**Gas Leakage Monitoring & Alerting System For Industries**

**Abstract:**

Safety plays a major role in today’s world and it is necessary that good safety systems are to be implemented in places of education and work. This work modifies the existing safety model installed in industries and this system also be used in homes and offices. The main objective of the work is designing microcontroller based toxic gas detecting and alerting system. The hazardous gases like LPG and propane were sensed and displayed and notify each and every second in the LCD display. If these gases exceed the normal level then an alarm is generated immediately and also an alert message (Email) is sent to the authorized person through the INTERNET and used ARM development board. The advantage of this automated detection and alerting system over the manual method is that it offers quick response time and accurate detection of an emergency and in turn leading faster diffusion of the critical situation.

# Industries Where Gas Detection Systems are Very Essential

## 1) Semiconductor Manufacturing Industries:

Gases like Methane (CH4), Carbon Monoxide (CO), and phosphine (PH3) are a key ingredient for semiconductor fabrication. These gases are used in different places throughout the manufacturing facilities of semiconductors such as gas cabinets, wafer dryers, and wafer reactors.

IoT based gas detection systems can be easily integrated into existing systems and equipment of a company, allowing easy detection of gas leakages that can result in severe catastrophe. Quick actions can hence be taken to not only prevent the spread of gas over a wide region but also identify the source of the leak and repair it.

## 2) Oil and Gas:

The oil and gas sector in its upstream, midstream and downstream segments deals with highly combustible gases that explode when exposed to high temperatures. Whether in offshore exploration or onshore refining of crude into subsequent products, there is always a chance for these gases to burst into flames.

In refineries, there is another challenge for oil companies to adhere to the environmental codes and regulations for the emission of exhaust gases. In such a case, gas monitoring solutions can help refineries a ton to control the release of harmful gases in the air. Furthermore, gas detection systems installed in specific places in oil companies can also help in detecting gas leaks, allowing authorities to take quick actions to repair the source and prevent heavy casualties.

## 3) Chemical Industry:

Some manufactured chemicals are responsible for releasing harmful toxic gases that cause serious irritation in the eyes, nose, and throat. Some of them when inhaled can even cause nausea and convulsion further resulting in unconsciousness and even death. Gases that are not toxic can displace oxygen in an enclosed area resulting in suffocation and difficulty in breathing.

These gases are stored and transported in large metal containers. While the threat is minimal, there is always a chance that these containers can release the gas while they are transferred. Hence portable gas detectors can be used with such containers while they are transported, and fixed detectors can be used in industries to detect leaks of harmful gases.

## 4) Mining:

Gas monitoring systems in the mining sector can be used to detect the presence of flammable and toxic gases like methane and H2S in mines. On the other hand, gases known as asphyxiates displace oxygen from mines that affect the health of workers. Lack of oxygen affects the mental health of workers resulting in their decrease in productivity and can even cause permanent mental disability.

Gas monitoring solutions can hence be used to ensure an oxygen-rich environment for workers, helping them to work without any health hazard.

**Literature Survey:**

1) LPG Gas Leakage Monitoring and Alert System using Arduino Ayesha Siddika1, Imam Hossain21 Faculty, Dept. of CSE, World University of Bangladesh (WUB), Bangladesh 2MSc. in CSE, Daffodil International University (DIU), Bangladesh.

**LINK:** . [https://www.researchgate.net/publication/332397437\_Gas\_Leakage\_Detection\_and\_Alert\_System\_using\_IoT](https://www.researchgate.net/publication/332397437_Gas_Leakage_Detection_and_Alert_System_using_IoT" \t "_blank)

# 2) GAS LEAKAGE DETECTION AND SMART ALERTING SYSTEM USING IOT Shital Imade, Priyanka Rajmanes, Aishwarya Gavali , Prof. V. N. Nayakwadi Shital Imade, Computer Dept., BSCOER, Savitribai Phule Pune University, India Priyanka Rajmane Computer Dept., BSCOER, Savitribai Phule Pune University, India Aishwarya Gavali, Computer Dept., BSCOER, Savitribai Phule Pune University, India Prof. V. N. Nayakwadi Computer Dept.,BSCOER, Savitribai Phule Pune University, India.

**LINK:** . <http://ijirs.in/gallery/22.%20feb%20ijirs%20-%20d539.pdf>

3) Gas Detection System using Arduino Raeesa1 Dept. of IS&E Yenepoya Institute of technology, Moodbidri Mangalore, India Navashree2 Dept. of IS&E Yenepoya Institute of technology, Moodbidri Mangalore, India Relin Jane Mascarenhas3 Dept. of IS&E Yenepoya Institute of technology, Moodbidri Mangalore, India Seema Jenitha Tauro4 Dept. of IS&E Yenepoya Institute of technology, Moodbidri Mangalore, India Mrs. Deeksha K R5 Assistant Professor Dept. of IS&E Yenepoya Institute of technology, Moodbidri Mangalore, India

**LINK:**  <https://www.ijert.org/research/gas-detection-system-using-arduino-IJERTCONV9IS12062.pdf>

# 4) Smart Gas Leakage Detection with Monitoring and Automatic Safety System [S.M. Zinnuraain](https://ieeexplore.ieee.org/author/37088335783); [Mahmudul Hasan](https://ieeexplore.ieee.org/author/37085340607); [Md. Akramul Hakque](https://ieeexplore.ieee.org/author/37088334928); [Mir Mohammad Nazmul Arefin](https://ieeexplore.ieee.org/author/37088334752)

**LINK:**  <https://ieeexplore.ieee.org/document/9032872>