Site suitability study for an International Airport in Visakhapatnam

Balarama Krishna RV¹, Durga Rani K², Gopala Raju SSSV³

¹Dept. of Civil Engineering, Andhra University, Visakhapatnam, A.P., India
²Dept. of Civil Engineering, GITAM University, Visakhapatnam, A.P., India

*Corresponding author: Gopala Raju SSSV, Dept. of Civil Engineering, GITAM University, Visakhapatnam, A.P., India, E-mail: sssvgopalaraju@gmail.com

Abstract

This case study has been taken with a view to study the planning and design of proposed international airport in Koruprolu village, S.Rayavaram Mandal, Visakhapatnam district. The present airport at Visakhapatnam is a domestic one and under the control of Indian Navy. However, it is not meeting international airports standards. The feasibility and expansion of present airport is not possible due to lack of land availability and safety of naval and military establishment. At this junction the need of international airport at Visakhapatnam is inevitable due to increase of international traffic and industrial growth and public development in Visakhapatnam. As an abstract, the requirement points of international airport are the feasibility in the proposed area. The traffic demand, planning, design, environment impacts, the present and future needs of the international air traffic is discussed in detail.

Keywords: Visakhapatnam; Airport; Traffic demand; Airport standards.

Abbreviations: ONGC - Oil and Natural Gas Corporation; HPCL - Hindustan Petroleum Corporation Limited; SEZ - Special Economic Zones; VSKP – Visakhapatnam.

Introduction

The idea to develop an international airport in Visakhapatnam was come back during January 1997 by state government of Andhra Pradesh. State government of Andhra Pradesh has proposal with the help of private participation at a cost of Rs.5 billion. It is a part of vision 2020 by the state government of Andhra Pradesh. The Andhra Pradesh infrastructure authority and the department of transport, roads and buildings, government of Andhra Pradesh are highlighted the importance of necessity of international airport at Visakhapatnam. The State Government of Andhra Pradesh’s efforts to set up a green field international airport near Visakhapatnam has been the momentum with the airport authority of India zeroing in on Koruprolu at S.Rayavaram as appropriate site for the project. As part of the plan a 10,000 feet run way has to built with 26% share of the government and 74% share of private (Infrastructure Corporation of Andhra Pradesh, 2007).

The following are some of the present developments and upcoming developments in the Visakhapatnam region show the requirements of International Airport.

- Oil and Gas Refineries – HPCL, Petro-Chemical complex, ONGC Refinery.
- Ports – Visakhapatnam Port Trust having connectivity with four major ports.
- Industries – Visakha Steel Plant, B.H.P.V etc.
- Industrial investments rose to Rs.12,350 crores in last three years generating an additional employment of 1,72,000 people as compared with investments of Rs.4,524 crores between 2003 – 2006.
- A dream project of Prestige Blues within area of 150 acres located Jeerupalem at Visakhapatnam.
- The biggest Snow World Project will be started by the Ocean Park Group of Companies nearby area at Visakhapatnam.
- The Health City which is in biggest in India at Adarsh Nagar having 200 acres area.
- The Coastal corridor itself envisages and an investment of Rs.3, 43,000 crores in 5 to 7 years.
Selection of sites for international airport at VSKP

In view of coming developments of Port city, Visakhapatnam, The government of A.P. offered the sites at the following sites: SABBAVARAM, ATCHUTAPURAM, HOGAPURAM and KORUPROLU.

Among the above four locations the meritorious points for the selection of site for proposed international airport at Koruprolu in S.RAYAVARAM listed below. S.Rayavaram’s location is in between Kakinada and Visakhapatnam. It is at a distance of 75km from Visakhapatnam and 60kms from Kakinada and only 4kms from national highway No.5. There is availability of huge stretch of land without necessitating any acquisition. Best suitable location for SEZ operation is idle because of less rehabilitation requirements.

It has immense potential to trigger industrial growth shifted to coastal stretch in first page in between Visakhapatnam and Kakinada having future potential in Visakhapatnam and Kakinada region. Proximity to the existing civil enclave Visakhapatnam Airport location is best suitable in the aspects of terrain, best soils for foundations, availability of huge construction materials, manpower nearby. The location is having minimum obstruction for navigation of aircrafts. The climatic conditions are also preferable at this location.

Location of the proposed site for international airport at Visakhapatnam

Name of the country : India (Asia)
Name of State : Andhra Pradesh
Name of the District : Visakhapatnam
Name of the Mandal : S.Rayavaram
Name of the villages in: Koruprolu, Timmapuram, Pedauppalem
Which site is located : Lingarajupalem, Gudivda, Vommavaram
By the site : KORUPROLU
Latitude of the site : 17° 25′ 37″ N
Longitude of the Site : 82° 45′ 45″ E
Located at : 4km from National Highway
75km from Visakhapatnam
60km from Kakinada

Mean sea level of the location: +16.154 m
River near by : Varaha River
Major Bridge nearby on: Br.No.782/3 between National Highway: dharmavaram-penugollu villlage
Area of extent of land: 4511.65 Acres.

Wind intensity calculations

Total No. of observations = 2920
Observations of velocity ranging from 6.4 kmph to 25kmph = 1735
Observations of velocity ranging
from 25 kmph to 50 kmph = 2
Observations of velocity ranging from 0 to 6.4kmph = 1735*100/2920 = 59.42%
Percentage of Observations ranging from 6.4 kmph to 25 kmph = 1183
Percentage of Observations ranging from 25 kmph to 50 kmph = 2*100/2920 = .06%
Percentage of observations ranging from 0 to 6.4kmph = 1183*100/2920 = 40.52%

Field Survey

Field survey is conducted at four locations i.e., at Sabbavaram, Atuchathapuram, Bhogapuram and Koruprolu in S. Rayavaram and noted the locations and villages and mandal details at that areas. The details of those locations are noted. Considering Koruprolu site is the best among other locations, detailed field survey is conducted for the area calculations of the proposed site for international airport. In the phase 2 of a survey longitudinal and cross sectional levels were taken along the proposed site of international airport at Koruprolu. For this survey leveling instrument, tapes, cross staffs, ranging rods and other survey instruments are used. The mandal maps and details of population and areas of the villages are collected from the revenue departments of the state government of Andhra Pradesh.

In the Proposed airport all necessary points are considered like Geographical features, Environmental impacts, Land acquisition Feasibility, Employment regeneration, Meteorological conditions, MSL, Soil characteristics, Natural Gradient, Drainage facilities, present and Future traffic, connectivity with national highways, railways, major ports and other airports. Upcoming coastal corridor projects, existing and future industrial, Health, social, commercial needs, strategic considerations, safety aspects, Water source availability, Parking facilities, Night landing facilities with modern signaling, lighting, Radar facilities, remote sensing equipment to avoid bird hazards, minimum disturbance to social and cultural life of local people, Funds feasibility Etc., as per International Standards.

Summary

After considering factors like geographical features of the ground meteorological points, such as wind intensity, wind direction, soil characteristics with detailed sub soil investigations, and natural gradients of the ground by surveying with leveling instruments etc., and taking considerations with fewer obstructions for the construction of airport. The points considered are summarized below:

- Total Population of the Villages -27,133
- Requirement of land - 4,512 acres
- Natural Gradient of the Ground - 1 in 400 (falling)
- Land availability - Maximum area is govt., land
- Source of Water supply - Varaha River
- Depth of water table - 6 mts.,
- Drainage facility - Varaha river is having large drainage capacity
- CBR Value of the soil at the site - 5%
- Bearing capacity of the soil - 25 tons per sq.mtr.
- Structures Proposed in the site - Terminal complex, holding Aprons, Runways, Taxiways, Loading aprons, Pillets, Parking Aprons, Apron turntable, Hanger, Blast protection structure, Parking areas, Roads, Horticulture works
- Visual Aids for day time - Airport markings such as runway, Markings, taxiway markings, shoulder, Markings, apron markings, wind direction indicators, landing direction Indicators
- Airport Lighting for night time - Rotating, Code beacons, Boundary, Approach, Threshold, Runway, Taxiway, Apron Lightings
- Measures Considered - To minimize adverse effects of the human, Activities, environmental impacts air and Water quality, ecological Resources, etc.,
Conclusion

The location at S.Raravaram is suitable for an international airport in the aspects of terrain, soils for foundations, availability of huge construction materials, manpower. The location is having minimum obstruction for navigation of aircrafts. The climatic conditions are also preferable at this location.

References

1. Infrastructure Corporation of Andhra Pradesh (2007) Details from Conference on Investment Opportunities Infrastructure for Visakhapatnam – Kakinada Coastal Growth Corridor held on 28\textsuperscript{th} & 29\textsuperscript{th} November, 2007 in Visakhapatnam conducted by Infrastructure Corporation of Andhra Pradesh.