

Design of Emergency Communication and Alerting System for High Risk Workers

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Abstract

Emergency Management System (EMS) is a system that communicates and alert for emergency medical care. Once it is activated by an incident that causes serious illness or injury to human workers. High Risk workers emergency communication system is equipment which is used for response on any emergency, the worker can alert the Rescuing people, and it will continuously monitor the workers blood pressure and Heart beat rate .If any violation occurs it will be observed by the equipment and it will alert the responsible persons by alarm and Emergency Messages. Using GSM modem, pressure sensor and Heartbeat sensor the equipment can observe the real-time health monitoring of the high risk workers. According to the alerting system we can shoot the first aid and control the accident severity rate. Thus, the proposed system makes the human's life at workplace easier and more comfortable.

Keywords: *Emergency Management System, Health monitoring, High Risk Workers, Pressure Sensor*

INTRODUCTION

Due to absence of work supervision and lack of first aiding time now a days is the problems in Indian Industry million of people in the world will be over 65 years (this estimation is twice of the 1990's rate). Coronary heart diseases are at the top of the world death cause in list and every year 7.2 million people die because of these diseases. Any worker can happen this as any unexpected time, so I planned to develop intelligent and low-cost emergency communication and alerting system for high risk workers systems to make the high risk industrial worker safety and health monitoring and emergency alerting system helps us to quick action take place. [1]

The high risk activity workers like working at height, confined space workers, under water worker and peoples we cannot observe directly for example lone worker, store keeper and expectant mother. The

safety system is used for measuring continuously, automatically the values of the worker at high risk area.

High Risk workers emergency communication system consist of two emergency switches 1.low severity level, 2.high severity level according to the causality response we can provide the emergency assistance to him.

Physiological parameters such as body blood pressure and pulse rate.[2] if any abnormality occurred the safety system alerting the responsible persons like health and safety specialist, E M S, Plant in charge.

Main function areas are

- Work at confined space
- Height work
- Lone worker(store keeper, securities , defense peoples)
- Working expectant mother

In the system do live monitoring the workers blood pressure level and heart

beat rate. If any values changed from the stored values it alerting the HSE peoples, first-aid station, and plant in charge. The

communication channel through a GSM modem

METHODS AND MATERIAL BLOCK DIAGRAM

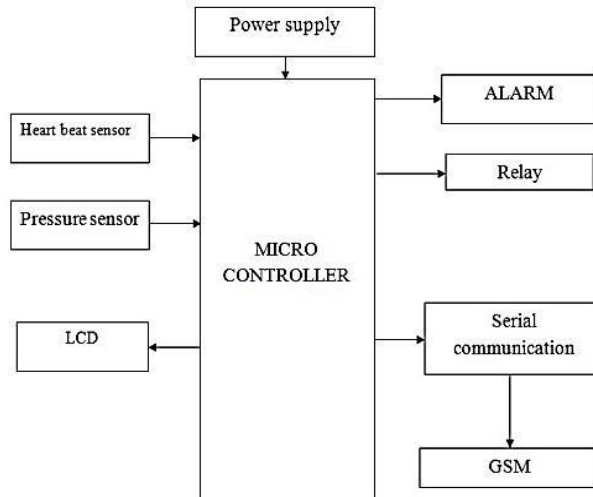


Figure 1: Block diagram.

Fig 2.1 depicts the entire process of the proposed system, in this system mainly use a heart beat measuring sensor and a pressure rate measuring sensor, continuously it monitor the workers health condition. If is there any violation in pre stored values the PC IC send a message to GSM modem , In the IC chip stored a emergency contact number. If any violation noted the PIC IC send the emergency SMS to the stored number using GSM modem. There are three processes. Once the input is given the microcontroller unit gives the output to the GSM module. GSM module sends the information to the mobile phone in the form of SMS to the Health and Safety department and First-aid team. Another process is if a worker have some problem while doing a confined space welding due

to the exhaust gas the welder met with some Sevier breathing problem suddenly he can press the severity level two, then the whole rescuing team will alert with respect to the severity rate. The mean while alerts the entire industry through alarm.

PROJECT OVERVIEW:

PRESSURE SENSOR: The Pressure sensor is used to measure the systolic and the diastolic pressure level using the device. Systolic is the higher of the two number measures the pressure in the arteries when the heart beats. Diastolic is the lower of the two number measures in the arteries between heart beats. It is measured in millimeter mercury (mmHg). Blood pressure changes from minute to minute.

Table 1: Classification of blood pressure.

Category	Systolic/diastolic pressure (mmHg)
Hypotension	< 90/60
Desired (normal)	90-119 / 60-79
Pre hypertension	120-139/80-89
Stage 1 hypertension	140-159/90-99
Stage 2 hypertension	160-179/100-109
Hypertensive	>= 180/>=110

HEART BEAT SENSOR

Heart beat sensor is used to measure the pulse rate of the heart in digital output, when a finger is placed on it. LED is used to detect the heart rate. The normal heart beat of the person is 78 bpm. It is

measured based on the beats per minute. If the heart beats more than 100 BPM causes Tachycardia. If the heart beats less than 60 BPM causes Bradycardia. Figure 2 shows the information about the heart rate of the person with time.



Figure 2: Heart Rate vs. Time

RESULT AND DISCUSSION

We can program the micro processor for the input of minimum and maximum set values of the heart beat rate and pressure. Kit will continuously monitor the value of heart beat and pressure of the worker. The output of the kit will generate a message when there is a deviation in the heart beat and pressure of the high risk worker. The model message of the kit was shown below.

```
##model message//
High level injury
Need first aid pressure80/60
Beat rate 89
```

Figure 3: Model output message from the proposed system.

CONCLUSION

The Emergency communication and alerting system for high risk workers system used for measuring the worker blood pressure and heart beat continuously and automatically.

If Workers can meet with accidents at any unexpected time intelligent and low-cost

Emergency communication and alerting systems to provide safety to the industrial worker. The advances in wireless communication and embedded computation technologies, remote health monitoring and emergency alerting system helps us to take quick action.

The high risk activity workers like working at height, confined space workers, under water workers and the peoples who cannot observe directly, for example expected mother, lone worker, and store keeper...etc.

REFERENCE

1. M.V.M Figueredo and J.S. Dias Mobile Telemedicine System for Home Care and Patient Monitoring Proceeding of 26th IEEE EMBS International conference on Engineering in Medicine and Biology Society, San Francisco, CA, USA, PP 3387-3390, Sept- 2004.
2. P.S. Pandian., K.P. Safer., Pragati Gupta., D.T. Shankuntala., B.S. Sundersheshu and V.C. Padaki Wireless Sensor Network for Wearable

- Physiological Monitoring International Journal of Networks, vol-3, issue-5, pp 21-29, May-2008.
3. Maxime Labat., Guillaume Lopez., Masaki Shuzo, Ichiro Yamada., Yasushi Imai and Shintaro Yanagimoto Wearable Blood Pressure Monitoring System-Case study of multiplatform applications for medical use Proceeding of the International conference on Health Informatics, Rome, Italy, pp 156-163, Jan-2012.
 4. Piyush V. Savaliya., Sunil B. Somani and Virendra V. Shete "A Bluetooth Tele Health, Household Security and Industry Safety Realization by Android Smartphone" International journal of Advanced Research in Computer and Communication Engineering, Vlo-4, issue-6, PP 382-385, June-2015.
 5. M. Vinaykumar and M. Sagar An ARM and GSM Based Global Embedded Patient Monitoring System International Journal of Science and Research, Vol-3, Issue-10, PP 1700-1702, Oct-2014.
 6. Shriram K Vasudevan., Sivaraman R., Subashri V and Murali N Design and Development of an Embedded System for Monitoring the Health Status of a Patient International Journal of Intelligent Systems and Applications, Vol-5, issue-4, pp 64-71, March-2013.
 7. Priya. M., Mathubala.R.S., Anitha.M and Vanitha M Embedded Based Wireless ICU Monitoring System International Journal of Advances in Engineering & Technology, vol-6, issue-5, PP 2084- 2092, Nov-2013.
 8. Media Aminian and Hamid Reza Naji A Hospital Healthcare Monitoring System Using Wireless Sensor Networks Journal of Health and Medical Informatics, vol-4, issue-2, PP 1-6, Feb-2013.
 9. Rifat Shashriyar., Md. Faizul Bari., Gourab Kundu., Sheikh Iqbal Ahmed and Md. Mostofa Akbar Intelligent Mobile Health Monitoring System (IMHMS) International Journal of Control and Automation, Vol-2, issue-3, PP 13-28, Sept-2009.
 10. Jenny S. Choy., Zhen-Du Zhang., Koullis Pitsillides., Margo Sosa and Ghassan S. Kassab Longitudinal Hemodynamic Measurement in Swine Heart Failure Using a Fully Implantable Telemetry System Journal of PLOS-one, Vol-9, Issue-8, PP 1-12, August- 2014.
 11. Amna Abdullah., Asma Ismael., Aisha Rashid., Ali Abou-ElNour and Md. Tarique Real Time Wireless Health Monitoring Application using Mobile Devices International Journal of Computer Networks & Communication, Vol-7, Issue-3, PP 13-29, May2015.
 12. S. Elango., N. Mathivanan and K. Arun Venkatesh Design and Development of wireless Sensor Network for In-Home Healthcare Application Using LabVIEW Journal of the Instrument Society of India, Vol-41, No-4, PP 233-236, Dec-2011.
 13. Mohamed Fezari., Mounir Bousbia-Salah and Mouldi Bedda Microcontroller Based Heart Rate Monitor The International Arab Journal of Information Technology, Vol-5, No-4, PP 153-157, Oct- 2008.
 14. Ping Wang The Real-time monitoring system for in-patient based on Zigbee Proceedings of Second International Symposium on Intelligent Information Technology Application (IITA), PP 587- 590, Shanghai, Dec-2008.
 15. S. Ahmed., S. Chen., K. Soueidan., I. Batkin., M. Bolic., H. Dajani and V. Groza A Prototype of an Integrated Blood Pressure and electrocardiogram Device for Multi-parameter Physiologic Monitoring Proceedings of IEEE International Conference on Instrumentation and Measurement Technology (I2MTC), PP 1244- 1249, Austin. TX, May-2010.
 16. Xiao Hu., Jiaqing Wang., Qun Yu., Waixi Liu and Jian Qin A wireless Sensor Network based on Zigbee for

- Telemedicine Monitoring System Proceedings of IEEE International Conference on Bioinformatics and Biomedical Engineering (ICBBE), PP 1367- 1370, Shanghai, May-2008.
17. Sudhindra.F., Annarao.S.J., Vani.R.M and P.V.Hunagund A GSM Enabled Real Time Simulated Heart Rate Monitoring & Control System International Journal of Research in Engineering and Technology (IJRET), Vol-3, Special Issue-3, PP 6-10, May-2014.
 18. Sudhindra.F., Annarao.S.J., Vani.R.M and P.V.Hunagund A GSM & GPS Enabled Real Time Simulated Heart Rate Monitoring & Control System Proceedings of 102nd Indian Science Congress 2014-15, Mumbai University, Mumbai, Maharashtra, PP 63, Jan- 2015.
 19. Sudhindra.F., Annarao.S.J., Vani.R.M and P.V.Hunagund A Low Cost Real Time Ambulatory Blood Pressure Monitoring & Alert System with GSM & GPS Indian Journal of Scientific Research (IJSR), Vol -12, issue-1, PP 180-186, Oct-2015.