

# Pedestrian Accident Rescue System

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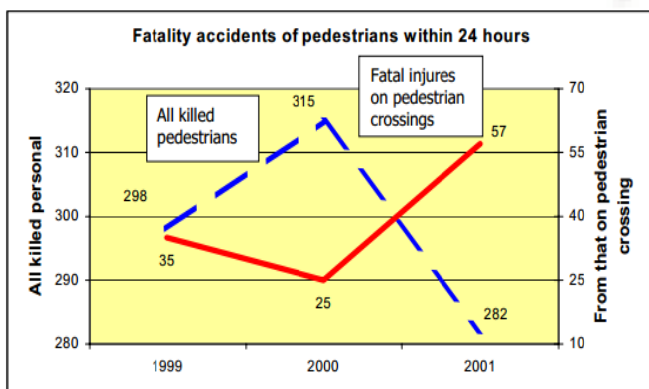
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**Abstract:** Today road accidents are rising at an alarming rate and 16% of the total number of road accidents involves pedestrian out of which ironically 20% of the accident takes place at the zebra crossing. The paper presents the idea of pedestrian accident rescue system which will help preventing accidents at pedestrian crossing, thickly pedestrian crowded area such as, school periphery and playground. First, a geophone will be deployed at the pedestrian accident prone area, which will convert the ground movement (caused by the pedestrians) into electrical voltage which is recorded and sent to the traffic system recording station. Second, the recording station is synchronized with the traffic lights nearest to the accident prone area, which will indicate a specific light say red, to make the driver aware of the fact of crowded pedestrian at the impending junction.

**Keywords:** Geophone, traffic system recording station, zebra crossing, accident prone area, sensor technology, rescue system, pedestrian accident.

## 1. Introduction

The paper focuses on providing a rescue system to the pedestrians on road and ensuring their safety. It involves the sensor technology (in this case, geophone) which helps in identification of areas which are at higher risks of accident such as schools, public parks and zebra crossings. Zebra crossing which was actually designed with the intention of safe traversal of pedestrian from one side of the road to another, are bringing the toll on humans due to carelessly reckless driving by the vehicle drivers. The integration of the sensor technology and traffic light management system serves as a platform to make the driver much informed and thus helps in regulating pedestrian accidents. It proposes an idea of reduced pedestrian accidents by application of the sensors in the traffic management system which will intern control the drivers' action by means of traffic light signaling.



**Figure 1:** Statistics of pedestrian accident (Data collected from the 15<sup>th</sup> ICTCT Workshop, speed related research and analysis).

Sequence	Districts	Kill	Serious injury	Number inhabitant	Number inhabitant per fatal or serious injury
1	Praha 1 - 10	15	110	1 160 118	9 280
2	Trutnov	3	7	120 486	12 049
3	Kladno	1	11	149 988	12 499
4	Prachatice	1	3	51 380	12 845
5	Ostrava	4	19	315 442	13 715
6	Liberec	1	10	158 351	14 394
7	Karviná	1	7	141 613	17 702
8	Brno město	2	19	373 272	17 775
9	Pardubice	1	8	160 770	17 863
10	Jihlava	1	5	108 261	18 044
11	Zlín	1	9	195 020	19 502
12	České Budějovice	3	6	178 140	19 793
13	Chomutov	1	5	124 826	20 804
14	Cheb	1	3	88 770	22 193
15	Přerov	2	4	133 703	33 426
16	Opava	3	5	181 168	22 646
17	Ústí n.Orlicí	1	5	138 892	23 149
18	Znojmo	2	3	141 023	28 205
19	Děčín	1	3	133 703	33 426
20	Olomouc	1	3	224 535	56 134

**Figure 2:** The district-wise analysis of accidents with number of killings, serious injuries and number inhabitant per fatal or serious injury. (2001)

## 2. Description

The whole rescue mechanism is divided in two finite steps:

### 2.1 Data Collection at Accident Prone Area

The sensor technology, involving the use of Geophones installed at accident prone areas will convert the ground movement caused by the pedestrians into electrical voltage. These electrical results are then passed onto the traffic system recording station of the city. The passage of the electrical signals from the geophone installation base (i.e., the accident prone area, say zebra crossing) is transmitted to the recording station by either by means of physical channel (small scale implementation) or by installation of a satellite (large scale implementation).

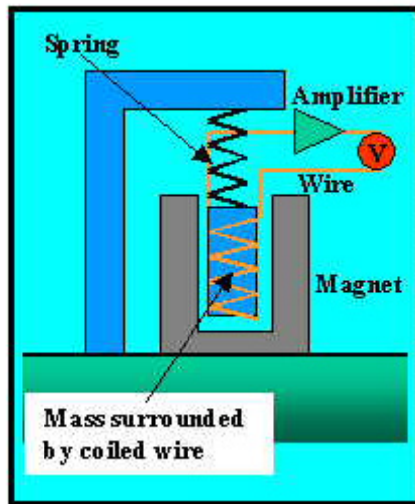


Figure 3: Working of a typical geophone

- [3] Analysis of road accidents on pedestrian crossing caused by speeding, by Jitka Rokytova, Michal Sklenar.
- [4] Pedestrian Safety-Report to congress- U.S department of transportation
- [5] Geophones by Tom Boyd Colorado School of Mines.
- [6] Prevention of pedestrian accidents by D. Kendrick, Archives of disease in childhood, 1993.
- [7] Analysis of highway accidents, pedestrian behavior and bicycle program implementation, by Zegeer CV, Opiela KS, Cynecki MJ.
- [8] Pedestrian cross flows in corridors, transportation research board of the national academies.
- [9] Survey of Pedestrian Detection for Advanced Driver Assistance Systems, IEEE Explore, Geronimo, D. Comput. Sci. Dept., Univ. Autonoma de Barcelona, Barcelona, Spain Lopez, A.M.; Sappa, A.D.; Graf, T.
- [10] How digital sensors compare to geophones? Denis Mougnot, Sercel, 44474 Carquefou, France.

## 2.2 Data Delivery at the Traffic Control System

The data collected at the traffic system recording station is amalgamated with the traffic light system. The driver is informed about the presence of impending pedestrian crossing or densely crowded areas on his way by the blinking of the traffic signal light, say red. This will help him take an informed decision by giving him an estimate of the distance up to which he has to slow down his speed of vehicle in order to ensure accident prevention.

## 3. Conclusion

The paper presents a novel method of pedestrian accident rescue system using a rather economical technology of sensors and its integration with the traffic light system. It will help in reducing the number of pedestrian accidents on roads due to reckless driving, or sometimes due to the drivers' ignorance about the pedestrian crossing the zebra crossing and the pedestrian crowded areas. The PARS will help preventing accidents by informing the driver at the nearest traffic signal about the presence of such areas.

## 4. Future Scope of Study

The paper encompasses a broader category of accident rescue of pedestrian at roads. It helps tackle the issue of higher death rates due to accidents which is rising at an alarming rate. The use of sensor technology, which is rather economical, will ensure the cost efficiency of the whole pedestrian accident rescue system. In nutshell, in practical scenario, it will revolutionize the road traffic management and accident prevention which would lead to lesser accidents and safer roads for a layman pedestrian.

## References

- [1] Accident Prevention Effects of Road Safety Devices - Annual Report. Japan Road Association, 1969.
- [2] Polus, A. and A. Katz. An analysis of nighttime pedestrian accidents at specially illuminated crosswalks. Accident Analysis and Prevention, Vol. 10, No. 3, September 1978.