel affect our design of apron area.

Other most important aspect governing apron area includes the system of aircraft parking. There are:-

Frontal System: The system where aircraft are parked along the face of the terminal building.

Open-apron system: Here, the aircraft are located in rows.

Pier System: Known as finger system where piers are built from the main terminal building with different shapes and gates can be provided on either side.

Satellite System: Here, small buildings known as satellite are built around the apron and gates are provided around this.

All these systems have their own pros and cons. On the basis of the type of airport the most suitable system can be adopted for better yield.

Significance and Inference

Aircraft may need immediate assistance after covering long distances thus proper facilities must be readily available. Also if some unexpected disaster occurs when the aircraft is resting, safety equipments must be readily available around the apron area.

AIRCRAFT CHARACTERISTICS

Overview

The important physical characteristics of the aircraft necessary for planning airport facilities as well as design of geometric components and structural layers of runways and taxiways are called aircraft characteristics. These include length of the aircraft, height, minimum turning radius etc for designing aprons, taxiways, runways etc.

Components

These include the physical dimension of the aircraft, weight and the exhaust product such as jet blast which affects the designing and planning of airport as a whole.

Brief Explanation

Some of the important parameters are discussed briefly below:-

Size of the airplane/aircraft: It is the overall dimensions of the airplane in terms of overall length, wing span and maximum height. The upper limit of the dimension of a large aircraft's is used for planning and designing airport components.

Length of Aircraft: The design of apron and hanger directly depends upon the length.

Maximum height of aircraft: This is needed to design the hanger gate.

Tyre pressure and contact area: This is used to determine the type of pavements and strength required.

Speed of aircraft: This is needed for estimating the length of runway.

Jet Blast: The high speed aircrafts are prone to eject hot exhaust gases at very high velocity which may affect the terminal buildings also (If aircraft parked in a nose-out manner).

Surface friction of runway: The runway should have minimum frictional resistance to stop a landed aircraft at a minimum distance.

Wheel Base: It is needed to determine the turning radius of taxiways.

Significance and Inference

The aircraft characteristics are very important for engineers because by analyzing these parameters only designing can be done. Thus it can be inferred that collection of suitable data of these characteristics will help engineers for economical and effective design.

AIRPORT OBSTRUCTION AND ZONING

Overview

Airport obstruction are those obstruction found in and around the airport which may pose danger during airport operations. They are of two types, imaginary surfaces and objects with actual height.

Some area around the airport is termed as 'zone' having certain common requirements. Since large areas cannot be acquired alone by airport authorities, certain restrictions are enforced regarding the heights of structures and types of land use in airport zones called **zoning laws**.

Components

The imaginary surfaces include approach surface, conical surface, horizontal surface, take-off climb surface, transitional surface and baulked landing surface. These surfaces are important for landing and takeoff operations of the aircraft. Similarly objects which exceeds a specified height above the ground is treated as an obstruction for operating flights.

The airport zones where restrictions are enforced are divided into approach zones, clear zones and turning zones.

Brief Explanation

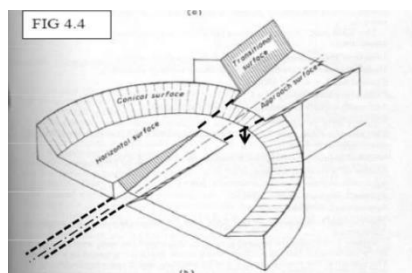


Fig: Imaginary surfaces

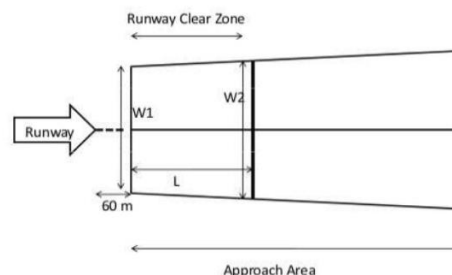


Fig: Airport zones

The airport obstruction's imaginary surfaces are shown above. It is an imaginary area responsible for aircrafts important operations. For example the approach area is the trapezoidal slope area located at both sides of a runway for landing and takeoff operations.

The approach zone is the area including 15km length from the runway end. The restrictions on height of houses and any other developmental activities are imposed. The clear zone lies nearer to the runway and should preferably be a level area that is free of all major obstructions. The turning zone is the area of an airport which is meant for turning operations during failure of engine at the beginning of the takeoff.

The zoning laws are provided so that the area around the airport is made safe. This includes height zoning, which restricts the heights of structures in the vicinity of the airport depending upon magnitude wise and size of airport. Another includes land-use zoning which restricts on development and land use in the vicinity of an airport. For example use of agricultural land may attract different kinds of birds which may be hazardous as they may cause accidents.

Significance and Inference

For improving safety, airport obstructions should be properly analyzed and based on that suitable area can be used. Furthermore, the proper plan of airport zones may help for future expansion also.

It can be inferred that studying all the airport obstructions around the proposed airport site as well as proper implementation of zoning laws, we can construct airport economically as well as with maximum safety.