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Study and Analysis of Odour of Hydrogen Sulfide and Ammonia Gas within Kurkumbh Industrial Area

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Abstract: ***Attention to odor as an environmental nuisance has been growing as a result of increasing industrialization and the awareness of people's need for a clean environment. As a consequence, efforts to abate odor problems are necessary in order to maintain the quality of the environment. It also presents an overview of current and emerging odor measurement techniques, including those based on sensory measurements (i.e., relying on the human experience of odor), and chemical analysis techniques, in which certain chemicals are identified as "surrogates" for odor and measurement is aimed at identifying the amount of these chemicals present in the ambient air. Typical source types for odor are also described in this chapter, along with the chemicals often associated with the odors they generate. Examples of gas surrogates include (ammonia [NH3], hydrogen sulfide [H2S] In this paper, odor pollution in the environment will be reviewed, including its sources and dispersion, the physical and chemical properties of odor. The measured gas concentrations were generally below the permissible exposure limits (PELs) established by the Occupational Safety and Health Administration (OSHA).One of the challenges when dealing with the odor pollution problem is the technique for the detection of odor emissions the detection and measurement of the odorous compounds i.e. Hydrogen sulfide and ammonia can be carried out by using sensor at different location within kurkumbh industrial area.***

Keywords: odor, odor, ammonia, hydrogen sulfide, instrumentation, sensory

1. Introduction

Odors are defined as sensations that occur when chemical substances (called odorants) stimulate.receptors in the nasal cavity. Most odors perceived in the environment are made up of a multifaceted mixture of odorants. Odour is sensory response to the chemicals in the inhaled air. Air quality is affected not only due to conventional air pollutants but also due to unpleasant odors. The usual effect of bad odours is nuisance, but in more serious cases it may lead to feelings of nausea and headache and to other symptoms that appear to be related to stressodour pollution has distinctly different characteristics and is undoubtedly the most complex of all all the air pollution problems. Till date, not much attention has been paid towards odour problem in the country. With growing population, industrialization and urbanization, the odour problem has been assuming objectionable proportion the compounds that make up particular odors are often present in small concentrations and can act in the human nose in a complex effect making their regulation by the setting of emissions limits (as is standard for other ambient air pollutants) complicated. The effects of odors are equally complicated and range from the associative and the psychological to the measurable and the physiological. A particular odor may elicit various behaviors, from the attraction to a potential meal, to a warning of present danger or potential sickness. The sense of smell and memory appear to be closely tied together The most frequently reported health effects of odors are described as eye, nose, and throat irritation, headache, nausea, diarrhea, hoarseness, sore throat, cough, chest tightness, nasal congestion, palpitations, shortness of breath, stress, drowsiness, and alterations in mood. Ammonia and hydrogen sulfide are common trace gases in the atmosphere with a major contribution coming from pharmaceutical industries. In addition to their malodorous nature, both (ammonia [NH3], hydrogen sulfide [H2S] although almost all persons possess the ability to sense odors, it is a phenomenon not well understood by most. A number of researches on the development of odor detection systems are currently being carried out to improve the present systems. The development of new, appropriate systems that are based on devices rather than on the human sensory system are important for increasing the acceptance by stakeholders and avoiding subjectivity in odor measurements. In this paper describe both ammonia [NH3] and hydrogen sulfide [H2S] gas odour within kurkumbh industrial area daund region district pune measured the intensity of those gasses by using sensor MQ136 and MQ 135. Compared with the permissible exposure limits (PELs), Occupational Safety and Health Administration (OSHA) and WHO'S a standard. It consists of a sensor which is used to detect the presence of gases namely ammonia and hydrogen sulphide. As this is a daily activity, the sensors are also used to monitor them regularly for a better health. The main advantage of our model is that the sensor does a regular act in monitoring them from their daily activities. The main challenge for developers is to have high selectivity of the metal-oxide gas sensors. There are two approaches generally for enhancing the sensors in selective properties. First one is specifically made sensitive to one compound and has low or zero cross-sensitivity to other compounds that are present in the atmosphere. Second approach is related to the preparation of materials for discrimination between several analytics in amixture. Kurkumbh is located in Daund Taluka of Pune District at a latitude 18.10683 and Longitude: of 75.77747, on Pune Sholapur National High Way No. 9. It is

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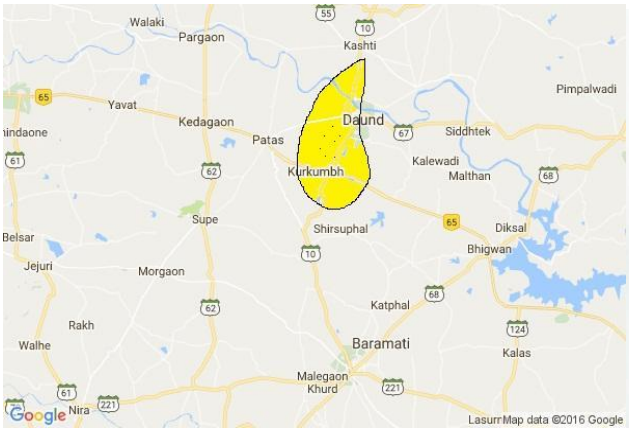
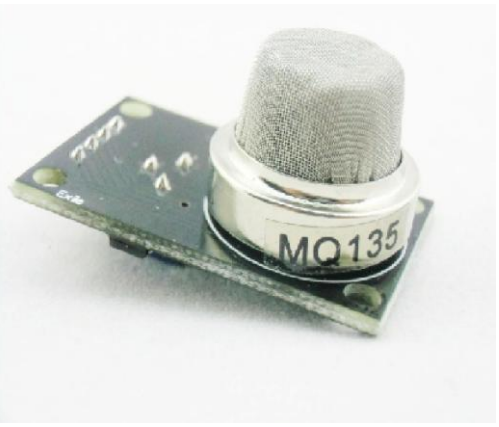
75 Kms away from Pune and 10 kms. away from Daund Railway Junction. The nearest air port for this location is at Pune. Its temperature is max. 40 to 42^0 C and the humidity is 51.1 in the morning and 46.13 in the evening. The climate of Daund Kurkumbh is generally hot and dry, and the area receives scant rainfall. May and June are considered the hottest months of the year having maximum temperature up to 40^0C. It decreases up to 12^0C in the months of December and January.in kurkumbh arises various complaints about odour.

Health Symptoms	Ammonia concentration in air (*ppm*)
Detectable by smell. Maximum Permissible Exposure Limit (PEL)[1)]	< 25
Uncomfortable, breathing support required. Maximum exposure 15 minutes[1)]	30
OSHA[2)] maximum exposure limit	50
Irritated eyes, throat and mucous membranes. Mild eye, nose, and throat irritation, may develop tolerance in 1-2 weeks with no adverse effects.	100
Moderate eye irritation, no long-term effect in exposures of less than 2 hours	140
Moderate throat irritation. Damage of mucous membranes with more than one hour exposure	400





2. Material and Methodology

It consist two sensor sensed gases can be transmitted to a particular place for regular\ monitoring of them. This makes their work rather easier for them. The sensed gases can be transformed into signals so that a wireless communication can be established between the monitoring places where problem of odour. Hence a proper reading can be provided to them and their surroundings. Also their health conditions can be maintained in a better way which will increase their immune system. The main backbone of our proposed model is the odour sensor it consist two sensor i.e. ammonia (CH3) MQ136 and hydrogen sulfide (H2S) MQ135 sensor, display, 12 volt power supply etc. MQ136 gas sensor has high sensitity to Hydrogen sulfide, Low sensitivity for other combustible gas. It is with low cost and suitable for different application. It has good sensitivity to H2S gas in wide range, and has advantages such as long lifespan, low cost and simple drive circuit & etc.

3. Methodology

1) Odour

The term odour refers to the stimuli from a chemical compound that is volatilised in air. Odour is our perception of that sensation and we interpret what the odour means. Odours may be perceived as pleasant or unpleasant. The main concern with odour is its ability to cause a response in individuals that is considered to be objectionable or

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offensive. Odours have the potential to trigger strong reactions for good reason. Pleasant odours can provide enjoyment and prompt responses such as those associated with appetite. Equally, unpleasant odours can be useful indicators to protect us from harm such as the ingestion of rotten food

2) Basic Sensory Properties of Odour:
Recognition, Intensity, Hedonic Tone, Odour Quality or Character

3) Odour Unit:
An odour unit is a sensory measurement of the concentration of a mixture of odorous compounds in a sample of odour. One odour unit (ou) is that concentration of odorant odour intensity can be measured in part per million(ppm)

4) Intensity:
The "intensity" of an odour is also relevant. Intensity refers to the perceived strength of an odour when described by a recipient. Low concentrations of some compounds in a sample are capable of being perceived as having a high intensity even when close to threshold concentrations. These compounds are common in naturally unpleasant odours such as hydrogen sulphide (rotten eggs)

5) Effects of Odour
Odour affects human beings in a number of ways. Strong, unpleasant or offensive smells can interfere with a person's enjoyment of life especially if they are frequent and / or persistent. foul odour may not cause direct damage to health, toxic stimulants of odour may cause ill health or respiratory symptoms. Secondary effects, in some, may be nausea, insomnia and discomfort. Very strong odour can result in nasal irritation, trigger symptoms in individuals with breathing problems or asthma.

6) FIDOL Factors
The FIDOL factors have been defined to highlight to EHPs and others which general principles and factors may be important in assessing when, or if, a specific odour source is likely to constitute a statutory nuisance. The same factors can also be used as a basic means of assessing the potential odour impact of proposed developments.The FIDOL factors are defined as **F**requency, **I**ntensity (and therefore concentration), **D**uration, relative **O**ffensiveness (hedonic tone/character) and **L**ocation, along with any aggravating characteristics. Although an odour does not have to be offensive in order for it to constitute a statutory nuisance, there are similarities between the criteria

4. Odour Measurement

An odour emission often consists of a complex mixture of many odorous compounds. Analytical monitoring of individual chemical compounds present in such odour is usually not practical. As a result, odour sensory methods, instead of instrumental methods, are normally used to measure such odour. Odour sensory methods are available to monitor odour both from source emissions and in the ambient air. These two diverse circumstances require different approaches for measuring odour. The collection of odour samples is more easily accomplished for a source emission than for an odour in the ambient air. Also, due to atmospheric dilution, the odour in the ambient air is usually much lower in intensity than it is at source. Thus the sensitivity of the odour sensory method must be significantly greater for measuring ambient odour than for source odour emissions. Measuring odour can be accomplished in several ways: instrumental methods /chemical analysis, electronic methods and sensory test methods / olfactometry**.** For known compounds, the Odour strength can be reliably estimated by measuring the concentration of the chemical, while, for mixtures of unknown substances, sensory method is preferred.in this method measure the intensity of hydrogen sulfide (H2S) and ammonia (NH3) gas in the air at different location within kurkumbh hourly from 7am to 7pm.

Symptoms/Effects	Concentration H2S (ppm)
Typical background concentrations	0.00011-0.00033
Odor threshold (when rotten egg smell is first noticeable to some)..	0.01-1.5
Prolonged exposure may cause nausea, tearing of the eyes, headaches or loss of sleep.	2-5
Possible fatigue, loss of appetite, headache, irritability, poor memory, dizziness.	20

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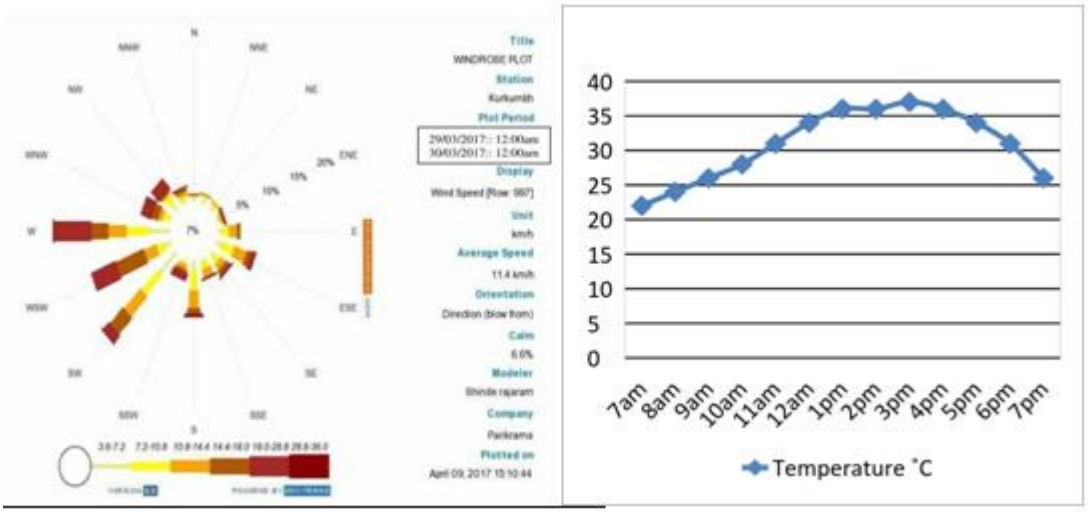
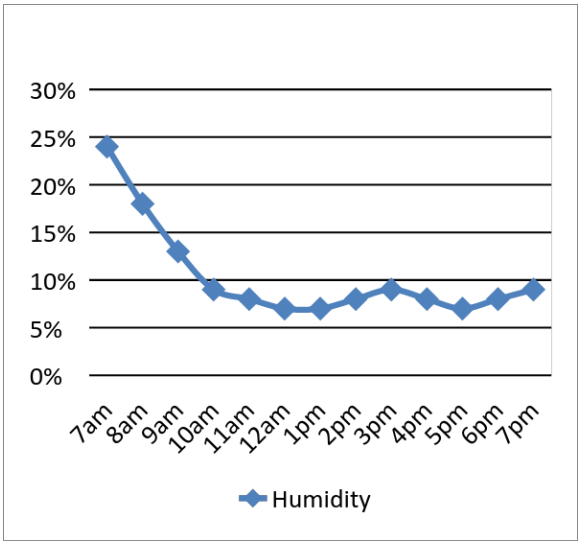
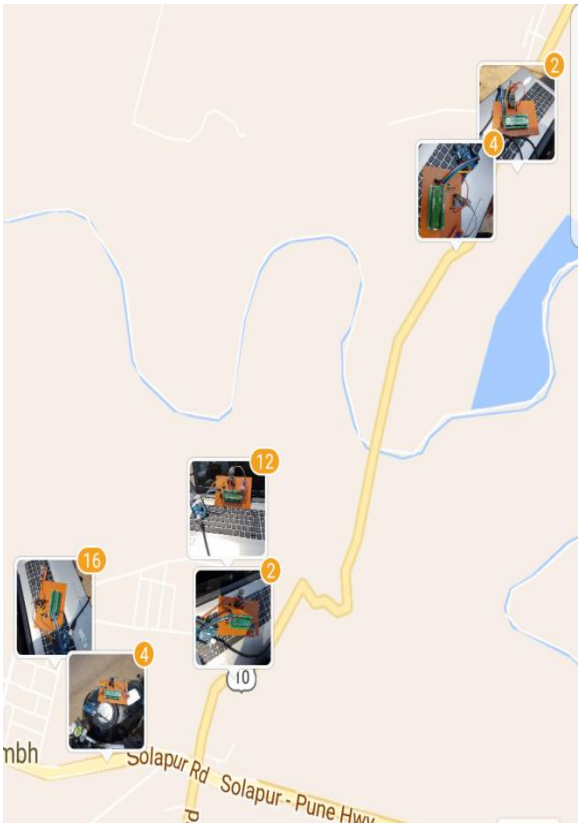
5. Result

Accurate measurement of odorous compounds and their impact have been challenging because these compounds possess widely varying physical and chemical properties and are present at concentrations ranging from high parts-per-million (ppm) to low parts-per-billion (ppb). Furthermore, each odorant has a unique odour and odour detection threshold which means that compounds, even if present at the same concentration, may have markedly different odour impacts.the concentration of of hydrogen sulfide (H2S) and ammonia (NH3) gas in the air at different temperature ,humidity and wind speed are measured when the temperature increases Intensity of that gasses decreases.variation of temperature, humidity and wind speed are as follow.





Location of reading taken



LOCATION: Within kurkumbh industries

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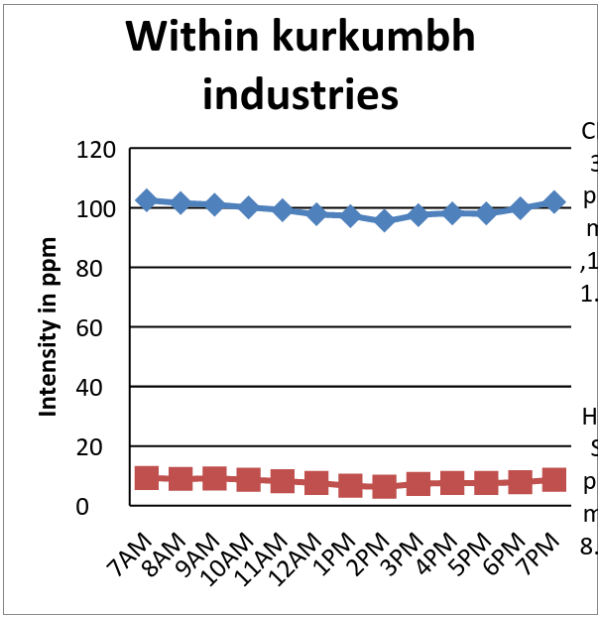
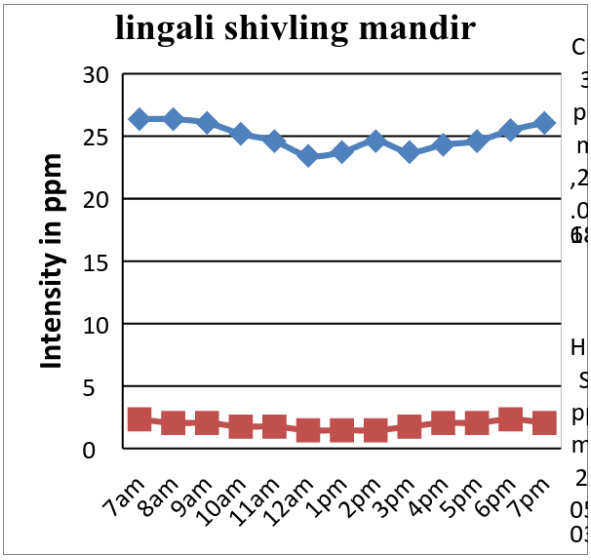
remark	H2S in ppm	remark	CH3 in ppm	Time
Prolonged exposure may cause nausea, tearing of the eyes	9.3	throat and mucous membranes. Mild eye, and throat irritation	102.5	7am
	9.0		101.6	8am
	9.0		101.0	9am
	8.7		100.1	10am
	8.2		99.2	11am
	7.6		97.8	12am
	6.7		97.2	1pm
	6.4		95.7	2pm
	7.3		97.5	3pm
	7.6		98.1	4pm
	7.6		98.1	5pm
	7.9		99.8	6pm
	8.7		101.9	7pm



LOCATION: lingali shivling mandir behind the green belt

remark	H2S in ppm	remark	CH3 in ppm	Time
tearing of the eyes, headaches or loss of sleep	2.34	Detectable by smell Maximum Permissible Exposure Limit	26.3	7am
	2.05		26.3	8am
	2.05		26.0	9am
	1.75		25.1	10am
	1.75		24.6	11am
	1.46		23.4	12am
	1.46		23.7	1pm
	1.46		24.6	2pm
	1.75		23.7	3pm
	2.05		24.3	4pm
	2.05		24.6	5pm
	2.34		25.4	6pm
	2.05		26.0	7pm



6. Conclusion

In this paper intensity of odour producing gasses i.e. hydrogen sulfide (H2S) and ammonia (NH3) gas are measured within kurkumbh industrial area of daund region district pune . At different location different temperature, wind speed, and humidity. Then understand that the intensity of odor decreases if the temperature increases and the opposite of wind blowing and wise versa. We can decrease the odour intensity by planting the green belt around the odour producing area intensity of odour are permissible limit one side of the trees belt and other side the industries these gasses are not in permissible limit.

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