

# LPG Gas Level Monitoring and Leakage Detection System

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**Abstract**—Liquefied Petroleum Gas (LPG) plays a significant role in our daily lives. However, handling it with the utmost care is crucial due to its high ignitability, which can lead to fire outbreaks and explosions. The accurate calculation of gas leakage and the precise capacity of LPG cylinders remains challenging. To address these concerns, a robust gas leakage detection and monitoring system becomes imperative. The primary objective of this research design is to provide real-time information regarding the LPG gas level within the cylinder and promptly identify any instances of gas leakage. In the event of a gas leak, an alert mechanism, such as a buzzer, will notify the user. The design incorporates gas detectors and cargo cells that enable gas level identification and leak detection. Additionally, a television display visualizes the quantity of gas present, accompanied by alert messages. By activating the buzzer and indicator upon gas leakage detection, immediate attention is drawn to prevent potential hazards. This research design not only offers insights into the LPG gas level during refilling. It also functions as a powerful tool to mitigate gas leakage incidents and promote overall safety. Consequently, it proves instrumental in advancing LPG cylinder technology.

**Keywords**—Arduino, Liquefied petroleum gas (LPG), gas leakage, Gas sensor, Liquid-crystal display (LCD).

## I. INTRODUCTION

LPG refers to a gas mixture made up of butane and propane that has no odour at all. It has both unsaturated and saturated hydrocarbons. Ethyl Mercaptan is a substance that is added to LPG to remove its natural smell. LPG in air has an explosive range of 1.8% to 9.5% of the gas volume. Depending on how much it weighs in the cylinder, LPG is divided into three categories: household, commercial, and industrial. 14.2 kg of LPG is the normal capacity of a residential cylinder[1]. In parallel, LPG cylinders in the industrial and there are two types of commercial categories: one weighing 19 kilograms and the other weighing 35 kilograms. LPG is usually filled up to only 85%, because any amount beyond that will cause the gas to turn into vapor. This is because all are being careful to prevent dangers. If the

temperature increases by 1°C, then the pressure of LPG in the cylinder goes up by 15 kilograms per square centimetre. LPG possesses a high level of danger due to its inherent flammability and potential hazards[2]. In the present age, where electricity dominates as the primary energy source, even a minor spark within the vicinity during a leakage of LPG can lead to a catastrophic explosion. Knowing the key safety protocols to adhere to during a gas leak is crucial for all users. Studies have been done on monitoring and finding leaks in LPG. Their attention was directed towards assessing the viability and credibility.

## II. IMPLEMENTATION SETUP

Here the product used to detect gas leaks and monitor LPG levels. A loadcell signal is amplified and sent to the Arduino via the HX711 amplifier. Arduino sends signals to the LCD. On the LCD, the percentage of gas in the cylinder is displayed.

By utilising the MQ-2 gas sensor [3-4], it is possible to detect gas leaks more easily. On the LCD, a warning message is appeared when the gas leak occurs, and a buzzer and BLDC fan are triggered.

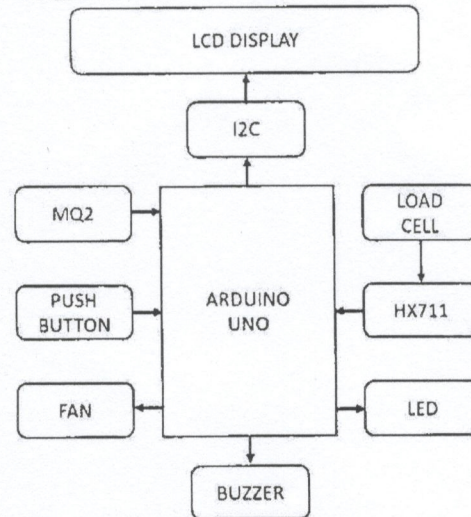


Fig. 1. Block Diagram of the work

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