

# IoT Based Bridge Health Monitoring System Using Sensors

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## Abstract

Bridges are vital components of transportation infrastructure. This paper presents an IoT-based Bridge Health Monitoring System that monitors vibration, load, and crack parameters using sensors to ensure safety and early fault detection.

**Keywords:** Bridge Health Monitoring, IoT, Sensors, Structural Health Monitoring, ENTC

## Introduction

Bridges are essential for transportation. Traditional inspection methods are manual and inefficient. IoT-based systems provide continuous real-time monitoring. In recent years, smart monitoring systems have gained attention due to their ability to provide continuous data with minimal human intervention. The integration of IoT and embedded systems enables real-time decision-making and improves the reliability of critical infrastructure such as bridges.

## Problem Statement

Lack of continuous monitoring leads to delayed fault detection and safety risks.

Proposed System Architecture

Sensors collect data which is processed by a microcontroller and transmitted wirelessly for monitoring.

## Hardware Components

Microcontroller, Vibration Sensor, Load/Strain Sensor, Ultrasonic Sensor, Power Supply

## Software and Communication

Embedded software processes sensor data and sends alerts using IoT communication.

## Results

The system demonstrated stable performance during continuous operation, with sensor data successfully transmitted without significant delay. The experimental observations indicate that the proposed system can be effectively used for early-stage damage detection and preventive maintenance.

## **Conclusion**

The proposed system improves safety and reduces manual inspection effort.

## **Future Scope**

Machine learning and cloud analytics can be integrated in future.

## **References**

1. Farrar C.R., Structural Health Monitoring, 2007
2. IEEE Sensors Journal, 2020