

Assessment of Safety Measures at Medium Scale Manufacturing Enterprise at Bengaluru

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ABSTRACT

In current world manufacturing industry needs to take care of employee safety as to abide by law. Many new laws are getting implemented for making working environment safe for workers in manufacturing industry. The accident rates in the manufacturing industry are very high as it involves a lot of machine handling which is a threat to the workers. As to provide protection for the workers the industry should have safety measures and should try and educate all the workers regarding it. Only when the industry looks after its employees, the employee's will be loyal and give their complete energy to fulfill the organization goals. By applying the safety measures in every level in the industry the awareness about it will increase among the workers. Just providing safety measures is not enough and the organization should train the workers about its usage and importance In order to make sure to have safety for the workers, protective gears must be used. If a worker is working welding related work then he should use goggles for his eyes protection and if they are working in warehouse then they should wear hard hats for the protection. The main aim of the study is to find the present safety measures used in the factory premises with reference to Synergy Innovation. The company is into manufacturing of commercial refrigeration products to the market. The population for this research study is 142. In this regards 55 questionnaires were asked to the employees working in the company. The study also involves the examination of the factors like safety measures, safety training, and awareness of safety. Result of the present study explains that there is significant relationship between overall safety measures and safety training. This is the main hypothesis of present research is confirmed.

Keywords: Safety Measures, Safety Training, Awareness of Safety, Manufacturing Industry, Overall Safety Measures.

INTRODUCTION:

The main purpose of the study is to identify the employee safety in the workplace. Only when employees of the organization feel safe in their workplace only they can invest the fullest to their capacities up to their limit and exploits the best possibility of their potentials and capability to work. Work place safety is very much important for the reason to improve the productivity. Workplace safety is the employer's & management's responsibility. It involves and specifies the formation, procedures and implement of the safety programs. And it also Employee safety practices and policies will help to cover the risk of an employee and they might suffer at their work. Industrial safety is important in the present industrial scenario in order to protect employees, and environment.

Industrial safety and its concept refer to safe guard and prevent the accidents occurring in the organizations, employees and assets thereby minimizing incidents and fatal accidents.

This study makes an effort to examine the various safety measures adopted by the company. The literature review gives a wider angle and covers various safety practices for all the organizational inputs like men, material and environment. It is observed from the literature review that for working in the factory environment personal protection equipments (PPE) are must and it is a part of safety policy. The equipment includes safety gum boots, goggle, ear mask ,gloves, helmet and following the instructions carefully.

This particular study aims at assessing the safety measures taken by Synergy Innovations. The main focal point of this study looks at assessment of safety measures. Hence the study is on assessment of safety measures at factory premises with reference to Synergy Innovations

The main aim is to understand that safety improves quality of the product of the product .Safe workplace tends to be more efficient which will be free of tangles. By working in a clean of what they do. The result of safety helps in better products that create customers loyalty and focus.

Factories Act, 1948 have given certain measures regarding safety of workers who are employed in factories. While implementing the safety measures given by the Factories Act, there is a need to provide training regarding the safety to workers and about installing safety equipment at the factories.

This topic is undertaken to understand the safety concern taken by the organization which mainly impacts on the working environment of the manufacturing industries. These industries are coming with various safety policies and training for the benefits of the employees. Therefore it is important to make a study as an useful subject.

This includes:

- To understand the various safety measures undertaken
- To analyze the present safety measures adopted in the organization.
- To create awareness about the safety trainings that has to be provided for the employee.

LITERATURE REVIEW:

Fatini Hanim Binti Mohamed Taufek et.al (2015), in this report the testing was performed to evaluate the relationship between the health practices, safety and injury management between employees in manufacturing industry. The main motive of the study is to known the safety concern and injury management among employees at the workplace. This study also provides the greater advantages for maintaining safe and secured work environment for the employees. The report conclusion states that the research has identify and explored the safety and health of work environment which involves consultation, management commitment .From the reliability analysis of the study states that the outcomes shows all variables are reliable and valid.

Sylvia Adu, George Adu et.al (2015) the study was done in the furniture industry at Ghana for analyzing the hazards, lost revenue because of hazards and its control. The result mainly indicate that unavailability and low usage of personal equipment (PPE) is the main reason for the occurrence of the accidents. The recommendation involves that the management should mainly involve of the training of their workers on use of safety tools. The main challenge in this report involves identifying of some of the hazards and controlling methods for preventing the hazard factors. The conclusion of the report states that the workers are exposed the different types of hazards at the working environment .If the workers are trained for the proper use and also for safety practice and the use of personal equipment, workers would become confident and thus eliminate of the injuries would be prevented in the factory.

Selvam A, Krithika Priyadarshini (n.d) the study explains us the various safety and control measures that has been occurred during building projects. This survey also provides the different control measures in places and their usage on building projects. Construction industry a deadly working space. Accidents occurred at building sites are common but it could be controlled by having serious-consequences in the workers. Thus, controls measures of accidents mainly ensure safety of the workers and will also minimize the accidents occurred due to waste in the sites are essential.

This report mainly focus on providing different measures to control accidents with respect to construction sites .Also focus providing first aid protective clothes, traction boots on the point of safety measures. Hence, the aim of present study is to decline the level of accidents' occurrence on the sites. The specific objectives are identified in different types of accidents at sites and the applicable control measures and also for identifying accident prevention methodologies, for examining the frequencies of usage control measures at sites and also for comparing the perceptions in the construction organizations about the rate of usage about control measures on sites.

Ezrin Hani Sukadarin, Nurud Suria Suhaimi (2012) Safety plays a vital part in determining the organizational success or failure. This paper aims to find the perception of employee towards safety culture in the manufacturing industry. Seven factors in the safety climate has been measured. The finding of this research will provide a guideline to propose and to perform a better working condition so there may be occurrence of the safety culture. Main objective of safety survey was to investigate safety culture in manufacturing industry. Safety culture model which is explained in the manner of safety culture is taken into consideration for embedding in the organization practices and its safety management systems (Choudhry et al., 2007). The result of this study has shown that the employee's has the positive perception towards safety management system and procedures that are implemented in the organization. A development of positive safety helps in provided guidance on how organizations might improve on the safety performance.

Ms. Lincy Joykutty (2017), the study is about finding and understanding the various kinds of accidents that happen the organization and realizing the reason for why safety is required and what those safety measures are for the employees. The also here mention about the legislative provisions that are necessary to be followed by the organization as declared by the government. The key objectives to do research was to locate the issues that with reference to the physical condition and safety in the organization. The result of the survey is that employees are aware of the committee that is working internally for their health and safety benefit, they also have accepted that have been provided with training program on the same matter. Finally the researcher states learning of the new techniques will help to improve the safety measures.

Ms.P.Vinotha et al..(2015), here the research is to study the causes of the accidents that happen the industries, issues relating to health in occur in premises of the organization. The researcher's finds few causes for accidents are due to no proper safeguarding of machines, overloading, lack of safety devices in area, no adequate lighting inside the premises. At next stage they mention about the hazard that occur during working timings may be chemicals that affect the human health directly or indirectly by showing the allergic reaction in skin which is one of the form of the physical condition issue. The purpose of the study point out to observe the protection practices that are been taken up for workforce at work situate and also on the subject of the education of safety is provided is having impact on work life of employee. The suggestion that is given by the researcher's is conduct meetings get the ideas from the employees.

Shu-Chiang Lin et.al (2017) this study here aims to assess safety-climate level in the area Taiwan's metal industries and also to identify the influence of an workers' backgrounds on safety climate. Earlier report has recognized that there is very little safety culture which is related to cause of an accidents in Taiwan's traditional manufacturing industries. This study involves total 839 workers were voluntarily participated and they helps in completing safety-culture questionnaires. Three factors like safety-climate factors, safety perception, safety-management systems, safety communication and were assessed. Based on the three validated safety-climate factors, it is stated that, from an industry perspective, overall, Taiwan's metal industries have a good safety climate. However, improvement is suggested in the areas of safety communication. Tests have showed that number of training session's results in higher safety climate so a mandatory safety-training program is strongly recommended. Various training programs are highly recommended to fit different workers' backgrounds to raise the overall safety climate. Based on the modest validity of the safety-culture which is developed by the Taiwan government it should improve in reconstructing its question in development process and it should focus on the research activities.

Abdul Zuba et.al (2014) According to this study the research made on the manufacturing industries in the southern part of India was found that there is only few industries are strongly maintaining the implement the occupational safety, health management factors. The information for this study involves training and leadership, organization and administration, hazards and control and risk management. The information for policies, administration and organization are collected by considering resources allocation, responsibility, management review and documentation. The study aim at analyzing the occupational health at workplace and safety of manufacturing industries in south India by gathering reports and analysis. The data for the risk and hazards control in this study are collected on the basis of hazardous identification and its determination of control measures, risk assessment and documentation of the risk assessment.

Dr. B P Mahesh et.al (2015) Industrial safety is very much essential and important in present industrial areas for protection of employees, and environment. Industrial safety is there to safe guard organizations, and its employees and assets thereby minimizing incidents and fatal accidents. Priorities are given to safety measures in the case of emergency. This study is carried out in a machine tool manufacturing company. The main objective of the study is to minimize hazards that help in preventing accidents and eliminate the accident that caused due to loss of production. It also involves educating all employees about safety in the organization. The initial study revealed

several problems with respect to industrial safety and productivity. The aim of the study was to analyze the existing layout and design the new layout is to improve the productivity of employees by ensuring the safety is according to the standards. Industrial safety includes solving number of issues which affects the safety of worker and assets of any organization.

Charles E. Ulinfun (2002) one of the major problems in organizations is that increase in injury rates which are increasing day by day because most of the safety programs are lack in the essential and most important safety measures is for accident reduction in the workplace. This study mainly examined the safety measures that plays very important role in accident and injury reduction in the workplace. Specifically, the older safety programs and new safety programs of an various and unrecognized company has to be investigated and they had to identify safety measures which are distinguished by both programs, their impact on injury rates, and whether the variables of safety program and the variables of safety performance are independent. Lastly, this report and the results provided and interpreted useful information for the inspection to safety authorities and organizations that need to be planned to develop the programs and its implement a cost effective and successful safety program which will reduce accidents and injuries in the workplace.

OBJECTIVES:

- To find the present safety measures used by the organizations.
- To examine the factors of safety like overall safety measures, safety training, safety awareness, safety medical training and equipment's usage.

RESEARCH DESIGN:

For analyzing the data collection, IBM SPSS Statistics Package 20 is being used and Chi Square Test, Co-relation, Regression and Simple Percentage Analysis were used.

Type of Research – Descriptive Study

Type of Sampling – Convenience Sampling

Sample Size – 142

HYPOTHESIS:

H₁₁ There is significant impact of satisfaction with overall safety measures on safety training.

H₁₂ There is significant impact of satisfaction with overall safety measures on safety awareness.

H₁₃ There is significant impact of satisfaction with overall safety measures on training to handle hazards.

H₁₄ There is significant impact of satisfaction with overall safety measures on safety medical training.

H₁₅ There is significant impact of satisfaction with overall safety measures on using safety equipment.

DATA ANALYSIS:

Table 1: Case Processing Summary

		N	%
Cases	Valid	142	100.0
	Excluded ^a	0	0
	Total	142	100.0

Table 2: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.871	.871	13

Reliability Statistics: The reliability co-efficient is 0.871 the numbers are close to 1. As a rule the coefficients supposed to be higher than 0.7 which are considered as include exceptional consistency. Thus end result of the table (Table -2) shows 0.871 and for this reason data is dependable and considered for additional treatment.

Profile of the Respondents:

Variables	Categories	No of respondents	Percentage
Gender	Male	94	66.2
	Female	48	33.8
Age	21-25	32	22.6
	25-30	39	27.4
	31-35	52	36.6
	35-40	19	13.4
Education	SSLC	58	40.8
	PUC	40	28.2
	Diploma	32	22.6
	Graduation	12	8.4
Experience	1-3	74	52.2
	3-6	29	20.4
	6-9	33	23.2
	10 and above	6	4.2
Monthly Income	8,000-10,000	104	73.3
	10,000-12,000	22	15.5
	12,000 and above	16	11.2
Marital Status	Married	45	31.6
	Unmarried	97	68.4

The above table explains about the demographic details of the respondents of the study. The first variable is gender wherein the maximum of the respondents are male with 66.2% and the rest is female with 33.8%. The second variable in the table is age and here most of the respondents belonged to category of 31-35 with holding 36.6% and the next highest category 25-30 which is 27.4%. Next variable of the table is education, where most of the respondents are SSLC with percentage of 40.8 and second maximum is PUC with 28.2%. The fourth variable is experience and here highest is 52.2% of the 1-3 option and least is 20.4% of 3-6. Next is monthly income where maximum is 8,000-10,000 income with 73.3% and minimum is 12,000 and above option with 11.2%. The last variable of the table marital status and here most of the respondents are unmarried with percentage of 68.4 and remaining is married with 31.6% of the respondents.

Descriptive Statistics:

Variable	Mean	Std Deviation	N
Overall safety measures	14.3039	1.19230	142
Safety training	17.3922	1.64802	142
Awareness of safety rules	17.2059	1.75949	142
Training to handle hazards	14.0588	1.78455	142
Using safety equipment's	19.1569	1.05065	142
Safety medical training	14.7255	1.36546	142

Chi square Test:

Variable 1	Variable 2	Chi Square Value	P value	Results
Overall safety measures	Safety training	55.609	.015	Rejected
Overall safety measures	Safety awareness	65.667	.006	Rejected
Overall safety measures	Training to handle hazards	40.476	.449	Accepted
Overall safety measures	Safety medical training	41.238	.083	Accepted
Overall safety measures	Using safety equipment	29.670	.075	Accepted

Correlations:

Variable		Over all safety measures	Safety training	Safety awareness	Training hazards	Safety equipments	Safety medical training
Over all safety measures	Pearson Correlation	1	-0.182	-.257**	0.182	0.112	.094**
	Sig. (2-tailed)		0.067	0.009	0.067	0.264	0.346
	Sum of Squares and Cross-products	143.578	-36.157	-54.382	39.176	14.137	15.51
	Covariance	1.422	-0.358	-0.538	0.388	0.14	0.154
	N	142	142	142	142	142	142
Safety training	Pearson Correlation	-0.182	1	0.023	0.44	0.141	-0.304
	Sig. (2-tailed)	0.067		0.818	0	0.156	0.002
	Sum of Squares and Cross-products	-36.157	274.314	6.765	130.647	24.725	-69.02
	Covariance	-0.358	2.716	0.067	1.294	0.245	-0.683
	N	142	142	142	142	142	142
Safety awareness	Pearson Correlation	-.257**	0.023	1	-.676**	-0.162	-0.05
	Sig. (2-tailed)	0.009	0.818		0	0.103	0.615
	Sum of Squares and Cross-products	-54.382	6.765	312.676	-176.235	-30.294	-12.235
	Covariance	-0.538	0.067	3.096	-1.745	-0.3	-0.121
	N	142	142	142	142	142	142
Training hazards	Pearson Correlation	0.182	.360**	-.676**	1	.197**	-.199**
	Sig. (2-tailed)	0.067	0	0		0.002	0.303
	Sum of Squares and Cross-products	39.176	130.647	-176.235	321.647	58.059	-25.353
	Covariance	0.388	1.294	-1.745	3.185	0.575	-0.251
	N	142	142	142	142	142	142
Safety equipments	Pearson Correlation	0.112	0.141	-0.162	0.307	1	-0.039
	Sig. (2-tailed)	0.264	0.156	0.103	0.002		0.699
	Sum of Squares and Cross-products	14.137	24.725	-30.294	58.059	111.49	-5.608
	Covariance	0.14	0.245	-0.3	0.575	1.104	-0.056
	N	142	142	142	142	142	142
Safety medical training	Pearson Correlation	0.094	-.197**	-0.05	-0.103	-.199**	1
	Sig. (2-tailed)	0.346	0.002	0.615	0.303	0.699	
	Sum of Squares and Cross-products	15.51	-69.02	-12.235	-25.353	-5.608	188.314
	Covariance	1.422	0.342	-0.324	-0.546	0.234	-0.043
	N	142	142	142	142	142	142

Interpretation:

When overall safety measures are compared with safety training it shows the value of -0.182 which is low negative degree of correlation. The overall safety measures is connected with training hazards is shows low positive correlation and again it is compared with safety medical training it gets a value of .094 which shows a result of high positive degree of correlation.

A variable Overall safety measure is having negative correlation with safety awareness. Safety medical training is also having weak negative correlation among the variable overall safety measures.

Training hazards as a variable is correlated with safety awareness, Safety medical training, safety training and safety equipments. Safety awareness is a weak correlated to variable training hazards. Whereas safety medical training is negatively but strongly correlated with training hazards. Variables like safety training and safety equipments are positively correlated along with training hazards.

REGRESSION:

Model Summary							
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.362 ^a	.131	.086	1.14008	.131	2.893	5

Interpretation:

The adjusted R square value shown is .086 and this shows that research explains 8.6% of data.

ANOVA ^a						
	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	18.798	5	3.760	2.893	.018 ^b
	Residual	124.780	96	1.300		
	Total	143.578	101			

a. **Dependent Variable:** Over all safety measures

b. **Predictors:** (Constant), Safety medical training, Safety equipment's, Safety awareness, Safety training, Training hazards

Interpretation:

The p value of the ANOVA table shows .018. So we accept the hypothesis related to the self-leadership.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	15.221	3.317		4.588	.000
	Safety training	-.202	.085	-.279	-2.371	.020
	Safety awareness	-.077	.083	-.113	-.921	.359
	Safety equipment's	.074	.113	.065	.649	.518
	Training hazards	.151	.093	.225	1.610	.111
	Safety medical training	.026	.087	.030	.297	.767

Factor Analysis:

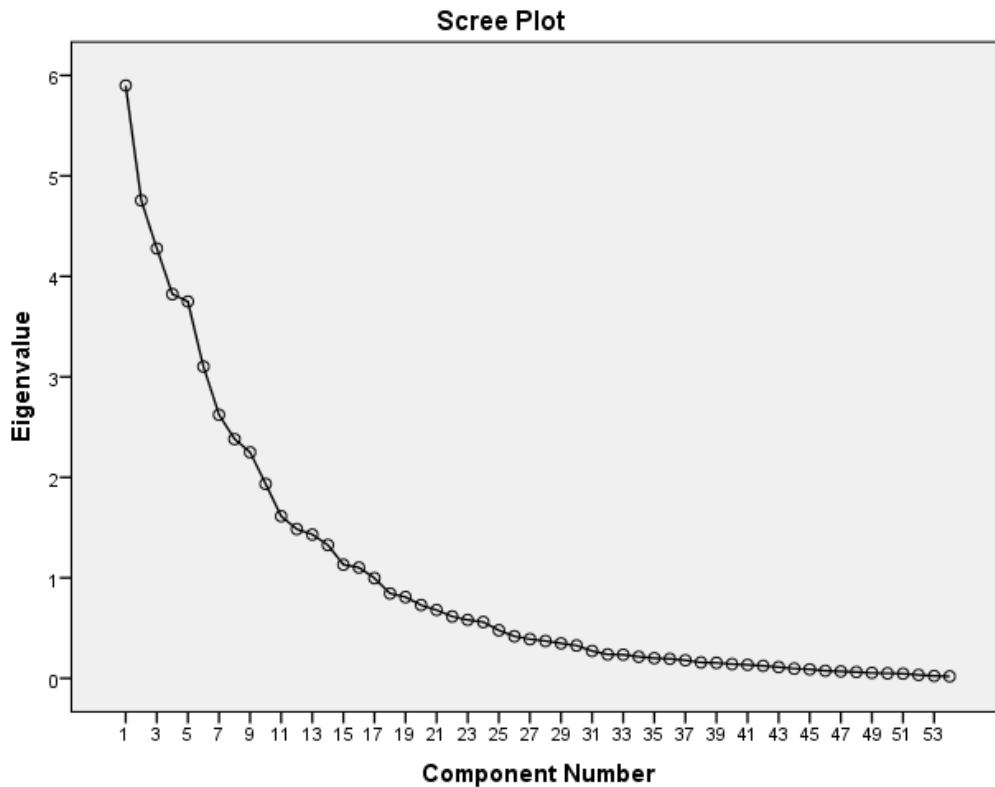
KMO and Bartlett's Test			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.			.715
Bartlett's Test of Sphericity	Approx. Chi-Square		4137.844
	Df		2431
	Sig.		.000

The above table clearly showcases that KMO measures of sampling is .715 which is greater than 0.6. So, due to this indication it is noted to continue with the Factor Analysis Bartlett's Test of Sphericity is significant and those

strongly indicate to run the Factors Analysis.

Rotated Component Matrix^a					
	Component				
	1	2	3	4	5
Training of proper handling of machineries are provided in the organization	0.765				
Company provided specialized training to the employees when the work involves unique hazards.	0.738				
Training of different techniques for recognizing hazards are provided in the organization.	0.71				
Training on methods to control hazards are provided.	0.678				
Safety training records are maintained in the organization.	0.667				
Awareness regarding the rules of safety measures are provided in the organization.		0.591			
Awareness reporting of hazards are encouraged in the organization.		0.568			
Awareness about material handling in the company.		0.554			
Awareness monitoring of high risk tasks		0.561			
Awareness health policy to the employees.		0.577			
Fire safety trainings are provided in the organization.			0.878		
Training of proper handling of machineries are provided in the organization.			0.842		
Company provided specialized training to the employees when the work involves unique hazards.			0.796		
Training of different techniques for recognizing hazards are provided in the organization.			0.631		
Training on methods to control hazards are provided.			0.737		
Safety medical training programs are conducted in the organization.				0.691	
Company involves safety health policy to the employees.				0.68	
Safety first aid training are provided in the factory premises.				0.662	
Safety injury management training are provided to the employees in the organization.				0.636	
Safety medical training are provided to the employees in the organization.				0.581	
Employees are trained on the proper handling of the equipment's in the organization.					0.733
Handling of accidents in the case of emergence in the organization.					0.718
Fire safety equipment are provided in the organization.					0.681
First aid equipment is provided in the organization.					0.66
Safe handling of the equipment's in the organization.					0.594

Rotation of factor matrix shows the breakup of 25 statements. The main variables for those statements are safety training, safety awareness, training to handle hazards, safety medical, using safety equipment. Under Varimax rotation, every statement shows factors loading equal or greater than 0.55 in all cases. The factors that we have chosen are based on Eigen values. Factors which has greater than 1 in Eigen values, it is selected.



- The analysis has more than 10 variables having greater value than 1.00 which has its own

FINDINGS:

- The variable is gender wherein the maximum of the respondents are male with 66.2% and rest is female with 33.8%.
- The last variable of the table marital status and here most of respondents are unmarried with percentage of 68.4 and remaining is married with 31.6% of the respondents.
- A variable Overall safety measure is having negative correlation with safety awareness. Safety medical training is also having weak negative correlation among the variable overall safety measures.
- Regression analysis brings out that data collected can explain at 8.6% accuracy.

SUGGESTIONS:

As it is manufacturing industry which representatives requires more safety measures to be followed .Employees in the company should be trained according to the safety policies in the organization. Company should also adopt the induction programs related to safety management. Considering employees as the asset of the company, awareness regarding the rules of safety measures are to be provided. In the mean while the organization should also trained their employees with the safety management and proper handling of the equipment's.

CONCLUSION:

The key aspire of the study is to find the present safety measures used by the organization .The Study also involves the examination of the factors like safety measures, safety training, and awareness of safety rules. From the study and survey we examine that factors company safe training, safety medical training, using safety equipments and overall safety measures .The response given by the employees was in positive side towards safety measure.

With increased usage of machines the occurrence of accidents has also increased. Accidents are main element that affects workers livelihood loss and also employers in conditions of damage to machinery besides the recompense to be compensated to the workers. Safety measures are to be implemented against such threat and vulnerability. Every organization should adopt certain policies and training activities to create awareness in the employees.

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