

Development of Safety Performance using Scoring Technique in Textile Industries

Raj Pradeesh T, Venkumar P, Saravanamani M

Abstract: The objective of the work focus to determine the potential safety factors that directed the triumph of a Human factors safety Management system for Textile workers. The number of accidents among textile workers and the level of responsiveness on problems concerning safety were also determined. The Spinning mills ranged from high noise annoyance areas, rotating machineries and Manual Material handling areas. The sample size was 75 in each sub criteria workers's. From the survey it was found that the most potential safety factor was personal awareness followed closely by statement. Suggestions and recommendations on machinery design and improved safety work practices and measures to improve the efficiency and yield of textile workers were proposed. Management was advised to get their labours response better informed about safety matters. The Investigation survey identify the ineffective management involvement is the main causes of creating safety deficiency inside the textile plants. About 40- 80% of peoples recorded the same reasons to improve the management involvement in all the safety aspects. Very few of the people delivered regarding origin of unsafe acts and condition due to their behaviour of worker inside the workplace related to Human error. This works presents the improved model for management of textile plants in upcoming future investigations.

Keywords : safety, factors, behavior, textile, management

I. INTRODUCTION

Textile Mill is the major prominent economic segments in virudhunagar district. Behind this manufacturing segments many peoples are working together in that Industrial zone. The study was chosen in virudhunagar district for a famous textile spinning Mills. Although spinning mills causes the noise annoyance inside the plant. Due to this it leads to human hearing loss Tinnitus diseases to the workers. Several risk factors involved in textile industry like physical hazards, Electrical, Fire hazards involved in textile plants. The fig shows the human factor tunnel model to develop the safety practices inside the industries and maintain a safety practices inside the workplace based on the monitoring the workers attitude, behavior e.tc. However several methodologies and risk assessments are available to monitor the risks and hazards

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continued in workplace because many accidents preaches many things based on the lesson learned from that incidents. The Industrial experts innovated the various tool for Risk assessment techniques to completely eliminate the risk from the workplace .In this work completely focus the one to interview methodology instead of risk assessment to mitigate the hazards in textile mills and conduct investigation survey from the workers. This method help to develop the safety practices frequently based on the scoring technique approaches

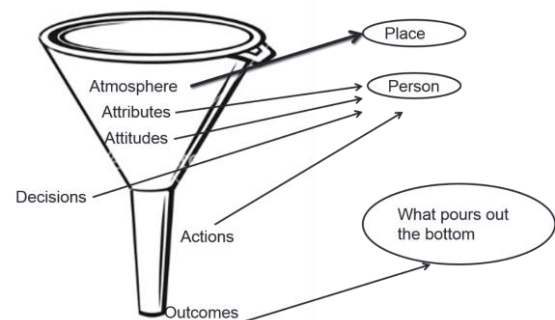


Fig. 1. Human Factors tunnel model for scoring approach

The human factors tunnel model show that the number of inputs given as inputs of various parameters like present areas conditions locate in the textile plants. After that attributes represents number of persons involved in that survey. On the other hand the workers are given their opinion individually based on the presence of mind in 5 point liker scale that comes under the decision of the people and actions that can be taken based on the behaviours. Finally all the results are consolidated and outcomes are listed. Based on the outcomes values the safety practices can able to develop in the required units of the investigation carried out in their corresponding responders sections. The investigation involved a self-investigation to the workers in the way of five-part questionnaire scoring techniques among the workers and interviews with industry experts involved in spinning and Packaging sections. Part 1 of the questionnaire concerned Working hours, Part 2 involved Physical factors , Part 3 about the Management Participation factors, Part 4 preach about the Human behavior factors and Errors in workplace and Part 5 show the self-awareness factors of workers and training undergone in industries was based on industry-accepted safety factor elements.

The responders is one of the major contribution to this survey and given his/her information regarding the safety violations and management involvement show the ability to enhance and develop the safety cultures in organizations. This work able to given clear description about the workers attitude based on the Human factors tunnel model design by the information as input and sequence of output by the workers.



Fig. 2. Categoires of Scoring approach factors and criteria

II. LITERATURE REVIEW

[1] **Sukran sekar, 2019** conducted a risk assessment for pharmaceutical industry to identify the potential and harmful hazards present inside in industry. In order to bow tie tool was used to identify the hazards and risks level under uncernity conditions in a pharmaceutical industries. The author used the QRA (Quantitative Risk assessment) as a methodology predict the outcomes of the possible parameters.

[2] **Gurcanli et al, 2009** analysed the risk level present in a construction sites. The risk assessment was conducted during the work carried out in construction sites with the combination of fuzzy logic. The assessment was used to identify the safety climate present in the appropriate manner. The author concluded amount of risk level present in workplace and able to develop the safety culture inside the construction sites.

[3] **W.H. Fung et al, 2010** conducted an investigation study on construction site workers. The authors more focuses on hazards and risk faced by the workers during work time in order to improve the safety culture in construction site. They proposed the RAM (Risk Assessment Model) for construction Industrial experts.

[4] **Dong-Chul Seo et al, 2004** conducted the investigation survey on various industries with the reference of various researchers' articles and reviews. In absence of various data's and empirical values the author develop the safety climate and systematic approach in every industry.

[5] **Couce-Vieira et al, 2017** frame a structure methodology for incident accident analysis. It is a management approach used to develop the safety practice in workplace. In this analysis the authors used the new innovative methodology for accident and risk analysis in industries.

[6] **Abel Pinto et al, 2011** reviewed the risk assessments conducted in construction industries. The author mainly focus the appropriate parameters that have been used for the assessments purpose applied in construction industries. Also the authors discussed the disadvantages of in absence data's used in ORA traditional methods.

[7] **O.N. Aneziris et al, 2012** represented the problems encountered in construction work carried out by the workers. Hazard identification conducted by models developed by the

authors such as Occupational Risk Model (ORCA) with reference of Workgroup Occupational Risk Model project (WORM), in the Netherlands, for enumerating work-related threat. This methodology evaluates work-related risk of a labors, in addition of several jobs, actions and their corresponding potential threats faced by the workers in workplaces.

[8] **Abu Hamja et al, 2019** conducted the serious discussion by revising the current information about the outcome of lean on efficiency and safety in the garment sectors. The final outcomes of this review was to improve the productivity of garment industry while the safety team take care for the improvement in safety culture.

[9] **Getnet Abat Tafere et al, 2019** conducted the investigations about the health and safety deficiencies among the industrial workers in industries. The outcomes of this investigation concluded that more number of induction training conducted to the new and current employees in workplaces, higher official give more importance regarding safety development activities carried out in workplace, form a safety committee and arranging the necessary personal protective equipment to the workers that can help to develop the safety follow-ups inside the workplace.

[10] **L.B. Andersen et al, 2012** reviewed the effects and manipulating potential issues of safety parameters in industries. The authors finally given suggestions based on the results that the economic problems was one of the major reason did not maintain the safety parameters and the outcomes of safety deficiencies are not properly maintained this leads to the failure of maintain general safety and OHS hazards in appropriate manner.

III. METHODOLOGY

This journal uses double-blind review process, which means that both the reviewer (s) and author (s) identities concealed from the reviewers, and vice versa, throughout the review process. All submitted manuscripts are reviewed by three reviewer one from India and rest two from overseas. There should be proper comments of the reviewers for the purpose of acceptance/ rejection. There should be minimum 01 to 02 week time window for it.

A. Interview Questionnaire Approach

This methodology is one of the qualitative analysis which shows the workers mind attitude as a result of his/her feedback. This method requires one person interview like one person asking questions and others in opposite gives a feedback regarding that questions arise from the interviewer. From this method many advantages are available .No one can shows their face in-front of management official because the interviewer maintain the confidential regarding that opposite person because it shows the reality feedback of workers about their working place information's. In this face to face interview methodology questions are framing full only on working place information's only. So that surveyor or interviewer maintain the confidential and not disclose the workers information .only consolidated results only give to the management for their future investigation surveys.



Fig. 3. Flow chart for conducting face to face interviews

B. Scoring Technique approach

The Scoring approach is the tool used to identify the proper parameters to achieve our own decision. In this investigation we segregate the questionnaire based on the suitable parameters and thus used as a choice of 5 point licker scale. The corresponding scales and score values are shown below the table.

TABLE I : 5 POINT LICKER SCALES VALUES

SNO	CHOICE SCALES	SCORES
1	Agree	2
2	Strongly Agree	4
3	Disagree	6
4	Strongly disagree	8
5	Agree neither nor disagree	10

In this scoring techniques the factors and criteria are categorized into five different groups based on the Questionnaire framed. The corresponding Questionnaire and criteria are shown in below figure. It shows the corresponding factors represents the parameters related to the criteria focus the appropriate feedback that can be collected from the workers face to face interviews

IV. DATA COLLECTIONS

Based on their category the score are taken in the above formats. If the Responder give strongly agree means its shows the values of risk is 2 simultaneously for strongly disagree-4, Disagree-6, strongly disagree-8, Agree neither nor disagree-10

TABLE I. SAMPLE WORKERS RESPONSES

WORKER-1		
SNO	QUESTIONS	RESPONSE SCORES
1	I am Handling Excessive weights at the working Hours	4
2	. I am Working Continuously Without Break	4

3	I have not the Musculo Skeletal Disorder problems such as back pain in workplace	8
4	I attended the training program about the ergonomics problems	8
5	I use the Proper Tools for Proper Use	8
6	I am Satisfied with the workplace Situation and arrangement	8
7	I am feeling causes of Physical discomfort at workplace	4
8	I am feeling most of an awkward postures to perform in workplace	6
9	The Various types of lightning is arranged by the management	8
10	I am feeling the same job during the workplace same time again and again	10
11	The Various types of ventilation are available at workplace	8
12	My management is arranging medical examination regularly	10
13	The Various types of lifts and hoists are available in my workplace	10
14	My Supervisor is conducting inspection regularly regarding ergonomics problems	10
15	I have already some biological problems in my body	8
16	I analyzed and see the incident due to the phylogical problems.	10
17	I already committed mistake due to absence of minds in workplace	10
18	I have well knowledge about ergonomics problems	8
19	My management is well support for workers Safety and health	8
20	I have been working for 8 hours per day	10

In this above table shows the sample responders will response their questionnaire views based on their own thinking related to human factors safety knowledge's. In the mean while take 15 samples were recorded and thus employed in scoring approaches

TABLE II. 15 SAMPLES CONSOLIDATED SCORES

WORKERS	TOTAL SCORE
WORKER 1	148
WORKER 2	154
WORKER 3	154
WORKER 4	160
WORKER 5	160
WORKER 6	158
WORKER 7	154
WORKER 8	160
WORKER 9	162
WORKER 10	154
WORKER 11	162
WORKER 12	164
WORKER 13	154
WORKER 14	148
WORKER 15	160

Based on their human factors and safety criteria the WORKER Questionnaire is split up into five parameters. Then the data has been analyzed by using the following parameters.

TABLE III. FACTORS DATA ANALYSED MODEL

SNO	PARAMETERS	QUESTIONNAIRES
1	WORKING HOURS	1. I am Handling Excessive weights at the working Hours. 2. I am Working Continuously Without Break 10. I am feeling the same job during the workplace same time again and again. 20. I have been working for 8 hours per day
2	ERGONOMICAL ISSUES	3. I have not the Musculo Skeletal Disorder problems such as back pain in workplace 7. I am feeling causes of Physical discomfort at workplace 8. I am feeling most of an awkward postures to perform in workplace. 15. I have already some biological problems in my body.
3	MANAGEMENT INVOLVEMENT	9. The Various types of lightning is arranged by the management. 11. The Various types of ventilation are available at workplace. 12. My management is arranging medical examination regularly. 13. The Various types of lifts and hoists are available in my workplace. 14. My Supervisor is conducting inspection regularly regarding ergonomics problems. 19. My management is well support for workers Safety and health.
4	HUMAN ERROR	16. I analyzed and see the incident due to the phylogical problems. 17. I already committed mistake due to absence of minds in workplace
5	SELF AWAARENES & TRAINING	4. I attended the training program about the ergonomics problems. 5. I use the Proper Tools for Proper Use. 6. I am Satisfied with the workplace Situation and arrangement 18. I have well knowledge about ergonomics problems.

TABLE IV. TOTAL CONSOLIDATED FACTOR ANALYSED DATAS

SNO	CRETERIAS	WORKERS	SCORES
1	WORKING HOURS	WORKER 1	22
		WORKER 2	34
		WORKER 3	40
		WORKER 4	38
		WORKER 5	38
		WORKER 6	34
		WORKER 7	38
		WORKER 8	36
		WORKER 9	38
		WORKER 10	32
		WORKER 11	34
		WORKER 12	32
		WORKER 13	38
		WORKER 14	32
		WORKER 15	36
2	ERGONOMICAL	WORKER 1	22

	ISSUES	WORKER 2	32
		WORKER 3	20
		WORKER 4	26
		WORKER 5	32
		WORKER 6	28
		WORKER 7	24
		WORKER 8	32
		WORKER 9	24
		WORKER 10	28
		WORKER 11	28
		WORKER 12	22
		WORKER 13	26
		WORKER 14	26
		WORKER 15	30
		3	MANAGEMENT INVOLVEMENT
WORKER 2	40		
WORKER 3	46		
WORKER 4	46		
WORKER 5	40		
WORKER 6	52		
WORKER 7	46		
WORKER 8	46		
WORKER 9	48		
WORKER 10	48		
WORKER 11	46		
WORKER 12	54		
WORKER 13	42		
WORKER 14	46		
WORKER 15	46		
4	HUMAN ERROR	WORKER 1	12
		WORKER 2	18
		WORKER 3	14
		WORKER 4	14
		WORKER 5	14
		WORKER 6	14
		WORKER 7	16
		WORKER 8	14
		WORKER 9	18
		WORKER 10	18
		WORKER 11	18
		WORKER 12	16
		WORKER 13	14
		WORKER 14	18
		WORKER 15	14
5	SELF AWAARENES & TRAINING	WORKER 1	40
		WORKER 2	30
		WORKER 3	34
		WORKER 4	36
		WORKER 5	36
		WORKER 6	30
		WORKER 7	30

	WORKER 8	32
	WORKER 9	34
	WORKER 10	28
	WORKER 11	36
	WORKER 12	40
	WORKER 13	34
	WORKER 14	26
	WORKER 15	34

V. RESULT AND DISCUSSION

Finally the management involvement is very low in the ergonomics mitigation problems in textile Industry while compared to the other criteria management involvement is too low like development of workers safety itself as well as ergonomics issues. All though the workers is little bit very much knowledge about self-awareness training and participatory of ergonomical issues also the human error is very low compared with the other criteria.

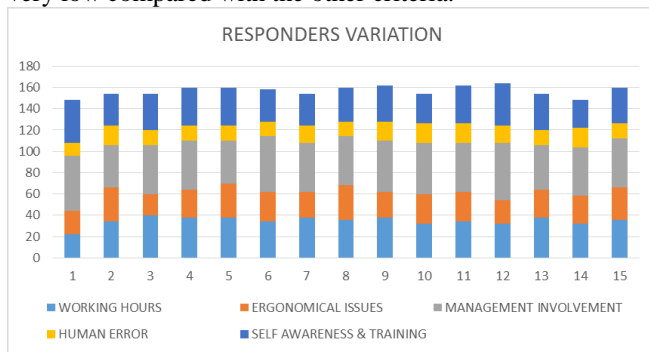


Fig 4 Worker’s variation and analytical approach

VI. CONCLUSION

The target of this survey was examine the various effect a change in work, which is often found in assembly processes in the textile industry, would have on an individual’s responses. The works participation can be included by using the scoring techniques their results were deeply discussed. In future it can be extended for other manufacturing sectors like automobile manufacturing, food manufacturing and various domains of industrial sectors and using a various other mathematical approach even using a simulation technique. Based on the expert’s opinion this model can be modified further in future investigation. This model can be used as reference for industrial expert’s worked in reputed industrial and research organization

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