HUMAN ERROR STILL CAUSES A THREAT TO CONSTRUCTION INDUSTRY: IS IT BECAUSE OF NEGLIGENCE OR LACK OF KNOWLEDGE?
(Evidence from the construction industry of Tashkent City, Uzbekistan)

[1]Aziz Zikriyoev, [2]Ravshan Nurimbetov

HIGHLIGHTS

- We estimate a proxy variable model to identify the effect of well-organized Health and Safety Regulation in construction industry;

- We find significant effects by induction of international standards and conventions for work quality in construction industry achievement;

- The effects are relatively small, but imply sizable life-time increasing of safety regulations based on ILO goals;

- Conventional estimates understate the effect of Health and Safety Regulation by reduction of site accidents for about 80%;

- Measurement error may reconcile the ambiguous evidence on effects of construction site accident rate;

- Health and Safety accident event variables distributed based on few articles from Sciencedirect for testing current situation of construction industry in international level; and

- Has been tested main categories from the article of "Work Accidents Correlation Analysis for Construction Projects in Northern Greece 2003–2007:A Retrospective Study" by the authors of Sotiris Betsis, Maria Kalogirou, Georgios Aretoulis and Maria Pertzinidou from Thessaloniki, Greece in Uzbekistan construction sector.

ABSTRACT-- Current research presents a systematic analyses based on approach for Prospective Health and Safety Performance on construction sites, with causal relationships and interactions between international standards and Uzbek construction site regulations taken into account. Four typical types of construction enterprises, namely the private enterprise, state enterprise, joint enterprise, and international enterprise are selected as sample to measure the level of safety performance given variables. Results provide professional safety performance practice in the construction site, and indicate tha the level o total knowledge and practice of

[1] *PhD student, Architecture and Civil Engineering Institute Tashkentz.aziz@taqi.uz*
[2]*DSc, Vise-Rector of Research and Innovations Architecture and Civil Engineering Institute Tashkent, Uzbekistan r.nurimbetov@taqi.u*

construction site personals. It can be explained that the construction sites hav graduall matured with the international norms, and conventions for improving risk assessment low level of accident rate in construction industry. Health and Safety performance differences existing due to organizational structure and skilled employee of the construction company categories are compared and analyzed based on evaluation results. This article provides insights into conceptual relationships among Health and Safety performance variables and goals, which can facilitate the development of ILO 155 and 167 conventions in construction industry of Uzbekistan. Main purpose of the current paper is examine risk level on site, evaluate human factor and preventing accident rate by reducing workers knowledge and experience for self-awareness.

Keywords--Human capital, awareness, accident, knowledge, working conditions, Health and Safety Regulation, cost of safety.

I.   INTRODUCTION

As we speak about human capital (human resources, human factor, social capital, and human force) it is directly going to male or female work ability personality. Interesting and meaningful work, which provided safety and preservation of physical, mental as well social health of the individual, is central to human life and well-being. Good working conditions contribute to ability to work, increase productivity and improve competitiveness.

Relevance of the current research area is raising human capital in construction industry of Uzbekistan too in accordance with the fully approved international standards. In Uzbekistan there are lots of reforms on this field: Action of Strategy 2017-2021 which in Section 4 directly states "Support Social Sector", announced year of current 2019, "Active investment and Social protection year of 2019", and State development goal by 2025 for increasing visibility of attractive in Doing Business reforms by liberalization and integration of construction industry make extremely reliability of this research.

The Ministry of Labor and Employment of Uzbekistan is experiencing an increase in accidents due to non-observance of labor protection. During the first five months of this year, 228 accidents were reported in the country, 61 of which were fatal, 155 were fatal and 11 were accidents. The In particular, there were 554 accidents in production throughout the country in 2018, of which 164 were fatal, 364 were fatal and 26 were group accidents. As a result of these accidents, 183 employees were died, 428 were seriously injured and 47 were injured. During the first five months of this year, 228 accidents were reported in the country, of which 61 were fatal, 155 were fatal and 11 were accidental.

Analytical investigations often show that employers do not comply with occupational safety requirements in accidents; insufficient awareness of the labor protection legislation by employees and does not claim their rights accordingly; unofficial use of personnel; non-payment of labor protection measures; showed that there are factors such as the lack of referrals for occupational safety, training for occupational safety and knowledge-based employment [1].

If we look through statistical information in result of breaking Health and Safety regulation at construction industry some 600,000 lives would be saved every year if available safety practices and appropriate information were used:

- Every year, 250 million accidents occur causing absence from work, the equivalent of 685,000 accidents every day, 475 every minute, 8 second;

- Working children suffer 12 million occupational accidents and an estimated12,000 of them are fatal;
- 3,000 people are killed by work every day, 2 every minute;
- Asbestos alone kills more than 100,000 workers every year [2]
- According to the ILO figures, the biggest killer in the workplace is cancer, causing roughly 640,000 or 32 per cent of deaths, followed by circulatory diseases at 23 per cent, then accidents at 19 per cent and communicable diseases at 17 per cent. Asbestos alone, the report says, takes some 100,000 lives annually.

Worse still, 12,000 children die each year working in hazardous conditions [3].

The Ministry of Employment and Labor reported that appropriate measures were being taken to address these violations. In particular, 6,118 written instructions and 298 submissions were issued to eliminate violations during the same period of the current year. An administrative fine of 395543 thousand sums was imposed against 207 officials for allowing violations during the special accident investigation. In addition, for the first 5 months of 2019, the State Labor Inspectorate reviewed 7,152 citizens' appeals which 4,668 were satisfied and 2,449 citizens were violated labor rights [4].

II.   METHODS AND MATERIAL

Research Philosophy: In this research we used survey method by giving 20 questions to all 103 construction site cases of Tashkent City, Uzbekistan. It determines the way a specific set of data collected, inferred and utilized for a research work. All collected data distributed in positivism, realism and interpretivism.

Research Approach: From the modern tendencies of the world construction industry can be seen that "Zero rate accident" and "Safety First" national act have been implemented for limited accident rate in construction industry. Globalization of construction industry in the same level of international standards Uzbekistan has already collaborated with ILO for more competitive working area. By transforming teaching and training system into global Health and Safety regulation increasing efficiency of construction process in various aspects among world class building industry in Uzbekistan. As for the analyses we tested deductive approach based on current research

Research Strategies: In accordance with the research survey questions collected primary source of categorical data is qualitative which characterized opinion only. In spite of the collected date was from the different geographical locations of construction industry results and outcome can be reached main objectivity of the research.

Time Horizon: Current research work has been conducted in panel data analysis with regression and correlation of chosen variables by determining variation Eco efficiency. All data analyzed in Stata 14.0 software with Cronbach's Alpha method.

Data Collection: For collecting data we learned each 103 construction sector respondents during 4 seasons on topic "Reduction of accident rate by implementing ILO conventions in construction sector of Uzbekistan". All sector members have been agreed research project in current topic and for data would prefer using descriptive survey method to prove validity and reliability of the collected data set. Survey questions organized in closed and liker scale formats in Google Forms.

Current research questions created based on UN New Millennium Goal, UNDP Sustainable Development Goal, Human Development Indices and Indicators, ILO conventions, WHO reports, UNIDO researches, World Social Protection Report, Global Trends: Emerging Construction Labor Markets, A global forecast for the construction industry to 2030, Human Resources Annual Report FY 2017-2018, Human Resources Report 2018, Human Development Index, International construction market survey 2018, The Global Human Capital Report 2017, National Human Development Report 2018, Human Capital Survey Report 2018, The Global Health 50/50 Report 2018, World Employment Social Outlook Trends 2018, The Inclusive Development Index 2018, Social Finance & Impact Insurance, World health statistics 2018, Support Social Sector state program.

III.   PURPOSE

1.This paper will review the research conducted on identify current practical achievements of the selected construction sector.

2. This paper will describe discussion on statistical and mathematical analyzing collected data by comparing the priority results with each selected construction site.

3. This report will explain how reducing accident rate by enhancing comprehensive knowledge on teaching and training of all employee on sites.

4. Accident rate limitation by means of modern science and technology induction of good intelligence or knowledge based construction work force.

IV.   LITERATURE REVIEW

The focus of recent research has been presented based on previous research in international platforms like Web of Science, Scopus, Science Direct, and Google scholar databases. As for the main keywords used "construction industry safety", "health and safety regulations" and "construction accident", a various articles were studied which does match for the research area. Studies were selected based on the following criteria:

a) the study was qualitative and quantitative with a focus on identifying categories and variables regarding construction industry;

b) was published between 1996 and 2018;

c) was available online and open access;

d) was published in a scientific indexing journal, and

e) was written in English.

f) was cite scored between 1,45-3,5

A number of relevant research papers are listed below. The aim is to firstly identify the type and classification method of data and then compare the results of the presented papers with the findings of the current research.

The next study sheds light on fatal falls. In this context, the study by Chi, Chang, and Ting, which analyzed 621 cases of fatal falls during 1994–1997, found that 92.1% of the workers involved in the accidents were men [5], and the remaining 7.9% were women. In 29.1% of cases, the workers' age falls in the range 35–44 years, followed by 22.2% for 25–34-year-old workers, and finally, 18.5% of the cases concern workers in the age group 45–54 years. The majority of fatal falls, 80.5%, involved workers with less than one year's experience [6]

Several publications have appeared in recent years documenting cause of accidents is the focus of the next research paper. Jabbari and Ghorbani [7] found that the most frequently occurring type of accident was falling to a lower level, which occurred in 57% of the cases. The second most common type of accident was injury due to falling objects with 20%. This was followed by contact with hazardous materials, which occurred in approximately 12% of the cases. The main cause of occupational accidents is attributed to working at height or open edges without using fall-protection systems (33% of the cases) followed by accidents associated with working on unsafe scaffolding, during erecting or gas pipelines and electrical systems, each representing 10% of the cases.

Similarly, Goh's and Ubeynarayana's study sheds light on [8] the types of accidents in construction sites. Their study analyzed 1000 cases of construction accidents and found that: 23.6% of the accidents were falls, 21.2% are related to objects collapsing, 13,4% were strikes by falling objects and 10.8% were electrocutions.

In the literature, several theories have been proposed to explain accidents related to subway construction are presented in the next paper. The suggested study, which was published in 2014, was based on a database of 241 incidents and showed that the type of accident that occurred most is "collapse", accounting for 40% of the cases. Second comes "struck by object" (12% of the cases) while "falls" come third with 10% [9].

Cheng, Leu, Lin, Fan, and Chihhao [10] associate the severity of accidents with the size of the firm. They found that most construction related accidents that cause death or injury occur in small firms.Between 2000 and 2007, 800 out of 1546 accidents, happened in enterprises with 10 or less employees, while firms with 500 or more employees had only 54 incidents over the same time period.

Hale, et al. [11] aimed at understanding the underlying factors of accidents. In their study, which focused on 26 cases of workplace accidents that led to 28 fatalities, they identified the following factors: in 23 cases of accidents, a violation had occurred and 21 errors were observed. In 25 cases, the factor of "Planning and Risk control" appeared. In 24 cases, "Hardware and workplace ergonomics/usability/hazards" appeared to be the factors that caused the accident while in 15 cases, the factor "Competence and suitability" appeared.

The issue of lack of knowledge has been a controversial disputed subject within the field of the Ale et al. [12] focused on types and causes of accidents in the Netherlands. Out of 2424 cases of accidents, 1330 were falls from height (roof/floor, scaffold, ladder), 472 were caused due to contact with falling objects, while 311 were caused due to contacts with moving parts of machines. Out of 559 "Falls from roof/floor", the main cause was "Roof edge protection failure" (48%), followed by "User ability failure", accounting for 30% of the incidents. In the "Contact with falling objects" type of accident, the main causes were "Safe zone failure" in 48% of the cases, followed by "Connection/Anchorage failure" in 42% of the cases [13].

The factors influencing unsafe behavior were the focus of Khosravi et al. [14]. More specifically, Site condition, Organization, Project management and Individual factors are the most common factors that influence unsafe behaviors which lead to accidents in the construction industry. Camino Lopes, Ritzel, Fontaneda, and Gonzalez Alacantara [15] analyzed in their study construction accidents in Spain from 1990 to 2000. Some of the highlights included the following findings and observations: the most serious and fatal accidents occurred in the age group of 30 to 39 years, accounting for 27.7% of the total accidents, followed by the age group of "40 to 49" years, with 18.5%. The age groups of "20 to 24" and "24 to 29" years came in third place with 17.7%. Most accidents seemed to occur amongst workers with experience of "3 to 6 months" with 17.5%, followed by workers with experience "6 months to 1 year" with 16.4% of the cases. The type of accident that occurred the most was

"Overworking", appearing in 20.9% of the cases and closely followed by "Struck by objects and tools", which occupied 20.5% of the sample. "Falls" from the same or different levels came third, with 19.9% of the cases having been caused by them.

One major theoretical issue that has dominated the field for many years concerns Yi, Kim, Kim, and Koo, [16] investigate the types of accidents and the age groups that are involved in them in construction worksites. They found that, in 92.292 accidents recorded from 2004 to 2008 in Korea, 32.7% were "Falls to a lower level", 16.7% of the cases were related to "Overworking", 11,7% of the cases were "Falls to the same level" and 11.3% were "Strikes by falling objects". Out of 3318 cases of fatal accidents in the same period 46.7% were caused by workers of over 50 years of age and 32.5% by the "40–49" year old group.

However, these rapid changes are having a serious effect on safety risk attributes and models for accident probability forecast were the subject of the research carried out by Esmaeili, B., Hallowell, M., and Rajagopalan, B. [17,18]. Their study included content of a large, representative, and reliable national database of 1812 injury reports of struck-by incidents. In total, 22 safety risk attributes that led to struck-by incidents were identified and their relative risks were quantified. Then a number of models were proposed which can be used by safety managers in order to skillfully forecast the probability of a safety incident happening, given identifiable characteristics of planned work.

Finally, Carrillo-Castrillo, Trillo-Cabello and Rubio-Romero, [19] and similarly Abdelhamid and Everett [22] managed to identify the most frequent causes of accidents in the construction sector, in order to help safety practitioners with the analysis of accident investigation reports. Their research revealed important associations of the types of accident causes with accident mechanisms and construction stages.

V.   RESULTS

After the examining all variables and their categorical parameters, values of the each distributed data were incorporated into STATA database. Descriptive data were generated for all variables classified into groups and corresponding as a percentage into tabulation form. This factor presented in Table 1.

Table 1: Details of individuals involved in the accident.

Variable	Category	%
Age (years)	18-24	12%
	25–34	23%
	35–44	35%
	45–54	18%
	54-other	12%
Gender	Male	97%
	Female	3%

Level of Education	Secondary school diploma	29%
	High school diploma	54%
	University diploma	11%
	Foreign experienced qualification certificate	6%
Nationality	Uzbek	68
	Russian	12
	Non resident	20
Work Experience (in years)	1-3	21%
	4-10	14%
	11-15	12%
	16-20	15%
	21-25	16%
	26-other	22%
State of Health	Previously ill	23%
	Healthy	71%
	Minor health problem	6%
Smoking during working period	Yes	69%
	No	31%
Type of Company Activity	Private	57%
	State	12%
	Joint Venture	17%
	Internatoinal	14%
Type of hiring	Self employed	19%
	Contract based	43%
	Seasonal	38%
Type of construction	House building	67%
	Office building	17%
	Infrastructure	16%
Work station	Outside	54%
	Inside	46%
Living distance from the site (in km)	5-10	31%
	11-20	23%
	21-30	16%
	31-50	11%
	51-100	19%
Weekly working period (in days)	5	44%
	6	32%
	7	24%

Size of workplace	<10	33%
(square km)	10-49	28%
	50-299	31%
	>300	8%
Worker Specialization	Laborer	25%
	Machine operators	7%
	Skilled workers	37%
	Specialists and Technicians	13%
	Office employees	3%
	Executives and Managers	9%
	Other	6%

As for the main results of the descriptive analysis were obtained from the STATA analyses. Results are presented in Tables 2 and 3. Table 2 presents the results for the variables related to the individual employees, while Table 3 describes the results for the accident cause event related categorical data. A comparison was made with the findings of the common literature review and the article "Work Accidents Correlation Analysis for Construction Projects in Northern Greece 2003–2007:A Retrospective Study" by the authors of Sotiris Betsis, Maria Kalogirou, Georgios Aretoulis and Maria Pertzinidou from Thessaloniki, Greece aiming comparison of obtained data.

Table 2: Health and Safety enforcement details.

Life insurance	Laborer	11%
	Machine operators	16%
	Skilled workers	23%
	Specialists and technicians	13%
	Office employees	12%
	Executives and Managers	16%
	Other	7%
Safety Training	CSCS Card	3%
	Site induction only	26%
	No safety training	71%
H&S Executive	Available	33%
	Not avalilable	67%
State of first aid	Available	37%
	Not avalilable	63%
State of CCTV	Available	36%
	Not avalilable	64%
Sate of Safety signs	Available	43%
	Not avalilable	57%

Personal protection	Full PPE	41%
	Reaches Min. required	37%
	No PPE	22%
Welfare	Good	56%
	Satisfaction	23%
	Not good	21%

Table 3: Accident event details.

Period of accident	9:00 AM -12:00PM	25%
	12:00 PM-5PM	37%
	5:00 PM-12:00 AM	18%
	12:00 AM-5:00 AM	20%
Level of accident	Minor injury	56%
	Major injury	31%
	Forewer disable	11%
	Fatal death	2%
Season	Spring	26%
	Summer	35%
	Autumun	21%
	Winter	18%
Type of accident	Falls	19%
	Struck by falling objects	17%
	Walking or hitting on objects	16%
	Compression in/between	13%
	Overworking	7%
	Exposure to high temperature	3%
	Electricity	7%
	Exposition to harmful	11%
	substances	6%
	Manual handling	1%
	Other	

Type of injury	Fractures	5%
	Concussions	11%
	Dislocations	6%
	Sprains	7%
	Amputations	3%
	Superficial injuries	16%
	Bruises	2%
	Burns	3%
	Poisoning	1%
	Back pain	34%
	Electric shock effects	3%
	Multiple lesions	3%
	Undefined	4%
	Other injuries	2%
Dangerous situation	Unsuitable workplace	15%
	Floors, corridors, fixed ladders, emergency exits	21%
	Work positions	11%
	Arranging	9%
	Machinery, facilities, tools and equipment	26%
	Organization and safety management	3%
	Work environment	7%
	No dangerous situations	8%
Injured body part	Head	21%
	Core	5%
	Lower body	7%
	General injuries	16%
	Neck	8%
	Upper limbs	6%
	Multiple injuries	16%
	Eye	17%
	Non specified	4%

Material Factor	Means of transport and lifting equipment	12%
	General equipment	25%
	Materials, substances	11%
	Work environment	16%
	Machinery	23%
	Time period	12%
	Other	1%

VI.   DISCUSSION

6.1. Descriptive Analysis' Results and Discussion

Question 1

The question asked about importance of the Health and Safety regulations in construction sector of Uzbekistan. It depicts that of all responses answered at this question as following table 4.

Table 4: Health and Safety regulations

Answer choices	High priority	Medium priority	Low priority	Not a priority	Not sure
Clients	46	33	14	2	5
Design engineers/architects	29	46	14	7	4
Contracting company	37	36	19	5	3
Specialist	43	29	15	10	3
Sub-contractors	28	44	12	9	9
Principle planning supervisor	42	36	14	4	4
Site-workers / operators	37	33	19	6	5
Trade associations	33	37	17	9	4
Professional institutions	37	31	14	12	6

Question 2

The question asked about responsibility for the Health and Safety occupation in construction site? It depicts that of all respondents covering questioner.

Table 5: respondents covering questioner

Answer choices	High priority	Medium priority	Low priority	Not a priority	Not sure
Clients	31	28	14	7	4
Design engineers/architects	35	32	13	2	2
Contracting company	38	26	16	3	1
Specialist	33	38	5	6	2

Sub-contractors	32	35	9	4	4
Principle planning supervisor	33	33	13	4	1
Site-workers / operators	27	28	20	9	0
Trade associations	25	30	17	9	3
Professional institutions	36	31	12	4	1

Question 3

The question asked about reducing personal errors on site provides positive effect regarding Health and Safety at site in Uzbekistan. It depicts that of all respondents covering questioner stated at following figure.

Table 6: provides positive effect regarding

Answer choices	High priority	Medium priority	Low priority	Not a priority	Not sure
Clients	34	35	11	1	2
Design engineers/architects	21	46	16	1	2
Contracting company	37	29	19	2	2
Specialist	24	40	14	7	1
Sub-contractors	22	35	20	5	5
Principle planning supervisor	19	41	11	7	3
Site-workers / operators	23	34	16	3	4
Trade associations	18	32	22	11	4
Professional institutions	27	27	20	6	4

Question 4. The question asked about construction sector believes its safety performance is satisfactory in Uzbekistan.

Table 7: sector believes its safety performance

Answer choices	Responces
Strongly agree	13.6% 14
Agree	27,2% 28
Agree a little	23,3 % 24

Unsure	14,6%	
	15	
Disagree	14,6%	
	15	
Strongly disagree	2,9%	
	3	
Total		100

Question 5. Professional qualifications for employee prepare them to deal with real Health and Safety issue.

Table 8: employee prepare them to deal

Answer choices	Responces	
Strongly agree	21,8%	22
Agree	29,7%	30
Agree a little	19,8 %	20
Unsure	15,8%	16
Disagree	6,9%	7
Strongly disagree	1%	1

Question 6.

The question asked about evaluation the current Health and Safety system in with all day ignorance even serious hazards in construction sector of Uzbekistan.
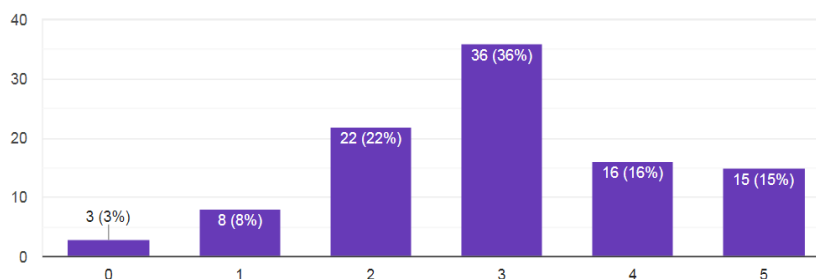
Figure 1: construction sector of Uzbekistan

6.2. Survey categories analyses

6.2.1. Season category

Major accidents took place in summer with 35%. Second main time period of occurance accidents in spring with 26% of the selected cases presented at Figure 2.
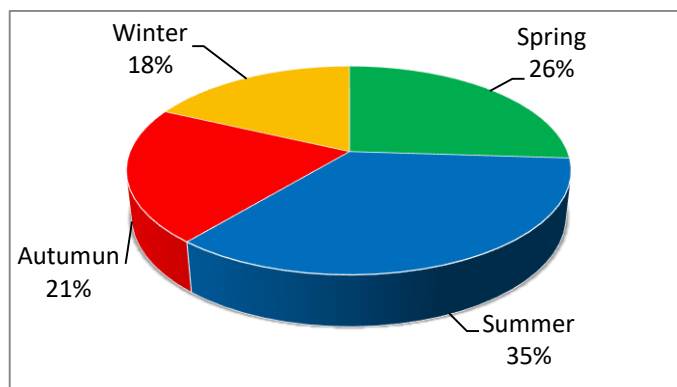
Figure 2: the selected cases presented

6.2.2. Level of accident category

Figure 3 stated majority of accidents 56% are categorized as "Minor injury". The second accident category took place of 31% major injury but 2% of respondents can be calculated as a fatal death.
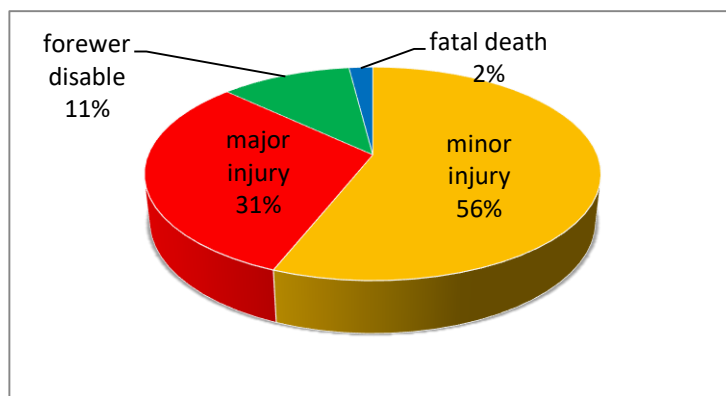

Figure 3 : Minor injury

6.2.3. Type of accident category

The most occurring accident type of injury with 19% fall categories, 17% of the cases stuck by falling objects, accident caused by electricity by 7% of total accidents. Remain cases can be other type of injuries that include manual handling with 6%, harmful exposition can be calculated 11%, accident with temperature only 3% of selected cases, hitting objects at walking area 16% presented at Figure 4.
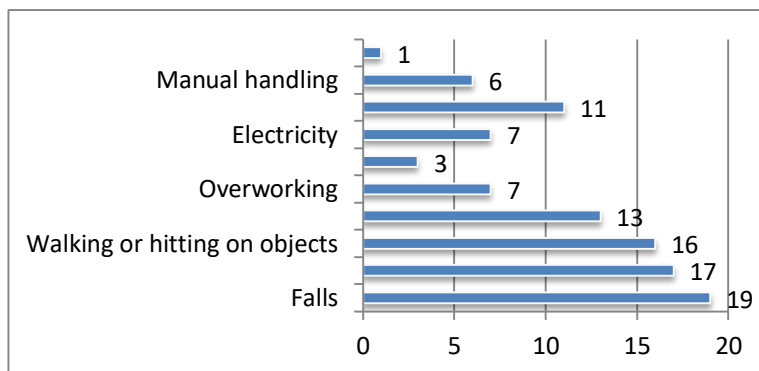
Figure 4: The most occurring accident type of injury

6.2.4. Type of dangerous situation category

Regarding hazard type at selected cases major accidents occurred causes with machinery facilities, tools and equipment's 26%, floors and corridors, emergency passage way 21% of danger. Unsuitable workplace with 15% and no danger situations distributed only 8% of hazard rate indicated at Figure 5.
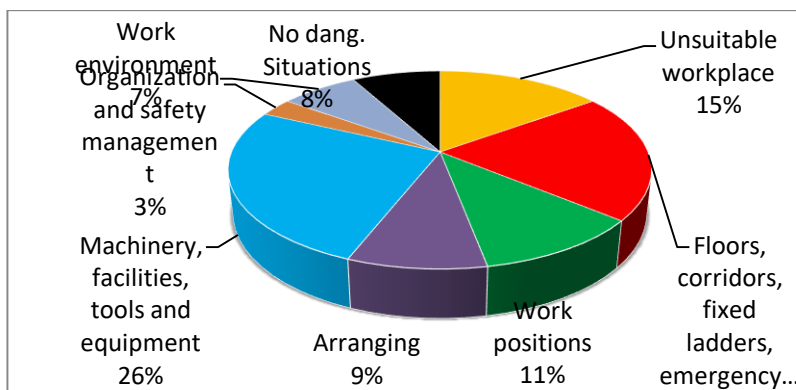

Figure 5:

6.2.5. Period of accident

As for the time period of occurred accidents can be analyzed during 12:00 PM-5PM with 37% of rate, the second main time period displayed during 9:00 AM -12:00PM with 25% and third minor accident rate occurred during 5:00 PM-12:00 AM with 18% which can be seen at Figure 6.
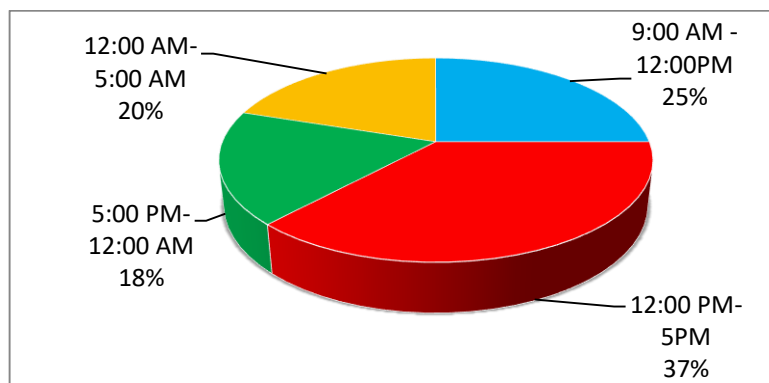

Figure 6:

6.2.6. Injured body part

This category explains the part of the body that suffers from hazard finally occurred accident. According to the Figure 7 accidents related with head is 21% which is extremely negative results and with 17% eye problems is the next major category. But both general injuries and multiply injuries with 16 % seem to be the most injuries, lower body and upper limbs have results with 7% and 6% injuries.
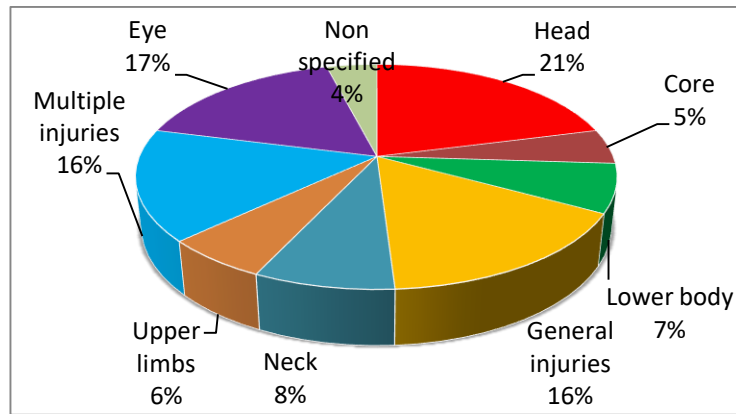
Figure 7:

6.2.7. Material Factor

Material factor causes 25% of accidents are associated with general equipment and, secondly, with 23% machinery. The third place is occupied by means of work environment means 16%. About materials and some danger substances factor can be analyzed 11% of total accident rate distributed Figure 8.
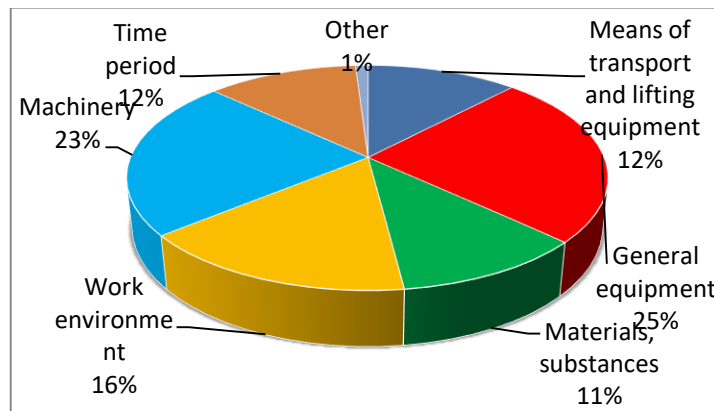

Figure 8:

VII.   CORRELATION ANALYSIS RESULTS AND DISCUSSION

Cronbach's Alpha Formula

$$\alpha = \frac{N \cdot \overline{c}}{\overline{v} + (N-1) \cdot \overline{c}}$$

Where:

N = the number of accidents.

c̄ = average covariance between item-pairs.

v̄ = average variance.

The results of the correlation analysis of the sample are presented in the following Tables (Tables 9–12), which only presented selected variables that are correlated. It can be identified correlations are developed among the following parameters:

- satisfaction of current Health and Safety Regulation
- importance of International Standards on Health and Safety
- age group 1
- age group 2
- hb
- ob
- projectmanager
- subcontractors
- supervisor
- laborer

Standart errors in parametrs ***p<0.01, ** p<0.05, p<0.1

The results of the descriptive analysis of the 10 sample questions which selected among 20 are given in the tables bellow. Table 9 depicts the summary and descriptive statistics of the following variables.

Table 9:

Variable	Obs	Mean	Std. Dev.	Min	Max
projectmanager	103	.3203883	.4689076	0	1
laborer	103	.1456311	.3544608	0	1
statisfaction	103	4.84466	1.702117	1	7
agegroup1	102	.6078431	.4906424	0	1
agegroup2	102	.2156863	.4133287	0	1
hb	103	.4174757	.4955542	0	1
ob	103	.368932	.484875	0	1
importance	103	2.242718	.7854812	1	3

Results for the mean estimation selected variables are presented at the Table 10 which respondents for asked questions above.

Table 10:

Mean estimation	Mean	Std. Err.	[95% Conf. Interval]	
subcontractors	.2330097	.0418583	.1499839	.3160355
supervisor	.1553398	.0358659	.0841999	.2264797
laborer	.1456311	.0349261	.0763554	.2149068
projectmanager	.3203883	.0462028	.2287452	.4120315
agegroup1	.6078431	.0485808	.5114718	.7042144
agegroup2	.2156863	.0409256	.1345008	.2968717

hb	.4174757	.0488284	.3206248	.5143266
ob	.368932	.0477762	.2741683	.4636958
importance	2.242718	.0773958	2.089204	2.396233
statisfaction	4.84466	.1677146	4.511999	5.177321

Next analyses show that proportion estimation of the selected respondent's ration for selected categories which current Health and Safety Regulation satisfactory for them and importance of international standards about Health and Safety in work stations of construction sector in Uzbekistan.

Table 11:

Proportion estimation	Proportion	Std. Err.	[95% Conf. Interval]	
subcontractors				
0	.7669903	.0418583	.6741084	.8396952
1	.2330097	.0418583	.1603048	.3258916
supervisor				
0	.8446602	.0358659	.7597178	.9033929
1	.1553398	.0358659	.0966071	.2402822
laborer				
0	.8543689	.0349261	.7707427	.9110127
1	.1456311	.0349261	.0889873	.2292573
projectmanager				
0	.6796117	.0462028	.5820279	.7636637
1	.3203883	.0462028	.2363363	.4179721
agegroup1				
0	.3921569	.0485808	.3009984	.4915104
1	.6078431	.0485808	.5084896	.6990016
agegroup2				
0	.7843137	.0409256	.6923369	.8545697
1	.2156863	.0409256	.1454303	.3076631
hb				
0	.5825243	.0488284	.4837287	.6751117
1	.4174757	.0488284	.3248883	.5162713
ob				
0	.631068	.0477762	.5323989	.7198716
1	.368932	.0477762	.2801284	.4676011
importance				
_prop_1	.2135922	.0405804	.1439819	.3048709
medium	.3300971	.0465615	.2450132	.4279784
_prop_3	.4563107	.049318	.3613516	.5545556

statisfaction				
_prop_1	.0291262	.0166503	.0092443	.087972
Disagree	.1456311	.0349261	.0889873	.2292573
_prop_3	.0291262	.0166503	.0092443	.087972
Neutral	.1262136	.0328818	.0740382	.2069403
_prop_5	.2330097	.0418583	.1603048	.3258916
Agree	.2912621	.0449868	.210565	.3876975
_prop_7	.1456311	.0349261	.0889873	.2292573

Table 12:

Regress importance statisfaction, noconstant hascons tsscons (note: hascons false)

```
     Source |       SS       df       MS        Number of obs  =     103
------------+------------------------------      F(1, 101)     =    2.93
      Model | 1.77200861      1 1.77200861      Prob > F       =  0.0902
   Residual | 61.1600302    101 .605544854      R-squared      =  0.0282
------------+------------------------------      Adj R-squared  =  0.0185
      Total | 62.9320388    102 .616980773      Root MSE       = .77817

--------------------------------------------------------------------------
    importance |   Coef.  Std. Err.    t   P>|t|   [95% Conf. Interval]
--------------+-----------------------------------------------------------
  statisfaction | .0774361 .0452672   1.71  0.090  -.0123619   .1672341
         _cons | 1.867567 .2323218   8.04  0.000   1.406703   2.328431
```

We started by investigating selected 8 questions which preseneted as a histogram below can be analyzed that majority responces collected data choosed staisfaction categories which directly support our hypothesis about rather negligence or lack of modern knowledge about C155 - Occupational Safety and Health Convention, 1981 (No. 155) and C167 - Occupational Safety and Health in Construction Industry, International labor Organization, United Nations. But opinion about importance of modern Health and Safety Regulation choosed by second group of respondednts
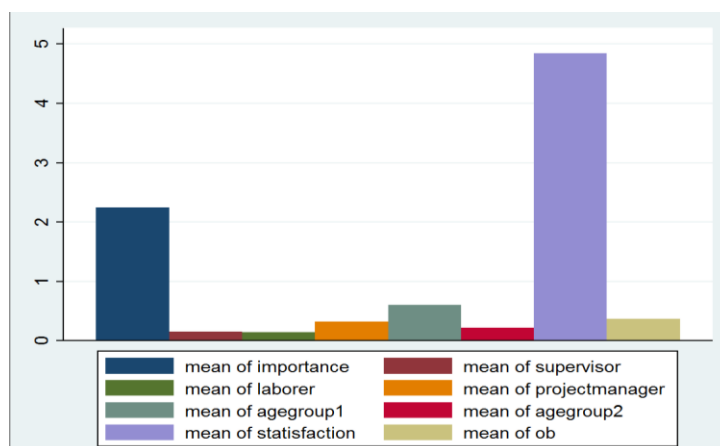
As for the Chi-square test on importance of the Health and Safety Regulation in construction sector of Uzbekistan explained following Figure 10.
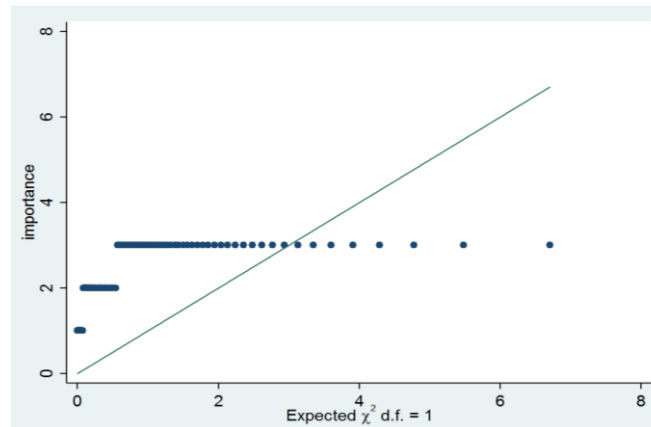

Figure 10:

We checked for the presence of the STATA dotplot importance of the Health and Safety Regulation in construction sector of Uzbekistan major respondents prefer some innovations and upgraded international standards for reducing accident rates on construction industry in Uzbekistan.
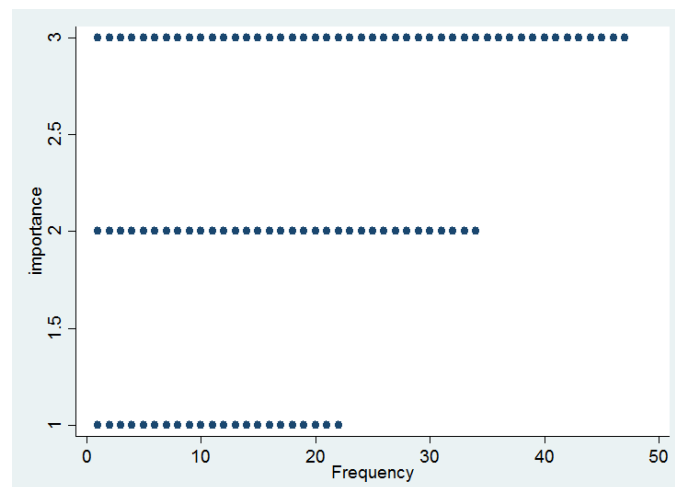

Figure 11:

To illustrate Boxplot, a simulation was performed three types of analyses show that main constructions personal stuff which subcontractor, supervisor and project managers. It explains importance of the Health and Safety Regulation for each selected categories that only main responsibility care about project managers explained Figure 12 (a, b, c, d).
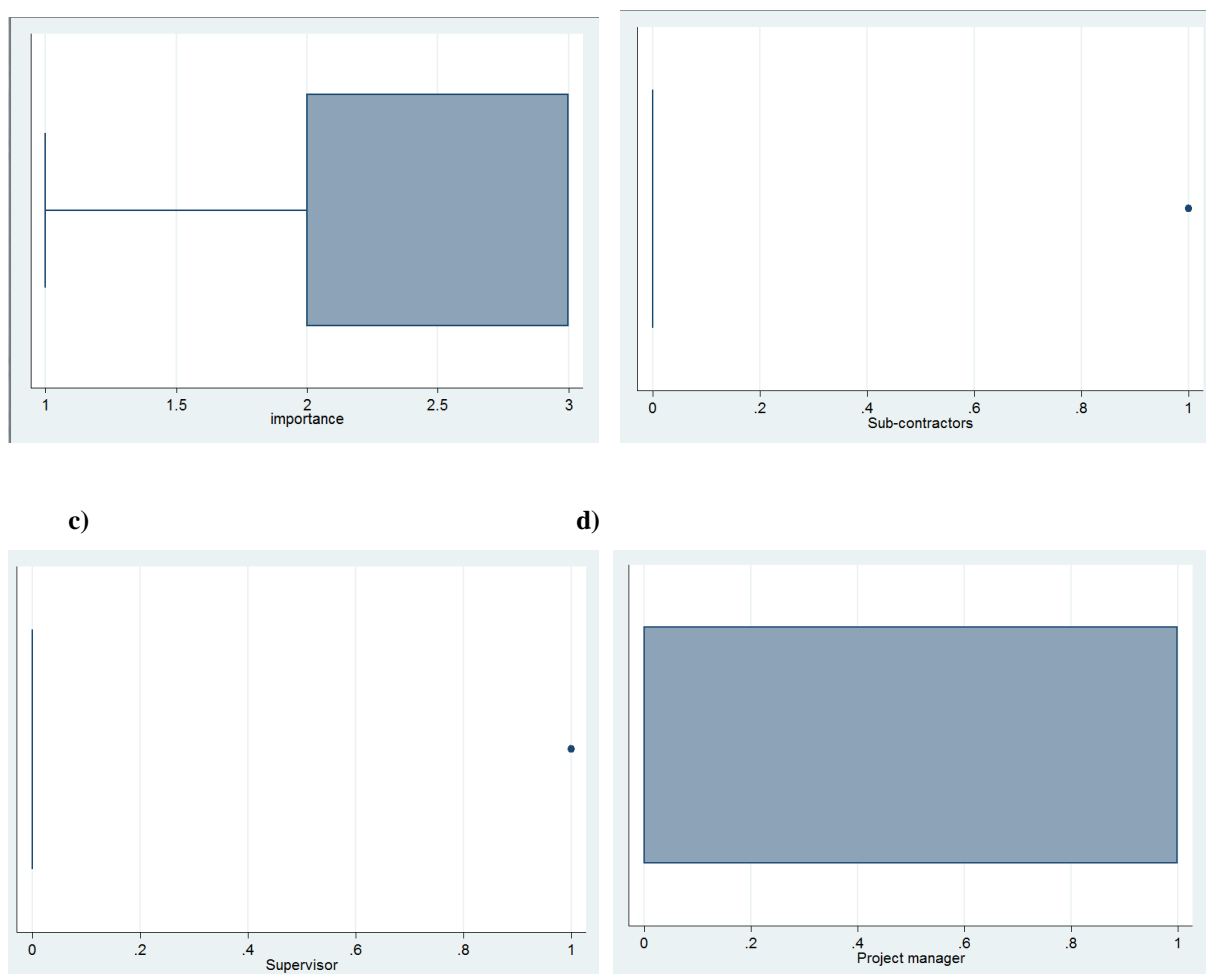
      a)   **b)**

Figure 12:

VIII. CONCLUSION

From the outcome of our investigation it is possible to conclude that the high level of accidents in a complex and consistent problem building industry is still in danger. This situation has encouraged factors that influence of legislation and inspecting on site cannot reduce accidents into Zero Rate. However, talking all workers whether experienced or not is remaining problem, because relationship and perception in this attitude getting too difficult to change Health and Safety Regulation on construction site. Summing up the results of the current research main outcomes should be presented as a development of cooperation into new stage with International Labor Organization. Analyses shows that raising an economic and socially effectiveness in construction industry while application of teaching and training personal with international standards in Uzbekistan.

Comparison of previous research by Sotiris Betsis, Maria Kalogirou, Georgios Aretoulis and Maria Pertzinidou from Northern Greece has not been supported hypothesis. It is because of Uzbekistan is a transition economy and organizational structure, budget, regulation (legislation, monitoring, audit, inspection) and knowledge or experience of personals in construction projects selected variable indicated different outcomes .

This paper has clearly shown that negligence and lack of knowledge on construction site can be a solution scientifically for now.

Main findings of the current research include as follows:

- The majority of the accidents involve inexperienced personnel (laborer and seasonal personal)
- Major accidents occurred due to negligence and lack of knowledge anyway.
- Falls from height and stacking objects are identified as main categories of accidents
- Construction industry personals hoped intentions of new standards by ILO conventions
- Teaching and training on site method supported by major respondents
- Time period of summer is appropriated with major accidents due to huge amount of work force
- Most accidents appear during morning hours

IX. SUGGESTIONS

This research was concerned with current status of the construction industry; however, the results should be applicable also as follows:

- Current legislation improvement of Health and Safety Regulation should be integrated into ILO conventions;
- More experienced and trained personals should be hired by the construction project team;
- Risk assessment should be implemented all level of the construction projects;
- Reducing threat level by only improving personal knowledge self-awareness on site.
- Accident rate (major illness and fatal death) can be reduced by inspection, audit and monitoring by government body in construction industry.

On the basis of the promising findings presented in this paper, work on the remaining issues is continuing and will be presented in future papers

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