



## **ANALYSIS & DESIGN OF AIRPORT TERMINAL BUILDING**

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At airport where there is a large number of air passengers accumulated for transportation needs sufficient shelter and space for departure and arrival purposes.

The purpose of airport terminal building is to provide shelter and space for various surface activities related to the air transportation. It acts as a focal point for activities of the airport. The size of these building depends upon volume of traffic.

Due to the rapid rise in popularity of passenger flight, many early terminals were built in the 1930s–1940s and reflected the popular art deco style architecture of the time. One such surviving example from 1940 is the Houston Municipal Airport Terminal. Early airport terminals opened directly onto the tarmac: passengers would walk or take a bus to their aircraft. This design is still common among smaller airports, and even many larger airports have "bus gates" to accommodate aircraft beyond the main terminal.

### **1.2 Technical Terms**

#### **1.2.1 Airport:**

It is an area of land or water which is to be regularly used for landing and takeoff of aircrafts. It is provided with facilities for shelter and repair of aircrafts in addition to the other normal facilities for passengers and cargo

**1.2.2 Airport Terminal building:**A focal point in the terminal area. It provides space for line operations, facilities for convenience of passengers, office for the airport management and non aero nautical functions.

#### **1.2.3 Immigration:**

This area is devoted for the examination of Passports. Consideration for design and function of this area must be correlated with federal authorities.

#### **1.2.4 Runway:**

Where the aircrafts are taken off and landed.

#### **1.2.5 Taxiway:**

Where the aircraft is parked and passengers get into or get down from the aircraft. In this area various other vehicles are also parked such as busses, luggage carriers etc.



### **1.2.6 Apron:**

Where passenger aircrafts are parked in and used for fuelling purposes. The apron is marked with yellow and red strip of lines indicating the path to travel by aircraft at apron to reach taxiway.

### **1.2.7 Departure:**

An assembly area including boarding control point, located at gate positions for passengers pending availability of aircraft for boarding.

## **1.7 Objectives**

The main objective is to provide space for line operations, facilities for convenience of passengers, office for the airport management and non aero nautical functions. As such they are planned for maximum efficiency, convenience and economy. The extent of the building area in relation to the landing area depends upon the present and the future anticipated use of airport. Location of the building area with respect to runway and taxiway should provide adequate space for future expansion of all structures.

## **1.8 Methodology**

- Limit state of design was adopted and General Code of practice for building (IS: 456-2000)&Code of practice for seismic design (IS: 1893-2002) was followed.
- Structural design and analysis are performed by using STAAD-PRO V8i & STAAD FOUNDATIONv8 software.
- Designed under the specifications of Tamil nadu municipality bye-laws and building rules 1972 and standard design codes.

## **PLANNING & ANALYSIS USING STAAD PRO**

### **3.1 Planning of Airport Terminal Building**

1. This design has certain specifications which makes it an unique design.
  - Radiant heat technology.
  - Eco friendly.
  - Zero level changes.
  - Energy saving.
2. The planning is based upon the shape of feathers of a peacock.
3. It is eco friendly in nature , such as by planning light well, solar panels, radiant heat technology, etc.
4. Zero Level Changes: Arrival are at the ground floor and departures are at the first floor.



5. Roofing of the first floor is planned to be tubular framed structures in order to accommodate light wells and solar panels.

### **3.3 Analysis using STAAD.Pro**

STAAD.Pro, the most popular structural engineering software product for 3D model generation, analysis and design. It has an intuitive, user-friendly GUI, visualization tools, powerful analysis and design facilities.

The Software Release Report for STAAD.Pro V8i contains detailed information on additions and changes that have been implemented since the release of STAAD.Pro 2007 build 03. This document should be read in conjunction with all other STAAD. Pro manuals, including the Revision History document.

It works on “ Finite Element method”

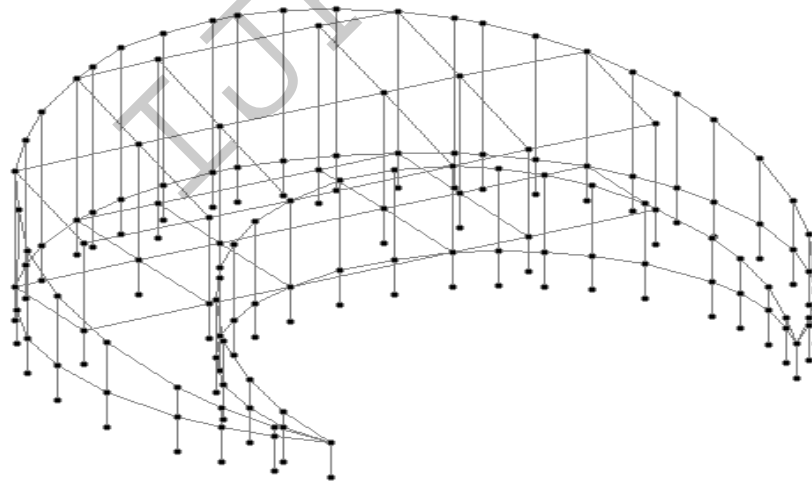
STAAD.Pro has been enhanced so that the model STD data file can be managed on a Project Wise server.

#### Description:

Four integration functionalities have been added. These are

- Open a STAAD model from a Project Wise repository.
- Save a local STAAD model into a Project Wise repository.
- Update an existing model from Project Wise.
- Review model properties (meta-data) which has been opened from a Project Wise repository.

### **3.2 STADD Pro Analysis of Airport Structure**



**Fig.3.3. Initial Structure Diagram.**

## **RESULTS AND CONCLUSIONS**

### **5.1 Results**



The following are the results obtained from this project:

### 5.1.1 Roof slab

Type	Dimension	Along longer side reinforcement	Along shorter side reinforcement
RS1	3.9m * 7m	10mm dia @ 300mm c/c	8mm dia @ 175mm c/c
RS2	5.8m * 7m	10mm dia @ 225mm c/c	8mm dia @ 125mm c/c
RS3	3m * 9.7m	10mm dia @ 225mm c/c	8mm dia @ 150mm c/c

### 5.1.2 Plinth Beam

Type	Dimension	Main reinforcement	Stirrups
PB1	230mm*380mm	16mm dia bars, 7 nos	8mm dia @ 300mm c/c
PB2	230mm*380mm	12mm dia bars, 5 nos.	8mm dia @ 300mm c/c
PB3	230mm*380mm	16mm dia bars, 5 nos	8mm dia @ 300mm c/c

### 5.1.3 Roof Beam

Type	Dimension	Main reinforcement	Stirrups
RB1	230mm*450mm	20mm, 4nos & 16mm, 4 nos.	8mm dia @ 300mm c/c
RB2	230mm*450mm	12mm dia bars, 7 nos.	8mm dia @ 300mm c/c
RB3	230mm*450mm	16mm dia bars, 7 nos	8mm dia @ 300mm c/c

### 5.1.4 Columns

Type	Dimension	Main reinforcement	Stirrups
C1	300mm*600mm	25mm, 4nos & 20mm, 6 nos.	6mm dia @ 350mm c/c
C2	300mm*600mm	25mm, 6nos & 20mm, 6 nos.	6mm dia @ 350mm c/c
C3	300mm*600mm	25mm, 8nos & 20mm, 4 nos.	6mm dia @ 350mm c/c

### 5.1.5 Footing

Type	Dimension	Depth	X sidereinforcement	Y side reinforcement
F1	3m*3m	1.5m	10mm dia @ 60mm c/c	10mm dia @ 85mm c/c
F2	3.5m*3.5m	1.5m	10mm dia @ 50mm c/c	10mm dia @ 60mm c/c
F3	3.75m*3.75m	1.5m	12mm dia @ 55mm c/c	12mm dia @ 70mm c/c
F4	4.10m*4.10m	1.5m	12mm dia @ 45mm c/c	12mm dia @ 50mm c/c

### 5.2 Conclusion



For this project we worked in a planned manner. We did it in a most proper way in each and every stage, which lead us to complete this project in a most successful manner. This project has given us quality such as team work. This information and the implements, which we have gained from this project, will help us in the later part of our carrer.

Planning and designing of Airport Terminal Building have been completely done. All necessary drawings have been provided. Structure is designed as framed structure. Design and analysis have been strictly in accordance by laws and code provisions.

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