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Environmental Impact Assessment of air pollution and its mitigation measures of Bellora Airport, Amravati, Maharashtra, India.

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ABSTRACT

The present study carried out proposed project of development of Bellora Airport at Amravati in Maharashtra. The Bellora Airport, Amravati is located on the South – West of Amravati at a distance of 14.50 kms from Amravati city. The airport has terminal building in an area of 308 sqm. The Airport has other facilities like airfield lighting and ATC tower. Ambient air quality monitoring has been carried out at 8 locations. The air pollutants considered in this particular area is Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2),Particulate Matter $PM_{10,}$ Particulate Matter $PM_{2.5,}$ Ozone (O_3), Lead (Pb), Carbon Monoxide (CO), Carbon Monoxide (CO), Ammonia (NH_3), Benzene (C_6H_6), Benzene (C_6H_6), Arsenic (As), Nickel (Ni). All Ambient Air Quality Parameters are within the permissible limits. The development of Bellora airport in Amravati town will have some impacts on environment particularly on land use, water environment and ecology of the project area. However there will be some environmental impacts but the development of Bellora airport will boost up the economy of the area and open new avenues for the development. All the environmental impacts will be controlled and mitigated appropriately during all phases of the project.

Keywords: Aviation, airport, emissions, Ambient air quality, SO_2, NO_2, particulate matter, Amravati.

Introduction:

Air Transportation in our country formally took off in early fifties with the enactment of Air Corporations Act in 1953. Eight private airlines operating that time were nationalized and amalgated to form the Indian Airlines Corporation (IAC) to provide efficient and economical air services. India is one of the fastest growing aviation markets in the world. The Airport Authority of India (AAI) manages a total of 127 airports in the country, which include 13 international airports, 7 custom airports, 80 domestic airports and 28 civil enclaves. There are over 450 airports and 1091 registered aircrafts in the country. The genesis of civil aviation in India goes back to December 1912 when the first domestic air route between Karachi and Delhi became operational. In the early fifties, all airlines operating in the country were merged into either Indian Airlines or Air India. And, by virtue of the Air Corporations Act 1953, this monopoly continued for the next forty years. According to DOT, (2003) Air transportation plays a major role in global economic activity and in the last decade air traffic has increased dramatically: 47 percent between 1991 and2000. As per the estimation of US-EPA, 2004 that airport emissions (i.e., aircraft and ground support equipment) in 1999 as compared to 1970 are up more than 80 percent for volatile organic carbon (VOC) and nitrogen oxide (NOX) emissions doubled. Many researchers has focused on quantification of the impact of aircraft emissions on the ozone layer, greenhouse gases, and the climate impact of aerosols in the last decade (Brasseur et al., 1998;Schroder et al., 1998;IPCC, 1999;Brock, 2000;Kentarchos and Roelofs,2002). Moussiopoulos et al. (1997) quantified the potential impact of emissions from a planned airport on the Athens basin using an Eulerian dispersion model.

Study area:

The proposed project is development of Bellora Airport at Amravati in Maharashtra. The Bellora Airport, Amravati is located on the South – West of Amravati at a distance of 14.50 kms from Amravati city. The runway orientation of the Airport is 08/26 at an elevation of 341.50 m above mean sea level (Fig-1, 2). The strip was originally constructed by PWD in 1992. The Fig 1.1 Shows the project area viz a viz Amravati. The Proposed Project is important to the region as it will provide connectivity to the Vidarbha region of Maharashtra which has much tourist potential both religious and eco tourism. Total population of the 5 villages falling in project is 5517 including 2871 males and 2646 females of total 1227 household. Male population corresponds to 52% of total population while 48% population is female. Total SC population of these villages is 2305 while ST population is 130.

Material and methods

Air environment

Air quality throughout rural area is good although dust storms may occur and affect the project area during dry season.

The Ambient air quality is being monitored at three locations by Maharashtra Pollution Control Board and Consultants got the monitoring done by MoEF recognized labs at locations. The details of monitoring locations are given below in Table 1 and all the parameters monitored were found to be within permissible limits given in Table 2.

Results and Discussion:

The air pollutants considered in this particular area in this study area Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2),Particulate Matter $PM_{10,}$ Particulate Matter $PM_{2.5,}$ Ozone (O_3), Lead (Pb), Carbon Monoxide (CO), Carbon Monoxide (CO), Ammonia (NH_3), Benzene (C_6H_6), Benzene (C_6H_6), Arsenic (As), Nickel (Ni)**.** In this present study Particulate Matter levels are < 53 µg/m^3 and Ozone (O_3) levels are < 18 µg/m^3 .The air quality monitoring results shows that all parameters are within the limits prescribed by CPCB. According to Hsu et al., (2012) ambient pollutant concentrations in the proximity of airports are positively correlated with aircraft landing and takeoff (LTO) activities. There have been a few studies of aircraft emissions. Measurement of aircraft emissions using remote sensing and Fourier-Transform infrared (FTIR) emission spectroscopy focused by (He-land and Schafer, 1998; Popp et al., 1999; Schafer et al., 2003).

Impacts

Air Pollution can cause significant effects on environment and subsequently on human, animals, vegetation and minerals. It primarily affects the respiratory (e.g. by fine dust), Circulatory (e.g. by carbon monoxide) and olfactory (e.g. by Odours) systems in human. In most cases air pollution aggravates pre existing diseases or degrades health status making people more susceptible to other infections or development of chronic respiratory and cardiovascular diseases. During the construction and operation phase of the project, the following pollutants are anticipated its source and primary effects were presented in Table 3. Pison and Menut (2004) quantified that the impact of aircraft emissions on ozone concentrations over theParis area.

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Mitigation Measures

The following imitative measures will be taken during construction and operation phases of proposed project. The construction site will be encapsulated from all sides to avoid wind laded with construction material and dust producing construction materials will be transported to site with proper cover as tarpaulin. In high dust areas workers will be provided and encouraged to wear nose masks and also for reduce pollution levels Regular sprinkling of water shall be done at site for dust suppression. While using Heavy Construction machinery and Vehicles plying on site will be regularly maintained, shall conform to Vehicular emission norms and shall be checked periodically for avoid pollution levels on construction phase. With the development of the green belt we can control air, noise, atmospheric pollution levels. To avoid noise than the optimum levels Traffic movements will be smooth and movements of vehicles will be so that there is least idling time at the airport.

Conclusion

The development of Bellora airport in Amravati town will have some impacts on environment particularly on land use, water environment and ecology of the project area. The impact on noise will be insignificant as there is no habitation in the vicinity of runway and airport. Also the impact on air quality will be only during construction phase. However there will be some environmental impacts but the development of Bellora airport will boost up the economy of the area and open new avenues for the development. All the environmental impacts will be controlled and mitigated appropriately during all phases of the project.

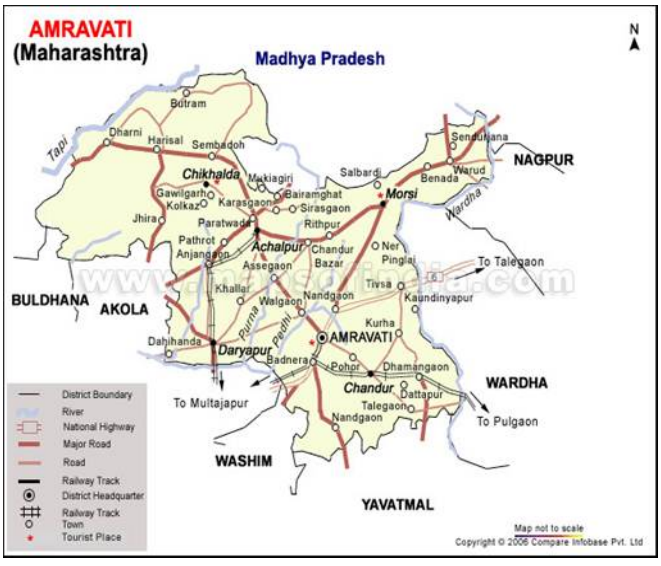

Figure 1. Location of Proposed Airport

Figure 2 .Arial View of Bellora Existing Airstrip

Table 1.Details of Monitoring Locations

S.No	Station Number	Date	Description	Environment Setting
1	AQ1	09.11.2014	Runway Strip	Commercial
2	AQ2	09.11.2014	Terminal Building	Commercial
3	AQ3	10.11.2014	Belora Village	Rural
4	AQ4	10.11.2014	Adagaon Village	Rural
5	AQ5	11.11.2014	Nimbhora Village	Rural
6	AQ6	11.11.2014	Jalu	Rural
7	AQ7	12.11.2014	Dabha Village	Rural
8	AQ8	12.11.2014	Anjan Gaon Bari	Rural

Table 2 Ambient air Quality Monitoring Results

Pollutants	Units	AQ1	AQ2	AQ3	AQ4	AQ5	AQ6	AQ7	AQ8	Standard
Sulphur Dioxide (SO_2)	$\mu g/m^3$	7	9	10	11	8	10	12	9	80
Nitrogen Dioxide (NO_2)	$\mu g/m^3$	12	14	17	15	10	14	18	17	80
Particulate Matter PM_{10}	$\mu g/m^3$	46	48	38	53	39	43	48	39	100
Particulate Matter $PM_{2.5}$	$\mu g/m^3$	13	14	11	19	14	15	16	11	60
Ozone (O_3)	$\mu g/m^3$	15	13	13	18	17	13	18	13	180
Lead (Pb)	$\mu g/m^3$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2.0

Carbon Monoxide (CO)	mg/m^3	<1.15	<1.15	<1.15	<1.15	<1.15	<1.15	<1.15	<1.15	2
Ammonia (NH_3)	$\mu g/m^3$	<10	<10	<10	<10	<10	<10	<10	<10	-
Benzene (C_6H_6)	$\mu g/m^3$	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Arsenic (As)	ng/m^3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Nickel (Ni)	ng/m^3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-

Source: M/s Hi Tech Lab

Table 3. - Primary sources and effects of air pollutants due to proposed project

S. No	Pollutant	Source	Primary Effects
1	SPM and RSPM	• Construction activities • Combustion of fossil fuels • Construction equipments • Vehicles • Diesel generators	• Soiling • Reduced Visibility • Aggravation of the effects of gaseous pollutants • Increased cough and chest discomfort • Reduced lung function • Aggravation of respiratory and cardio respiratory diseases
2	Sulphur di-oxide (SO_2)	• Combustion of Sulphur containing fossil fuels • Construction Equipment • Vehicles • Diesel Generator sets • Construction Activities	• Plant/Vegetative Injury • Reduced Visibility • Deterioration of metals, textiles, leather, finishes, coatings etc. • Irritation of eyes • Aggravation of respiratory diseases (asthma, emphysema) • Formation of Acid Rain
3	Nitrogen Oxides (NO_x)	• Combustion of Fossil fuels • Construction equipment • Vehicles • Diesel Generator set	• Aggravation of respiratory illness • Reduced Visibility • Reduced Plant Growth
4	Carbon Monoxide (CO)	• Combustion of Fossil fuels • Construction Equipment • Vehicles • Diesel Generators	• Plant/Vegetative Injury • Reduced Visibility • Deterioration of metals, textiles, leather, finishes coatings etc. • Irritation of eyes • Aggravation of respiratory diseases (asthma, emphysema)

Source: South Coast Air Quality Management District (SCAQMD) 1993. CEQA Air Quality Handbook

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