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Status of Health and Safety Measures in Indian Automobile Sector

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Abstract

Success of any organization does not solely depend upon money but workforce also plays a very significant role because in today's scenario human resources are treated as an indispensable asset rather than a liability. Just like blood for a human body same as with human resources for the organization whether manufacturing or service. So, it is a prime obligation for an employer to maintain and develop this asset. In this epoch of intense competition foremost priority of an organization is to maintain the health & safety standards of its human capital. The aim of this paper is to find out whether the health and safety provisions as provided by the Acts and Statutes are implemented in automobile manufacturing organizations or not. The data was collected through a structured questionnaire from different automobile manufacturing units. Factor analysis was used to reduce the statements and carve out the relevant factors and t-test and ANOVA was applied to check the variations among the employees' responses.

Keywords: Health and safety, Accident, Injury, Safety management, Employees

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1. INTRODUCTION

With the rapid change in technology, machines have replaced human beings very effectively and efficiently. While not ignoring the positive aspects of these techniques, there are also some negative impacts as use of innovative machinery and flammable things at workplace affects the health and safety of employees. Health and safety measures refer to all facilities provided to the employees while performing their day to day tasks smoothly and helpful in reducing any types of causality and thus is a very central facet for any organization. It is true that quality products can enrich the image of organization but its goodwill is the more important. 1984, Bhopal gas tragedy was an eye opener not only for chemical industry but also for other sectors where thousands of people have lost their life due to that catastrophe. This was a strong signal to the government to create and implement laws for better health and safety measures for both employees as well as society. Basically, two forces motivate an employer to upgrade health and safety conditions i.e. quality products and its own reputation. Performance of an organization is directly associated with health and safety facilities provided by it and technology up-gradation, workplace safety, worker-supervisor relations, rule and regulations regarding health and safety and its implementation are some factors which plays a significant role in building health and safety climate in industry which cannot be ignored at any cost.

Use of highly technical machines while manufacturing somewhere increases the chances of fatal accidents. So, there should be proactive policies regarding health and safety of employees. Moreover, time to time revision and appropriate improvements should be done. In manufacturing, Automobile sector is very prominent sector which generates employment and increase growth rate of the country. In Haryana state, both foreign and Indian companies are engaged in manufacturing work for automobile sector which attracted the attention of the researchers for present investigation. Hence the locale of the present investigation is industrial organizations engaged automobile sector in the state of Haryana with particular focus on health and safety measures opted by these industrial units

2. REVIEW OF LITERATURE

Zohar (1980) argued that assessing the shared perceptions guiding appropriate and adaptive safety related behavior based on cues in the environment. In scientific literature on safety, a very little attention has been paid on finding the solutions of occupational hazards and from his own experience, Swuste (1996) remarked necessary improvements in health and safety. Both quality movement change in technologies and change in operational research regarding operation function; workforce diversity and organized labour interest regarding human resource functions are some factors that increases the importance of issues related to operational managers. External factors like Political, legal and public also have influences operation management. A cost based modeling approach has been developed for evaluating safety requirement by (2000). According to this approach a fuzzy set modeling and evidential reasoning are combined to assess both safety requirement and cost incurred. Both these are then combined to obtain the preference degree connected with all option of safety provisions specifications for selecting the best one. This approach is beneficial to the safety programs. In addition to this a risk assessment approach has been given by Cagno et al. (2003), which uses analytic hierarchy process (AHP) to estimate risk in a direct and holistic manner. These methods show a variance as compared to established method. Methodology allows supporting risk characterization and prioritization of hazards in a hierarchical structure. Influence analysis of key reason of risk machine, worker, measures and environment providing by management with a normal framework to make decisions and assign resources also supported by this study.

Analytic hierarchy process may be an alternative to current goal oriented approach and can be substituted with hybrid structural international matrix. Whitaker et al. (2003) argues that progress of a prototype judgment assist to encourage access scaffold safety

and guide by an examination of the root-causes and management deficiencies evident in: paper and by soft file by computer held by the Health and Safety Executive (HSE) in the UK since 2000. Major causes behind this are fitting of faulty machinery, unofficial alteration of the structure, omission of barriers, easily detectable structural faults, common managerial deficiencies, failure to control risk, unsafe methods & procedures, inadequate training and supervision etc. Furthermore, a quasi-experiment field study conducted by Hickman and Geller (2003) and found that employees, who work in relative isolation as compared to traditional industrial workers, may benefit from a process by which they can systematically observe themselves. Apart from these studies, Siu et al. (2002) found linear and curvilinear relation between age and safety performance and cleared that age was not related to accident rate and in curvilinear manner age is related to occupational injuries, firstly injuries is increased with age then decrease. A real option approach introduced by Farrow and Hayakawa (2002) for decision making in the private sector for regulatory decisions that involve irretrievable and uncertain safety impacts, social costs that differ from personal costs, and variation in perception among the stakeholders and decide if it is best possible to spend in safety even if the expected costs significantly exceed the estimated benefits.

An empirical demonstration has been given by Zohar's (2000) study of 53 work groups in a single manufacturing company corroborated both intra group homogeneity and inter group variation in safety-related perceptions within the organization at supervisory level and found that groups are differed in terms of perception of safety over a range of facets, or aspects of the organization. Further, Patel et al. (2011) discussed about the progress of the industrial safety and occupational health movement in the United States towards their goal of protecting the physical welfare of workers and also evaluate the current problems & relationship among safety health and compensation. There is positive influence on safety performance, competitiveness performance and financial performance by safety management (Muniz et al., 2009). These are important factors which boosts the firm to implement a safety management system. Apart from previous study, Nenonen (2011) studied typical fatal occupational accidents, its contributing factors and their preventive measures while manufacturing tasks found that dangerous work practices and insufficient hazard identification most frequently contributed to accidents. Statistical difference was found between outsourced and in-house operations and suggests that safety of outsourced manufacturing operations should be considered thoroughly in order to prevent accidents and ensuring occupational safety. Further, Chan & Alan (2011) investigated the understanding of industrial safety signs and messages by registered and non-registered S O in Hong Kong with ten different user factors to examine the relationship between cognitive sign features and sign comprehensibility. Findings revealed that out of ten factors tested; only the factor of possession of registered safety officer status was a significant predictor of comprehension performance Quartey & Puplampu (2012) examined employee health and safety practices in the shipping and manufacturing industries and found that employees in the shipping and the manufacturing industries are prone to employee health and safety hazards. Shipping industry had more employee health and safety initiatives than the manufacturing industry. Demographic conditions do not influence employees' attitude towards health and safety practices. Punia & Kumar (2012) explored the reasons of accidents, coworker's safety, supervisor's safety; employees' compliance with safety behavior and as a whole health and safety climate and the safety management has a positive influence on performance of firm.

In terms of application to the issue of accident reduction in high risk industry, the safety culture approach to accident fall emphasizes the role played by social forces within an organization that act upon its members with respect to safety (Clarke, 1999). It had been suggested that culture reaches uniformly into all parts of the organizational structure and exerts a consistent effect. This is the reason for its improvement more effectively than increased

supervision or more precise procedures in enhancing safety performance (Reason, 1998). Reason (2000) proposed that an organization's safety culture takes on a deep implication at the point where accident rates reach a "plateau", i.e. where negative result statistics base out at some asymptotic value. In order to go beyond this "small but (seemingly) unassailable" plateau and to continue enhancement in safety performance, it is necessary to address the hearts and minds of the management and labour (Lee, 1998). This plateau is often reach after necessities for safety "hardware and software" (i.e. barriers and procedures) have been met (Cox and Cox, 1991). (Nunez & Villanueva 2011) combined the research framework on intellectual capital with traditional OSH concepts by developing a theoretical link and found occupational health and safety should be considered among the sources of intellectual capital of the firm. In addition to these studies Eid et al. (2013) examined authentic leadership related to risk perception in safety critical organizations with a hypothesis that authentic leaders influence risk perception through the mediating effect of safety climate and found that leadership are negatively related to risk perception and positively associated with rating of safety climate. Hon *et al.* (2014) compared the level of safety climate of workers, supervisors and managers in the RMAA sector; and explaining the impact of safety climate on these three categories and found that a positive workforce, safety attitude and acceptance of safety rules and regulations reduced the workers injuries at workplace and lowest mean score is found under supervisor group. Yoganandan & Sivasamy (2015) found in their study that majority of the employees belong to the age group of 31-40 year and there is a significance relationship between experienced and their perception on health and safety measures and suggested that the organization need to increase salary, take necessary action to reduce the air pollution caused by manufacturing in the light diverse laws. Though in our country there are many laws which focus on for better health and safety of employees working in various industries yet adoption of the Factories Act 1948 comes on the centre.

3. OBJECTIVES AND METHODOLOGY

The aim of this research paper is to examine the actual status of health and safety measures used in automobile companies. Nature of this study is exploratory cum descriptive which is based upon primary collected through survey. The survey was conducted in automobiles companies using a structured questionnaire having 25 statements regarding health and safety measures. The questionnaire was designed on five point scale ranging from highly available (5) to unavailable (1). Statements has been prepared with the help of health and safety provisions mentioned in factories act 1948 and all provisions have converted into simple statements for better understanding to the respondents so that they could give their best response. 600 questionnaires were distributed among the prospective respondents out of which 406 responses were received. Convenience sampling method was adopted to select the respondents. The collected data was analyzed with the use of SPSS (Statistical package for social science) software. Factor analysis technique is used for reducing the unnecessary statements to carve out factors. KMO and Bartlett's test is applied to check normality of data to access data suitability for factor analysis. Further t-test and ANOVA test have been used in the light of the objectives of the study.

4. RESULTS AND DISCUSSIONS

Table1 describes status of twenty-five statutory procedures to ensure health and safety measures in automobile industry in India. Data revealed that most available measure is 'Drinking Water' with a mean value of 4.33. Few other measures also have mean very close to highest mean value of 4.33. They are 'Lighting' (mean=4.22), Disposal of waste (mean=4.20) and Safety equipment for worker (mean=4.13). Employment of young person (mean=3.25) is least available measure. It is interesting to notice that all twenty-five measures lie in either 'Highly Available' or 'Available' category of five-point rating scale. It reflects satisfactory availability of health and safety measures in Automobile industry.

Twenty five dimensions are too large for deep analysis, thus factor analysis is applied for reduction of data. Firstly KMO and Bartlett's test is applied to check normality of data and to access suitability of data for factor analysis.

Table 1: Descriptive statistics

Dimensions	N	Mean	SD
1. Cleanliness	408	4.12	.849
2. Disposal of Waste	408	4.20	.825
3. Ventilation	408	4.11	.839
4. Temperature Maintained	408	3.88	.925
5. Environment free from dust	408	3.92	.894
6. Artificial Humidification	408	3.58	.986
7. Overcrowding	408	3.80	.948
8. Fencing of Machinery	408	4.02	.888
9. Safety equipment for worker	408	4.13	1.002
10. Employment of young person	408	3.25	1.159
11. Facility of striking gear	408	3.91	.925
12. Inspection of hoist and lift	408	3.95	.909
13. Inspection of moving machine	408	4.07	.848
14. Maintenance of Floors and Stairs	408	4.09	.892
15. Prohibition from carrying excessive weight	408	3.98	.914
16. Safety guard for protection of eyes	408	4.15	.831
17. Precautions against dangerous fumes	408	4.08	.824
18. Practicable measure taken to handle explosive	408	3.96	.886
19. Maintenance of buildings	408	3.89	.852
20. Safety officer	408	3.96	.937
21. Worker participation in safety Management	408	3.90	1.001
22. Sanitation	408	4.09	.898
23. Spittoons	408	3.89	.960
24. Lighting	408	4.22	.779
25. Drinking Water	408	4.33	.826

25 statutory dimensions of health and safety were subjected to principal components factor analysis in which to define factors (scales) clearly, loadings exceeding 0.40 were considered and included in a factor [Table2]. The KMO and Bartlett's Test of .926 reveal that data is appropriate for factor analysis. Thereafter factor analysis was administered to have distinct factors out of the 25 statements and in all six factors was extracted. One dimension (Employment of young person) has been excluded because it is making one factor separately and it is not fulfilling the conditions of making the factor. Bartlett's test is sensitive to departures from normality. Significant value (<.05) indicates that data is normally distributed. The data reduction tool has reduced the twenty five practices into seven factors, which could be studied in great depth. Different number of variables comes under different factors. Few factors inscribe as many as six variables while rest of factors consists of three or four or two variable only. This reduction of data

allows researcher to explore status and potential of these health and safety practices in great detail. Now extracted factors could be devoted with quality investigation to highlight various demographical variations and fluctuations. The Six factors extracted through factor analysis as shown in the Table 3 and have been discussed accordingly.

Table 2: KMO and Bartlett's test

Kaiser-Meyer-Olkin measure of sampling adequacy (KMO)		0.926
Bartlett's Test of Sphericity	Approx. Chi-Square	4504.409
	Sig.	0.000

Table 3: Factor analysis

Factors	Loading	Eigen Value	% of Variance
F-1: **Body Safety Provisions**		9.301	38.752
Safety guard for protection of eyes	.781		
Inspection of moving machine	.654		
Prohibition from carrying excessive weight	.589		
Maintenance of Floors and Stairs	.520		
Precautions against dangerous fumes	.489		
Safety equipment for worker	.451		
F-2: **Pollution Reduction Measures**		1.738	7.241
Artificial Humidification	.770		
Temperature Maintained	.640		
Overcrowding	.628		
Environment free from dust	.536		
F-3: **Hygienic Conditions**		1.348	5.615
Spittoons	.757		
Lightening	.714		
Drinking Water	.652		
Sanitation	.633		
F-4:**Workers' Participation in Safety & Maintenance Practices**		1.026	4.275
Workers' participation in safety Management	.728		
Safety Officer	.680		
Maintenance of buildings	.662		
Practicable measure taken to handle explosive	.439		
F-5: **Operational Measures**		.973	4.053
Facility of striking gear	.774		
Inspection of hoist and lift	.596		
Fencing of machinery	.478		
F-6: **Climate Factor**		.835	3.479
Ventilation	.732		
Cleanliness	.700		
Disposal of waste	.689		

F-1: Body Safety Provisions: Measures to protect any direct physical injury are included in this factor. Protection of eyes and inspection of moving machines so that any misshaping could be avoided explains approx. 6.5% of variance.

F-2: Pollution Reduction Measures: Air pollution is an integral aspect of industrial production. It has dangerous impact on health of the employees. Thus this factor considers protection for dust and fumes in factory premise and it include Artificial Humidification, Temperature Maintained, Overcrowding and Environment free from dust & fume, all these measures contribute in reduce the pollution from workplace.

F-3: Hygienic Conditions: Maslow explained that absence of hygienic conditions may lead to dissatisfaction among employees. And this psychological state is critical to health and may cause compromise with safety measures too. Thus sanitation, spittoons, lightening and drinking water etc. are included in this factor.

F-4: Workers' Participation in Safety and Maintenance Practices : It includes three variables i.e. measures to handle explosives and workers' participation in safety management, safety Officer, maintenance of buildings and practicable measure taken to handle explosive. This factor has an Eigen value of 1.026.

F-5: Operational Measures: Health and safety issue is directly related to operational process of manufacturing. In this factor Inspection of hoist and lift, Facility of striking gear and Fencing of machinery etc. are to be taken care of. This factor includes all these measures related to manufacturing process. The factor could explain 4.053% variance and has an Eigen value of .973.

F-6: Climate Factor: Working environment is one of the important factors that could affect performance and safety of the employees. Extreme or unpleasant conditions leads to psychological draining of the employees and hence chances of accidents increases. The factor includes ventilation, cleanliness and disposal of waste related issues. It has Eigen value of .835 and explains approx. 3.479 % of variance.

Now these extracted factors are subjected to further analysis to determine status of health and safety measures in Automobile sector.

Table 4 describes the six factors that come after applied the data reduction technique. Data revealed that most available factor is F6 'Climate Factor with a highest mean value of 4.14. Another factor has very close mean to highest mean value of 4.13 that is 'Hygienic Conditions. Pollution Reduction Measures (mean=3.79) is least available. It is remarkable to note that all seven factors lie in either 'Highly Available' or 'Fairly Available' category of five-point rating scale. It shows satisfactory availability of health and safety measures in Automobile industry.

Table 4: Descriptive statistics for six extracted factors

Factors	N	Mean	SD
F1: Body Safety Provisions	408	4.08	.65060
F2: Pollution Reduction Measures	408	3.79	.73875
F3: Hygienic Conditions	408	4.13	.68904
F4: Workers' Participation in Safety & Maintenance Practices	408	3.92	.72065
F5: Operational Measures	408	3.99	.69099
F6: Climate Factor	408	4.14	.68118

Source: *Primary data*

Table 5 depicts the results of t-test applied to explore statistical difference based on marital status. The responses regarding first factor (Body safety provisions) is found significantly different with married (M=4.149) and unmarried (M=3.952) respondents. The [p value - 0.004*] is less than .05 at 95% degree of confidence scale shows that there is a significant difference. In case of pollution reduction measures, the [p value - 0.034] is found

again significant and showed Married employees (M=3.851) getting higher mean value in comparison to unmarried employees (M= 3.687). Further, in Operational measures factor married and unmarried employees again differ significantly [p value - 0.021*] showed that Married employees (M=4.054) responses are falling in 'available' on five point response scale whereas unmarried employees (M=3.888) feel 'fairly available' of these measures. With respect to hygienic conditions, Workers' Participation in Safety and Maintenance Practices and Climate Factor there was no significant difference found in married and unmarried employees' responses. Eventually, the results signify that married employees are more aware about these safety measures prevailing in the organizations instead of the unmarried employees. The reason behind these findings may be that the married employees are having more responsibilities in their personal lives and they are more conscious about health and safety and thus have additional sense of dependability of their families and relationships on them and that is why they have maturity of saving themselves and soundings from damage.

Table 5: T-test statistics for marital status and status of health & safety measures

Factors	Marital Status	N	Mean	SD	t-value
F1: Body Safety Provisions	Married	267	4.149	.6217	2.937
	Unmarried	141	3.952	.6858	(.004)*
F2: Pollution Reduction Measures	Married	267	3.851	.7177	2.131
	Unmarried	141	3.687	.7683	(.034)*
F3: Hygienic Conditions	Married	267	4.176	.6345	1.791
	Unmarried	141	4.047	.7774	(.074)
F4: Workers' Participation in Safety & Maintenance Practices	Married	267	3.969	.6897	1.600
	Unmarried	141	3.849	.7722	(.110)
F5: Operational Measures	Married	267	4.054	.6694	2.321
	Unmarried	141	3.888	.7200	(.021)*
F6: Climate Factor	Married	267	4.158	.6962	.702
	Unmarried	141	4.108	.6528	(.483)

**Significant at 0.05 level*

Table 6 explain the result of t-test applied to investigate statistical difference based on working experience of employees engaging in automobile sector. In respect to third factor (Hygienic Conditions) responses is found significantly different with experience holder (M=4.226) and employees who have no experience (4.025). The [p value - 0.003*] is less than .05 at 95% degree of confidence scale cleared that significant difference is found here. In case of Climate factor, the [p value - 0.000*] is found again significant and showed experience holder employees (M=4.310) have greater mean value as compared to without experience employees (M= 3.953). With respect to rest of the factor body safety provisions, pollution reduction measures, workers participation in safety & maintenance practices and operational measures differences is found in the response but significant difference is not found at 95% degree of confidence scale. Results of this table show that in relation to every case, experience holder employees mean value is higher as compared to fresher employees. With increasing experience, employees become more conscious towards health and safety measures may be the reason behind it. Experience holder employees can easily recognize the reasons of accident.

Table 6: T-test statistics for work experience and status of health & safety measures

Factor	Experience	N	Mean	SD	t-value
F1: Body Safety Provisions	Yes	215	4.130	.6531	1.593
	No	193	4.027	.6451	(.112)
F2: Pollution Reduction Measures	Yes	215	3.838	.7036	1.260
	No	193	3.746	.7749	(.208)
F3: Hygienic Conditions	Yes	215	4.226	.6878	2.968
	No	193	4.025	.6765	(.003)*
F4: Workers' Participation in Safety & Maintenance Practices	Yes	215	3.930	.7353	.075
	No	193	3.924	.7058	(.940)
F: 5 Operational Measures	Yes	215	4.015	.6909	.553
	No	193	3.977	.6922	(.580)
F: 6 Climate Factor	Yes	215	4.310	.5562	5.465
	No	193	3.953	.7558	(.000)*

Significant at 0.05 level

Table 7 elucidates the result of t-test applied to found statistical difference based on locality of employees. In relation to body safety provisions employees' responses is found significantly different with rural background employees (M=4.158) and employees those belong to urban area (M=4.019). The p value (0.032*) is less than significant level corroborated that significant difference is found here. In case of Climate factor, the [p value-0.035*] is found again significant and showed employees belonging to rural area (M=4.062) have lower mean value as compared to urban area employees (M=4.205). In case of other factors including Pollution reduction measures, hygienic conditions, workers participation in safety & maintenance practices and operational measures differences is found in the response but significant difference is not found at 95% degree of confidence scale. Results of this table show that on the basis of locality only two factors are significantly different. Reason of these findings may be only these two factors are important for employees whether they belong to rural or urban background.

Table 7: T-test statistics for locality and status of health & safety measures

Factors	Locality	N	Mean	SD	t-value
F1: Body Safety Provisions	Rural	182	4.158	.5557	2.147
	Urban	226	4.019	.7131	(.032)*
F2: Pollution Reduction Measures	Rural	182	3.774	.6998	-.490
	Urban	226	3.810	.7698	(.624)
F3: Hygienic Conditions	Rural	182	4.192	.5399	1.596
	Urban	226	4.083	.7867	(.111)
F4: Workers' Participation in Safety & Maintenance Practices	Rural	182	3.979	.6111	-.101
	Urban	226	3.886	.7968	(.920)
F: 5 Operational Measures	Rural	182	4.071	.5814	.566
	Urban	226	3.938	.7640	(.572)
F: 6 Climate Factor	Rural	182	4.062	.6747	-2.113
	Urban	226	4.205	.6811	(.035)*

Significant at 0.05 level

Table 8 explore the results come after applied t-test on the basis of qualification category and in respect to all factor no significant difference is found. In every case p value is more than significant level (0.05) confirmed that no significant difference is found in responses given by respondents whether they belong to technical or general qualification category. But on the basis of higher mean value (M=4.100) in respect to body safety factor, (M=4.146) in respect to hygienic conditions, (M=3.949) in case of Workers' Participation in Safety & Maintenance Practices, (M=4.017) in relation to operational measures and (M=4.169) with respect to climate factor of employees belong to technical qualification as compared to general qualification category employees in every case demonstrated that availability of all health and safety measures in the organization. The reason may be that technical employees are directly involve in production process and they know each and every aspect related to any causality or reason of accident occurred during the work.

Table 8: T-test statistics for qualifications and status of health & safety measures

Factors	Qualifications	N	Mean	SD	t-value
F1: Body Safety Provisions	Technical	338	4.100	.6197	1.256
	General	70	3.992	.7819	(.210)
F2: Pollution Reduction Measures	Technical	338	3.794	.7075	-.021
	General	70	3.796	.8798	(.983)
F3: Hygienic Conditions	Technical	338	4.146	.6749	.947
	General	70	4.060	.7547	(.344)
F4: Workers' Participation in Safety & Maintenance Practices	Technical	338	3.949	.7068	1.357
	General	70	3.821	.7803	(.176)
F5: Operational Measures	Technical	338	4.017	.6644	1.299
	General	70	3.900	.8052	(.195)
F6: Climate Factor	Technical	338	4.169	.6633	1.849
	General	70	4.004	.7517	(.065)

**Significant at 0.05 level*

Table 9 depicts ANOVA test statistics for age and exiting status of health and safety measures adopted by the automobile sector. In respect to body safety provisions employees' responses is found significantly different with 21-30 age group (M=4.002), 30-40 age group (M=4.194) and above 40 (M=4.221). On the basis of p value (0.010*) it is demonstrated that significant difference is found in the response given by the different age group. In case of third factor (hygienic conditions), the [p-value-0.015*] is found again significant and showed employees belong to 21-30 age group (M=4.053) and 30-40 age group (M=4.226) have lower mean value as compared to above 40 age group (M=4.309). Further in relation to Workers' Participation in Safety & Maintenance Practices, Operational Measures and Climate Factor and significant difference are also found and mean value is increasing with the increase in age. With respect to pollution reduction measures differences is found in the responses given by different age group category but not found at significant level at 95% degree of confidence scale but mean value is increasing here also with the increase in age. The reason behind this as the age increase employees' consciousness regarding health and safety is also increased.

Table 9: ANOVA test statistics for age and status of health & safety measures

Factor	Age (years)	N	Mean	SD	F-value (p-value)
F1: Body Safety Provisions	21-30	246	4.002	.6948	4.678 (.010)*
	30-40	116	4.194	.5525	
	Above 40	46	4.221	.5774	
F2: Pollution Reduction Measures	21-30	246	3.738	.7610	2.729 (.067)
	30-40	116	3.829	.7174	
	Above 40	46	4.005	.6335	
F3: Hygienic Conditions	21-30	246	4.053	.7442	4.267 (.015)*
	30-40	116	4.226	.5585	
	Above 40	46	4.309	.6262	
F4: Workers' Participation in Safety & Maintenance Practices	21-30	246	3.855	.7586	3.158 (.044)*
	30-40	116	4.028	.6296	
	Above 40	46	4.059	.6915	
F5: Operational Measures	21-30	246	3.918	.7200	4.124 (.017)*
	30-40	116	4.109	.6321	
	Above 40	46	4.137	.6229	
F6: Climate Factor	21-30	246	4.056	.7104	6.058 (.003)*
	30-40	116	4.218	.6386	
	Above 40	46	4.398	.5334	

**Significant at 0.05 level*

Table 10 depicts ANOVA test statistics for department and exiting status of health and safety measures adopted by the automobile sector. Only significant difference is found in operational measures dimension of health and safety [p value- 0.031]. Higher mean value (M=4.136) belong to production department as compared to quality department (M=39.00), PPC (M=3.940) and others (M=3.968). The reason behind it could be that the employees belonging to production department can easily understand the health and safety measure used in the organization as compared to other various departments in the organization.

Table 10: ANOVA test statistics for department and status of health & safety measures

Factor	Department	N	Mean	SD	F-value (p-value)
F1: Body Safety Provisions	Quality	148	4.056	.5984	2.298 (.077)
	Production	137	4.193	.5989	
	PPC	39	3.987	.6368	
	Others	84	3.988	.7956	
F2: Pollution Reduction Measures	Quality	148	3.792	.7684	1.078 (.358)
	Production	137	3.819	.6233	
	PPC	39	3.602	.9099	
	Others	84	3.848	.7703	

Factor	Department	N	Mean	SD	F-value (p-value)
F3: Hygienic Conditions	Quality	148	4.148	.6961	1.767 (.153)
	Production	137	4.204	.5950	
	PPC	39	4.121	.7114	
	Others	84	3.988	.7923	
F4: Workers' Participation in Safety and Maintenance Practices	Quality	148	3.925	.7257	1.442 (.230)
	Production	137	4.016	.6588	
	PPC	39	3.814	.6379	
	Others	84	3.839	.8301	
F5: Operational Measures	Quality	148	3.900	.6927	2.988 (.031)*
	Production	137	4.136	.6124	
	PPC	39	3.940	.6437	
	Others	84	3.968	.7976	
F6: Climate Factor	Quality	148	4.157	.7184	.177 (.912)
	Production	137	4.143	.6233	
	PPC	39	4.068	.6451	
	Others	84	4.142	.7286	

Significant at 0.05 level

Table-11 explicit the results come after applied t-test on the basis of educational qualification category, the table shows that in case of 'climate factor' significant difference is found with mean value (M=3.631) of matric passed employees, (M= 4.229) of Diploma/degree, and (M=4.105) of Post Graduate employees shows that responses regarding body safety measures are falling in fairly available to available on response scale. . The [p value - 0.000*] is less than .05 at 95% degree of confidence scale shows that there is a significant difference. In respect to rest of the cases Body Safety Provisions, Pollution Reduction Measures, Hygienic Conditions, Workers' Participation in Safety and Maintenance Practices and Operational Measures no significance difference is found but interesting findings is here that mean value is increasing with lower to higher educational qualification. The reason behind this may be as the education increase the employees also want to know about the health and safety measures adopted by the organization to reduce the any causality at work place.

Table 11: ANOVA test statistics for qualifications and status of health & safety measures

Factor	Educational Qualification	N	Mean	SD	F-value (p-value)
F1: Body Safety Provisions	Matric	47	3.943	.6032	1.306 (.272)
	Diploma/Degree	298	4.106	.6086	
	PG	63	4.066	.8464	
F2: Pollution Reduction Measures	Matric	47	3.611	.7368	1.845 (.159)
	Diploma/Degree	298	3.807	.6978	
	PG	63	3.873	.9023	

Factor	Educational Qualification	N	Mean	SD	F-value (p-value)
F3: Hygienic Conditions	Matric	47	4.106	.5411	.321 (.726)
	Diploma/Degree	298	4.147	.6819	
	PG	63	4.075	.8164	
F4: Workers' Participation in Safety and Maintenance Practices	Matric	47	3.819	.6270	1.146 (.319)
	Diploma/Degree	298	3.923	.7202	
	PG	63	4.027	.7830	
F5: Operational Measures	Matric	47	3.865	.5138	1.034 (.356)
	Diploma/Degree	298	4.008	.6738	
	PG	63	4.042	.8644	
F6: Climate Factor	Matric	47	3.631	.7525	16.988 (0.000)*
	Diploma/Degree	298	4.229	.6213	
	PG	63	4.105	.7352	

Significant at 0.05 level

5. CONCLUSION AND POLICY IMPLICATIONS

To increase the productivity and enrich the working environment, the role of health and safety measures are very important in manufacturing unit whether it belong to automobile sector or any other sector. Health and safety measures directly affect the employees' capacity while performing their duty on manufacturing process. On the basis of this research, it is revealed that all measures are adequately implemented in well-defined manner. However the task of Human Resource department has been increased due to change in laws related to health and safety of employees. But it facilitates the employees to maintain their health with the help of measures provided by the Factories Act, 1948. This paper explored the current status of health and safety measures adopted by various automobile companies and almost each aspect has been covered under this research paper and attempted to find out the facts from every direction. During the collection of data i.e. survey period one important aspect has emerged though informally that organizations follow the health and safety measures largely due to compulsion of the government legislative yet the need of the hour is the adoption health and safety measures by choice for the cause of individuals and the institutions.

6. REFERENCES

Brown, K. A. (1996). Workplace Safety-A Call for Research, *Journal of Operational Management* , Vol. 14 No. 2, pp. 157 - 171.

Cagno, E., Giulio, D.A. and Trucco, P. (2003). Risk and Causes of Risk Assessment for an Effective Industrial Safety Management, *Journal of Safety Research* , Vol. 349(3), pp. 227 - 340.

Chan, K.L. and Alan H.S. Chan. (2011). Understanding Industrial Safety Signs: Implications for Occupational Safety Management, *Industrial Management & Data Systems* , Vol. 111(9), pp. 1481 - 1510.

Clarke, S., (1999). Perceptions of Organizational Safety: Implications for the Development of Safety Culture, *Journal of Organizational Behavior*, Vol. 20, pp. 185 - 198.