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HEALTH MONITORING SYSTEM

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Abstract: Intelligent health monitoring system of the long-span railway stayed requires the comprehensive knowledge of instrumentation, analytical and information processing technologies with the knowledge and experiences in design, construction, operation and maintenance of railway equipment for long-term monitoring the performance throughout its lifecycle. It is necessary to perform sensor-based structural monitoring for identifying the conditions in order to assure the structural safety and to evaluate the operational performance. The considerations for deploying a proper monitoring system are appropriate sensor instrumentation, robust signal acquisition, reliable signal
processing, and intelligent signal and information processing. Sensor and hardware instrumentation, signal transmission, signal acquisition and analysis are schematically described mainly. Fire and gas sensors are used to protect entire train system. And for passenger safety, we are attaching a wireless RF system. With this advanced equipment, the exact dangerous spot is known with in less time.

Keywords: Radio frequency, sensor instrumentation, Health monitoring, structural monitoring, Fire and Gas sensor, Signal Enhancement, segmentation.

I. INTRODUCTION

The process of implementing a damage detection and characterization strategy for engineering structures is referred to as Structural Health Monitoring (SHM). Here damage is defined as changes to the material and/or geometric properties of a structural system, including changes to the boundary conditions and system connectivity, which adversely affect the system's performance. The SHM process involves the observation of a system over time using periodically sampled dynamic response measurements from an array of sensors, the extraction of damage-sensitive features from these measurements, and the statistical analysis of these features to determine the current state of system health. For long term SHM, the output of this process is periodically updated information regarding the ability of the structure to perform its intended function in light of the inevitable aging and degradation resulting from operational environments.

II. DATA AQUISITION

The data acquisition portion of the SHM process involves selecting the excitation methods, the sensor types, number and locations, and the data acquisition/storage/transmittal hardware. Again, this process will be application specific. Economic considerations will play a major role in making these decisions. The intervals at which data should be collected is another consideration that must be addressed.

Because data can be measured under varying conditions, the ability to normalize the data becomes very important to the damage identification process. As it applies to SHM, data normalization is the process of separating changes in sensor reading caused by damage from those caused by varying operational and environmental conditions. One of the most common procedures is to normalize the measured responses by the measured inputs. When environmental or operational variability is an issue, the need can arise to normalize the data in some temporal fashion to facilitate the comparison of data measured at similar times of an environmental or operational cycle. Sources of variability in the data acquisition process and with the system being monitored need to be identified and minimized to the extent possible. In general, not all sources of variability can be eliminated.

Now a days fire accidents are occurring regularly in trains with that many people are losing their lives, here we are introducing an automatic alert system which avoids the accidents as well losing of lives. The system which we propose consists of different sensors which are used to sense the changes in the normal environment conditions. Here we use fire and gas sensors for the detection of gas leakage and fire occurrence. When any mishap occurred in compartment the passenger will pull the chain or triggers a switch, we use RF modules for the transmission of the data from compartment to the controlling section and the information regarding the compartment will be displayed in LCD from which compartment the signal is received. Here, HT12D is used as the RF decoder at the controlling section.

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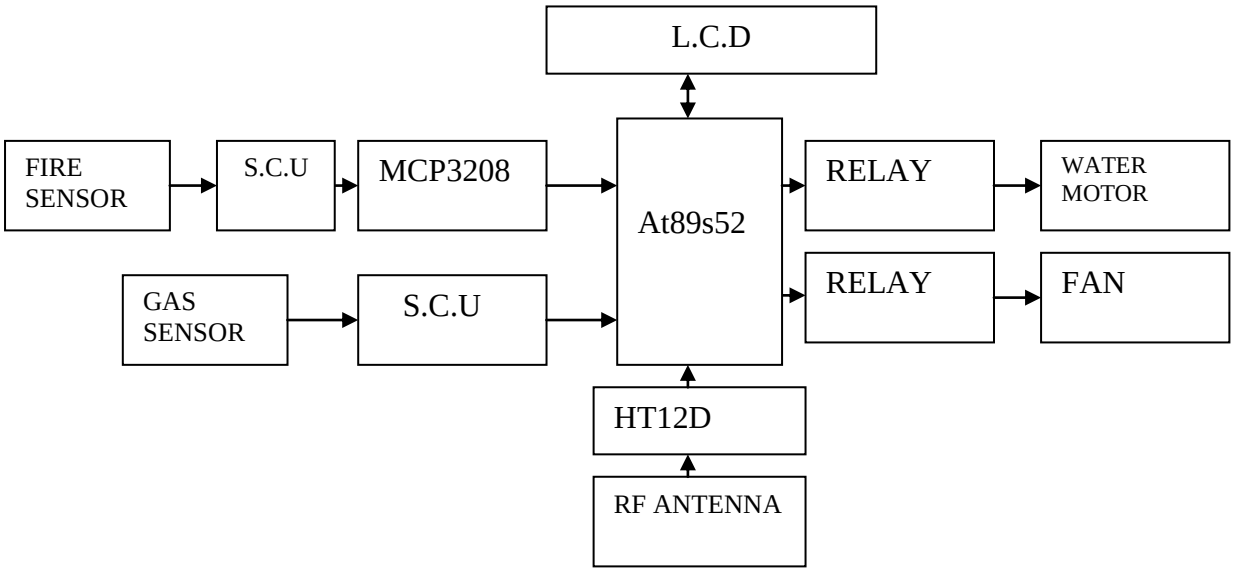

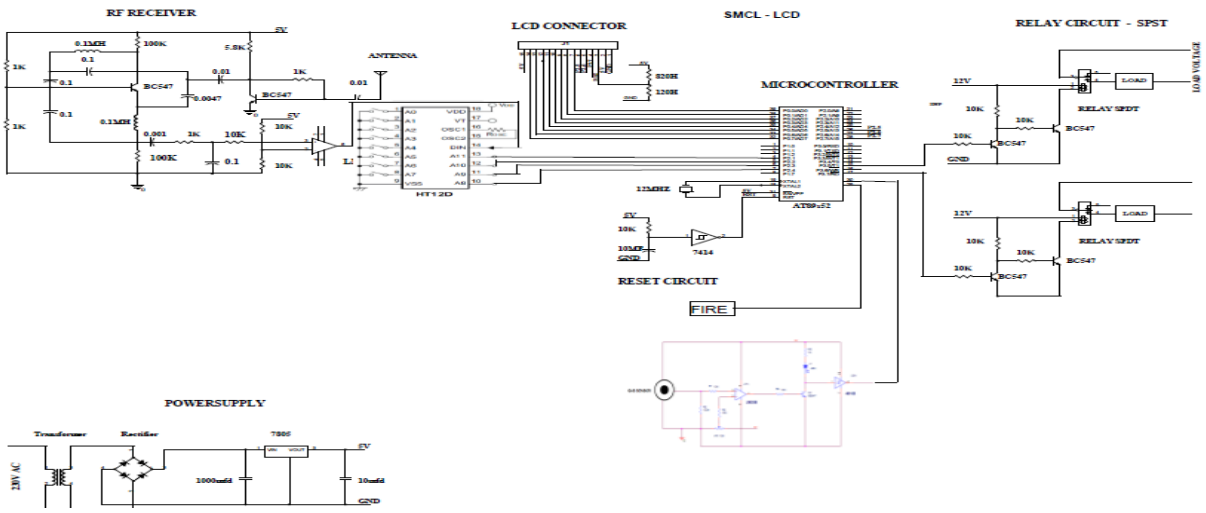

III. CIRCUIT DIAGRAM

Normally the initial state of gas and fire sensors will be low when the sensors are activated by the sensing of fire detection and gas leakage the outputs of sensors will be changed which causes changes in the induced voltages. Here the controller acts as comparing and controlling element when the induced voltage levels crosses the predefined values in the controller it will activate the relay units that were interfaced with the controller. Water motor and fan will be turned ON to control the fire and gas leakage.

IV. ADVANTAGES AND APPLICATIONS

Real-time At-a-Glance Views of the health of entire systems, sub-systems, and their components – machines, devices, networks, software in one central console enables managers to proactively monitor and manage all components of your system.

Unified visibility of the entire facility systems including devices, machines, and all networks gives managers complete insight – and knowledge – about the health and status and enables them to identify potential issues and take immediate action.

Advanced System Organization and Aggregation with behind-the-scenes ION logical framework that organizes and aggregates all relevant systems, sub-systems, network and devices so that the critical and complex system information is presented in one interface – simplifying managers complex daily activities in a consolidated command center.

Condition Monitoring of Your Systems and the Conditions Your Systems are Monitoring with status reporting and alert mechanism on system components and instruments that are monitoring the status of key processes and devices – temperature, pressure, tank-levels, and more.

System Annunciators identify risks, emergencies, and situations that require immediate attention for each system component. Multi-level visual notification with large, easy-to-read status indicators provide facility personnel with real-time alerts and information about system events that can be addressed without incident – before they become a critical.

Alarms, Events and Alert Mechanisms are based on configurable parameters and thresholds for distinguishing among minor, major and critical alarms and are accompanied by detailed troubleshooting information.

V. CONCLUSIONS

This paper presents the preliminary verification and applicability of wireless modulus monitoring system to monitoring the seismic response of structure, proposes a continuous real-time structural health monitoring (SHM) and damage detection system. The results show that, our design is having the capability of automation controlling and enhanced systems such as long distance coverage RFs and sensor module.

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BIOGRAPHY

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