Gas Leakage Monitoring And Alerting System For Industries

LITERATURE SURVEY

A system was designed to identify and measure methane gas in the zones of flammable gas stockpile sites. The device measures the air and water quality, including every parameter that can have deviation as the result of gas leakage in the water or air. The sensors measure the amount of CH4 and CO2 gas in the air while the temperature, pH, and electrical conductivity of the water are monitored. The device is controlled by an Arduino UNO microcontroller that transmits measured data to the database on Raspberry Pi 3.

Different advancements in pipeline leakage detection were put forward. This includes acoustic emission, optic fiber sensor, ground penetrating radar, Vapour sampling and infrared thermography. A system with sensors are connected to arduino for data collection and it uses LabVIEW as the GUI (graphical user interface).

A detailed sensor list for flammable toxic and combustible gases and their possible advantages and disadvantages has been compared. One such example is the SB-95 sensor, which detects sequentially the variation on the methane and carbon monoxide gas concentration and modifies its resistance accordingly. The variation in the filament resistivity is transmitted as a voltage variation on the load resistor. At the same time, metal oxide sensors have a long response time and even longer recovery time. These sensors need to extract the gas by making a hole into the pipe for the gas concentration measurement. Making holes can cause danger such as leakage or explosion of the toxic gas.

On the other hand, ultrasonic sensors are free from the above disadvantages for the measurement of gas concentration with fast response time and the device is compact and inexpensive too.

A detailed study of health issues related to gases like hydrogen sulphide, Carbon monoxide and methane has been done. Activation of optical alarms and buzzers when the sensed values of SB-95 sensor goes above the threshold along with the working of the sensor is explained in detail. Table gives a reference about the sources and flammable limits of Hydrocarbons and Hydrogen Sulphide gas. Even though the sources of leaks of both the types of gases are common, the lower

range of flammability of hydrocarbons are less than hydrogen sulphide which makes their leaks vulnerable to explosions. At the same time the toxicity of hydrogen sulphide is seen as 50ppm which can really cause lots of health issues in humans and continuous exposure may even lead to death.

REFERENCES

[1] Lianos, M. and Douglas, M. (2000) Dangerization and the End of Deviance: The Institutional Environment. British Journal of Criminology, 40, 261-278. http://dx.doi.org/10.1093/bjc/40.2.261

[2] Ferguson, T. (2002) Have Your Objects Call My Object. Harvard Business Review, June.

[3] Nunberg, G. (2012) The Advent of the Internet: 12th April, Courses.

[4] Kosmatos, E.A., Tselikas, N.D. and Boucouvalas, A.C. (2011) Integrating RFIDs and Smart Objects into a Unified Internet of Things Architecture. Advances in Internet of Things: Scientific Research, 1,5, http://dx.doi.org/10.4236/ait.2011.11002

 [5] Aggarwal, R. and Lal Das, M. (2012) RFID Security in the Context of "Internet of Things". First International Conference on Security of Internet of Things, Kerala, 17-19 August 2012.http://dx.doi.org/10.1145/2490428.2490435

[6] Biddlecombe, E. (2009) UN Predicts "Internet of Things". Retrieved July 6.

[7] Gershenfeld, N., Krikorian, R. and Cohen, D. (2004) The Internet of Things. Scientific American,