SYNOPSIS

Air pollution has become a matter of grave concern, particularly in mega-cities and urban areas, where the situation is alarming and becoming more and more severe. Air pollution has become a growing problem in urban areas throughout the globe, mainly due to industrialization and transportation as they major source of air pollution in many cities. Despite the improved performance of technology is presently insufficient to counteract the growth of industries, vehicles and associated pollution problems. Thus, it is necessary to evaluate the status of urban air pollution continuously and to assess its impact on human health and plants, so that proper mitigative measures can be implemented. (Sirajuddin et al.). In this study an attempt has been made to assess the impact due to industrial activity and road traffic on the air quality in urban areas during the period 2008-2011.

Main objectives of the present study was generate an integrated and compressive data set with detailed measurement and modelling of various air quality parameters at selected industrial areas. An attempt has made to evaluate the effects of health on human in study areas by the measurement of concentration of air pollutants such as SPM, SO₂, NO₂ and CO at selected areas. The effect of meteorological parameters like temperature, humidity on air pollution concentrations was also studied. The statistical relationship between meteorological parameters and air pollutants were developed and a predictive statistical model was established.

Present study has four main components. The main objective of this study to determine the concentrations of the air pollutants and transport related air pollutants in the selected areas. The classified traffic flow studies were conducted during 6.00 am to 6.00 pm using manual technique at all study areas. The ambient air pollutant concentrations were continuously measured at all selected areas using ambient air quality measuring instrument of High volume sampler. Devices to measure the various meteorological parameters like temperature, humidity were used. An Air Quality Index (AQI) a measuring tool on quality of the ambient air was developed considering the standard and observed values of the four main pollutants; viz. SPM, SO₂, NO₂ and CO.
First component of the study involved the air quality analysis, traffic assessment at selected major points in industrial areas. After the analysis of traffic data it was vivid that, in working and non working days, the two wheeler vehicles were predominant at all the study areas. In the analysis of air pollutants the concentration of SPM and CO levels exceeded the standard permissible limit prescribed by CPCB in all study areas. The SO₂ and NOₓ concentration levels well within the standard permissible limit of 80µg/m³ prescribed by CPCB in all study areas.

Pollutant levels are generally higher during summer season than the winter season. During winter, average mixing height is lower as compared to other seasons and atmospheric dispersion is typically at a minimum and therefore the pollutants will not be dispersed widely. But in winter and monsoon the large amounts of precipitation reduce atmospheric pollution via associated wet deposition processes.

Geo statics study and statics modelling study, the isopleths plots for summer and winter seasons have been developed for SPM, NO₂, SO₂ and CO for the study period. The isopleths plots show the concentrations of SPM, NO₂, SO₂ and CO due to the various sources of such as diesel generator sets, constructional activities, process in industries and vehicles in all major industrial areas. From all isopleths plots, it is observed that the pollutant is traversing from north-east and south-west part of the study area.

The social questionnaire survey was adopted out in different industrial areas and analysis was made to assess the impact of pollution on the health of human beings. In all industrial areas on an average of 620 persons who were exposed to air pollution for at least 8 to 10 hours in a day were contacted and asked to fill up questionnaire. Questionnaire survey was conducted in the vicinity of all industrial area to investigate the effect of industrial and vehicular emissions on human health. The main health problem observed eye irritation, nasal irritation, throat irritation, cough, sneezing and common cold, out of which eye irritation is high.

Second component consist of air quality index was computed for all the four different industrial areas shows that lightly polluted in Bomasandra, Jigani,
Electronic city respectively and moderately polluted in Peenya industrial area. To assess the IND-AQI using concentration of all selected pollutants at different areas.

The present study focuses on the impact of air pollutants on human beings in selected hospital admissions in the vicinity of study area, from the questionnaire survey, it was noted that respiratory illness is amongst the most common chronic diseases in this area, and chronic bronchitis and asthma affect more per cent of the population.

In order to generalize the results of the study, the Advanced Statistical Package SPSS (Statistical Package for Social and Sciences) was used to estimate the coefficient of correlation (R) between specific air pollutants and illnesses. Eye and acute respiratory ailments correlate strongly with all the air pollutants considered. Chronic ailments like bronchitis, asthma, cough, sneezing and skin diseases, however, have a fair correlation with motor vehicular and industrial air pollutants.

Multiple Regression equations were developed for prediction of air pollutant concentrations. The study also attempted to predict the health problems from hospital data.

Third component consists of statistical study, impact of pollution, Linear Regression equations were developed to examine the relationship between Independent variables such as temperature, wind speed and humidity and selected dependent variables such as SPM, SO$_2$, NO$_2$ and CO in all areas during the study period. A significant correlation coefficient was found between the temperature and humidity with respect to all pollutants.

In order to generalize the results of the study, the Advanced Statistical Package SPSS (Statistical Package for Social and Sciences) was used to estimate the coefficient of correlation (R) between specific air pollutants and Independent variables such as temperature, wind speed and humidity.

Fourth component consists of study of AERMOD, in the present study the American Meteorological Society and the United States Environmental Protection Agency Regulatory Dispersion Model (AERMOD) air quality model was used. In order to determine the contribution of air pollutants from selected industrial areas of Bangalore city, the emission inventory data were collected during the period of study,
and analyses using air quality prediction models.

Conclusions were drawn based on the results of field studies and on the results of statistical analysis and modelling keeping in view of the objectives of the study. In the present study the least affected area is Electronic city and worst affected area is Peenya industrial area by air pollution. Air quality models to predict the concentration of air pollutants are invaluable to transportation, industrialisation and environmental engineers and planners to quantify the environmental impacts due to vehicular and industrial activities. The present study which deals with a comprehensive and integrated measurement and modelling of air pollution at various study areas can be effectively used for development of rational control and management strategies to reduce the air pollution levels due to vehicular traffic and industry.

The outcome of this investigation may be considered as a use full tool for the urban planners and pollution control experts for framing and implementing suitable abatement strategies. This research can also be used for policy development and regulation to control the air pollutant concentrations to tolerable limits in industrial areas, so that general environment is maintained under normal and safe levels.