



The Relation between Construction Safety Management and Productivity

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Abstract:

The aim of this study is to understand the relation between occupational health and safety (OHS) and increasing employee productivity in construction industry from the point view of contractors in Delhi NCR. This has been done by identifying strategies that effectively promote both safety and productivity during a construction task. In this study, a quantitative research was adopted as the main statistical component. The survey approach has been chosen and has been conducted through some face-to-face interviews and a written closed and semi closed questionnaire for a chosen sample with a size of 42 people from the construction population. After making validity test, reliability test, and descriptive analysis, the test of the relative importance index (RII) has been conducted to determine the relative importance of various factors. Strategies that can be followed to effectively affect safety and productivity were resulted from the survey feedback.

Keyword: construction safety, safety plan, occupational health and safety, relative importance index

I. INTRODUCTION

Safety is the control of recognized hazard to attain an acceptable of risk. By improving safety and preventing accident we can protect our work force while also reducing our workers compensation cost. Safety is not the only things that we can do reduce our workers compensation cost we can also lower our cost by proactively managing our compensation claim. Safety in construction is to be insured by careful planning of the location, design and layout of the project. Numerous accidents are reported as no suitable measures are taken initially at planning stage. Safety of the constructed facility is normally the responsibility of the architect and engineer, whereas safety of the construction process is conventionally considered to be the contractor's responsibility. In many cases, construction accidents are, therefore, mainly considered as the contractor's responsibility. In fact, many factors associated with construction accidents can be traced back to the designer's responsibility as well as the client's responsibility. The safety depends on the Proper planning of every stage of work like design, construction, site location and climate. In design stage, every level of task should be preferred with appropriate or suitable safety provision. It also depends on the construction site location that like a desert, hill or plane are considered a different type of safety provision. Site location is also effect on safety and the climate of the site can affect on safety and health. The cold or hot weather can also require the additional safety provision and affect the productivity. Proper planning by management is an essential part of preparation and budgeting for the safe and efficient running of a construction operation. There are many accident due to tripping, slipping, or falling over material and equipment which have been left lying around. By using the personal protective equipment(PPE) like protective clothing, safety belt, helmets, goggles, shoes or other garments and equipment designed to protect the body from injury blunt impact, electrical hazards, heat, chemicals, and infection for job related health and safety. **Lamm, Massey, Perry** (2006): -

Finding of a study that increasing and compelling evidence that providing a healthy and safe working environment has the Potential to increase labour productivity and in turn increase business profit. Lamm also refer to the argument of some commentators to become more productive and in doing so are driving their works to work longer, harder and with higher utilization often in extremely hazardous condition, and only implement health and safety measure to keep compensation cost down. Lamm also suggest effort to increase productivity through occupational safety and health can have contradictory result and point out the gapes in literature that while that is evidence that occupational injuries and illnesses impact on productivity losses. **De Greet and Vanden Broek** (2004): - According to de greet and Vanden that health and safety measure have p positive impact not only on safety and health performance but also on company productivity. The author also states although the literature survey was fairly limited research finding support the existence of an important link between a good working environment and the performance of a company. Thus, the quality of a working environment has strong in fluence on productivity and profitability. The study also suggests the poor OSH performance can lead to a competitive disadvantage impairing the form status. The fending of the literature survey was also supported by the collection of cases studies. By making the link between health and safety and performance of the company the case demonstrate that OSH should no longer be seen as purely a cost but also as an instrument to improve the overall performance of a company, meaning that OSH should be an integral parameter in general management **Goetzel and ozmenskowsh** (2008): - In this report state that many employees associate poor health with reduced employee performance safety and morale. The organizational cost of workers in poor health and those with behavioural risk factors, include high medical disability and workers compensation expenses elevated absenteeism and employee turnover and decreased productivity at work in addition one worker's poor health may negatively affect the performance of the others

who work with him or her. They add the results in the literature suggest that workplace health promotion (WHP) program. Can increase employee's health and productivity. The author also refers to the barriers like the Perception of employee related to workplace health promotion programs being luxurious and their belief that the programmers during working hour may distract workers in their daily duties and negatively impact worker productivity. They also conclude that successfully integrated programmers and safely can also help ensure the safety of work environment leading to healthier and more productive employee. **Raimo niemela sari ratio, make Hennula and kari reijula** (2002): - They suggested that work environment effects on labour productivity. The thermal condition, air quality and lighting condition improved notably. They also conclude that increased productivity is most likely related to the combined effect of the improved work environment. in the case of hazardous environment causing occupational illness, absenteeism and turnover the link between the environment and productivity is obvious. The health care cost and costs related to sick leaves and turnover are high and can be estimated reliably. **E dwin Sawcha, Shamil Naoum and Daniel Fong** (1999): -Factor affecting safety performance on construction site, finding indicated that most influential factor driving safety performance in the construction industry is the organization policy towards safety. The report recommended that all contractors employing five or more people must have written safety policy. Ensuring the proper management of health and safety on construction project. A well planned and well-run project will be both safe and efficient. It well saves lives injury, ill, health and money.

Adnan Enshassi, Sherif Mohammad, Ziad Abu Mustafa and Peter Endurd Mayer (2007): - Factor affecting labour productivity in building project. In this research, the conclusion is justified as any project cannot be executed without availability of material and tool. On the other hand, the safety factors affecting labour productivity. Which can be readily interpreted as that the government show little concern about and safety and that contracting companies have little awareness of the impact of safety factor on labour productivity. The productivity is considered the main value within the construction sector. The aim of this research was to identify factor affecting labour productivity. **Adnan Enshasei**: - (factor affecting safety on constructing project) In this paper the result is focused that the safety is important its and the safety is more profitable for firm by reducing the direct and indirect cost of accident and compensation. The direct cost may include medical cost, Premiums for compensation benefits, liability and property lasses. The indirect cost includes reduced productivity for both the returned workers and the crew or workforce, cleanup cost replacement cost stand by cast, cost of overtime, administrative cost, replacement worker orientation, coat resulting from delay, supervision cost, cost retreated to rescheduling, transportation and wages paid while the injured is ideal **Nomgiba A. kheni, Alistair G.F. Gibb and Andrew R.J Dainty**: -The management of construction site health and safety small and medium contractor. The study give result that small scale contractor wants to make the maximum profit and would not provide the personal protective equipment for their worker. They do not evaluate the risk in the carrying out construction work and as such do not take step to minimize or eliminate hazards. Some of their workers are employed without completing their apprenticeship. While some may not be trained. They may not be sensitized for their safety. Most of their workers are from the informal sector where they may not

go under any regulation or union. They would not go to spend their, money and resources to train workers to a certain standard of safety and health.

II. METHODOLOGY

The aim of this study is to understand relation between occupational health and safety (OHS) and labour productivity in construction industry from the point view of contractors in Delhi NCR. This has been done by identifying strategies that effectively promote both safety and productivity during a construction task the present proposed work is oriented for an analysis and study of improving labour safety and its impact on improving productivity of construction site. This work examines documents and theories regarding construction project labour health & safety management, and its impact over improving productivity distributes a questionnaire to construction safety professionals to further analyze the factors involved in successful construction productivity safety. The questionnaire compares the roles of different professionals in construction projects, and the effects of their various project attributes provide a reference for site safety management and its effect on productivity of labour.

PROVISION FOR SAFETY & FACILITIES AT CONSTRUCTION SITE AS PER GOVT. RULE: -

1. Site level safety committee (SLSC)
2. Member of SLSC -
 - Contractor
 - Worker
3. Meeting of SLSC – Every month
4. Structure of SLSC
5. All provision of Act & well documented safety program exists.
6. Work permit system exists for construction activity especially
 - At hazardous location such as height & depth
 - All hot, fabrication work electrical repair & maintenance
 - All concreting works
 - Under high noise & high dust environment
7. All employees are informed of the hazards and are provided with adequate protective equipment.
8. Work environment and the neighborhood is free from debris, musk, and any unhygienic condition.
9. See that a detailed schedule for periodic calibration and preventive maintenance of all the machinery and equipment is being implemented.
10. Periodic medical examination of all employees and workers are carried out to the extent required as per the work environment.
11. Assess the potential at hazards and dangerous occurrences at the work place and examine the effectiveness of the safety and control measure.
12. Is various process of construction and disposal of debris and effluents are safe?
13. Is there a safety circle in the side?
14. Is there a complaints book for any risk and dangers?
15. Any accident prevention program?
16. Any organizing safety weeks
 - Safety competition
 - Safety discussion
 - Film shows on safety
 - Displaying poster and other promotional activities to stimulate interest among staff and worker?

- Site safety inspection, daily walk through surveys.
 - Check all personal protective equipment provided to worker as require
17. General Safety Provision
- Work planning – related to environment occupational health & safety.
 - Job hazard analysis report
 - Work permit – All new work site engineer submit form for work permit to safety officer too give clearance.
18. Safe working procedure
- Medical check-up for every worker at height, fit or unfit.
 - Fit person shall be issued height passes.
 - Every six months re check-up & re issue the passes.
 - Unfit personalist shall be submitted to the department and allowed to work at ground level.
19. Record of medical check-up/fitness test shall be maintained at the first aid centre.
20. The bamboo/wooden scaffolding shall not be permitted at height of work only steel scaffolding shall be used.
21. The scaffold to be erected for height shall be designed for estimated load and get approved by authority.
22. The scaffold shall be inspected and cleared by safety officer.
23. The base of the structure shall be supported and levelled on firm ground as far as possible.
24. Where firm ground is not available the vertical members of distributed with the help of baseplate, soleplate, and channels should be used.
25. The base of the scaffold shall be away from excavated pit.
26. Safety tag shall be displayed. “DO NOT USE”
27. Construction machinery & tools.
28. Operator’s training and fitness
29. Lifting and hoisting Machinery.
- 30. Fire Safety**
- Combustible material should be stored in sufficient requirement.
 - Containers of paints and thinners should be stored separated.
 - Fire extinguishers should be provided at the site of different types of classes for different types uses such as A, B, C, & D.
 - Work men & supervisors should be trained in firefighting and extinguishing methods.
 - The telephone number of the nearest fire station shall be displayed at suitable location.
- 31. House Keeping**
- Site office
 - Labour Toilets
 - Surroundings like road should be clean and free from unwanted materials, scrap, surplus material.
 - Accommodation for labour in well condition.
 - Drinkable Water
 - First aid box / medicines / medical equipment.
 - Full time medical attendant
 - High noise level
 - High Dust Exposure
- 32. Productivity**
- I. Factors affecting productivity**
- Project uniqueness

- Technology
- Management
- Labour organization
- Real Wage trends
- Construction training

II. Factors having adverse effect on productivity

- Overtime and fatigue
- Errors and omission in plan & specification.
- Dilution of supervision
- High accident rate
- Jurisdictional disputes
- Work rule and restrictive work practices
- Availability of skilled labour
- Re assignment of manpower from task to task
- Material location – above ground level / above floor level
- Adverse temperature or weather
- Inadequate lighting
- High absenteeism
- Material Storages
- Ground water level
- Attitude of the work force
- Crew size & composition
- Economic conditions & level of unemployment
- Timeliness of decisions
- Uncontrolled breaks
- Inadequate temporary facilities – parking / restroom

QUESTIONNAIRE DEVELOPMENT

Before the distribution of the questionnaire, a face validity of the questionnaire was conducted by discussing a draft of the questionnaire with a group of professors and experts as well as a statistician. After that a pre-test for the questionnaire was conducted with five respondents of colleagues and key decision-makers (site engineers and project managers). At its core, pretesting was conducted to make sure that people can understand the questions, and to verify the completeness of questionnaire. Many improvement changes were implemented on the questionnaire after the feedback from the pre-test. The respondents have recommended to change the answer options in the questions of section two beside modifying some wordings of some questions in sections two and three to clarify some confusion and ambiguity which were reported by them. After the pre-test, a pilot study was conducted with fifteen respondents. It was done to discard questions that are not providing useful data and to make final revisions of the questionnaire. The results of the pilot study were reliable. Accordingly, the pilot study sample was included under the full main sample.

QUESTIONNAIRE DISTRIBUTION

Forty-two questionnaires were distributed to randomly selected contractors to get their opinion used a 5-point Change scale, running from 1 (very low important) to 5(very high important) for the finalized data. data taken to improve safety and productivity in Delhi NCR. 33 valid responses were retrieved (a return rate of 78%) for quantitative analysis. A well-designed questionnaire was developed for the study with mainly closed ended questions and some open questions. The questionnaire was built on three sections that cover the main

questions of the study. The first section is related to the demographic information about respondents and company profile. Second section is related to extent of importance of safety topic in the company and it also includes some questions about labour productivity. Third section is related to strategies that can be followed to effectively affect both of occupational safety and increasing productivity. It includes 5 main groups with 19 factors.

The five groups are planning, training, monitoring, communication skills and inspection both of occupational safety. To ensure the validity and effectiveness of the data, procedure like cross-examination and group discussion held amongst the practitioners available nearby. The original questionnaire design included 15 questions regarding construction site safety management success factors (SFs). In this work, validity was used to ensure accurate measurement of the characteristics and factors. Prior to distribution, the questionnaire was reviewed by five experienced construction safety experts who were asked to comment on readability, comprehensiveness, and accuracy.

FACTOR ANALYSIS

The relative importance index (RII) test was adopted for similar studies to determine the relative importance of various factors. The RII test adopted for this study to determine the relative importance of the factors in part three by depending on responses from contractors. The five-point scale ranged from 1 (very low important) to 5 (very high important) was adopted and transformed to relative importance index. The RII was used to rank the analysis that will improve both productivity and occupational safety in construction from the point view of contractors in Delhi NCR.

DATA COLLECTION

The survey was distributed by hand to practitioners in the domain of construction safety in and around Gurugram / NCR region. A total of 42 questionnaires were distributed, and 33 valid responses were retrieved (a return rate of 78%). The majority of respondents were Practitioners, with 5-30 years working experience. The Practitioners were project manager, site engineer, site supervisor and contractor. Field data has been collected from 10 construction sites of a contracting company in Gurugram Delhi NCR.

To remove any possible bias in the productivity results, the workmen involved in the productivity studies on sites, have are unaware that their work is being recorded. A review of the minimum, maximum, range and the average productivity rates for all the trades under observation indicated large variation of productivity rates over sites and generally supported the fact that baseline productivity rate attached to an activity cannot be fixed, as there are several factors interacting with each other, affecting the overall productivity. A total of 10 data sets were collected. The data was scrutinized for any abnormal readings using the baseline productivity and the site average comparisons and a set of 6 homogenized readings were subjected to further review and analysis.

III. DATA ANALYSIS AND RESULT

The data analysis being focused on basis of some major points

OCCUPATIONAL SAFETY AND COMPANY POLICIES

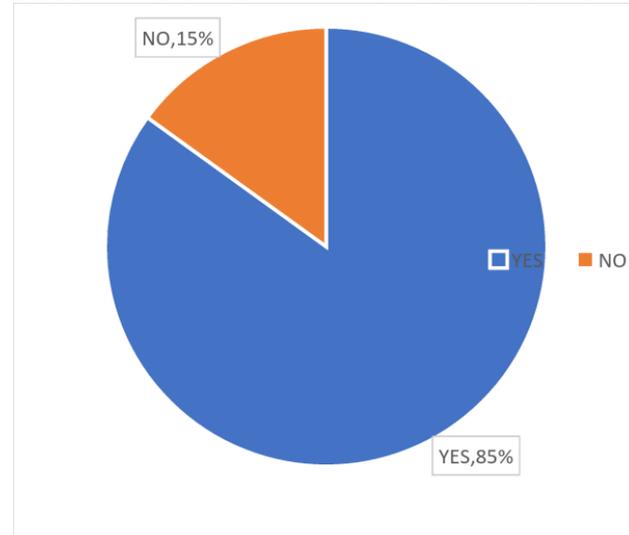


Figure. 1. Occupational Safety and Company Policy

Table.1. Profile of The Responded

The title position	Frequency	Percentage
Project manager	3	8.82
Site engineer	6	17.64
Office engineer	4	11.76
site Supervisor	8	23.52
Safety engineer	2	5.88
Foreman	10	29.41

Figure (1) shows that majority of respondents (85%) of the sample mentioned that occupational safety forms a part of company policies, while the rest of the study sample (15%) believed otherwise, and expressed that occupational safety does not form a part of company policy. The result is a good sign for construction companies that classified as first class in Delhi NCR, as this evidence of increased awareness of the importance of occupational safety in construction. Even though that many companies which safety forms a part of its policies do not apply such safety policy. A written health and safety policy helps to promote an effective occupational safety and health (OSH) program. Such a policy should reflect the special needs of the company in terms of safety and should be regularly reviewed and updated.

SAFETY PROGRAM

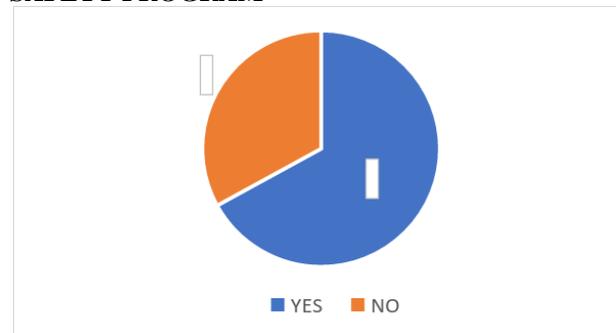


Figure 2 SAFETY PROGRAMS

As shown in figure (2), on a question about if the company has a safety program for each project or not, (67 %) of respondents stated that their companies designed a safety program for each project. On the other hand, (33%) replied negatively with respect to this question. Safety program should be written in a manner that takes into account both the safety and productivity. Companies that do not have a safety program said that the availability of the safety program for each project

depends on the request of supervision or owner (financier of the project), and there are those who said that each project manager is responsible for the safety of the site and therefore no need for a special safety program. There was also a saying that all construction projects are similar, and therefore would not require each project to a special safety program. Furthermore, they have considered that safety program is useless and costly in view of worker compensation and injury treatment. Results showed that most of companies are realizing that safety program is not only beneficial for the employees. It is also a way to gain a competitive edge over the competition level.

SAFETY TRAINING

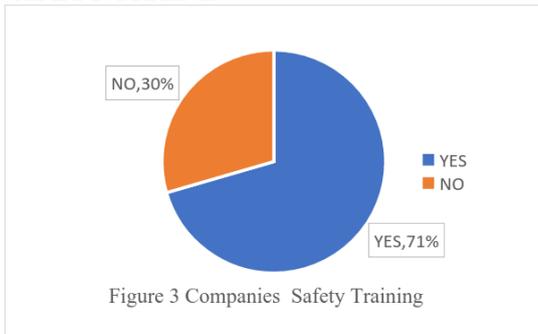


Figure (3) shows whether company provides employees in each project a safety training courses or not. (70 %) replied positively while (30 %) mentioned that project employees didn't join any kind of safety training. This result shows that companies which provide safety training to the project employees are more than those who don't provide. It reflects that companies appreciate the important role of safety training in construction. All employees are required to attend safety training from manager to worker. Safety training gives employees opportunity to identify hazards and the best practices to avoid such hazards at work-place. Safety training programs should be offered to meet the current demand of the construction industry. There was a clarification from the companies that do not provide a safety training program for staff by saying that most projects do not pose a threat to the lives of workers. In addition to that, they think that safety training is costly and takes from the time of the project.

PLANNING ACTIVITY WITH THE STANDARD OF OCCUPATIONAL SAFETY

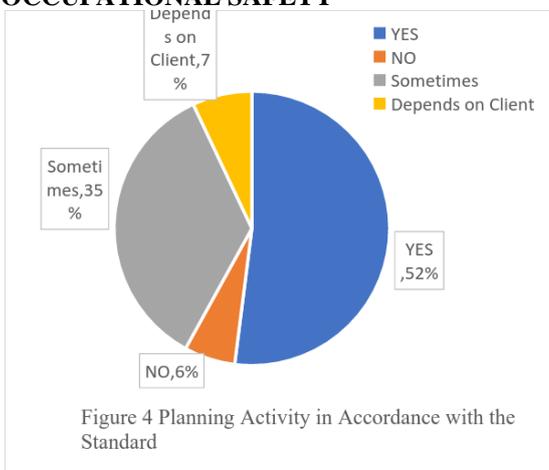


Figure (4) describes respondents' responses when they have been asked whether project is planned and implemented according to safety measures. It is shown that (52 %) of respondents replied with yes, while only (6 %) replied with no. (35%) of respondents said that projects, in some-times, are planned and implemented according to safety measures

and (7%) said that it depends on the request of client. Projects that are planned by taking into account safety are projects that cost less and are performed well. In other words, when safety is included into project planning, compensation will reduce, productivity will increase and quality will increase too. Compensation will reduce because planning for safety means that project employees and workers will be less exposed to expected hazards and thus accidents and its inherent compensations will decrease. Thus, as found through the literature review, Hammad et al. [16] said that safety planning is an important element for increasing the productivity at construction sites. Also, Saurin et al. said that effective planning for health and safety is essential if projects are to be delivered on time, without cost overrun, and without experiencing accidents or damaging the health of site personnel

SAFETY MEETINGS BETWEEN OWNER AND CONTRACTOR

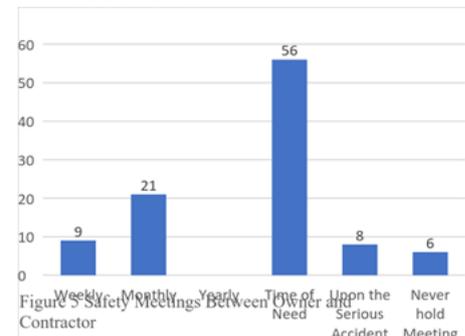


Figure (5) shows that (9%) of the study sample holds safety meetings with owner of the project every week, and (21%) holds safety meetings with the owner every month. The majority of respondents (56%) holds safety meetings with the owner only when they need to that, and (8%) of the respondents said that holding safety meetings with owner depends on the occurrence of serious accidents. Also, figure (5) shows that (6%) of the respondents never hold meetings with the owner. Safety engineer is responsible for conducting safety meetings periodically with the owner to discuss different topics such safety rules, expected hazards, corrective actions, accident prevention, and reviews of accidents that have occurred recently. Such meetings should be held at least once monthly.

ACCIDENTS RATE

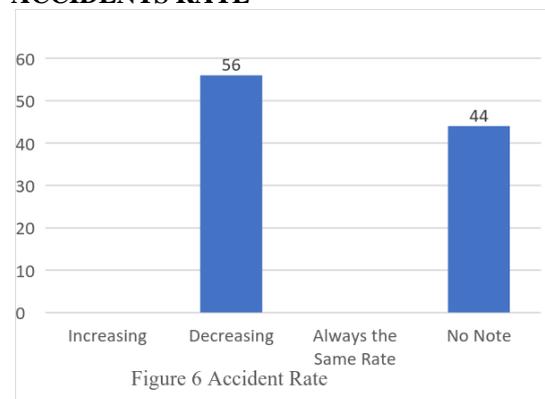


Figure (6) shows that (56%) of the study sample believed that the accidents rate is decreasing in the projects of their company, but there were (44%) of respondents did not notice if the accident rate has increased or decreased. The second result gives a serious indicator of occupational safety at construction sites, where non-observation of the accidents rate in the workplace means that the issue of the safety of the workers

does not have any importance and does not be taken seriously. Although it has been reviewed previously among the literature review that incidents which lead to accidents and disasters require time and resources to be over-come, but even near-miss incidents will usually hurt productivity. Moreover, occupational injuries can harm the reputation of a company, decrease productivity.

MEASURES ARE TAKEN TO AVOID THE RECURRENCE OF ACCIDENT

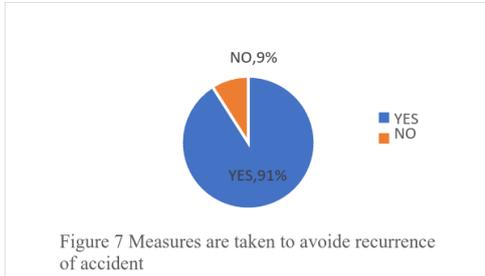


Figure (7) shows that there are (91%) of the respondents say that their companies have taken measures to avoid a repetition of the incidents that occurred at construction sites, such as searching for gaps regarding to measures of occupational safety and trying to treat the problem, in addition to raising awareness of the workers regarding safety standards, and ensuring the availability of all the necessary safety tools, as well as following-up and monitoring of workers and imposing sanctions on those who do not adhere to safety standards. In the other hand, there are (9%) of the respondents said that there are not any procedures to be followed by their companies to prevent the repetition of the incidents which occurred at construction sites. They say that there is no need for that because the number of injuries is too small and it is not affect the workflow.

IV. TECHNIC CAN BE FOLLOWED TO EFFECTIVELY AFFECT SAFETY AND PRODUCTIVITY

Table .2. Relative importance index (RII) and ranking for each item of the field: “technics that can be followed to effectively affect safety and productivity.

Strategies that can be followed to effectively affect safety and productivity	RII%	Ranking	Group
Training workers to carry out works properly, especially in the new types of work	81.58	1	Training
Supervisor should be firm with the contractor in safety conditions because it will positively affect productivity	79.51	2	Inspection
Foreman should put daily and weekly work plans and define tools that should be used. This will increase productivity and ensure safety	78.28	3	Monitoring
Drug test for workers	76.2	4	Monitoring
Workers should be trained about dealing with changes in working conditions, such as extreme heat, rain and slippery surfaces to prevent injuries and to get excellent productivity	76.1	5	Monitoring
A safety engineer at site is necessary to prevent accidents and increase productivity	75.12	6	Planning
Workplace safety signs maintain facility and keep workers safe, healthy, and productive	74.55	7	Communication skills
Giving workers breaks time, and urges workers to take a rest when feel tired and fatigue, as well as not deprive of holidays	73.81	8	Monitoring
First aid training	73.00	9	Training
Managers, engineers and supervisors must be a good example for workers in compliance with the safety standards, such as wearing safety shoes, hats and etc., as this is considered an indirect message to workers to abide safety standards	72.3	10	Communication skills
It is necessary to allocate a portion of project budget for the application of health and safety standards perfectly	71.80	11	Planning
Housekeeping is important in the workplace to get effective results with zero accidents	69.55	12	Planning
Planning each stage of work will help to adhere to the schedule with ensuring safety and productivity	68.8	13	Planning
Foreman or supervisor should have communication skills with workers to manage safety and to obtain higher productivity	67.5	14	Communication skills
Periodically safety meetings for managers, engineers and workers for discussing risks of activities to avoid accidents and to increase productivity	66.12	15	Communication skills
A safety program must be written to include all safety matters such as expected hazards and techniques to avoid hazards, training, equipment, tools and recording of injuries	65.24	16	Planning
Workers should be trained to select and use of appropriate tools	64.35	17	Training
Training of managers and supervisors to define responsibilities and to cover any shortfall in awareness for occupational safety, and illustrate how important to be a good example for workers	64.12	18	Training
Workers should be trained on occupational safety techniques and wear appropriate clothing	64.00	19	Training

Table (2) demonstrates the results from the survey feedback in the RII according to overall respondents. It is about strategies

that can be followed to effectively affect safety and productivity. These strategies fall under five major groups;

planning, training, monitoring, communication skills, and inspection. Results indicated that "training workers to carry out works properly, especially in the new types of work" factor with (RII = 81.35) has been ranked in the 1st position with regard to its importance in sustaining safety and productivity of project. This factor belongs to training group. In terms of productivity, skilful worker is a productive one because he performs his tasks on time and with quality. Results of research prove that orientation of either newly hired workers or regular workers is essential especially for irregular job tasks. In general, it can be seen that the first five strategies, that have been selected based on the experiences of respondents, are already reflect the culture of the people to the importance of increasing productivity and ensuring occupational safety at the same time his was matched with what Abo Mustafa found in his thesis research that safety is a new topic in the construction sector in Gaza strip, so contracting companies have a little awareness about the impact of safety factors on labour productivity. Thus, training and then monitoring strategies are acceptable to be taken firstly to in still the concept of safety culture and its importance to increase productivity. It will be done through strict supervision, accurate monitoring and the use of incentives and sanctions with adopting respect in dealing all the time with workers to increase productivity and ensure safety at the same time, where planners and managers put a plan for that and then individuals can easily be committed to that plan

V. CONCLUSION

In the present work, a methodology for evaluation and finding connection between OHS and increasing employee productivity in construction industry from the point view of contractors in Delhi NCR. To achieve this aim, one main objective has been outlined which is identifying strategies that effectively promote both safety and productivity during a construction task. The study concluded that integration of safety management and productivity improvement are very important for achieving the strategies that developed by the company in the construction work. After studying the literature review about the topic of research and by using the questionnaire survey approach, many important results were found from the respondents of the target group, which were the contractors from the first class in Delhi, NCR. For example, the strategies that can be followed to effectively affect safety and productivity fall under five major groups, which are, planning, training, monitoring, communication skills, and inspection. The strategies, in the descending order from the top to the lowest, are; training workers to carry out works properly, especially in the new types of work (under training group), supervisor should be firm with the contractor in safety conditions (under inspection group), foreman should put daily and weekly work plans and define tools that should be used (under monitoring group), drug test for workers (under monitoring group), and scheduling adequate number of workers to complete the heavy tasks, which helps to decrease injuries, as well as to foster a spirit of teamwork and increase productivity (under monitoring group). Training and monitoring strategies are acceptable to be firstly taken for instilling the concept of safety culture and its importance to increase productivity. This is due to that the occupational safety standards do not represent as an essential part of the culture of workers in the construction industry in Delhi NCR. It can be done through training of new workers on company's safety policies and procedures before they start work encouraging the buddy system by having new workers learn from experienced workers training of workers to select and use

the right tool for the job and correct them when necessary and alerting workers about the changed working conditions such as extreme heat, rain, or slippery surfaces. Some necessary elements required, such as a good level of cooperation between the management and employees, to ensure the success of an OHS intervention and the subsequent increases in productivity.

VI. RECOMMENDATION

Safety and productivity are interdependent. To achieve good safety is also important to achieve good productivity. All stakeholders for the project, including contractor, should come together to look into ways to enhance safety and productivity together. According to that, the study recommended companies to plan for a strategy to achieve that. It is important to develop working cultures in a direction which supports health and safety at work, and promotes a positive social climate and smooth operation, and thus enhance the productivity. After that, companies need to move from the planning phase to the implementation phase for the strategies. In other words, contractors are recommended to act strategically to protect workers by continuously identifying, evaluating, and mitigating hazardous conditions, as activities, work locations, and other conditions change in work-place. They should talk about safety in the same manner as about cost and schedule, use incentives with caution, and conduct regular safety meetings to discuss the safety issues in the construction sites. Contractors should prepare safety training programs which help personnel to carry out various preventive activities effectively. They should concern in training of the workers and teaching them the significance of using safety equipment, the good use of construction equipment, and the cooperation to identify hazards, the costs and results of injuries. As a foreman, or a site engineer, or any employee works in a key position in the workplace should help to increase company's work production while reducing injuries. To achieve that, training and orientation must be applied by an accurate monitoring with maintaining on respect in the dealing with the workers.

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