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SOI: 1.1/TAS DOI: 10.15863/TAS

International Scientific Journal

Theoretical & Applied Science

p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)

Year: 2019 **Issue:** 06 **Volume:** 74

Published: 17.06.2019 **http://T-Science.org**

QR – Issue QR – Article

Aziz Sadulloyevich Zikriyoev
Architecture and Civil Engineering Institute
PhD student, Tashkent

Robert Arthur Crane
the INSEEC Business School
Professor, France

PREVENTION OF SOCIAL COST IN OCCUPATIONAL HEALTH AND SAFETY IS SUSTAINABLE DEVELOPMENT FOR THE CONSTRUCTION INDUSTRY

Abstract: *World construction industry has suffered human and economic losses as for the not enough organized health and safety regulation in the construction industry. The purpose of this study is to clarify safety enforcement and it's cause and effects in social point of view in construction industry. This research demonstrates the feasibility of social relationship with companies and workers in world class approaches. Especially, studies objects are taken from almost all over the regions make clear understanding of social benefits by countries. The next point offers a solution for changing routes of migrants influenced social cost of the construction projects badly while safety regulation is strongly applicable. Aspects of social losses studies briefly in the next paragraph. In this paper, a novel method of survey is presented. Outcomes of the research provide insight into prevention of accidents and injures for saving financial lost, time of the project, health of the workers, reputation of the companies and keep away from being disability and fatal death on site Thus the paper concludes by providing a set of recommendations and strategies to contractors for improving their safety performance socially protection of the all construction members.*

Key words: *health and safety, regulation, social affairs, international work force, health care, cost effects, construction companies, major countries.*

Language: *English*

Citation: Zikriyoev, A. S., & Crane, R. A. (2019). Prevention of social cost in occupational health and safety is sustainable development for the construction industry. *ISJ Theoretical & Applied Science, 06 (74)*, 263-273.

Soi: http://s-o-i.org/1.1/TAS-06-74-32 ***Doi***: crossref https://dx.doi.org/10.15863/TAS.2019.06.74.32

INTRODUCTION

Dynamic development of construction sector in the world can influence both the positive and the negative morale of employees. The work environment plays an important role in employee productivity and profitability. Most industries have an unsafe working environment and in most cases are unhealthy. This study focuses on the work environment in a medical facility and its impact on healthcare professionals like construction sector members. Over the past century there has been a dramatic increase in insecure health facilities such as inadequate furniture, poorly designed workplaces, inadequate ventilation, excessive noise, inadequate lighting, inadequate management support, poor workplaces, poor communication, and inadequate fire safety measures in emergency situations and lack of personal protective equipment are mainly cost cut factors of the construction project.

The nadir of the global financial crisis is now ten years behind us, and there is a certain return to "economic normalcy" as recovery across the developed world appears to be building momentum, credit conditions have improved considerably, and the massive pullback in construction activity has turned the corner, albeit at varying speeds across regions. This suggests that the expansion phase of the construction cycle is well established and that we thus can expect relatively strong prospects over the next few years from a business cycle perspective [1].

Healthcare workers are an important issue for prone to occupational diseases such as heat stress, deafness, ergonomic disorders and suffocation. The performance and productivity of health workers can be reduced because of a poorly planned workplace

environment as it can affect work morale and lead to reduced job motivation and dissatisfaction. As a result, management makes work safety difficult for employees almost all construction industries of the world. Ensuring health, performance and good regulation saves social issues as well human factor plays the most predominant role while there are true ergonomics.

As for the World Health Organization Human factors and ergonomics are scientific disciplines concerned with: "the understanding of the interactions among humans and other elements of a system, and the profession that applies theoretical principles, data and methods to design in order to optimize human well-being and overall system performance" [2].

The term 'social costs' refers to costs incurred due to the execution of a construction project that cannot be classified as either direct or indirect costs incurred by the parties engaged in the contractual agreement (Allouche et al., 2000). Incurring a cost is defined as 'the act of using resources for a specific purpose' (AWWA, 2000). If we realize that construction projects as a team work process with various contractors.

The contractor is obligated to fulfill the project's objectives in accordance with the contract documents, drawings and specifications. Within these limitations, his goals are to complete the project for the lowest cost, within the tightest time limits, and at the highest profit (Heiber, 1996).

In the last few years there has been a growing interest in traditional view of effectiveness and efficiency in construction industry. In contrast time, cost and quality, the new paradigm shown in Figure 1 uses broader terms and takes wider views of time (life cycle assessment), cost (construction and social costs; minimal resource consumption) and quality (human satisfaction; minimal environmental impact). Due to modernized innovation technologies help to any project management organize work conditions scientifically and obtain expected results. Self-assessment and construction site strong monitoring on safety regulations provide human factor life expectancy with no injures on construction site.

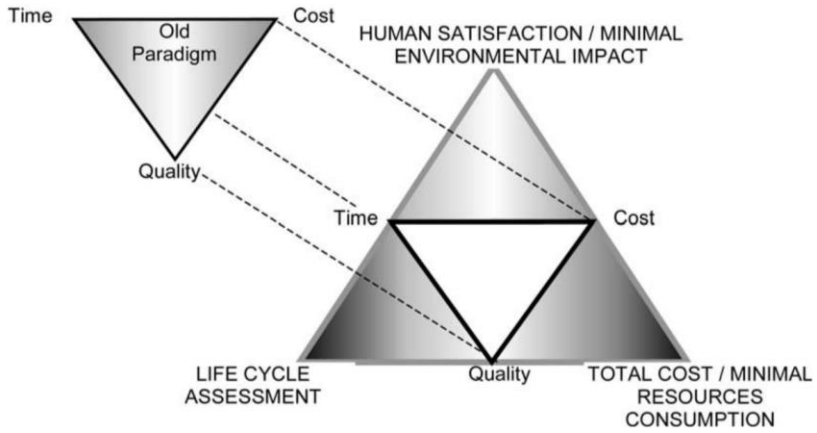

Figure 1. The new paradigm for sustainable construction (Modified after Vanegas et al., 1996) [3].

PURPOSE

The major objective of this study was to investigate analyzing of social cost theories, clarify role of social benefits and protection of workers in construction sector, regional study of the importance of social care of employees. The aim of this study is to shine new light on these debates through an examination of cost reduction via social relationships between companies and workers. The objectives of this research are to determine whether foreign workers in various types of working conditions and find out social effects of poor health and safety regulation. This case study seeks to examine the changing nature of workers knowledge, experience and behavior on site. This study seeks to obtain data which will help to these research gaps among government, companies and members of the construction projects. This study therefore set out to assess the effect of social cost, and the effect of life expectancy of human factor.

METHOD AND MATERIALS

We started by investigating our next research by clear clarification of ground theory methods of the social cost in construction. In this study has been long established in social care to present detailed analysis of relevance and urgency of log run perspectives of poor working conditions. Qualitative methods offer an effective way of primary source data as a result of 100 members of the construction projects of Uzbekistan gave detail approach of social interests should be key factor in construction site as for the human factor includes everyone.

RESULTS

The results show that over the last five years there have been some dramatic changes in the construction market. Businesses across many parts of the world were faced with unprecedented challenges arising from a number of factors. These included rising prices of raw materials, limited availability of funding, corporate failures arising from the inappropriate management of risks, government spending cuts and falling consumer spending coupled with new accounting standards and safety regulatory requirements. Such factors have affected how companies in construction operate modern building business. The overall measurement results are summarized in medium term a number of overarching factors are likely to impact on demand for construction and transform the construction sector even further. It is anticipated that global construction market will increase by 4.3% per annum; from USD 8,663 billion in 2012 to USD 15,030 billion in 2025. This is an increase of over 70% with professional labor force [4].

The previous sections have shown that taking a human factors approach means that when safety incidents occur, it is important to have a non-punitive culture. Instead of blaming individuals for events, the systems approach focuses on:

- building systems to reduce potential risks and prevent future errors;
- building system defenses to reduce of errors resulting in patient harm.

According to the (Safe System of Work Policy, Northumbra University Newcastle) social relations can be involved any of the following activities in construction work:

Construction	Upkeep
Alteration	Redecoration
Conversion	Maintenance
Fitting out	Decommissioning
Commissioning	Demolition
Renovation	Dismantling
Repair	Upkeep

The results thus obtained are compatible with detail theoretical approaches relation to the social issues which may be a taking in account of construction sectors are:

Building	Aqueduct
Cable	Sewer
Railway line or siding	Sewage works
Tramway line	Gas holder
Dock	Road
Harbour	Airfield ·
Inland navigation	River works
Tunnel	Drainage works
Shaft	Earthworks
Bridge	Lagoon

The method is an effective way to improve social effects of good organized work conditions are directed to reduce cost benefits and time factor. If we see at following figure it clear states that where social losses can be occurred during the working period.

Relevance of social costs

Social costs represent losses incurred by society due to occurrence of construction site accidents. Social costs are defined as any items that will result in the utilization of national resources. Social costs are not based on the contractor's point of view like what were discussed in the previous sections, but are based on the society's point of view. This point will be further discussed below. The following are examples of social costs (Ngai and Tang, 1999):

(a) The productive years of the injured worker. To evaluate the loss of the productive years of a worker, The ordinance establishes the compensation of an injured worker for the case of permanent total incapacity and the case of permanent partial incapacity, with reference to earnings, age and the extent of loss of earning capacity of the injured worker.

(b)Families and relative losses. This refers to the opportunity costs of housewives' work and relatives' work to take care of the injured workers.

(c)Fire Department and rescuer services. Costs are incurred by society to provide rescue services such as the ambulance transportation and first-aid services. Besides, fire-engines services and the wages of the related staff are also social costs.

(d)Losses due to the medical expenses and hospitalization. The losses incurred by the society are the actual expenses.

(e) The Police Force. When a construction site accident is reported to the police, the latter will tackle the case and carry out immediate actions. The police also maintains discipline on site and assists factory inspectors from the Labor Department in investigating the accident. This is also a cost to the society.

(f)The Social Welfare Department. This includes the administration /personnel costs of the Social Welfare Department to provide assistance to the injured worker.

(g)The Labor Department. This includes the costs for regular site inspection for prevention of accidents and the costs for investigation and reporting if accidents occur.

(h) The Court. When a serious or a fatal accident happens, the Court will carryout an investigation to find out the reasons for the injury or the death of the worker, especially when there is any argument between the employer and the family of the employee. This is another cost to society [5].

We have introduced a new approach to completely working process on dangerous process while human factor work every day in construction industry. This chain only able to solve current

available problems like accident rate is a main purpose of the project management well-being Health and Safety regulation implementation. Following figure represents detail relationship where social benefits lye on.

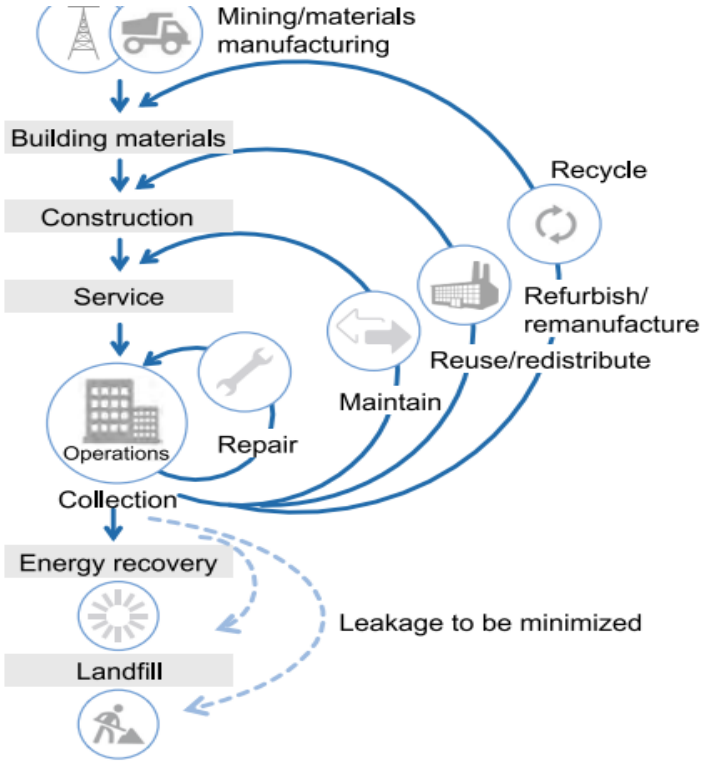

Figure 2. Circular Social principles in the Construction Value chain [6]

Source: *Elen MacArthur Foundation; World Economic Forum; The Boston Consulting Grouping.*

A similar approach is used for the next part of world countries social protection charges by countries. It means most regions already understood cause and effect of the poor safety in construction industry.

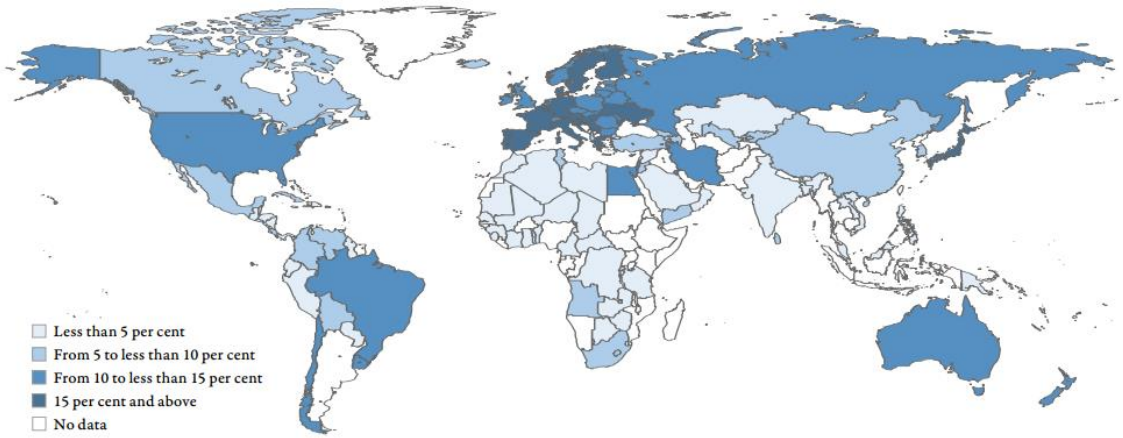

Figure 3. Public social protection expenditure, excluding health, latest available year (percentage of GDP) [7]

Source: *World Social Protection Report 2017–19: Universal social protection to achieve the Sustainable Development Goals, page 2.*

Dark blue countries are highly work conditions protected regions. While lack of social protection leaves people vulnerable to poverty, inequality and social exclusion across the life cycle, thereby constituting a major obstacle to economic and social development. But, the next factor which is the SDGs call for universal social protection. In particular, countries have a responsibility to guarantee at least a basic level of social security – a social protection floor – for all, as part of their social protection systems. While many countries have al-ready achieved universal protection, more efforts are needed to extend coverage and ensure adequate benefits.

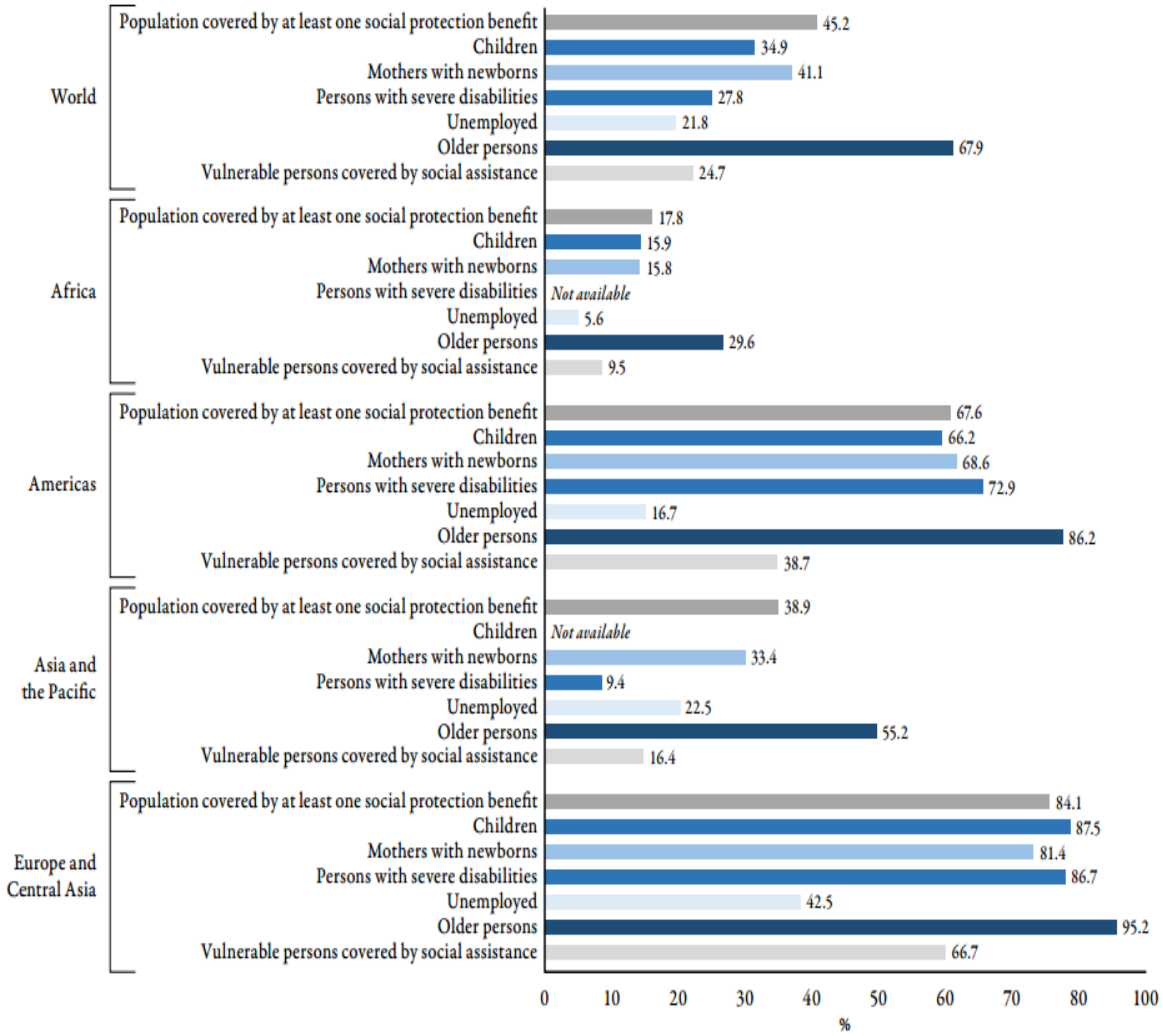

Figure 4. Effective social protection coverage, global and regional estimates by population group (percentage) [8]

Sources: *ILO, World Social Protection Database, based on the Social Security Inquiry (SSI); ILOSTAT; national sources.*

There is a good match between Social Protection Legislation and Act by government implemented it must not left every single sectors of the human factor where at work or not. But from the figure 4 we can analyze main targets are older and disable persons. It means some amount of this data even if minority is disabled workers government or company's burden benefits to their employees.

The next part of the research studies labor shortages appear to be an increasingly common feature of global construction recent years in the world.

Skills shortage: Amsterdam, Bangalore, Beijing, Bogotá, Dublin, Hong Kong, Jakarta, Johannesburg, Kampala, Kigali, Kuala Lumpur, London, Melbourne, Munich, New York City, Northern Ireland, San Francisco, Seattle, Seoul, Singapore, Sydney, Tokyo, Toronto, UK, Central UK, North UK, South Zurich (58.7%).

In balance: Preliminaries and margins are two other drivers of overall construction costs. Brisbane, Buenos, Aires Dar ES Salaam, Doha, Ho Chi, Minh City, Istanbul, Madrid, Moscow, Nairobi, Paris, Perth, Santiago, Scotland, Shanghai, UAE, Warsaw (34.8%)

Surplus: Houston, Muscat, São Paulo (6.5%) [8].

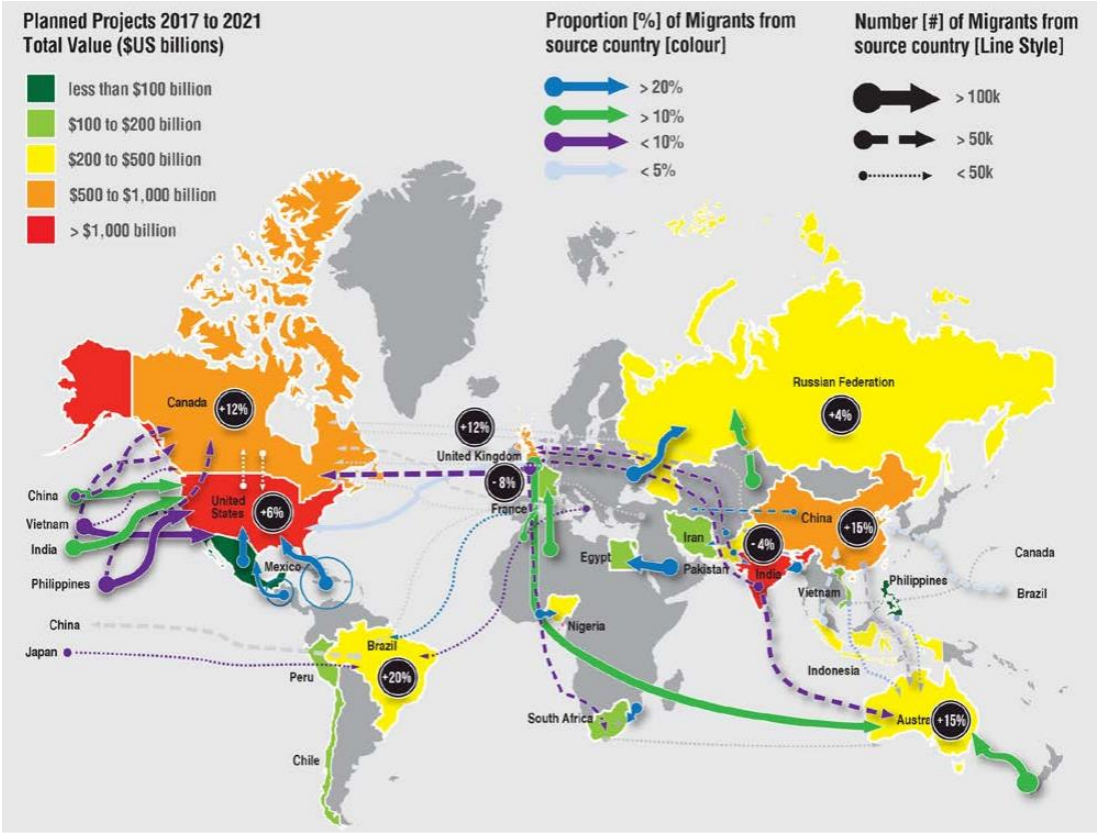

Figure 5. Mapping change in international migration flows to global construction hotspots (demand) and migrants' countries of origin (2010 - 2015) [9]

Source: *Global Trends: Emerging Construction Labor Markets, Build Force Canada, March 2017, page 16.*

Simple statistical analysis was used to the United States and India lead the way globally, each with well over a trillion dollars (USD) in planned energy and infrastructure projects. Canada, China and the United Kingdom follow, with aggregate project values upwards of $500 billion. Australia, Russia, France and Brazil round out the top countries, with projects valued at more than $250 billion. This project-based analysis is consistent with other outlooks. The Global Construction 2030 report, published by Global Construction Perspectives and Oxford Economics, projects that growth in global construction will rise by $8 trillion, growing by 85 percent to 2030. According to the report, China, the United States and India are expected to account for more than half (57%) of anticipated growth. The primary growth drivers cited by the report are population growth, demographic shifts and the related needs to build or replace power and civil infrastructure [10].

One possible solution to this problem is calculating globally workers are not trained well or lack of education about Health and Safety work policy. In our previous researches state clear clarification about workers types and conditions while major accidents happen with same objectives.

Analyzing quantities methods (such as propagation of uncertainty and least squares parameter fitting) can be derived analytically in explicit form when the relevant variables are normally distributed. In this research our variables are cost dynamics and construction life cycle. However, many other distributions are bell-shaped (such as the cost, construction life *t*-, health and safety distributions).

The probability density of the normal distribution is

$$f(x|\mu,\sigma) = \frac{1}{\sqrt{2}\pi\sigma} e^{-\frac{(x-\mu)^2}{\sqrt{2\pi\sigma^2}}}$$

where

μ – is the mean or expectation of the distribution (and also its median and mode),

σ – is the standard deviation, and

e^2- is the variance.

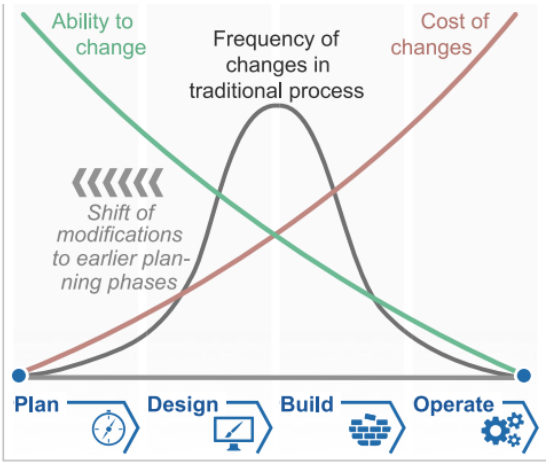

Figure 6. Cost of changes in the Construction life cycle [11]

Source: *World Economic Forum; Shaping the Future of Construction: A Breakthrough in Mindset and Technology, May 2019, page 26.*

It is relationship of well-organized project management against accident rate for cost reduction with social benefits in construction. So operational management pushes forward all-time low level of accident and traditional working conditions which causes accident and to become illness, disable or fatality of the workers during the working hours.

The black curve is the standard normal distribution fig.6. But there are many cases where the data tends to be around a central value with no bias left or right, and it gets close to a "Normal Distribution" changes in traditional process and 68% of values are within 1 standard deviation of the mean, 95% of values are within 2 standard deviations of the mean, 99,7% of values are within 3 standard deviations of the mean. It means planning, design, and build and operation phase of the construction work normally distributed.

It is clear to find out the standard deviation, because we can say that any value is:

1. *likely* to be within 1 standard deviation (68 out of 100 should be)
2. *very likely* to be within 2 standard deviations (95 out of 100 should be)
3. *almost certainly* within 3 standard deviations (997 out of 1000 should be)

The next factor is detail cause and effects of the health and safety in construction industry. These four relationships are really connected with one other. If we say social factor only solution with human factor in construction process, so:

Table 1. Social effects of poor health and safety regulation

EMPLOYER	**INDUSTRY**
• Payment for sickness • Poor productivity of ill worker • Investigating cases • Temporary replacement of worker • Permanent replacement of worker • Reduced productivity of new worker Retraining • Occupational physician cost • Increased insurance • Civil claims, prosecution, blames, • Preparing defense for civil claims Administration from different actions	• Continuous recruiting new workers • Loss of skilled workers • Every day new site induction • Responsibility • Managing workers out • Assessing risk • Making adjustments • Rescheduling work • Increased surveillance • Affects white, blue-collar worker • Extra responsibilities; • First aid arrangements
INDIVIDUAL	**SOCIETY**

- Pay for treatment
- Pay for drugs
- Lost wages
- Reduced bonuses
- Time off
- Time, cost and civil claims
- Get lower paid job
- Can no longer work
- Costs in retirement
- GP costs
- NHS costs
- Prescription subsidies
- Disability benefit
- Emergency benefit
- Accident benefit
- Forever disable
- Legal aid for child claims
- Early pensions

RAISING AWARENESS OF HEALTH AND SAFETY IN CONSTRUCTION INDUSTRY OF UZBEKISTAN

On this research we held a survey among 100 respondents about social benefits of good Health and Safety. Questions and outcomes are as followings:

The most surprising aspect of the data is in the ”*Occupation of the work”* .

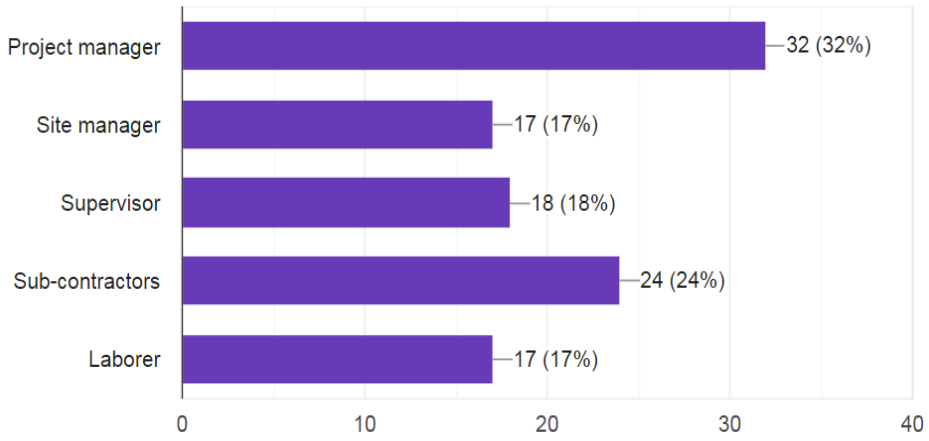

Figure 7.

About 32 % respondents are project managers and 24 % sub-contractors. Almost two thirds of responses focused on the need to raise awareness of health and safety – among employers, workers and the managers. Opinion was split on the most effective method of awareness rising with many suggesting that several methods should be deployed at once.

After collection, the samples were shipped back of share of respondents *“Sector of the construction”*.

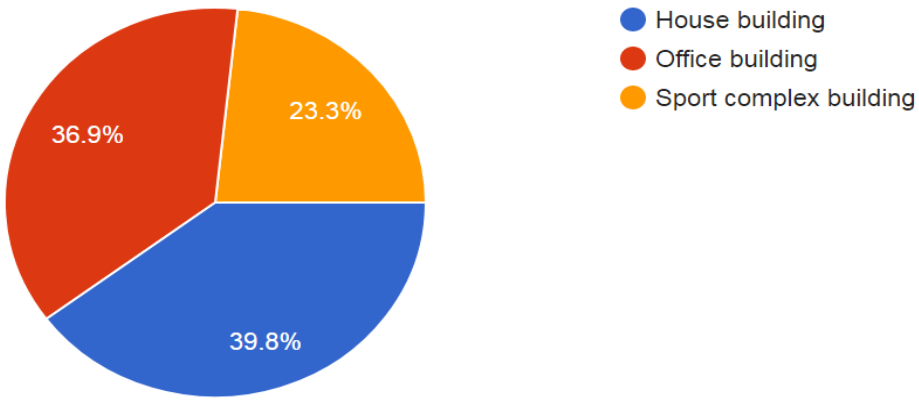

Figure 8.

We can see from the figure 8 that main respondents of current survey were housing sector with 39.8% and even in low level of 23.3% played main role for out outcomes.

In the follow-up phase of the study, participants were asked *"Experienced management system reduces social cost of the project"* .

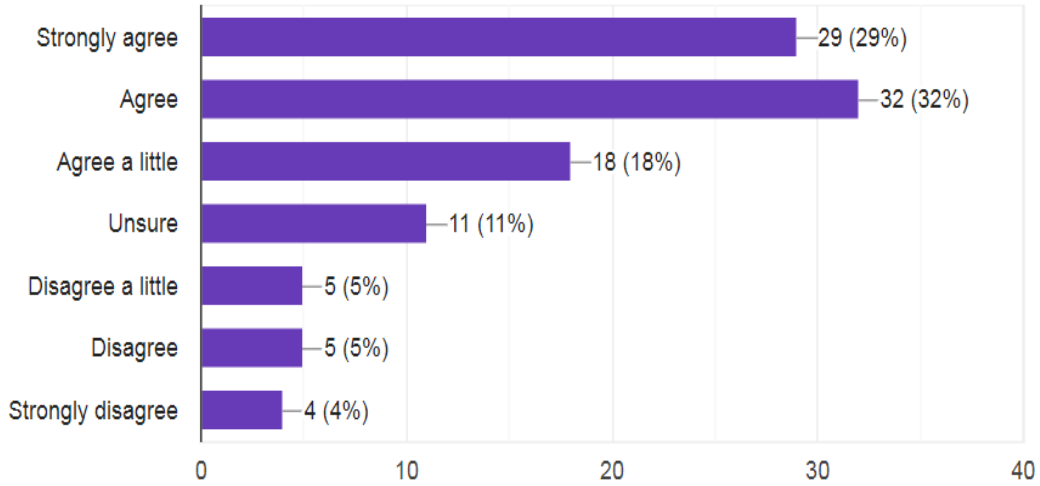

Figure 9.

In this question major respondents agree with the statement with 32% and 29% of the next applicants were strongly agree that social benefits really cause of well-being organizational management system. Outcome hypothesis are local construction members supports modern Health and Safety regulations relevant problem solver. They believe that this regulation if applicable dynamic cost reduction with human factor.

Management Issues

One third of responses suggested that ensuring health and safety was a boardroom issue would be a key factor in making further progress. The most important issues were felt to be:

- covering health and safety in company annual reports;
- indicating publicly which Director holds responsibility for health and safety;
- including health and safety on the agendas of Board meetings;
- clarifying the position on corporate responsibility in accordance with the world experiences [12]

Finally, questions were asked as to the role of *"Companies in the construction sector consider their health and safety performance is education and training of the workers for the social success".*

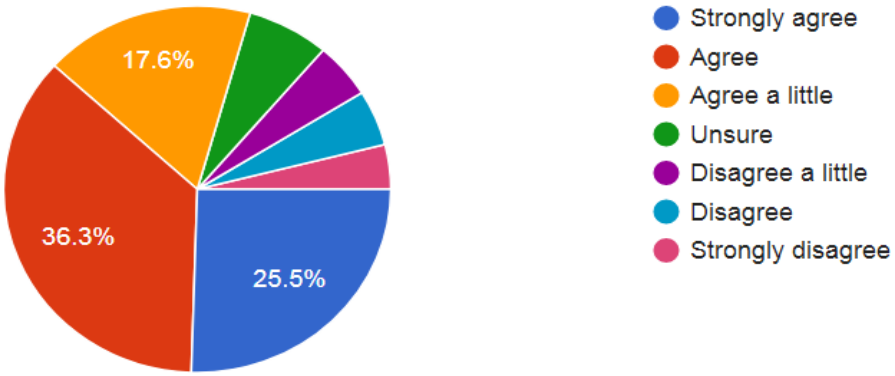

Figure 10.

Results of the next questions were with 36.5% of respondents majority of the solutions agree that education and training in construction site effects to social relations of the project.

Enforcement Action

Enforcement issues were mentioned in over a third of responses. The most popular suggestions were:

- more inspections;
- increased funding for regulators;
- stiffer penalties;
- more energetic enforcement of existing legislation (some made the point that this would be easier to achieve if the legislation was clearer); and
- greater attention to the recording and reporting of incidents (for example through a National Safety Audit requiring companies to produce audited annual reports on their health and safety performance and plans).

DISCUSSION

This paper is a modest contribution to the ongoing discussions about how working conditions effects social relationships of workers on construction site. According to the results of the survey we can discuss following approaches:

The main concern of the paper was prevention of social cost in health and safety in construction is sustainable development for each construction company. Our current research shows that theoretical approaches of the social benefits and losses at site. Particular attention is paid to the role of the international regulations for social protection of the laborer at work by sector including construction. In some cases it is unacceptable issue that main human factor damages and loses caused with migrant workers worldwide and not enough qualified worker at specific field. The main migration anyway US markets attract most workers in the world. There for lots of accidents and injuries in US construction sites [13].

The originality of our solution lies in the fact that survey question in construction sector of Uzbekistan is dramatically interesting. Our results describe for the first time the represented in directly asked from individual construction work personals in Health and Safety regulations for social causes. This paper presents a pilot study to find the answer to our current research. It shows that international standards of occupational Health and Safety regulations are really compulsory to implement not only construction but also anywhere with high level of hazard and risk. Well-being professional management system like Project managers, Site managers, Foreman managers and supervisor, safety inspectors with constant monitoring reduced almost all hazard and accident rate even in “ZERO RATE” level in accordance with the top world construction companies results, experiences and achievements.

CONCLUSION

In conclusion, it is evident that this study has shown obligatory to obey any regulation and legislation within the construction site. This research was concerned with all-time strong monitoring and inspecting should be organized and well prepared however, the results should be applicable also to all industry sectors. While hiring a traders requested work experience and feedback from the previous of the former construction managers. And basic education and qualified Health and safety site induction, weekly training services and special organized site CSCS checking system of electronic monitoring on site can be only solution for each workers of the all projects. While we all human being we must understand all chance and potential working against to reduce accidents and hazard work conditions in our hand. This study set out to determine effective and modern ways, methods should be implemented by government immediate reforms of Uzbekistan. From the outcomes we can offer followings:

These findings suggest that in general and specific goals of the guidelines in construction reducing social cost in site are:

- agency and field work with outsourcing style trader offering;
- service programs, continuing education materials, and tools related to social work safety;
- workers’ rights;
- technology that enhances social worker safety;
- licensing, regulation and CSCS card
- development, refinement, and integration of best practices in promoting social worker safety [14]

The present study was designed to determine the effect of assessing past incidents should be considered as a social benefit cut for preventing any accident at workstation the following factors:

Type of incident (for example, verbal threat/ abuse, intimidation, attempted or actual physical assault, property damage, stalking); staff, clients, and witnesses involved in or witnessing the incident; weaknesses/breaches of protocol or gaps in protocol or policies that facilitated/contributed to, or did not deter, the incident (procedural, environmental, errors in assessment or misunderstanding of the safety protocol); orientation and training needs of staff for risk reduction and safety promotion and assessment of current safety measures and policies and gaps in protocols/procedures. [15].

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