ANALYSIS

20(64), June 1, 2014

ISSN 2278–5469 EISSN 2278–5450

Discovery

Safety Measures for Building Construction Workers in Unorganized Sector of Allahabad District

Rekha Verma[1]*, Razia Parvez[2], Nazia Inam[3]

1.Assistant Professor Dept. of Family Resource Management, Ethelind School of Home Science, SHIATS, Allahabad, India
2.Associate Professor; Dept. of Family Resource Management, Ethelind School of Home Science, SHIATS, Allahabad, India
3.M.Sc Student Dept. of Family Resource Management, Ethelind School of Home Science, SHIATS, Allahabad, India

***Corresponding author:** Dept. of Family Resource Management Ethelind School of Home Science, SHIATS, Allahabad, India, E-mail: rekhahari50@gmail.com

Publication History
Received: 23 March 2014
Accepted: 21 May 2014
Published: 1 June 2014

Citation
Rekha Verma, Razia Parvez, Nazia Inam. Safety Measures for Building Construction Workers in Unorganized Sector of Allahabad District. *Discovery*, 2014, 20(64), 116-123

General Note
Article is recommended to print as color digital version in recycled paper.

ABSTRACT

Construction workers are one of the most vulnerable segments of the unorganized labour sector in India. The construction is the most dangerous land based civilian work sector. The two biggest safety hazards on site are falls from height and vehicles. The "Safety measures for building construction workers in unorganized sector of Allahabad'' was undertaken with the objectives, to find out the existing safety measures of construction workers of unorganized sectors, to find out the problems regarding workers working in construction unit and to suggest safety measures for the building construction workers. The interview schedule was used for the data collection and sample size for the study was 110(55 samples men and 55 women) working in omaxe city of Allahabad. The analysis of the data was done using frequency, percentage and then Z-test was applied to test the hypothesis and the inference was drawn as per the objectives. It was concluded that the standard safety measures and safety facilities must be provided to male and female workers at construction sites. Some of the construction workers were facing problem of safety at construction site due to

which major accidents and injuries at work site were taken place daily. It was concluded that safe work environment was not provided at work site. Some were given safety equipment's while some were not given for protection during work. A safety facility was not proper. Medical facility was not given properly to all workers. Injuries occurred due to unsafe work environment and lack of facility. Safety an inspection was not done properly by the official's in charge.

Keywords: Safety, construction workers, construction site.

1. INTRODUCTION

Modernization and industrialization have paved a good way for the construction industry. Small towns and cities have become more urbanized and the construction sector too has got a boost. The construction industry is the most dangerous land based civilian work sector. In the European Union, the fatal accident rate is nearly 13 workers per 100,000 as against 5 per 100,000 for the all sector average. Today, nearly 60 percent of women aged 16 and over participate in the workforce. While women have made some gains in occupations traditionally occupied by men, construction trades remain overwhelmingly male dominated. In 1970, when OSHA was enacted, women made up less than one percent of workers in the construction trades. By 1995 that percentage had only grown to 2.3 percent (Andi, 2008).

The construction industry is an injury prone industry. Workers are exposed to new hazards due to the changing nature of construction projects as per requirement of every day. Different causes of injuries are tripping, slipping, fall of objects from above, hit by materials, pricking by nails or other sharp objects. Construction workers require physical fitness because their work requires working in cramped spaces, lifting and carrying heavy objects, and working with potentially dangerous tools and equipment (Bhattarjee and Ghosh, 2011).

Now a day's men and women both are playing an important role in construction work. In case of women construction workers, the problems at work site are more, as they have to look after their husbands, elders and children. Further, there are temporary dwellings in which they are living, which show the lack of social security and privacy. Majority of the construction workers are illiterate and they don't know about the work discrimination cases in construction work. It is also emphasized that the wages paid to construction laborers is also lower and discriminatory, based on the relation of the employers and employees. The problems of construction workers are extreme, if they are pregnant or having small children. There is no system at all to take care of these children at the work site (Brubette and Maria, 2005). These construction workers have no leave and if absent at construction site due to ill health and other reasons, they have to face cut in their wages and lose their work. Construction Workers are exploited because they are socially backward, unorganized, uninformed, and poor. In order to minimize the above problems related to the safety of the construction workers the need arises for the study of the safety measures of building construction workers. So on the basis of the above justification the present study was proposed to be undertaken with the following objectives. To find out the problems regarding workers working in construction units. To find out the existing safety measures of construction workers of unorganized sectors.

2. MATERIALS AND METHODS

The study was carried out in the Omaxe city near Trans Ganga areas of Allahabad which is one of the unorganized sectors where construction work is going on in large scale. The sample size selected for the study was 110. The 55 samples of men and 55 samples of women were selected for the study. As there were more number of workers in the Omaxe city so the selection of sample was easy. The random sampling was adopted for the data collection. Interview schedule was prepared to conduct the study. The personal interview was taken from the workers in the Omaxe City while working and each question was filled by asking questions from the workers correctly. There were 32 questions in the interview schedule related to the study. The Interview Schedule was framed using internet, reports, books, journals and articles. The survey method was used for data collection for which Interview schedule was prepared. Then the survey was conducted in Omaxe city of Allahabad. The questions were asked by investigator from the male and female construction workers and then the interview schedule were filled correctly. The interview was conducted on both men and women at the construction site. The qualitative and quantitative data were tabulated and quantified as per the standard procedure and analysis done was as under.

Frequency and Percentage:-

Arithmetic mean

Standard Deviation (S)

Testing of Hypothesis:-

A statistical hypothesis is an assumption about a population parameter. This assumption may or may not be true.

- The best way to determine whether a statistical hypothesis is true would be to examine the entire population. Since that is often impractical, researchers typically examine a random sample from the population. If sample data are not consistent with the statistical hypothesis, the hypothesis is rejected. The framed Hypothesis was tested by using Z-test.

3. RESULTS AND DISCUSSION

3.1. Background information of male and female workers

Table 1 shows that the background information of worker who have working at unorganized sector in Omaxe city of Allahabad and distribution of males workers and females workers according to their age, family type, mode of payment, duration of working. The table 1 shows that the 45.4 percent male workers and 49.0 percent female workers were in age range of 29-38 years and age range of 39-48 years and 21.8 percent male workers and 40.9 percent female workers were in age group of 39-48 years and 29-38 years whereas 14.5 percent male workers and 16.4 percent female workers were in age group of 18-28 years. And 63.6 percent of male workers and 54.5 percent female workers belonged to joint and nuclear family whereas 36.3 percent male workers and 45.4 percent female workers belonged to nuclear and joint family. Sixty percent male workers and 50.4 percent female workers were getting monthly payment and 32.7 percent male workers, 30.0 percent female workers were getting daily payment whereas 7.3 percent male workers and 14.5 percent female workers were getting weekly payment. Only 43.6 percent male worker and 53.7 percent female workers were working 12 hours and 29.0 percent male workers and 25.4 percent female workers were working 5 hours. Whereas 21.8 percent male and 21.8 percent female workers were working less than 8 hours. After calculation, it is concluded that, Z cal (-0.708) is less than Z tab (1.96) at 5% level of significance, therefore female and male construction workers were not provided safety equipments.

The data in the table 2 shows that 67.2 percent male workers and 54.5 percent female workers were getting helmet at work time and 32.7 male workers and 45.4 percent female workers were not getting helmet and total 60.9 percent workers were getting helmet at work time and 30.9 percent workers were not getting helmet at work time. And 58.1 percent male workers were getting face shield at work time and 45.4 percent female were getting face shield at work time. Data shows that 41.8 percent of male workers and 54.5 percent of female workers were not getting face shield at work time. Total number of workers 51.8 percent were getting face shield at work time and 41.8 percent were not getting face shield at work time.

Only 58.1 percent male workers were getting face chaps and 51.8 percent female workers were getting face chaps at work time and 41.8 percent male were not getting chaps and 55.6 percent female workers were not getting face chaps at work time whereas total number of workers that were getting face chaps are 47.2 percent and that were not getting face chaps at work time are 55.6 percent. Only 45.4 percent male workers and 50.9 percent female workers were getting welding gloves at work time whereas 54.5 percent of male workers and 49.0 percent were not getting welding gloves at work time by construction company. Total number of workers that were getting welding gloves for welding work are 50.4 percent and that were not getting welding gloves are 51.8 percent at work time.

Table 2 shows that 58.1 percent of male and 70.9 percent of female 58.1 percent of male and 70.9 percent of female workers were getting ear plug cat work time whereas 41.8 percent male and 29.0 female workers were not getting ear plug at work time by construction company. Total number of workers 64.5 percent were getting ear plug and 35.4 percent were not getting ear plug at work time. Only 36.3 percent of male and 63.6 percent of female workers were given reflective coverall and 63.6 percent of male and 36.3 percent female were not getting reflective coverall at work time. Whereas total workers 60.0 percent were given reflective coverall and 50.0 percent workers were not getting reflective coverall at work time.

Fifty and nine percent of male and 50.9 percent female workers were getting steel boots at work time. And 49.0 percent male and 50.9 percent female workers were not getting steel tools at work time. Total numbers of workers that were provided steel boots are 50.9 percent and that were not getting steel boots all 49.0 percent 56.3 percent of male and 52.7 percent of female workers were getting rubber gloves at work time 25.4 percent of male and 47.2 percent of female workers were not getting rubber gloves at work time. Whereas total number of workers that were getting rubber gloves is 54.5 percent and that were not getting rubber gloves are 36.4 percent Construction Company.

Table 1

Distribution of workers according to their background information

S. No.	Variables	Male Workers		Female Workers		Total
		Frequency (n=55)	Percentage %	Frequency (n=55)	Percentage %	N=110
1.	Age range					
	1. 18-28	8	14.5	10	18.1	16.36
	2. 29-38	25	45.4	20	36.3	40.9
	3. 39-48	12	21.8	15	27.2	49.0
	4. Above 48	10	18.1	10	18.1	18.1
2.	Family Type					
	1. Nuclear	20	36.3	30	54.5	45.4
	2. Joint	35	63.6	25	45.4	54.5
3.	Mode of Payment					
	1. Daily	18	32.7	17	30.9	31.8
	2. Weekly	4	7.27	8	14.5	10.9
	3. Monthly	33	60	30	54.5	57.2
4.	Duration of Working					
	1. 8 hrs	19	29	29	52.7	43.6
	2. 12 hrs	24	43.6	12	21.8	32.7
	3. Others	12	21.8	14	25.4	23.6

Table 2

Distribution of workers according to safety equipments provided

Variables	Male				Female				Total	
Safety equipments	Frequency (n=55)		Percentage %		Frequency (n=55)		Percentage %			
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
1. Helmet	37	18	672	32.7	30	25	54.5	45.4	60.9	39.0
2. Face shield	32	23	58.1	41.8	25	30	45.4	54.5	51.8	48.1
3. Face Chaps	23	32	41.8	58.1	29	26	52.7	47.2	47.2	55.6
4. Welding gloves	25	30	45.4	54.5	28	27	50.9	49.0	50.4	51.8
5. Ear plug	32	23	58.1	41.8	39	16	70.9	29.0	64.5	35.4
6. Reflective high visibility vest or orange (or lime yellow) reflective coverall.	20	35	36.3	63.6	35	20	63.6	36.3	50.0	50.0
7. Steel Boots	28	27	50.9	49.0	28	27	50.9	49.0	50.9	49.0
8. Rubber gloves	31	14	56.3	25.4	29	26	52.7	47.2	54.5	36.4
9. Gloves	44	11	80	20	26	29	47.2	52.7	63.6	36.3
10. Gas mask	30	25	54.5	45.4	20	35	36.3	63.6	45.4	54.5
11. Safety belt	27	28	49.0	50.9	29	26	26	52.7	47.2	50.9

Table 3

Distributions of workers according to safety and follow ups

Variables	Male				Female				Total	
	Frequency (n=55)		Percentage %		Frequency (n=55)		Percentage %			
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Doctors availability	30	25	54.5	45.4	33	22	60	40	57.2	52.7
Medical facilities	40	15	72.7	27.2	35	20	63.6	36.3	68.1	31.8
Security facilities	32	23	58.1	41.8	34	21	61.8	38.1	60	51.8

Table 4

Distribution of workers according to safety facilities

Variables	Male				Female				Total	
	Frequency (n=55)		Percentage %		Frequency (n=55)		Percentage %			
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
1. Safety equipments	35	20	63.6	36.3	35	20	63.6	36.3	63.6	36.3
2. Leave when ill	32	23	58.1	41.8	35	20	63.6	36.3	60.9	39.0
3. Transportation of dangerous construction materials	39	16	70.9	29.0	32	23	58.1	41.8	64.5	35.4

Table 5

Distributions of workers according to safety measures

Variables	Male		Female		Total
	Frequency (n=55)	Percentage %	Frequency (n=55)	Percentage %	
1. Safety from falling objects					
(a) Eye	0	49	7	12.7	7
(b) Face	27	49.0	31	56.6	52.7
(c) Head	28	50.9	17	30.9	40.9
2. Safety from sharp objects					
(a) Arm	0	0	0	0	0
(b) Hand	23	41.8	29	52.7	47.2
(c) Foot and Leg	32	58.1	26	47.2	52.7
3. Safety against chemical exposures					
(a) Respiratory	7	12.7	12	21.8	17.2
(b) Arm	22	40	27	49.0	44.5
(c) Hand	16	29	16	29.0	29

	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
4. Gas detection devices available	30	25	54.5	45.4	30	25	54.5	45.4	54.5	45.4
5. Heal and tail lights provided	23	32	41.8	58.1	33	22	60	40	50.9	49.0
6. Certificate of testing & inspection available for lifting machinery	35	20	63.6	36.3	36	19	65.4	34.5	64.5	35.4
7. Officials in charge of execution	32	23	58.1	41.8	29	26	52.7	47.2	55.4	44.5

of work at the various organizational levels in the omaxe city ensure strict enforcement of safety regulations in the execution of work.										
8. Contractors evaluated monthly for safety	20	35	36.3	63.6	27	28	49.0	50.9	42.7	57.2
9. Fire extinguish shears provided	32	23	58.1	41.8	30	25	54.5	45.4	56.3	43.6

Table 6

Distributions of workers according to injuries

S. No.	Variables	Male				Female				Total	
		Frequency (n=55)		Percentage %		Frequency (n=55)		Percentage %		N=110	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
1.	Ever injured	29	26	52.7	47.2	30	25	54.5	45.4	53.6	46.3
2.	Type of injuries										
	1) Eye infection	4		7.2		1		1.8		4.55	
	2) Leg injury	20		36.3		10		18.1		27.2	
	3) Limb fracture	11		20		28		50.9		35.4	
	4) Fallen from height	20		36.3		16		29.0		32.7	

Eighty percent of male and 47.2 percent of female workers were getting gloves at work time. Twenty percent of male and 52.7 percent of female workers were not getting gloves at work time. Whereas total number of workers that were getting gloves is 63.6 percent and not getting are 36.3 percent at work time. And 54.5 percent male and 36.3 percent female were getting gas mask at work time. 45.4 percent male and 63.6 percent female were not provided gas mask at work time. Whereas total number of workers that were getting gas mask is 45.4 percent and that were not getting gas mask are 54.5 percent at work time. Data shows that 49.5 percent of male and 26 percent of female were given safety belt at work time. 50.9 percent of male and 26 percent female were not getting safety belt at work time. Whereas total number of workers that were getting safety belt is 47.2 percent and that were not getting safety belt are 50.9 percent.

The table 3 shows that the 54.5 percent of male workers reported that doctors were available 29 hours and 60 percent of female reported that doctors were available 24 hours 45.4 percent of male and 40 percent of female responded that doctors were available 24 hours at 2 percent work site. Total numbers of workers answered that doctors were available 24 hours. And 52.7 percent said that doctors were not available. Seventy two and seven percent of male and 63.6 percent of female workers responded that medical facility was given and 27.2 percent of male and 56.3 percent of female workers reply that medical facility was not given. Total number of 68.1 percent of workers reported that medical facility was not given. Data shows that 58.1 percent of male and 61.8 percent of female workers reply that insurance was given. And 41.8 percent of male and 38.1 percent of female workers reply that insurance was not given total number of 60 percent workers responded that insurance was given and 51.8 percent reported that insurance was not given to them. After calculation, it is concluded that z cal (-0.589) is less than z tab (1.96) at 5% level of significance, therefore female and male construction workers were not provided safety facilities.

The table 4 illustrates that the 63.6 percent male and 63.6 percent female were given safety equipment. The 36.3 percent male and 36.3 female workers were not given safety equipment. The total 63.6 percent were given safety equipment and 36.3 percent were not given. Similar findings were reported by Visscher, Shahid and Frits (2008). Data shows that 58.1 percent male and 63.6 percent female were given leave because they were ill severely. Only 41.8 percent male and 36.3 percent female were not given leave if suffering from bad health. The total 60.9 percent workers were given leave. And 39.0 percent were not given leave if suffering from bad health. Seventy and nine percent male workers and 58.1 percent reply that transportation and handling of

explosives facility was given whereas 29.0 percent male and 41.8 percent female answered that transportation and handling of explosives facility was not given. The total 64.5 percent reply that transportation of dangerous construction materials facility was given and 35.4 percent reply that transportation of dangerous construction materials facility was not given. After calculation, it is concluded that z cal (0.796) is less than Z tab (1.96) at 5% level of significance, therefore female and male construction workers were not provided safety measures.

The table 5 illustrates that 49 percent of male and 7 percent of female workers were given eye protection and total 7 percent of workers were not given eye protection. Forty nine percent of male and 56.6 percent of female workers were provided face protection. Total 52.7 percent of workers were given face protection. Data show that 50.9 percent of male and 30.9 percent of female workers were provided head protection. Total 40.9 percent of workers were getting head protection safety from sharp objects. None of male and female workers were given arm protection. Total none of workers were given arm protection from sharp objects. And 41.8 percent of male and 52.7 percent of female workers were getting hand protection. Total 47.2 percent of workers were given hand protection from sharp objects. And 58.1 percent of male and 47.2 percent of female workers were provided foot and leg protection from sharp objects total 52.7 percent of workers were given foot and leg protection from sharp objects.

Table 6 shows that 12.7 percent of male and 21.8 percent of female workers provided respiratory protection. Total 17.2 percent of workers were given respiratory protection against chemical exposure. Forty percent of male and 49.0 percent of female workers were given arm protection. Twenty nine percent of male and 29 percent of female workers were not provided. Total 29 percent of workers were given hand protection. Similar study was done by Nicole D and Francois B (2002). Fifty four and five percent of male and 54.5 percent of female workers reported that gas detection devices were available at work site. And 45.4 percent of male and 45.4 percent of female workers responded that gas detection devices were not available. Total 54.5 percent of workers reported that gas detection devices were available and 45.4 percent of workers responded that gas detection devices were not available at site. Data shows that 41.8 percent of male and 60 percent of female reported that heal and tail lights were provided at site. And 58.1 percent of male and 40 percent of female reply that heal and fail lights were not provided at site. Total 50.9 percent said that heal and tail lights were provided and 49.0 percent of workers said that heal and tail lights were not provided at site. Total 50.9 percent told that heal and tail lights were provided and 49.0 percent of workers said that heal and tail lights were not provided. Similar study was done (Prasad and Reghunath, 2011).

Sixty three and six percent of male and 65.4 percent of female workers reported that certificate of testing and inspections were available for lifting machinery. And 36.3 percent of male and 34.5 percent of female workers reported that certificate of testing and inspections were not available for lifting machinery. Total 64.5 percent workers answered that artificial of testing and inspection were available and 35.4 percent of workers reported that certificate of testing and inspection for lifting machinery were not available at site. Fifty eight and one percent of male and 52.7 percent of female workers reported that officials in charge of execution of work at the various organizational levels in the Omaxe city ensure strict enforcement of safety regularities in the execution of work. And 41.8 percent of male and 47.2 percent of female workers answered that officials in charge of execution of work at the various organizational levels in the Omaxe city did not ensure strict enforcement of safety regulations in the execution of work. Total 55.4 percent of workers reported that officials in charge of execution of work at the various organizational levels in the Omaxe city ensure strict enforcement of safety regulations in the execution of work. And 44.5 percent of workers reply that official in charge of execution of work at the various organizational levels in the Omaxe city did not ensure strict enforcement of safety regulations in the execution of work (Rozenfeld et al., 2010). Thirty six and three percent of male and 49.0 percent of female workers reply contractors were evaluated monthly for safety. 63.6 percent male and 50.9 percent female workers reported contractors were not evaluated monthly for safety. Total 42.7 percent of workers reply contractors were evaluated monthly for safety. And 54.2 percent of workers contractors were not evaluated monthly for safety. Similar research was done by Raja RA (2007).

Data show that 58.1 percent of male and 54.5 percent of female workers reply fire extinguish shears were provided at site. And 41.8 percent of male and 45.4 percent of female workers reported fire extinguish shears were not provided at site. Total 56.3 percent of workers answered fire extinguish shears were provided at site whereas 43.6 percent reported that fire extinguish. The table 6 reveals that 52.7 percent of male and 54.5 percent of female workers were injured at work site. And 47.2 percent of male and 45.4 percent of female workers were not injured at work site. Total 53.6 workers with injured at site whereas 46.3 percent were not injured at work site. Similar research was done by D Bonanto, B Silverstein, D Adams (2006). Data show that 7.2 percent of male and 1.8 percent of female workers were having eye infection while working at work site. Total 4.55 percent were having eye infection. And 36.3 percent of male and 18.1 percent of female workers were having leg injury while working at work site. Total 27.2 percent of workers were having leg injury while working at work site. Twenty percent of male and 50.9 percent of female workers were having and fracture while working at construction site. Total 35.4 percent were having hand fracture while working at work site. And 36.3

percent of male and 29.0 percent of female workers had fallen from height while working at work site. Total 32.7 percent of workers fallen from height while working at work site.

4. CONCLUSION

It is concluded that the building construction workers in unorganized sectors were not given proper safety measures by the construction company. Some workers were given safety facilities and safety equipments and some were not given. There was a significant difference between safety measures, safety facilities, safety equipments and follow ups, provided or not provided to male and female construction workers. Some of the construction workers were facing problem of safety at construction site due to which major accidents and injuries at work site were taken place daily. Therefore, it is concluded that standard safety measures and facilities must be provided to male and female workers at construction sites.

SUMMARY OF RESEARCH

- Safe work environment was not provided at work site.
- Some works were given safety equipments while some were not given for protection during work.
- Safety facilities was not proper .Medical facility was not given properly to all workers.
- Injuries occurred due to unsafe work environment and lack of facility
- Safety an inspection was not done properly by the official's in charge.

FUTURE ISSUSES

- Similar study can be taken up on the workers of various occupation and industries.
- Workers of organized sectors of building construction sector could be studied

DISCLOSURE STATEMENT

There is no special financial support for this research work from the funding agency.

REFERENCE

1. Andi (2008). "Construction workers perception toward safety culture," Repeat survey. Civil Engineering dimension March, 2008.
2. Bhattarjee and Ghosh (2011), "Safety improvement approaches in construction industry: a review and future directions", 47th ASC Annual International Conference Proceedings Associated Schools of Construction.
3. Brubette and Maria (2005), "Development of Educational and Training materials on safety and health: Targeting Hispanic workers in the construction Industry, "http://journals iww.com/family and community health.
4. D.Bonanto, B.Silverstein, D.Adams (2006), "Accident on construction sites and their reason, "*Journal of Civil engineering and management,* Vol. 12, pp. 20-28.
5. Nicole. D. and Francois. B. (2002). "A framework for evaluating the safety performance of construction contractors", Building and Environment 40(10), pp-13-20
6. Prasad and Reghunath (2011), "Empirical Analysis of construction safety climate. A study", *International journal of Engineering Science and Technology*, Vol.-2(6), 1699-1707.
7. Prasad and Reghunath (2011), "Empirical Analysis of construction safety climate. A study", *International journal of Engineering Science and Technology*, Vol.-2(6), 1699-1707.
8. Raja R.A. (2007) , "Construction Job Safety analysis", Safety Science 48,pp. 491-498.
9. Rozenfeld .O.,Sacks.R.,Rozenfeld.Y.,Baum.Hadassa.,(2010), "Construction Job Safety analysis", Safety Science 48,pp. 491-498.
10. Visscher, Shahid and Frits (2008)., "An assessment of health and safety management of health and safety management within working groups in the U.K. manufacturing sectors. *Journal of safety research*, 32, 479-490.