

Impact of Toxic Hazardous Chemicals on Construction Workplace

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Abstract

The following study is based on the impact of toxic hazardous chemicals on construction workplaces and the study has been evaluated with all sorts of valid insights. At the beginning of the study, the topic has been introduced within a valid manner and the introduction has been based on the concept of toxic hazardous chemicals and its impact on the construction sites. The introductory part consists of several kinds of conception about the impact of toxic chemicals reagents in the construction sites and how it can be hazardous to the employee retention and sustainability of a company. Later on in the study, some objectives have been developed by going into depth of the subject matter. The objectives which have been made are topic related and have been met with the help of valid insights. Further, in this study, the materials and methods have been selected and evaluated to provide proper execution to the research. After the execution, the types of toxic hazardous chemicals in the construction sites, its impact and how to presume its usages in the construction sites has been depicted with the help of two appropriate graphs. Also, Chernobyl's example has been provided in the following study. Finally, the study has been evaluated with a valid conclusion.

Keywords

Construction Sites, Hazardous, Toxic Chemical.

INTRODUCTION

The adverse impact of the chemical reactions is the natural pollution which can be the outcome of the emission of some hazardous gasses from the chemical reactions. The toxic hazardous chemicals are the reason for several kinds of health disorders and skin for the workers and the other people around the construction workplace. The immense exposure to chemicals commonly implemented within the workplace and construction sites which can lead to various short and long term health related problems of the workers. A toxic element is a substance that is poisonous in nature or creates health issues. People basically are aware of the chemicals preservatives such as, polychlorinated biphenyl and dioxin which can be identified within some hazardous wastes and construction sites as well [1]. As the impact of the toxic chemicals, the immune system of humans decreases in a certain manner. The construction sites which deal with chemicals and toxic hazardous compounds can affect the employee retention as well for the workplace.

Certainly, the major impact of the toxic hazardous chemicals can create a huge decay on the overall performance of an organization. A constructional workplace has been conducted by keeping several kinds of factors in mind and the factors are as follows- sustainability criteria, safety protocols of the employees, profit margins, and employee retention and employee engagement towards the workplace. For the impact of toxic agents in the construction sites, it can impact these following factors within an organization. As the toxic chemicals affect human health directly, employees become more aware and impulsive to quit the workplace with an

immediate note. Quitting the workplace decreases the rate of employee retention within an organization [2]. Also, in case a manufacturing firm is implementing the chemical reagents to produce high quality products, the sustainability norm would automatically collapse for the company in the existing marketplace. Therefore, the impact of toxic hazardous chemicals on the constructional workplace becomes an important aspect which needs to be assessed by presuming the consumption of the chemicals.

Objectives

The objectives of the study have been made below-

- To discuss the types of toxic hazardous chemicals.
- To evaluate the impact of toxic hazardous chemicals on workers' health.
- To assess the impact of toxic hazardous chemicals on the constructional workplaces.

MATERIALS AND METHODS

The following study is based on the impact of toxic hazardous chemicals on construction workplaces. The main focus of the following study is to depict the effect of the hazardous elements on the all organizational aspects of the constitutional sites and constructional workplaces. In the following study, the data which have been collected are based on the subject matter and all kinds of data gathered within the study are closely related with the aftermath of the constructional workplaces for the chemical reagents. By following some crucial steps of methodology, the methods have been selected for the following study by focusing on the subject matter.

For the study, the secondary data has been chosen and interpreted which are based on the subject matter. The collected data has been evaluated by following the qualitative method of the following study. Also, for the study, the primary data has been excluded and the secondary data has been included in a certain manner. Certainly, the type of the following study is secondary qualitative and the research design for the following work which has been chosen is cross-sectional research design. Lastly, all the data which have been collected for the study have been collected from peer reviewed journals and articles which are constructed after the year of 2019.

RESULTS

From the beginning, the impact of hazardous chemicals is not a trivial issue which can be ignored by an organization. Majorly, the chemicals do make an impact over the respiratory organs and skins of the workers who worked within a constructional workplace. The impact of chemical hazards in workplace or construction sites can cause several kinds of skin diseases and can damage the brain cells of the workers for long term. There are several types of chemical hazards which exist within construction sites and the environment of the workplace becomes immensely toxic to work for long term within that particular workplace [3]. These hazards can form from various types of sources involving the chemicals which are implemented vigorously within the constructional workplaces. Sources might involve the chemicals which are in the constructional procedure, on site retention of chemicals and chemicals that might exist in the soil or water which are occupied in the construction sites.

There are plenty of cases where the workers could not be able to protect themselves from the hazards and chemicals which have been used immensely within the constructional workplaces. Therefore, it is important for the workers to get familiar with the materials safety data sheets. The material safety data sheet is the list of the chemical hazards which can make a huge impact on the workers' health in the construction site and also, by getting aware of the reagents, the workers can take sheer amount of precaution in the workplace to get secured [4]. Chemicals have been found in several types of products which are implemented in the construction workplaces. The reagents include- asbestos, silica, lead, carbon monoxide and harmful spray paints. These following chemicals can exist in various kinds of forms such as, dust, fumes, fibres, liquids, gasses and vapour which can be present in the construction environment.

The chemicals can enter within the human body in different ways as the workers have to work a maximum of a day within the construction site. By inhaling, the micro particles of the chemicals can easily enter the human body while working within the site. Later on through accidental swallowing while eating at the site, the chemical can get entered within the workers body. The impact of the chemicals can be acute and chronic which can be the cause of losing the job of the workers' [5]. The major impacts of chronic impact

of the toxic chemicals are asbestos fumes, welding fumes and solvents. Workers who work in the construction sites might get exposed to the asbestos when the demolition of old buildings happens to get more cured. In order to protect the buildings, the buildings have been constructed by giving the layers of asbestos. However, the asbestos has not been used in the construction but still the workers' have to get exposed in the remodelling works of a building.

The removal process of the asbestos has been generally done by the trained workers and the workers can get lung infection and lung cancers from consuming the micro particles of the asbestos. Also, welding fumes consists of various types of toxic chemicals which are based on the product which have been welded, which are rods, fluxes and shielding glasses. As the result of welding fumes, the acute exposure can cause eye, nose, throat irritation and dizziness which can disrupt the workflow of the workers for long term. Furthermore, the industrial example can be started with the nuclear energy source of a company. For instance, the impact of the chemical reagents on the construction site, the Chernobyl incident is the major example of the radioactivity in the construction site of the nuclear energy source. 5% of the radioactive reactor exploded due to human error and impact on the environment of Chernobyl [6]. Also, 28 workers died within a few days after the exploration for acute radiation syndrome. As a result, 3500 people had been evacuated due to the massive explosion in Chernobyl.

There are various types of several kinds of solvents differentiating with degrees of the toxicity have been implemented in the construction sites or constructional workplaces. Solvents can exist in paints, adhesive, epoxy resin and products in the construction workplace. As an impact of the solvents, the nervous system can be inflatable with toxicity and a humongous amount of reproductive hazards can happen within the female workers and make workers as well. Also, because of the impact of solvents in the construction sites, the kidney and liver can be damaged for a really long time which cannot be cured in further procedures. Several kinds of dermatological problems can be caused by the impact of solvents in the construction sites [7]. Generally, the possibility of exposure to excessive amounts of solvent vapours is greater when solvents are handled in enclosed or confined spaces.

In order to assess the symptoms of solvents within the workers' of a constructional organization, there are plenty of symptoms by seeing which, the cause of mal-effect among workers can be identified. Irritation in eyes, nose and throat, dizziness, headache, makes the ability of judgment or coordination ineffective, internal damages and bleeding and increases the dryness of the skin which can affect the workers to make concentration on the work. Another important toxic chemical which can make a huge impact on the workers is the silica or silicate. About 2.3 million of workers who have been worked are exposed to the breathable crystalline silicate elements in the constructional workplace and involve 2 million constructions who drill, cut, and crush the silicate

contaminated elements [8]. There are several functions which need silicate in the process and commonly in the process of brick production and hydraulic fracturing, the rate of silicate consumption is an important yet hazardous chemical which can be used in the construction sites. Quartz is the basic forms of silicate which can be formed within the earth crust and also create several kinds of problems including health issues.

There are several kinds of construction materials which consist of silicate in a crystalline form and the crystalline form is immensely risky from every aspect of an organization. Plastic composites, soils, asphalt fillers contain crystalline silica which are used in the construction sites. The elements generally used in the work of plasters, putty, wallboard, joint compounds and caulking. Exposure to the excessive silica can cause lung scarring for long term. The smaller and bigger particles of silicate can cause fatal types of lung disease which can be the cause of less engagement of the employee within the workplace [9]. The smaller particles are immensely risky while inhaling within the air of the construction workplace.

Another major type of reagent of which plays a huge role in the construction areas is the lead which has been used massively in several construction sites over the globe. Lead is an example of an immense toxic chemical reagent and it can be implemented in several types of construction works and can be the cause of severe health problems for a long time. The workers who are associated with the constructional binge works, have to be exposed to lead on the repairing work of the bridge and also, the workers can be exposed in the paint removal process of the bridge which is highly consumed of lead [10]. However, lead is such kind of toxic chemical which cannot be ignored in the construction site of an organization.

There are several kinds of health hazards which can be caused by the impact lead in the construction area of a particular company. Several kinds of health hazards can occur due to the impact of lead in construction sites of an organization. The frequency of severity can be increased for the presence of lead in blood and for the presence of lead, loss of appetite, feeling of nausea, cramps in stomach, uneasy flow of bowel, fatigue, unwanted headache and anaemia [11]. Among all kinds of toxic chemical reagents, lead has a long term impact on human health and can decay over the employee retention. Also, for the impact of lead, the reproductive health can make impulsive changes in the blood pressures that can occur within workers of the construction sites.

The safety regulations in the construction sites of China have become a major aspect of construction sites in China. From the year of 2006, the rate of accidents in the construction sites of China has been lower than the facilities in the construction sites. The mortality number was 200 in the year of 2006 and the number of workers who had benefited from the safety regulations is 300 [12]. In the year of 2018, the number of accidents was still less than the number of workers who had benefited from safety regulations in the

construction areas and workplaces of China.

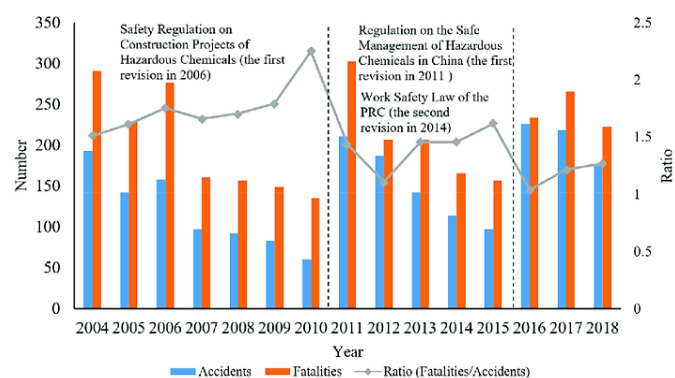


Figure 1: Ratio of safety relation in the construction area in China

Additionally, there are no such ways to reduce the use of toxic chemical reagents in the construction sites but, there are plenty of ways to get secured from the fatal strike of toxic chemicals in the toxic chemical reagents in the construction sites. The best way to secure the workers from the impact of toxic chemicals is better implementation of effective engineering regulations which mitigates or differentiates the source of toxic hazards from the workplace [13]. Also, it is important for each and every worker to use the PPE kit consciously to get secured from the highly contaminated elements of the toxic chemicals. Although, there four types of engineering regulations which are implemented in the construction sites and the types are as follows-ventilation, substitution, change of process and isolation.

As mentioned earlier of the context that the toxic hazardous chemicals can have an impact on the sustainability, employee retention and overall performance of the organization. The impacts of the chemicals on the organizational environment can disrupt the flow of work for the workers and makes the workers fragile day by day. When in a construction site the workers have to get exposed to the toxic reagents, it affects the health and skin of the workers immensely for a long term. After getting affected by the harmful and hazardous chemicals, the capability to take any sort of manual loads went within a declining rate [14]. For the health impact, workers' have to quit the workplace and encourage other workers to quit the job to maintain the safety of their health.

However, the number of workers in the EU Union's Chemical industry has increased from the previous decades. In the year of 2021, this industry gives employment around 2.24 million workers roughly [15]. This can be stated that, European chemical industry is maintaining the safety protocols and sustainability norms in an effective manner and for this reason, the industry is able to hire more employees than past years.

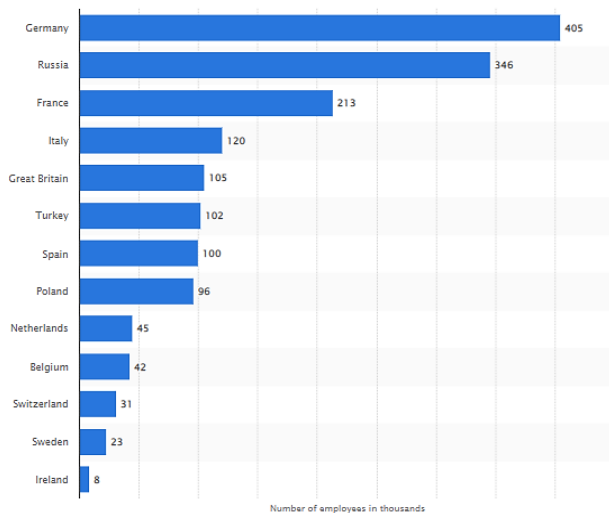


Figure 2: Employee retention rate in the EU chemical industry

On the other hand, these chemicals can decrease the rate of sustainability of the organization. Certainly, the toxic chemicals affect the environment of the construction within which the workers have to work for a long time and most of the construction sites consume massive rates of carbon emissions [16]. For any sort of organization, maintaining the rate of carbon emission is an important factor of sustainability which should be managed by all sorts of organizations. Usually, for the construction sites, it is not possible to maintain sustainability as the lead, silica and solvents are the major reagents in the constructional works and building construction.

According to the sustainable principle of the construction sites, there are several crucial principles which need to be followed by each and every construction site. The principles are as follows-sustainable design, rate of durability, mitigating waste, regulating the air quality of the workplace, energy efficiency, preservation of water and sustainable or green building material [17]. All of the following principles cannot be possible to maintain in the construction sites. The major ingredients in the construction sites are lead, solvents and silica which can make an adverse impact on the sustainability aspects of a sort of organization. Also, it is immensely difficult to preserve water for the construction workplaces as the sources of water become toxic while it gets exposed to the toxic chemicals.

As a precautionary principle to avoid the harmful impact of these chemicals, all the workers should be given PPE kits to work safely in front of the reactors. Also, in the engineering control, it is important to maintain ventilation to regulate the work of construction. Also, ventilation includes implementing regional and basic exhaust ventilation to omit contaminations from the air before they have a chance to fetch the workers' breathing zone [18]. Further, it is important to actively allocate the substitution of the renewal of hazardous chemicals with less hazardous chemicals. As an instance, implementing a power washer is more sustainable

than using a pressure washer. It is important to use a power washer to remove the lead contaminated paints from a surface and for using this, the workers would not be able to expose to the micro particles of lead. Further, in the construction sites, it is important to maintain enclosure and isolation for safety regulations and mitigation of the toxic chemicals. With the help of maintaining these minor things, the employee retention and sustainability can be increased for a construction workplace.

DISCUSSION

In the following study, the subject matter has made its focus on the impact of toxic hazardous chemicals on construction workplaces and all of the insights have been gained by depending on the subject matter. At the initiation pause of the study, the concepts of toxic chemicals reagents have been clarified and the impacts of toxic chemicals reagents have been discussed with sheer elaboration. The workers' life can be at immense risk and can snatch the job of workers as the workers got seriously impacted by the impact of toxic chemical reagents. Also, it has been shown how the reagents can make a huge impact on the health of the workers. Also, in the introductory part of the following study, the hazardous impact of the chemicals has been depicted on the workers' retention rate of a particular company. Later on, the types of toxic hazardous chemicals, effect of the chemicals on the health of the workers and the effect of chemicals on the construction sites has been depicted in the following study.

Also, all of these aspects have been fulfilled with valid and proper insights which are based on the subject matter. Further, several kinds of toxic chemicals have been depicted and the sources of the chemicals have been discussed with elaboration. The chemicals agents have two types of impacts, acute and chronic and both of the impacts are crucial yet dangerous for the employee to work within an organization or within a construction site for a long time. Further, the impact of chemical reagents can affect the employee retention rate as the chemicals makes the workers fragile to take any sorts of manual load in the construction sites and also, the effect of the chemical creates a void on the organizational structure of the workplace. At the beginning of the study, an aspect has been constructed over the impact of the toxic chemicals that it can affect all sorts of organizational factors of the company. The excessive amount of toxic chemicals can affect the sustainability criteria of a company and can decay the entire norm of CSR of the company in a certain way.

Further, the CSR activities, sustainability criterion and employee retention are closely connected with the excessive amount of usage of the toxic chemicals reagents. All of these aspects are associated with each other and can be affected sincerely for the impact of chemical reagents of which have been used in the construction sites of a company. As an instance, the incident of Chernobyl has been depicted to showcase the intensity of the impact of toxic chemical reagents on the construction sites. Also, the impact indeed

immensely intense for the life of the workers as can decrease the morale of workers to get associated with the company for a long term.

CONCLUSION

The following study is based on the impact of toxic hazardous chemicals on construction workplaces and insights which have been gained from the following subject matter of the study. In the study, the data which have been collected are taken from recent sources which related with the subject matter and the insights have been selected and implemented from peer reviewed journals and articles. At the beginning of the study, the subject matter has been introduced primarily with a brief introduction. In the introductory part of the given study, the concept of toxic hazardous chemicals has been discussed and then the impacts of these chemicals on the health of the employees have been represented. Also, in this following section, the impact of hazardous chemicals in decreasing the employee retention of a company has been aligned within a proper manner. In short, the subject matter has been introduced in this part in an appropriate order. After the introduction, the research objectives have been constructed by relying on the subject matter. Later on making of the objectives, the materials and methods of the following study has been discussed with sheer elaboration.

In the following study, the cross sectional research design has been chosen by following the secondary data which are related to the topic and maintaining the qualitative method. After selecting and executing the subject matter, the results have been made which consist of the detailed information about the impact of toxic chemicals hazards on the construction sites and workplace. In the following sections, at first, the types of chemical reagents have been depicted and then types have been evaluated by assessing the impacts of the chemical reagents on the workers' health and employee retention of the organization. Further, the example of Chernobyl's incident has been showcased as the fatal example of the impact of chemical reagents in the workplace. Also, the ratio of safety regulations in China's construction sites has been illustrated and showcased the rate of mortality and facilities in the construction workplaces of China. Further, some recommendations have been made over the presumption of the toxic chemicals reagents in the construction sites. Lastly, the study has been concluded with a valid part of discussion and conclusion.

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