



# ANALYSIS OF ACCIDENTS DURING ROAD CONSTRUCTION AND STUDY OF ITS CAUSES AND EFFECTS IN SALEM DISTRICT

A.MohamedSadik

Sona College of technology, Salem, 636005&Tamilnadu

Email:sadikjaguar@gmail.com

**Abstract**-Accidents associated with highway and road construction projects have a major impact on issues related to cost, time and quality of project delivery. Unexpected accidents result in either positive or negative outcomes often causing deviations from project plans and making construction projects particularly prone to risk. Therefore identifying the various causes and effect of accidents on construction sites and proposing ways and means of reducing these accidents should be acknowledged. This study examines the major causes of accidents and suggests ways of mitigating these accidents on construction sites. A designed questionnaire was administered and descriptive statistics were used for the analysis. From the research negligence is the main cause of accidents on construction sites, labourers are also the major victims of these site accidents, loss of time in project execution is the major effect caused by these accidents in project execution. To ensure safety and to reduce the occurrence of construction site accidents to the minimum, management of construction firms must undertake and implement some of the context of this study such as implementation of safety policy, use of safety items and gears, training on safety measures and accident prevention methods, ensuring safe working environment and enforcing safety rules etc.

**Key words:** road Construction; construction equipments; maintenance; Accidents, Causes, Effects, Safety.

## I. INTRODUCTION

The Indian construction industry, don't have a proper management practice for construction equipments. It's important to have a proper management for maintenance, work schedule, fuel consumption, and idle time. It is essential to know about the utilization of machine properly and match their capacities to specific project requirements. For

the highway construction projects have the attributes of construction equipment in addition to the common characteristics of general commodities, control of cost and management present complexity and different levels to project governors. The construction equipment's will act as backbone for huge construction projects. Proper use of appropriate equipment's will contribute economy, quality, safety, speed and timely completion of project. Accidents prevention has become increasingly important aspect which could be a major cause of concern in the construction industry therefore any effort to identify and explore possible ways of preventing and controlling accidents should be sought after, hence the need for the study.

## II. OVERVIEW OF ACCIDENTS

### *Accidents in Terms of Classification of Roads:*

National Highways accounted for 29.1 per cent in total road accidents and 35.3 per cent in total number of persons killed in road accidents during 2012, whereas the State Highways accounted for 24.2 per cent of total accidents and a share of 27.3 per cent in the total number of persons killed in road accidents during same period of time. Highways permit greater speed resulting in relatively greater number of road accidents and fatalities. National Highways accounted for 29.1 per cent in total road accidents and 35.3 per cent in total number of persons killed in road accidents during 2012, whereas the State Highways accounted for 24.2 per cent of total accidents and a share of 27.3 per cent in the total number of persons killed in road accidents during same period of time. Highways permit greater speed resulting in relatively greater number of road accidents and fatalities.



### B. Spatial Distribution of Road Accidents (Urban Vis-À-Vis Rural):

In 2012, the total number of road accidents that occurred in rural areas was more than that in the urban areas; the former accounting for 54.3 per cent (2, 66,450) and the latter accounting for 45.7 per cent (2, 23,933) of total accidents. Rural areas had more fatalities (61.6 per cent) than urban areas (38.4 per cent)

## II. SCOPE AND OBJECTIVES

- To identify the various causes of accidents in road construction in salem district.
- To examine the safety of workers involved in road construction.
- To propose the ways of means of reducing accidents.
- To suggest new technology that can be applicable for local road safety construction.

## III. METHODOLOGY

The methodology adopted in this project is given below:

- Study of various accidental risk at road construction.
- Objective, need and necessary of the project.
- Site visit to ongoing projects.
- Questionnaire survey and personal interviews with Site-Engineers, Supervisor and managers.
- Analyzing the questionnaire.
- Factor analysis of data obtained from site and identifies the root cause.
- Remedial measures are to be suggested and the present data is to be recorded for future reference.
- Conclusions, recommendations and suggestions for future study.

## II. LITERATURE REVIEW

### Technology behind the road

#### construction safety traffic light system

The road construction safety traffic light system has a number of individual components working together to perform

as it is designed. As the construction safety traffic light system is an automated device, the system requires sensors to communicate with the control unit for relevant control functions. Apart from the sensors, the communication medium for the construction safety traffic light system is using Radio Frequency (RF) as the means for low cost and efficient wireless communication between the master and slave unit. The intelligent

construction safety traffic light system is capable to perform the entire process without human intervention.

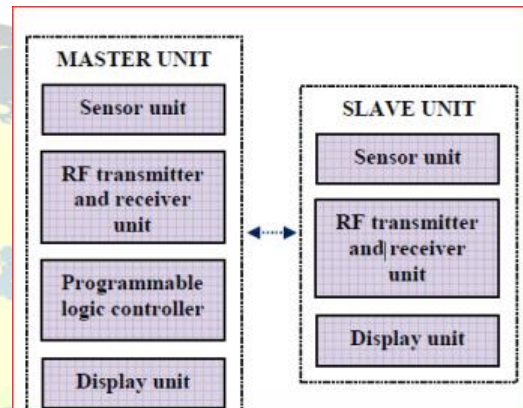


Figure 1

## AUTOMATION IN CONSTRUCTION

Automation and robotics systems in construction industry may achieve the following advantages:

- Uniform quality with higher accuracy than that provided by skilled workers.
- Improving work environment as conventional manual work is reduced to a minimum, so the workers are relieved from uncomfortable work positions.
- Eliminating complaints about noise and dust concerning works such as removal, cleaning or preparation of surfaces.
- Increasing productivity and work efficiency with reduced costs.
- The Earthwork machines such as excavator, grader, asphalt paver, etc. should consist of the Laser – based sensor systems installed on it. By using this system, we get the required field data with the help of the laser sensors which acts alongside the working of machines. The field data is then displayed on the LCD screen to the operator, with help of which



he can make necessary adjustments in the machine before commencement of work.

- The earthwork machines used for the construction of bituminous roads should be fully equipped with required features and should be fully functional. (See Fig.5)
- Fig.5: Laser – based systems that can be used in Earthwork Applications
- The asphalt paver machine sho

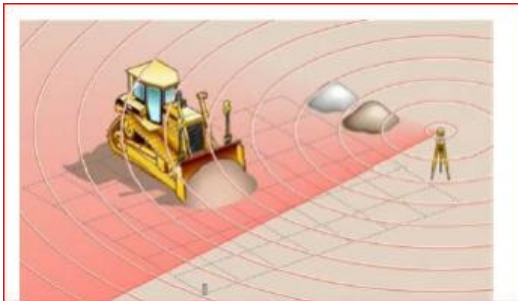


Figure 2

## V.FIELD SURVEY AND ANALYSIS

### 5.1construction vehicle usage

In case of road construction projects, the proper use of appropriate equipments contributes to economy, quality, safety, speed and timely completion of a project.

#### Jcb-Side berms clearance



Figure 3

- It is used in various types of jobs such as digging in gravel banks, clay pits, digging cuts in road works, road-side berms, etc.

### Paver-Chip spreader



Figure 4



Figure 5



Figure 6

The paver machines used for the laying of the wearing course for the construction of bituminous road was unchecked.

The bituminous aggregate was not being supplied to the asphalt paver continuously from the truck containing the material.





Due to slow feeding of bituminous aggregate to paver, its temperature was reducing.

#### **Dump truck**



Figure 7



Figure 9

#### **5.2 Design and awareness**

Ignorance of safety regulations

#### **5.3 quality and role of contractor**



Figure 8

#### **Earthwork machines**



Figure 11



Figure 10

## VI. CONCLUSION AND RECOMMENDATIONS

Labourers happen to be the main class of workers that are responsible for accidents on construction sites and are also the major victims of construction sites accidents. Negligence was the major cause of accidents on construction sites. The main effect of accidents on construction sites is the loss of time in project execution. To ensure a safe and accident free construction site, management must understand, undertake and implement all or some of the following measures which are regular supervision and inspection by safety officials and leaders on site, constant training on the use of tools and equipment, proper use of safety items and attire, signs and notices should be provided on construction sites and should be located at strategic areas on site, training programs should be provided regularly which should include how to handle tools, equipment and plants, how to understand and interpret signs and symbols, management must ensure safety policies are obeyed, plants, machineries and equipments should be maintained regularly.

For a project to be successful the following recommendations are hereby presented:

- Adequate planning should be provided before the commencement of project construction.
- Safety, rules and regulations in construction site should fully be maintained from the initial to final stage of construction.
- Durable and quality materials for construction should be supplied and used properly.

- Efficient and Economical use of all the available resources should be adopted by all associates of construction team.
- Effective communications and corporations between all members of construction team should be adopted.
- Well trained and experienced workmen should be employed where necessary.
- Proper use of appropriate equipment contributes to the economy, quality, safety, speed and timely completion of the project.

## REFERENCES

- [1] Akintoye, A. and MacLeod, M. (1997) "Risk analysis and management in construction." *International Journal of Project Management*, 15 (1), 31-38.
- [2] Ashley, D., Diekmann, J., and Molenaar, K. (2006). "Guide to risk assessment and allocation for highway construction management." *FHA, International Technology Scanning Program. Office of international program, FHA, Washington, DC*, 4-17.
- [3] Diab, M. (2011) *Analyses of highway project construction risks, performance, and contingency*, ProQuest, Ann Arbor, MI, 56-102.
- [4] Flyvbjerg, B., Holm, M., and Buhl, S. (2002). "Underestimating Costs in Public Works Projects-Error or Lie?" *APA Journal*, 68 (3), 279-295.
- [5] Lam, P. (1999). "A Sectoral review of risks associated with major infrastructure projects". *International Journal of Project Management* 17, (2), 77-87.
- [6] Molenaar, K. (2005). "Programmatic cost risk analysis for highway megaprojects". *Journal of Construction Engineering and Management* 131(3), 343-353.
- [7] Nassar, K., Nassar, W., and Hegab, M. (2005) "Evaluating Cost Overruns of Asphalt Paving Project Using Statistical Process Control Methods". *Journal of Construction Engineering and Management* 131(11), 1173-1178.
- [8] PMI. (2004). "A Guide to the project management body of knowledge." *Project Management Institute*, Newtown Square, PA, 237-268.
- [9] Kumaraswamy, M.M. (1997) *Conflicts, claims and disputes in construction*, Engineering, Construction and Architectural Management, 4(2): 95- 111.
- [10] Kumaraswamy, M.M. and Chan, D.W.M. (1998) *Contributors to construction delays*, Construction Management and Economics, 16: 17-29.



- [11] Lester, A. (2007), "Project Management, Planning and Control", 5th ed. Elsevier Ltd.
- [12] Manelele, I. and Muya, M. (2008) "Risk Identification on community-based construction projects in Zambia", Journal of Engineering, Design and Technology, 6(2): 145 – 161.
- [13] Mills, A. (2001) "A Systematic Approach to Risk Management for Construction", Structural Survey, 19(5):245-252.
- [14] Palmer, W.J., Maloney, J.M. and Heffron, J.L., III (1996), Construction Insurance, Bonding, and Risk Management, McGraw-Hill Companies, Inc., Kingston, MA.
- [15] Renn, O. (1998) Three decades of risk research: accomplishments and new challenges, Journal of Risk Research, 1(1): 49-71.
- [16] Santoso, D.J., Ogunlana, S.O. and Minato, T. (2003) Assessment of risks in high rise building construction in Jakarta, Journal of Engineering, Construction and Architecture Management, 10(1): 43-55.
- [17] Tah, J.H.M. and Carr, V. (2000) Information modelling for a construction project risk management system, Engineering, Construction and Architectural Management and Economics, 7(2): 107-119.
- [18] Tchankova, L. (2002), "Risk Identification- Basic Stage in Risk Management", Environmental Management and Health, 13(3): 290- 297, MCB University Press.
- [19] Thuyet, N.V., Ogunlana, S.O. and Dey, P.K. (2007), "Risk management in oil and gas construction projects in Vietnam", International Journal of Energy Sector Management, 1(2): 175 – 194.

