**GAS LEAKAGE MONITORING AND ALERTING SYSTEM**

**LITERATURE SURVEY**

# 1.TITLE: Sulfur Hexafluoride Gas Leakage Monitoring and Early-Warning Method for Electrical Power Facilities

# AUTHOR: CHUNRUI LIU, FUJIE DENG , LEI SHI , AND FENG WANG

# YEAR OF PUBLICATION: 2020

# PUBLISHED IN: [2017 International Conference on Wireless Communications, Signal Processing and Networking (WiSPNET)](https://ieeexplore.ieee.org/xpl/conhome/8292786/proceeding)

# ABSTRACT: Most transformer substations in power supply facilities rely on sulfur hexafluoride electrical equipment. A sulfur hexafluoride gas leak can cause serious health concerns if effective measures are not adopted in time. Therefore, in this study, a sulfur hexafluoride gas leakage monitoring, early-warning, and emergency disposal model was established. First, taking the main transformer chamber of an underground transformer substation as the research object, a 3D-model was built, and a numerical simulation was performed. Second, the simulation results were utilized to determine the dispersion and concentration distribution of the sulfur hexafluoride gas, identify concentration-sensitive areas, and arrange sensors based on the simulation results, to ensure early-warning in case of leaks. Then, a sulfur hexafluoride gas leakage monitoring and early-warning model was built based on the data collected using sensors at the monitoring points; thereafter, a construction method was developed for a sulfur hexafluoride gas leakage emergency disposal model, which can be referenced to establish a leakage gas recycling system. This paper also provides some recommendations regarding the determination of the optimal conditions for this emergency recycling device, which can be utilized to maintain the concentration of sulfur hexafluoride gas below a specified value and to construct a recycling time prediction model. The results of the study can provide a theoretical basis for sulfur hexafluoride gas leakage early-warning and emergency disposal, which will contribute to the prevention of suffocation-related accidents

## 2. TITLE: Simulation Experiment of Leakage and Diffusion and Monitoring System of Gas Network

**AUTHOR:** **Zhang Furen, Xu Pai, Xing Rongjun** [**Mickel Saad**](https://ieeexplore.ieee.org/author/37086279740)**;**[**Ed teNyenhuis**](https://ieeexplore.ieee.org/author/37329133400), **Zhang Furen**

# YEAR OF PUBLICATION: 2017

# PUBLISHED IN: [2017 IEEE Electrical Power and Energy Conference (EPEC)](https://ieeexplore.ieee.org/xpl/conhome/8275251/proceeding)

# ABSTRACT : —Leakage location and monitoring of gas network is one of difficulties and hot issues of research in the field of gas transmission and distribution and security. Therefore, establishing simulation experiment of gas network and monitoring system has great significance to control and reduce the leakage accidents. On the basis of the analysis to actual gas network system, a kind of establishing a set of small-scale stimulator to verify various new theories is proposed, in order to solve the problem of actual gas network on-site measurements is difficult to realize. The configuration of simulation leakage experiment model and development and realization of monitoring system are elaborated deeply, the feasibility of the model is validated through practical application, which provides experimental foundation for researching the theories of leakage location better.

## 3.TITLE: [Smart Gas Level Monitoring, Booking & Gas Leakage Detector over IoT](https://ieeexplore.ieee.org/document/7976812/)

**AUTHOR:** [**Kumar Keshamoni**](https://ieeexplore.ieee.org/author/37086074973)**;**[**Sabbani Hemanth**](https://ieeexplore.ieee.org/author/37086069744)

# YEAR OF PUBLICATION: 2017

# PUBLISHED IN: [2017 IEEE 7th International Advance Computing Conference (IACC)](https://ieeexplore.ieee.org/xpl/conhome/7974917/proceeding)

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# ABSTRACT: This journal explains about the most common problem experienced in our day-to-day lives that is regarding GAS container going empty. We bring this paper to create awareness about the reducing weight of the gas in the container, and to place a gas order using IOT. The gas booking/order is being done with the help IOT and that the continuous weight measurement is done using a load cell which is interfaced with a Microcontroller (to compare with an ideal value). For ease it is even has a been added with an RF TX & Rx modules which will give the same information. When it comes it to security of the kit as well as gas container we have an MQ-2(gas sensor), LM 35(temperature sensor), which will detect the surrounding environment for any chance of error. When ever any change is subjected in any of the sensors (load cell, LM35, Mq-2) a siren (60db) is triggered.

## 4.TITLE: Gas Leakage and Fire Detection using Raspberry Pi

**AUTHOR: Sourabh Jamadagni**, **Priyanka Sankpal**,

# YEAR OF PUBLICATION: 2019

**PUBLISHED IN:** **Third International Conference on Computing Methodologies and Communication (ICCMC 2019)**

# ABSTRACT: This paper presents the growth in the industrial monitoring system’s design using Internet of Things (IoT). The sensor used for the development of this system is MQ-2 which detects the leak age of gas at any atmos pheric condition and fire sensor as a simple and compact device for protection against fire. In gas sensor system, Ras pberry pi plays an important role such that all the components are interfaced to it. This avails the observer to notice the changes from anywhere in the world. The requirement of a gas detection system is to monitor the surroundings continuously. When gas and smoke is detected then system will send short message service (S MS) to the user then user will take respective action.

## 5.TITLE: [Hardware Design of Factory Toxic Gas Leakage Monitoring System Based on CC2530](https://ieeexplore.ieee.org/document/8530223/)

**AUTHOR:** [**Chunlong Ma**](https://ieeexplore.ieee.org/author/37086520511)**;**[**Nan Li**](https://ieeexplore.ieee.org/author/37086520554)**;**[**Xin Pang**](https://ieeexplore.ieee.org/author/37086521805)**;**[**Shaohua Wang**](https://ieeexplore.ieee.org/author/37086523442)**;**[**Yue Yang**](https://ieeexplore.ieee.org/author/37086520668)

# YEAR OF PUBLICATION: 2018

# PUBLISHED IN: [2018 10th International Conference on Intelligent Human-Machine Systems and Cybernetics (IHMSC)](https://ieeexplore.ieee.org/xpl/conhome/8529148/proceeding)

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# ABSTRACT: In order to solve the problem of inflexible location, dead angle and large measurement error of the network node of the wire monitoring system for factory toxic gas leakage, a toxic gas monitoring and alarm system based on CC2530 wireless sensor network is designed. The hardware design of the monitoring system and the hardware design of the CC2530 network node are mainly studied. The system guarantees the mobility of the poisonous gas monitoring node, the absence of monitoring dead angles, and the improvement of measurement accuracy.

## 6. TITLE: Leakage Detection of Natural Gas Pipeline Based on an Embedded System

# AUTHOR: [Maribelle JUALAYBA](https://ieeexplore.ieee.org/author/37086800314);[Kristian REGIO](https://ieeexplore.ieee.org/author/37086800345);[Harold QUIOZON](https://ieeexplore.ieee.org/author/37086800315);[Adrian DESTREZA](https://ieeexplore.ieee.org/author/37086799644)

# YEAR OF PUBLICATION: 2014

# PUBLISHED IN: 2014 Seventh International Symposium on Computational Intelligence and Design

# ABSTRACT: Natural gas, which is treated as an alternative to the depleting supplies of oil, is widely used for fuel and electricity production. The use of natural gas in the world depends upon the thousands miles of natural gas pipeline networks that have been set up in few decades. The safe operation of these complex systems is of significant importance due to the intrinsic characteristics of hydrocarbons such as: toxicity, flammability and explosion velocity. In this work, a real-time leakage monitoring model of the long distance natural gas pipeline is proposed. And a leakage detection and localization mechanisms based on the above model were studied. In order to test the performance of the provided method, a networked data acquisition and analysis system was built. Through application to a practical system, it is verified that the proposed system is effective in gas leakage detection.

## 7. TITLE: [Smart Gas Leakage Detection with Monitoring and Automatic Safety System](https://ieeexplore.ieee.org/document/9032872/)

# AUTHOR: [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)

# YEAR OF PUBLICATION: 2019

# PUBLISHED IN: [2019 International Conference on Wireless Communications Signal Processing and Networking (WiSPNET)](https://ieeexplore.ieee.org/xpl/conhome/9027608/proceeding)

# ABSTRACT: In this paper, we have proposed a LPG (Liquified Petroleum Gas) leakage detection with monitoring and automatic safety system. With the drastically increased demand and use of LPG, this system would be helpful to monitor the usage of LPG on a regular basis and to take safety about any hazards that may occur due to LPG leakage. We have designed a system that notify the user using IOT (Internet of Things) through mobile app about the amount of LPG so that appropriate measures can be taken. Since LPG is a highly hazardous and inflammable gas, we have also designed a safety system to with the help of IOT (Internet of Things) through mobile app, when any leakage occurs in LPG so that necessary safety can be taken to avoid an explosion.

# 8. TITLE: A LabVIEW Based Remote Monitoring and

# Controlling of Wireless Sensor Node for LPG Gas

# Leakage Detection

# AUTHOR: L.P.Deshmukh1 , T.H.Mujawar1 , M.S.Kasbe1 , S.S.Mule1 , J.Akhtar2 and N.N.Maldar3

# YEAR OF PUBLICATION: 2016

# PUBLISHED IN: [2016 International Symposium on Electronics and Smart Devices (ISESD))](https://ieeexplore.ieee.org/xpl/conhome/9048180/proceeding)

# ABSTRACT: There is an enormous interest in the development of gas monitoring systems for application in the gas leaks, detection of harmful gases in mines, home safety, exhausts gas monitoring, etc. A key fact in all these is the need of the flexible and practical virtual instrumentation, a way to easily expose the gas sensors to hazardous levels of gas concentrations. The detection of LPG/CNG gases has become a main issue today due to more wellbeing policy wide-reaching. This paper presents a conceptual architecture for a versatile, flexible and cost effective portable system for monitoring the LPG gas leaks in the presence of air. The software platform in terms of virtual instruments is developed using LabVIEW programming environment for internet connectivity to cover a large monitoring area. The monitoring of the sensor node is done using G-code created in LabVIEW. The system provides a very intelligent communication (notifications) and replacement of the wired connection and inturn the gas sensing system. This system can be installed in a place where LPG/CNG gas leak happens instantly. Our system for gas detection plays an imperative role of the prototype model to industry and general public as well.

## 9. TITLE: Design of Wireless Monitoring System for Gas Emergency Repairing

# AUTHOR: Qiang Luo1 , Xiaoran Guo2 , Yahui Wang2 , Xufeng Wei2

# YEAR OF PUBLICATION: 2016

# PUBLISHED IN: 28th Chinese Control and Decision Conference (CCDC)

# ABSTRACT: : Gas leakage accident occurs frequently due to the aging of pipeline and the third-party interference. To ensure safety during the gas pipeline emergency-repair, it’s necessary to detect the gas concentration in the working place. In this paper, a WSN-based monitoring system for gas emergency repairing is proposed. The monitoring system is composed of the wireless nodes and the terminal software. The wireless nodes are used to collect gas concentration, temperature, humidity, wind speed and wind direction in real time, and transmit the data to the command terminal. The terminal software then store, upload the data, and can check those data as well as alarm. In order to provide feasible reference data for alert area and evacuation zone, this paper not only studies the diffusion model of gas leakage in the air, but also studies the impact of environmental meteorological condition on the gas diffusion. The system has been proven effective and reliable in real gas emergency-repair.

# 10. TITLE: IoT Based System for Monitoring and Control of

# Gas Leaking

# AUTHOR: S. Z. Yahaya, M. N. Mohd Zailani, Z. H. Che Soh, K. A. Ahmad

# YEAR OF PUBLICATION: 2020

# PUBLISHED IN: 1st International Conference on Information Technology, Advanced Mechanical and Electrical Engineering (ICITAMEE)

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# ABSTRACT: Fire accidents due to gas leakage is a serious issue since it frequently causes loss of life and bad injuries. Recent advances in sensing techniques, microcontroller and IoT technologies have allowed the development of various techniques in detection and prevention of fire accidents due to gas leakage. This paper present an IoT based system for monitoring and controlling Liquefied Petroleum Gas (LPG), which is commonly used as cooking gas at home, in order to prevent leakage. NodeMCU is used as the controller of this system where it processes the data of gas concentration and flame occurrence from MQ-2 sensors and Flame sensors respectively, and decides on the action to be taken by the system to activate prevention devices. Blynk application is used as the platform to notify the user when a gas leakage has occurred, monitor the concentration of gas and control the fire prevention devices installed along with the system. With this system, the user is able to monitor the concentration of the gas in ppm on their smartphone, receive notifications and remotely take necessary action when gas leakage occurs.

## 11. TITLE: Internet connected wireless combustible gas monitoring system for apartment buildings

# AUTHOR: Denis Spirjakin, Alexander M. Baranov

# YEAR OF PUBLICATION: 2017

# PUBLISHED IN: Federated Conference on Computer Science and Information Systems

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# ABSTRACT: Despite the modern gas equipment, combustible gas leakage related emergency situations still take place and lead to building demolitions and human losses. Leak integrity failures because of anthropogenic and natural factors make impossible to prevent such emergency in other ways except providing continuous monitoring of combustible gas concentration and notification for people and special services. In this work, the design results of the Internet connected wireless sensor network for combustible gas concentration monitoring in apartment buildings is presented. The system consists of wireless autonomous gas sensors, actuators, routers and a gateway and it’s connected to a web service where it posts its data and gets events to react them in WSN.

## 12. TITLE: [A Smart Natural Gas Leakage Detection and Control System for Gas Distribution Companies of Bangladesh using IoT](https://ieeexplore.ieee.org/document/9331226/)

# AUTHOR: [Hilton Paul](https://ieeexplore.ieee.org/author/37088661220);[Mohammad Khalid Saifullah](https://ieeexplore.ieee.org/author/37088662358);[Md. Monirul Kabir](https://ieeexplore.ieee.org/author/37089403803)

# YEAR OF PUBLICATION: 2021

# PUBLISHED IN: [2021 2nd International Conference on Robotics, Electrical and Signal Processing Techniques (ICREST)](https://ieeexplore.ieee.org/xpl/conhome/9330807/proceeding)

# ABSTRACT: This paper proposes a smart mobile based model of gas leakage detection and control for gas distribution system of Bangladesh using IoT, called as smart natural gas leakage detection and control system (SNLDCS). The proposed SNLDCS has been implemented in both software and hardware modules. The existing researches are about Liquefied Petroleum Gas (LPG) leakage detection that are used for cylinder gas. Therefore, these models are not suitable for gas distributions companies of Bangladesh where natural gas leakage is being controlled from remote placesThe experimental results confirm that, implementation of SNLDCS model in gas distribution system in Bangladesh can provide the quickest detection and rapid resolve of gas leakage. As a result, it will increase safety, decreases system loss and reduces Greenhouse Gas (GHG) emission in the air.