Engine Oil Level Indicator In Backhoe Loader

A PROJECT REPORT

Submitted by

PRAVEEN M (927622BME063)
PUVIYARASAN M (927622BME065)
RAGUL M (927622BME066)

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR

ANNAUNIVERSITY: CHENNAI 600025

MAY 2024

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BONAFIDE CERTIFICATE

Certified that this project report "**Engine Oil Level Indicator In Backhoe Loader"** is the bonafide work of **"PRAVEEN M(927622BME063) PUVIYARASAN M (927622BME065), RAGUL M (927622BME066)** who carried out the project work during the academic year 2023 – 2024 under my supervision. Certified further, that to the best of my knowledge the work reported here in does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

SIGNATURE	**SIGNATURE**
Dr. T.NITHYANANDAM M.E., Ph.D.	Dr. M. LOGANATHAN.M.E.,PhD.,
SUPERVISOR	**HEAD OF THE DEPARTMENT**
Department of Mechanical Engineering,	Department of Mechanical Engineering,
M. Kumarasamy College of Engineering,	M. Kumarasamy College of Engineering,
Thalavapalayam, Karur - 639113.	Thalavapalayam, Karur - 639113.

This project report has been submitted for the end semester project viva voce Examination held on ________________

INTERNAL EXAMINER EXTERNAL EXAMINER

DECLARATION

We affirm that the Project titled **“Engine Oil Level Indicator In Backhoe Loader”** being submitted in partial fulfillment off or the End Semester Examination of **B.E. MECHANICAL ENGINEERING**, is the original work carried out by us. It has not formed the part of any other project or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

Student Name	Signature
1. PRAVEEN M	-----------------------------
2. PUVIYARASAN M	-----------------------------
3. RAGUL M	-----------------------------

Name and signature of the supervisor with date

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INSTITUTION VISION & MISSION

Vision

- To emerge as a leader among the top institutions in the field of technical education.

Mission

- Produce smart technocrats with empirical knowledge who can surmount the global challenges.
- Create a diverse, fully-engaged, learner-centric campus environment to provide quality education to the students.
- Maintain mutually beneficial partnerships with our alumni, industry and professional associations.

DEPARTMENT VISION, MISSION, PEO, PO & PSO

Vision

- To create globally recognized competent Mechanical engineers to work in multi-cultural environment.

Mission

- To impart quality education in the field of mechanical engineering and to enhance their skills, to pursue careers or enter into higher education in their area-of-interest.
- To establish a learner-centric atmosphere along with state-of-the-art research facility.
- To make collaboration with industries, distinguished research institution and to become a center of excellence

PROGRAM EDUCATIONAL OBJECTIVES(PEOS)

The graduates of Mechanical Engineering will be able to

- PEO1: Graduates of the program will accommodate insightful information of engineering principles necessary for the applications of engineering.
- PEO2: Graduates of the program will acquire knowledge of recent trends in technology and solve problem in industry.
- PEO3: Graduates of the program will have practical experience and interpersonal skills to work both in local and international environments.
- PEO4: Graduates of the program will possess creative professionalism, understand their ethical responsibility and committed towards society.

PROGRAM OUTCOMES

The following are the Program Outcomes of Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design / Development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life - long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life -long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

The following are the Program Specific Outcomes of Engineering Graduates:
The students will demonstrate the abilities

1. **Real world application:** To comprehend, analyze, design and develop innovative products and provide solutions for the real-life problems.
2. **Multi-disciplinary areas:** To work collaboratively on multi-disciplinary areas and make quality projects.
3. **Research oriented innovative ideas and methods:** To adopt modern tools, mathematical, scientific and engineering fundamentals required to solve industrial and societal problems.

Course Outcomes	At the end of this course, learners will be able to:	Knowledge Level
CO - 1	Identify the issues and challenges related to industry, society and environment.	Apply
CO - 2	Describe the identified problem and formulate the possible solutions.	Apply
CO -3	Design / Fabricate new experimental set up/devices to provide solutions for the identified problems	Analyse
CO -4	Prepare a detailed report describing the project outcome	Apply
CO - 5	Communicate outcome of the project and defend by making an effective oral presentation.	Apply

MAPPING OF PO & PSO WITH THE PROJECT OUTCOME

Course Outcomes	Program Outcomes												Program Specific Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO - 1	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 2	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 3	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 4	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 5	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3

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ABSTRACT

This project, titled **"Engine Oil Level Indicator in Backhoe Loader"**, addresses a critical aspect of vehicle and machinery maintenance by enabling real-time monitoring of engine oil levels. Ensuring optimal oil levels is vital for engine health, as it supports proper lubrication, reduces mechanical wear, and prevents overheating—common issues that can lead to significant engine damage and costly repairs if left unaddressed. This system leverages a float sensor designed to float on the engine oil and detect changes in oil levels. As the oil level fluctuates, the float sensor moves accordingly, generating electrical signals that a microcontroller processes. The microcontroller then converts these signals into a readable format, displaying the current oil level for the user.

This setup allows operators to effortlessly monitor the oil level without needing manual checks, enhancing both operational safety and convenience. By providing accurate, real-time feedback on oil levels, this system helps prevent engine damage associated with low oil conditions. This project demonstrates the practical application of basic sensor technology in advancing vehicle maintenance procedures, aligning with the growing need for preventative maintenance solutions in the field of heavy machinery.

In addition to its immediate benefits, the system holds significant potential for future enhancements. One such improvement could involve integrating Internet of Things (IoT) technology to enable remote monitoring and data collection. Through IoT connectivity, real-time data on oil levels could be transmitted to cloud platforms, allowing for predictive maintenance and trend analysis. Such advancements would not only enhance the reliability of machinery but also add convenience for users, enabling maintenance teams to anticipate issues before they escalate. Thus, this project contributes a foundational approach to machine maintenance while paving the way for more sophisticated, data-driven solutions in the future.

CHAPTER -1
INTRODUCTION

Monitoring engine oil levels is crucial for ensuring the long-term performance and durability of an engine. Proper oil levels help maintain effective lubrication, which minimizes friction between moving parts, prevents overheating, and ultimately protects the engine from costly damage. In traditional setups, oil level checks are often performed manually. However, manual checks can be time-consuming, prone to error, and are sometimes neglected, leading to the risk of low oil levels going undetected. This neglect can result in significant wear and tear, overheating, and even catastrophic engine failure.

To address these issues, this project, titled **"Engine Oil Level Indication Using Float Sensor,"** proposes an automated system that continuously monitors engine oil levels in real-time. At the core of this solution is a float sensor, a device that floats on the engine oil surface and moves in response to changes in the oil level. As the oil level rises or falls, the sensor's position changes, producing a corresponding electrical signal. This signal is then sent to a microcontroller, which processes the data and converts it into a readable display for the user.

The processed data is displayed on a user interface, providing a straightforward, real-time view of the current oil level. This information allows users to quickly assess the oil status without needing to perform a manual inspection, significantly enhancing the efficiency and reliability of routine maintenance. By ensuring that oil levels are always within optimal ranges, this system reduces the risk of engine damage due to inadequate lubrication and overheating.

This automated oil level monitoring system offers significant benefits across a wide range of applications. It is ideal not only for vehicles like cars and trucks but also for heavy machinery, construction equipment, and industrial systems where consistent engine performance and reduced downtime are essential. Furthermore, it contributes to safer and more reliable operations by reducing the likelihood of unexpected engine issues caused by low oil levels.

Looking forward, this system could be further enhanced by incorporating Internet of Things (IoT) capabilities. With IoT integration, the engine oil level data could be transmitted wirelessly to a cloud-based platform, allowing for remote monitoring and alerts when oil levels fall below a safe threshold. Additionally, data analytics and predictive maintenance algorithms could analyze trends in oil usage, enabling maintenance teams to anticipate refills or service requirements, thus avoiding unexpected breakdowns.

CHAPTER- 2
LITERATURE REVIEW

Traditional Methods: Traditional engine oil monitoring primarily relies on manual checks, typically through the use of dipsticks. In this approach, users are required to periodically inspect the oil level by pulling out the dipstick, wiping it clean, re-inserting it, and then checking the oil mark. While effective, this process is time-consuming, inconvenient, and dependent on the user's diligence and consistency. Due to the manual nature of the process, oil checks are often neglected, especially in vehicles or machinery that operate continuously or under high demand. Such oversight can lead to low oil levels going unnoticed, resulting in poor lubrication, overheating, and significant engine damage. These limitations highlight the need for an automated solution that can monitor oil levels in real-time, eliminating the need for constant manual intervention.

Importance of Automation: Research has increasingly underscored the benefits of automated oil level monitoring systems, particularly in applications where equipment or engines run continuously or under high load. Automated systems offer immediate feedback on oil levels, helping operators and maintenance teams keep engines in optimal condition without the delays or errors associated with manual checks. By providing real-time alerts, automation reduces the risk of engine issues, improving both operational efficiency and safety. For industries reliant on heavy machinery or vehicles in high-demand environments, an automated solution allows for proactive maintenance, ensuring that engines receive timely servicing and reducing the likelihood of costly breakdowns.

Effectiveness of Float Sensors: Studies by Mahmud et al. (2020) and Zhang & Li (2019) have demonstrated that float sensors offer a reliable and cost-effective solution for real-time oil level monitoring. Float sensors operate by floating on the oil surface, adjusting their position as oil levels fluctuate.

CHAPTER 3

METHODOLOGY

Component Selection: A **stainless steel float sensor** is chosen for its durability in oil environments, accurately detecting oil level changes. A **microcontroller** processes sensor signals, and an **LED/LCD display** provides real-time visual feedback, allowing easy monitoring of oil levels. Each component is selected for compatibility and resilience in automotive or industrial applications.

Circuit Design: The circuit connects the sensor, microcontroller, and display, optimized for stable operation and minimal signal noise. Proper power management and shielding ensure accurate readings despite environmental factors like temperature fluctuations and vibrations.

Signal Processing: The microcontroller is programmed to interpret sensor data, converting it into readable oil levels. Calibration adjustments are made to ensure reliable readings under different operating conditions, accounting for factors like temperature and oil viscosity.

Testing: The system undergoes rigorous testing in various conditions, including temperature changes and vibrations, to verify accuracy. Calibration is fine-tuned as needed to ensure precise and consistent oil level detection in real-world environments.

CHAPTER 4

CONSTRUCTION

The construction of the Engine Oil Level Indicator System involves integrating key components—float sensor, microcontroller, and display module—to provide real-time oil level monitoring. The process is broken down into the following stages:

1. Float Sensor Installation:
   A durable stainless steel float sensor is placed within the engine's oil sump to detect oil level changes. The sensor floats on the oil surface, generating signals as the level fluctuates. Careful positioning and secure mounting ensure stable readings, unaffected by engine vibrations.
2. Microcontroller Integration:
   A microcontroller (e.g., Arduino) receives the sensor's signals, interprets the data, and prepares it for display. Proper wiring minimizes noise and ensures consistent power, enabling reliable data processing.
3. Display Module Setup:
   An LCD or LED display connected to the microcontroller provides a user-friendly, real-time oil level readout. The display is mounted in an accessible area, allowing users to easily monitor the oil level.
4. Circuit Design and Assembly:
   The system's circuit connects the sensor, microcontroller, and display, with a regulated power supply and noise-reducing components like resistors and capacitors. Components are arranged on a breadboard or PCB for stability, and the circuit is insulated to withstand engine heat and vibration.
5. Programming and Calibration:
   The microcontroller is programmed to process sensor data accurately. Calibration accounts for changes due to temperature, vibrations, and oil viscosity, ensuring reliable, precise readings. Alerts are set for critical low oil levels.
6. Testing and Final Assembly:
   The system undergoes testing under different temperatures, vibrations, and oil levels to verify accuracy. Adjustments are made as needed, and all components are securely mounted for long-term operation.

CHAPTER 5

COMPONENTS AND DESCRIPTION

MAJOR COMPONENTS

1. FLOAT SENSOR
2. MICROCONTROLLER
3. DISPLAY MODULE

FLOAT SENSOR

A float sensor is a widely used device for measuring the level of liquids, particularly in applications like engine oil monitoring, fuel tanks, water systems, and industrial processes. Float sensors are simple, reliable, and cost-effective, making them ideal for real-time fluid-level detection. They work by utilizing the buoyancy of a floating object to detect changes in the fluid level, converting this physical movement into an electrical signal that can be processed by a control system.

Float Sensor Working Principle:

Float sensors operate on the basic principle of buoyancy. The sensor consists of a floating element, usually made of a material such as plastic or stainless steel, that is designed to float on the surface of the liquid being monitored. As the liquid level rises or falls, the position of the float changes accordingly. The float is mechanically or magnetically coupled to a sensor that detects its position.

MICRO CONTROLLER

In the **Engine Oil Level Indicator** system, the **Arduino Uno** serves as the central control unit that processes the data from the float sensor and displays the oil level on a connected display (e.g., an LCD or LED). Here's how it fits into the project:

1. **Signal Processing**:
   The float sensor detects the oil level and generates an analog signal based on the position of the float. This signal is fed into one of the **analog input pins** of the Arduino Uno. The Arduino processes this input, which corresponds to the oil level.
2. **Analog-to-Digital Conversion**:
   The Arduino Uno uses its **ADC (Analog-to-Digital Converter)** to convert the analog signal from the float sensor into a digital value that can be easily processed by the microcontroller. The ADC allows for precise measurements of the oil level.
3. **Programming the Arduino**:
   Using the **Arduino IDE**, you can write a program (sketch) that reads the analog values from the sensor, processes the data to determine the oil level, and sends this information to the display. The code can also include

thresholds for low oil level warnings.

4. **Display Interface**:

   The processed oil level data is displayed on an **LCD or LED display**. The Arduino Uno uses its **digital output pins** to send signals to the display, which shows the real-time oil level or alerts when the oil level is low.

5. **User Interface**:

   The Arduino can be programmed to control LEDs or even buzzers to signal the user when the oil level is dangerously low. This makes the system more user-friendly and ensures timely action.

6. **Additional Features**:

   If you want to expand your system, the **Arduino Uno** can be integrated with **IoT capabilities** through **Wi-Fi** or **Bluetooth modules** (like **ESP8266** or **ESP32**) for remote monitoring.

Advantages of Using Arduino Uno:

- **Ease of Use**: The Arduino Uno is beginner-friendly with an easy-to-use development environment and large support for learning resources.
- **Cost-Effective**: The board is affordable, making it a practical option for prototyping and small-scale production.
- **Extensive Documentation**: Arduino has a vast online community with plenty of tutorials, libraries, and examples, which helps when integrating the float sensor and display.
- **Wide Range of Compatible Sensors**: Arduino Uno supports a variety of sensors, and it's easy to interface with different components such as displays, sensors, and alarms.

How Arduino Uno Connects in the Oil Level Monitoring System:

1. **Float Sensor**: The float sensor provides an analog signal that changes with the oil level. This is connected to one of the Arduino's analog input pins.

2. **Processing**: The Arduino reads the sensor's data, processes it, and determines the current oil level.
3. **Display**: The processed data is sent to an LCD or LED display, showing the user the oil level.
4. **Alarm**: If the oil level falls below a threshold, the Arduino can activate an LED or buzzer to alert the user.

DISPLAY MODULE

An OLED display can be highly beneficial for your Engine Oil Level Indicator project due to its graphical and high-resolution capabilities. Here's how an OLED display can be helpful in this project:

Advantages of OLED Display for Engine Oil Level Indicator:

1. Graphical Output:

- Display Oil Level as a Graph: With an OLED display (typically 128x64 pixels), you can visually represent the oil level as a progress bar or gauge. As the oil level changes, the bar or gauge can update in real-time, providing an intuitive and easy-to-understand visual indication of the oil status.
- Example: A filled bar that starts from the bottom and rises as the oil level increases. You can use different colors or segments in the bar to indicate low, normal, and full levels.

2. High Resolution and Clarity:

- Better Visuals: OLED displays have high contrast ratios and display clear, sharp images even in bright conditions, making them perfect for environments where the display might be hard to see (e.g., bright sunlight, inside a machine engine compartment).

- Enhanced Visibility: With bright, crisp text and graphics, the user can easily read the oil level, even from a distance.

3. Customizable Information:

- Multiple Indicators: An OLED display can show more than just a simple number or text. You can use icons (e.g., a warning symbol when oil is low) or a battery indicator for system health. You can even display temperature, oil level, and status messages all at once.
- Example: Displaying the oil level with a status icon such as:
  - Green icon when oil level is good.
  - Yellow icon when oil is low.
  - Red icon when oil is critically low.

4. Compact Design and Energy Efficiency:

- Space Saving: OLED displays are compact (e.g., 0.96-inch diagonal) and can fit into tight spaces, which is essential in machinery like a backhoe where space is limited.
- Low Power Consumption: Unlike traditional displays, OLEDs consume less power when displaying black or dark images, making them suitable for battery-powered applications, reducing the overall energy consumption of your system.

CHAPTER 6

WORKING PRINCIPLE

The Engine Oil Level Indicator system works by continuously monitoring the oil level in an engine or machinery using a float sensor. The float sensor is positioned inside the oil sump or reservoir, where it rests on the surface of the engine oil. The float is designed to float on top of the oil due to its buoyant nature. As the oil level changes—either increasing or decreasing—the float moves accordingly, rising or falling with the changes in the oil level. This movement causes a change in the electrical properties of the sensor, which generates an analog signal. The float sensor can be a resistive type or capacitive, where the change in position either alters resistance or capacitance, respectively, producing a measurable electrical signal that varies based on the oil level.

This analog signal is then sent to an Arduino microcontroller via one of its analog input pins. The Arduino reads the signal and converts it from analog to digital format using its built-in Analog-to-Digital Converter (ADC). The digital value represents the oil level, which the Arduino interprets according to predefined thresholds. For example, a higher digital value indicates a higher oil level, while a lower value corresponds to a lower oil level. Based on these readings, the microcontroller determines if the oil level is within the acceptable range.

The processed data is then sent to a display module, typically an OLED or LCD screen, where the oil level is shown in real-time. The display may show a graphical representation, such as a gauge or progress bar, or simply display text indicating whether the oil level is "Low", "Normal", or "Full." This allows the user to quickly and easily assess the oil level without needing to perform manual checks.

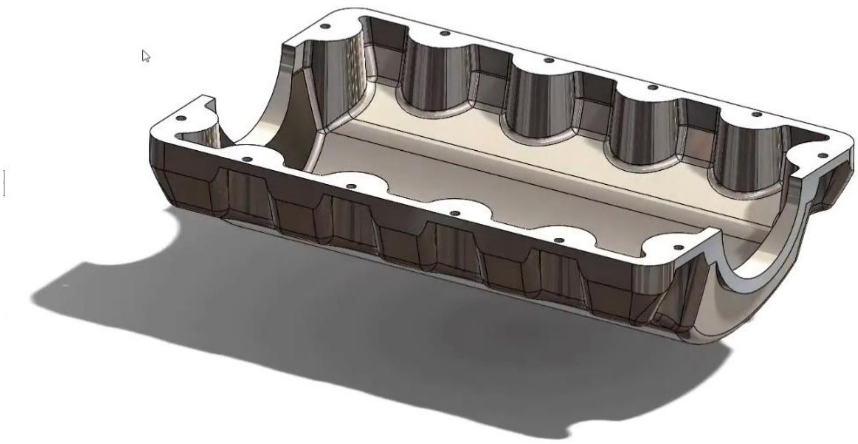
In addition to visual feedback, the system can be enhanced with a warning mechanism. If the oil level falls below a critical threshold, the Arduino triggers an alert, such as lighting up a red LED or sounding a buzzer, notifying the user that the oil level is dangerously low and needs attention. This alert system helps prevent engine damage by ensuring the operator takes corrective action before the engine runs dry.

The entire process is automated, allowing for continuous, real-time monitoring of the oil level without manual intervention. This greatly reduces the likelihood of human error or oversight, improving the reliability of the engine or machinery. The system also contributes to better maintenance practices, ensuring that the oil level is always optimal, thereby promoting engine longevity, reducing wear, and preventing overheating.

Overall, the working principle behind this project is a combination of sensor technology, signal processing, and real-time feedback, which together ensure that the engine oil level is constantly monitored and that any deviations from the desired level are immediately communicated to the user. This approach significantly improves operational safety, engine health, and maintenance efficiency.

CHAPTER 7

3D MODELING



1. Purpose and Function of the Oil Sump:

- Oil Storage: The primary function of the oil sump is to store the engine oil, which is circulated through the engine to lubricate various moving parts, such as pistons, crankshafts, and camshafts. Proper lubrication is critical for reducing friction, preventing overheating, and ensuring the engine operates smoothly.
- Reservoir for Lubrication: The sump ensures a continuous supply of oil to the engine, allowing the oil to cool down and filter impurities before it is pumped back into the engine for further circulation.

2. Oil Level and Oil Quality Monitoring:

- In your project, the oil sump becomes the housing for the float sensor that detects the oil level. It is essential to monitor the oil level in real-time to prevent damage to the engine due to either low oil levels or excessive oil accumulation.
- The sensor placed inside the oil sump detects the oil level, which is used to alert the user when the oil is low, ensuring that the engine is properly lubricated.

3. The Role of the Oil Sump in the Float Sensor Mechanism:

- Positioning of the Sensor: The float sensor is mounted inside the oil sump, with the float positioned just above the oil's surface. As the oil level fluctuates (due to usage or leaks), the position of the float changes.
- Sensor Functionality: The float sensor's movement is then converted into an electrical signal that corresponds to the oil level, which is then processed

by the Arduino microcontroller. This signal is used to trigger visual indicators (like the OLED display) or alarms (LED/buzzer) to inform the operator of the oil level status.

4. Factors Affecting Oil Sump and Oil Level:

- Oil Consumption: Over time, the engine will consume oil due to leakage, evaporation, or oil being burned in the engine. Monitoring the oil sump level ensures that any decrease in oil can be immediately noticed.
- Oil Contamination: The oil sump collects not only the oil but also dirt, metal shavings, and other contaminants that can accumulate over time. This makes oil level monitoring vital, as low oil levels may indicate contamination or that the oil is being used up quickly.
- Oil Viscosity and Temperature: The viscosity of the oil, which can change with temperature, also plays a role in how the float sensor behaves. The sensor needs to be calibrated to work accurately across the expected temperature range of the engine oil.

5. Installation Considerations for the Oil Sump in Your Project:

- Mounting the Float Sensor: The sensor should be securely mounted within the oil sump, ensuring it does not obstruct oil flow or get damaged during operation.
- Sensor Calibration: When installing the float sensor, it is essential to calibrate it to the expected oil levels in the sump. For instance, you'll want to set thresholds for low, medium, and full oil levels, based on the specific size and shape of the oil sump.

CHAPTER 8

CONCLUSION

The Engine Oil Level Indicator Using Float Sensor project successfully addresses the critical issue of monitoring engine oil levels in vehicles and heavy machinery, ensuring the proper lubrication and functioning of the engine. By utilizing a float sensor, which detects oil level changes, and an Arduino microcontroller for signal processing, the system provides a real-time, automated solution for monitoring oil levels. This system enhances maintenance efficiency and minimizes the risk of engine damage caused by low oil levels, which can lead to costly repairs and potential safety hazards.

The OLED display offers a clear and intuitive visual representation of the oil status, allowing operators to easily monitor the condition of the oil without the need for manual checks. The incorporation of warnings through LEDs or buzzers ensures that immediate action can be taken when the oil level is critically low, improving overall engine reliability and safety.

Additionally, this project demonstrates the application of basic sensor technology and microcontroller programming, while offering potential for further development. Future enhancements, such as integrating IoT for remote monitoring or adding predictive maintenance features, could further improve the system's functionality and convenience.

Overall, this project provides a cost-effective, user-friendly, and efficient solution for oil level monitoring, making it highly suitable for use in various types of vehicles, machinery, and industrial applications.

CHAPTER 9

COST ESTIMATION

NAME OF PRODUCT	QUANTITY	COST OF PRODUCT
FLOAT SENSOR (STAINLESS STEEL)	1	1500
MICROCONTROLLER	1	500
DISPLAY MODULE	1	500
WIRING AND CONNECTION	REQUIRED	200
	TOTAL	2700