



Investigation of Current Behavioral Safety in Indian Construction Industry

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Abstract:

The study is about the behavioral safety in the construction site management. Questionnaire was prepared with 50 questions with different factors and was distributed to the companies. The study was done in 30 construction company. The accidents were analyzed according to the company accident response. The behavioral safety was measured by means of a questionnaire made up of questions concerning safety factors. The statistical package for social and sciences (SPSS) was used in this study to analyze the safety behavior. The study proved that the workers don't have awareness about the safety while working in the site. The results also show that under each factor the safety recommendation is given and the awareness of the safety is created and the accidents are reduced or avoided.

Keywords: Safety management; Effective supervision; Building construction; Accidents

1. INTRODUCTION

In construction industry, although safety at work has been recognized as an important issue, the number of fatal injuries is still increasing according to the data from Bureau of Labor Statistics. Recently, as an approach to safety at work, behavior-based safety programs began to be adapted in construction industry. Behavior-based safety approach is introduced into the United States in 1930's and has been popular in manufacturing area since 1980's, assumes that many of injuries and illnesses are the result of unsafe acts by workers. Safety is influenced by a number of factors such as workplace environment, management's commitment to safety, attitude or behavior of working personnel towards safety, etc. Workers' positive behavior towards safety is considered one of the key factors in preventing accidents at workplaces. A successful introduction of behavioral safety process, focusing on identifying and reducing unsafe behavior and reinforcing safe behavior is one means of improving safety at workplaces. Behavioral Safety is a methodology used to improve safety culture through change of behavior of working personnel in an organization. This methodology has been applied successfully in other industries like petrochemical and manufacturing and is gaining popularity in the construction industry. Learning the behavioral safety approach will help participants to apply the concept of monitoring safe & unsafe behaviors of working personnel at their workplace and help to prevent accidents. Behavioral safety is not just an observation system. There are many preliminary activities that must take place before construction workers will participate in such a system. Management must first demonstrate to workers that their welfare is paramount and that everything is being done to make their workplace safe.

1.1 DEFINITION OF SAFETY

Safety literally means the absence of danger at work, which is possible by elimination of hazards that create the danger more practically "a thing is provisionally categorized as safe if it's are deemed known and in the light of the knowledge, judged to be acceptable.

1.2 BEHAVIOR-BASED SAFETY

The behavior-based safety (BBS) work environment is a closed. Work groups that one worker unsafe act observed by others, misunderstanding of the work procedure and causes accidents by continuous unsafe act. Since it is a close group the work environment site is observed. The worker's name or identification numbers are not noted in the checklist. Part of the checklist can be used to summarize the observation process and the discussion. The worker's comments and reasons for the at-risk behavior is recorded along with the suggested safe behavior. Recording this interaction is important for a later detailed analysis so feedback can be provided to both workers and management, to help identify the most appropriate corrective actions. See BBS business process model for further information. Data gathering and preliminary reports Observation checklists are gathered and entered in electronic database. Reports are generated for BBS steering committee to analyze and recommend practical solutions. These reports flag out trends of at-risk behaviors and in which location they are taking place. Ideally, feedback reports are generated and given to the workers themselves in the different locations on a weekly basis. Report analysis and recommendation the steering committee is made up of high-level influential members and chaired by a Management Representative. The committee has periodical meetings to discuss and analyze BBS report findings. The committee then produces a set of recommendations to an overall continuous improvement intervention: This planned schedule often begins with briefing sessions for all those work areas and departments that will be involved. People are asked to volunteer to either become observers or part of the project team or steering committee. These people are trained to carry out their respective duties. The project team identifies unsafe behaviors that are placed on checklists. The approval of those being monitored is then sought to ensure they are in agreement with the behaviors on the checklists. Once the checklists are developed the trained observers carry out observations for a certain period of time to establish a baseline (usually a week or so), with which subsequent performance can be compared. Once the average

baseline score has been determined, the intervention is implemented at kick-off meetings, or goal-setting sessions whereby the workgroups set improvement targets for themselves. Subsequently, the trained observers continue to monitor their colleague's safety behaviors on a regular basis. The observation scores are then analyzed so that fine detailed feedback can be given to those concerned on a regular basis. The project team also monitors the data for trends so that improvements can be highlighted and praised or corrective actions can be taken. In this way Behavioral Safety incorporates the principles of continuous improvement. Behavioral Safety involves significant workforce participation: One of the reasons Behavioral Safety is so successful is that it fully engages the workforce in safety management, perhaps for the first time in their working lives. Traditionally, safety management has been top-down driven, with a tendency for it to become stuck at the front-line management level. This means that those workers most likely to engage in unsafe behavior or to be hurt have traditionally been divorced from the safety improvement process. Behavioral Safety overcomes this by deliberately involving those most likely to be hurt so they are actively engaged in eliminating the occurrences of unsafe behaviors. Without such widespread workforce involvement, the ownership of, and commitment to, the process will be lacking and the initiative will probably fail. Behavioral Safety targets specific unsafe behaviors. Another reason for the success of Behavioral Safety is its focus on that 'small proportion of unsafe behaviors that are responsible for the lion's share of a company's safety incidents'. Targeting these will eliminate the incidents historically associated with them. These behaviors can be discovered via Pareto analyses or other systematic means of examining a company's incident records. Most Behavioral Safety practitioners utilize Applied Behavioral Analytic techniques to identify the workplace factors that drive or trigger particular unsafe behaviors and the consequences or rewards to the person for engaging in these unsafe behaviors. Some also identify the associated management system faults so that they can be addressed in order to stop those triggering unsafe behaviors. The unsafe or safe behaviors identified from such a process are written onto a checklist of some type. These are divided into categories (e.g. Housekeeping, Use of Tools, Line of Fire, Personal Protective Equipment, etc..) and presented to employees' feedback is also discussed by Steering committees and/ or management teams on a monthly basis. Behavioral Safety involves data-driven decision-making processes; A further reason for the success of behavioral safety is its emphases on focused data-driven decision-making for their approval or 'buy-in'. As the Behavioral Safety process matures, people identify other unsafe behaviors and place these on the checklists as the original unsafe behaviors are eliminated or brought under control. The golden rules for these behaviors are [1] that they are directly observable: i.e. anybody can see them as they occur; and [2] are within people's control (i.e. everything is in place so that people can behave safely. Behavioral Safety involves regular focused feedback about on-going performance; Feedback is the key ingredient of any type of improvement initiative. Behavioral Safety feedback usually takes three forms: Verbal feedback to people at the time of observation; Graphical feedback where trends of weekly behavioral performance on large graphs is placed in strategic locations in the workplace; and weekly tabulated feedback reports are discussed by work crews. Behavioral Safety requires visible on-going support from managers and front-line supervision: Management's visible and demonstrable commitment to the process is vital. They usually demonstrate

their commitment by allowing the observers the time to conduct their observation tours; Give praise and recognition to those working safely; provide the necessary resources and assistance for remedial actions to take place; Help to set up and run regular feedback sessions and generally promote the initiative whenever and wherever the opportunity arises. The reason for the failure of a behavioral safety intervention (which sometimes occurs) is almost always due to a lack of management's commitment and support to the process.

2. METHODOLOGY

2.1 safety model

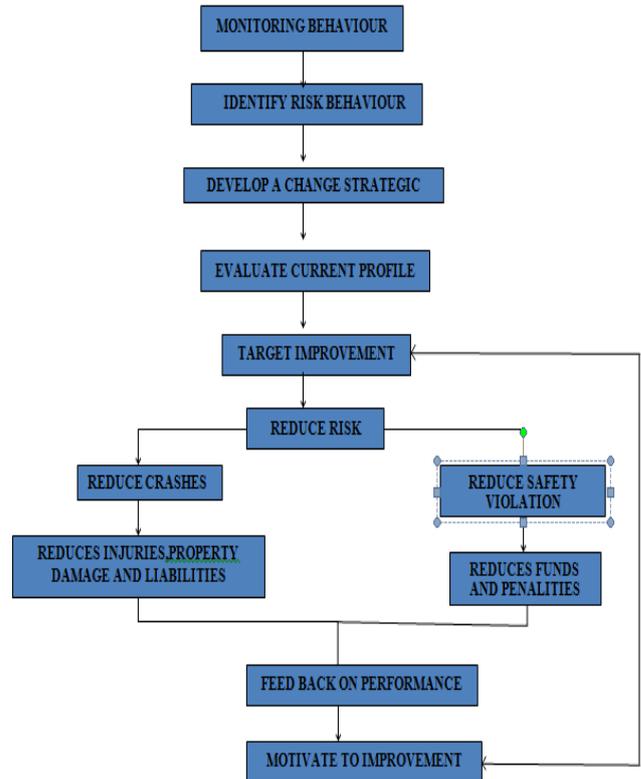


Figure.1. safety model

The thesis is started by finding a suitable title and the literature suitable for the selected title is collected and is reviewed. The literature is reviewed to learn the various thesis that are similar to the chosen required data is collected the policies and modeling behavioral based study is also done and the analysis is a five continuous process. The process starts by analyzing a company's safety behavior. Based on the analyzed results obtained the necessary changes have to be implemented in the company in order to maximize the outcome of the company. Various companies' feedback is also collected for the study. After the study the obtained results are used to implement changes in the companies' safety behavior by analyzing in SPSS. The target of the project is to provide the improvement to the workers while they are working in the site under various factors .from this above created model the risk is reduced, accidents are minimized and lives are saved. Motivation is done to improve the safety awareness and to the follow the safety measures. The cycle is repeated until the target is achieved. SPSS (Statistical Package for the Social Sciences) is a comprehensive and flexible statistical analysis and data management solution. SPSS can take data from almost any type of file and use them to generate tabulated reports, charts, and plots of distributions and trends, descriptive statistics, and conduct complex statistical analyses. SPSS is available from several platforms; Windows, Macintosh, and the UNIX

systems. SPSS customers in virtually every industry, including telecommunications, banking, finance, insurance, healthcare, manufacturing, retail, consumer packaged goods, higher education, government, and market research. SPSS is a computer program used for survey authoring and deployment, data mining, text analytics, statistical analysis. The SPSS software contains the process of containing the data window and variable window to enter the values of the survey. The output window and chart editor window is using to get the output of the results. and to bring about an awareness among the workers in the same. The implementation is done by making the necessary changes in the workers and observing them if there are any improvements. Once the implementation is done the result is viewed by the workers behavior. The result obtained is positive if their behavior is improved.

2.2 SAFETY CIRCLE

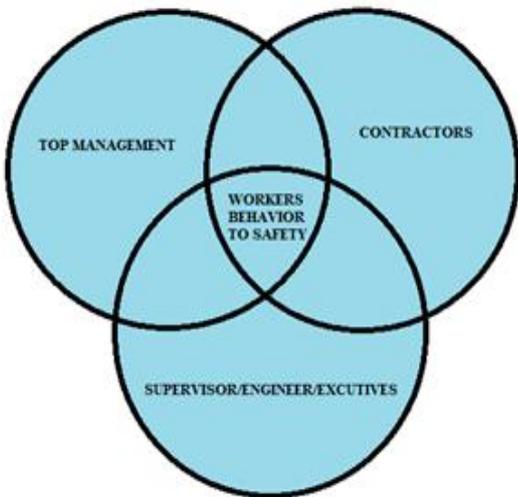


Figure.2. safety circle

Safety circle is the model created to know the workers behavior in the construction industry. The top management who are responsible for the development of the construction must also involve the safety behavior. Top management is the superior in the construction industry; they should also involve in the safety of the workers and must insist other departments to create awareness to the workers. Contractors who are the ones deals with agreements of the project and assigns the workers to the concern project. When the workers are allotted with the job, contractors must provide the safety measure equipment's in order to save the life of the workers. The engineers who are responsible at the site work should supervise the site when the workers are at work, they should have a interaction between the workers and convey the importance of the safety, provide safety measure equipment such as helmet, gloves. Workers who work at height must create a supportive structure for a hold. These three above mentioned departments in the construction industry have to involve in the safety of the workers, all the three together measure the workers behavioral safety to reduce the accidents and to save the life of workers.

3. RESULTS AND INTERPRETATIONS

According to the study, survey was taken in 30 companies, 50 questionnaires' was prepared under different factors of behavioral safety. The questionnaire was prepared for seven

different factors such as workers health and safety, person working at height, behavioral safety in construction site, confined space, excavation safety, road safety, scaffolding safety. This factor was analyzed according to the response of the companies. The data which is collected from the companies is analyzed using spss(statistical package of social sciences) for each factors and the negative percentage under each factor was recognized (table 1) and the recommendation was given for each factor using spss.

Table 1

FACTORS	NEGATIVE ANSWERS IN PERCENTAGE
workers health and safety	22.85
person working in height	39.52
behavioral safety in construction site	41.7
confined space	43.7
excavation safety	40.0
road safety	26.67
scaffolding safety	29.63

4. RECOMMENDATION

According to the result obtained from the analysis of spss for each factor recommendation are to be provided for each factor.

4.1 Person working at height:

Person working in height must be careful while working and they are at risk if they are not aware of safety. We recommend them to wear helmet, gloves and must provide temporary supportive structures until the work is completed. Carelessness and lathorgicness will also lead to accidents so workers must be conscious while working at height nWhen the worker is working at the height which is 6 feet or more in height, the worker must be protected from by falling by using guardrail systems, safety net system, or personal fall arrest system. Anchorage connectors and belts are also advisable to use.

4.2 Workers health and safety:

Health of the workers must be taken into account when they working. The health of the workers must be checked constantly and necessary funds and amount must be given. First aid provisions have to be provided. Workers should not be forced to work under any circumstances if their health conditions are not proper. The management have to provide the necessary needs to the workers.

4.3 Scaffolding safety:

In Scaffolding work there is a lot of chances to get injured and lost the life. Workers who are working must be conscious and continue their work without any diversion . Slight deviation will cause death. Belt and helmet can be given to the workers.

4.4 Excavation safety:

Excavation operation is the first and major job in the construction site. If the excavation is not carried out with protective measures accidents will happen. Cave in accidents results in accidents according to the excavation. Practical

knowledge is important in recognizing the hazardous situations in the excavation. Accidents in the excavation occur due to the violation rules and safe work practices

5. CONCLUSION:

Thus after the detailed study and analysis we conclude workers should be given awareness about safety and risk behind the work they are involved. The recommendations are taken into account to avoid the accidents and death can be reduced. The top management, engineers and contractors must insist the behavioral safety to the workers and death awareness in concern.

6. REFERENCE:

- [1]. JP.Zhang, z.zHu ,(2010) BIM and 4D based integrated solution of analysis and management for conflicts and structural safety problems during construction :1.principles and methodologies volume 20 page 155-156
- [2]. Helen lingard, Steve rowlinson(1984)Behaviour safety management in Hongkong's construction industry volume 28 no -4 pg 243-256
- [3]. Pete Kines , Lars P.S. Andersen , SorenSpangenberg , Kim L.Mikkelsen , Johnny Dyreborg (2010) Improving construction site safety through leader-based verbal safety communication vol 41 pg 399-406
- [4]. Markku Mattila a, Marita Hyttinen h, Eeva Rantanen a(1993) Effective supervisory behavior and safety at the building site volume vol 13 pg 85-93
- [5]. Linda M. Goldenhara, Stacey Kohler Moranb, Michael Colliganc(200)1 Health and safety training in a sample of open-shop construction companies volume 32 page 237-252
- [6]. S Napsiah Mohamad Saifullah* and FaridahIsmail(2011) ssIntegration of Occupational Safety and Health during Preconstruction Stage in Malaysia. volume 35 page 603-610