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Full Length Research Paper

Impact of occupational health and safety on worker productivity: A case of Zimbabwe food industry

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This research sought to assess the impact of occupational health safety (OHS) on productivity in the commercial food industry. The objective of the study was to explore OHS problems of different work areas and their impact on productivity. The research targeted production supervisors, shop floor employees and industrial clinic nurses. Questionnaires, interviews and observations were used as research instruments to collect data. The study found out that OHS related problems negatively affect workers' productive capacity in the food industry resulting in reduced worker output. Workers develop a negative attitude and low morale towards work. High incidents of accidents at work also occur. The study recommends that food industry factories should upgrade their OHS through training programmes and use up-to-date equipment.

Key words: Occupational health, safety, food factory, productivity.

INTRODUCTION

Most food industries aim at maximum productivity from their workforce and equipment. There are however, a number of occupational infections and injuries affecting staff in the production departments at food factories in Zimbabwe, leading to decreased employee productivity. As the duration of a person's employment in an unpleasant environment increases, his/her fitness is compromised leading to reduced performance. Some of the tasks being done manually should be carried out mechanically. Most areas of work in the Zimbabwe food industry are dark, dusty, hot, slippery and noisy. Protective clothing is used as upfront protection rather than the last resort. There are high levels of absenteeism and ill health due to lack of sound occupational health safety (OHS) procedures. More than five employees go on sick leave every month at a rate higher than two working days in most food factories.

For the month of February 2008, five workers from the production department in one food factory, were given sick leave days amounting to a total of 11 working days resulting in 330 min lost production time in clinic attendance alone. In March 2008, in another food factory, there were five injuries in the production department of seven employees. These resulted in 15 days of lost production time in the five employees. There were also 6 sick employees in the same factory that made up 690 min of lost production from clinic attendance. They got 10 working days off sick. Lost time actually doubled from month to month. These months are also associated with high medical bills being presented to the company for payment. For example, one food factory's medical costs amounted to 15% of the company's earnings. Such medical expenses are very significant figures in the accounts payments register of most food industries in Zimbabwe. It therefore, becomes imperative that studies exploring the impact of OHS on worker productivity be carried out.

Objectives

1. To identify the kind of health problems that employees go through because of the type of their work.
2. To examine the impact of low standards of OHS on productivity.
3. To assess the attitude of management towards the OHS of employees.
4. To develop OHS package suitable for employees working

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in food factories

Literature review

Muchemedzi and Charamba (2006) define occupational health as a science concerned with health in its relation to work or working environment. According to Oxenburgh et al. (2004), the health and safety of all employees is closely linked to the company's productivity in all workplaces.

In most cases, occupational health safety (OHS) is largely measured by negative outcomes such as workplace injury and illness but these measures have a shortfall, for instance, a low incidence of injury does not necessarily mean that adequate safety systems and controls are in place (Health and Safety Executives, 2006). At some food factories, attention is mainly on negative outcomes. As long as there are no serious accidents, occupational health and safety policies and practices are not carried out fully. As a result, threats to employees' safety are not eliminated in time because accident- prone areas are not recognized and taken care of before accidents occur.

Muchemedzi and Charamba (2006) explain that accidents do not arise from a single cause but from a combination of factors which act simultaneously. A potentially unsafe situation does not cause an accident until someone is exposed to it. Accidents are caused by the result of unsafe acts or practices (the human element that results from poor attitudes, physical conditions and lack of knowledge or skills to enable one to work safely). They are also caused by the result of unsafe conditions of equipment or materials.

Koopman (2001) states that accidents bring pain and suffering to the worker and his family. When it results in permanent disability, the consequences are disastrous for both the victim and the company. The victim loses his earning capacity and ability to enjoy a normal active life, and the society and company are deprived of his/her skill and contribution to production.

The 1969 Frank Bird Accident Ratio study on causes of accidents found out that 88% of accidents are caused by unsafe acts of persons, 10% are caused by unsafe mechanical or physical conditions and the remaining 2% are unpreventable. Muchemedzi and Charamba (2006) analysed the above statistics and established that the majority of accidents (98%) do not just happen. instead, people who perform unsafe acts and create unsafe conditions cause them and therefore accidents are preventable. A local National Social Security Association (NSSA) bulletin established that most food factories do not abide by set OHS regulations. Most accidents are so minor that they have no visible injury or damage. Taking care of these minor problems results in a reduction or elimination of the major ones.

In Zimbabwe, there is a national regulation on the safety of factories (Amended Factories and Works Act Chapter 14:08) (1976). Inspections are carried out on factories, for instance on drains, pollution and any areas that are lacking in terms of the act. During an inspection, the inspector looks out for health hazards which the employer may or may not be aware of. The Factories and Works Act (1976) was amended to include the regulation that factories should renew their licenses annually. This is done to ensure that a working environment is safe. Some food factories are facing a risk with the health authorities due to dirty and degraded company environments, for example, the ferns are dusty and the paint on some of the equipment is chipped.

According to Webb (1989), a central belief in most of the occupational medicine/health promotion literature is that people perform better when they are physically and emotionally able to work and want to work which in turn leads to higher productivity. More substantial links between the implementation of health and safety programmes and their beneficial impact on a business's productivity and profits are emerging both directly (such as reduced sick pay and compensation claims) and indirectly (for example, reduced absenteeism, improved corporate reputation and reduced staff agitation).

Webb (1989) also studied a workstation change and found out an increase of 1000% in productivity within less than three months. These changes are mechanical and physical, for example a change of postures to reduce physical strain of work and use of appropriate machinery for some tasks. Improving the fit between humans and tools inherently means a more effective match, good design permits more output with less human effort (MacLeod, 1995). Improving the quality of the workplace environment promotes productivity and food companies need to undertake OHS practices that achieve this.

A workstation change can increase productivity; however, it is misleading to conclude that this change results in the improvement of OHS standards. New machinery can also be hazardous to health. For instance, a noisy machine may be replaced by a new machine that is more efficient but produces dust. This shows a mere shift from one hazard to another. A workstation change can cause increased efficiency and productivity leading to an ignorance of the resultant OHS implications. It is therefore misleading to conclude that a workstation change improves OHS standards in light of the increased productivity.

Some workers experience back, neck, leg or arm pain discomfort. There is now a recognition that safer and healthier workplaces translate into increased productivity, more job satisfaction and stronger bottom-line results. There are four factors that explain the link between productivity and employees' overall health and safety (Brandt-Rauf et al., 2001):

1. The need for more innovative ways to reduce the high

rates of workplace injury and illness.
2. The pressure to reduce the social and economic costs of injury and illness, particularly compensation costs.
3. The need to improve labour productivity without employees needing to work longer hours and/or taking on more work.
4. The need to offer good working conditions as an enticement to recruit and retain skilled workers in a tight labour market.

The current set up in most food factories is such that workers have to perform strenuous tasks and work longer hours in order to increase productivity. This may result in work related stress and muscular-skeletal disorders (Oxenburg et al., 2004). For instance, workers manually load long trucks using their shoulders, necks and heads. They also work longer than their normal eight hours up to twelve hours with a benefit of overtime money at the end of the month. Twelve hours are too long because of factory heavy work.

According to McCunney (2001), the primary beneficial impact of occupational health and safety on productivity is reduced absenteeism. McCunney demonstrates that the health risks and failure of employees to participate in fitness and health promotion programmes are associated with higher rates of employee absenteeism. There is need for much emphasis on the employer's participation in ensuring that OHS programmes and policies are existent. If these OHS practices are set, it is more likely that the worker participates in order to preserve his/her life. However, absenteeism may be encountered but may be completely neither unjustified on medical grounds nor attributable to unsafe conditions or hazardous events in the workplace.

It is difficult to demonstrate conclusively the extent to which business prosperity benefits from good health and safety or on the contrary, to say that prosperous businesses have good health and safety because they are able to afford it (Health and Safety Executive, 2006). However, based on available evidence, the Occupational Health and Safety Reports argue that there is clearly a vicious circle in that a healthy and happy workforce is more productive, leading to increased investment in health and safety to reduce accidents, which in turn leads to further productivity gains.

The Health and Safety Executive (2006) further explains that genuine productivity gains can be realized by those businesses that invest in high performance health and safety practices. However, the Health and Safety Executive (2006) also recognizes that there need to be a positive attitude by many organizations if they are to move on from simply attaining minimum legal compliance toward implementing the best practice of OHS. For those organizations that make the transition, the rewards are well worth the effort. In other words, when an organization is committed to OHS best practice and implements it in a properly managed manner, the result is a win-win situation that benefits both the workforce and the organization for which they work. There is need for a workplace improvement in terms of occupational health and safety for the benefit of the employer and the employee in order to increase productivity.

According to Koopman et al. (2002), presenteeism is a common concept amongst the workforce. Presenteeism is one of the major results of poor OHS practices. Some infections and illnesses are not reported to the industrial nurse. Some workers are also reluctant to seek medical attention. These workers come to work as if everything is normal but in actual fact their health and fitness is poor. This concept should be eliminated in order to increase productivity.

Zimbabwe Congress of Trade Union (ZCTU) Health and Safety Department (2001) divides OHS hazards into six categories, these are physical, chemical, mechanical, biological, ergonomic and psychological. All these hazards negatively affect employees' OHS that resultantly cause low productivity. For example, psychological hazards include monotony which causes mental stress and decreases productivity.

The Zimbabwean law stipulates that no worker should be exposed to a noise level of over 90 dB in an 8 h day. Many other countries forbid an exposure above 85 dB in 8 h. However, some workers still experience hearing loss even at 75 dB. The ZCTU Health and Safety Department has data on the sound levels and the duration of time that an employee should be exposed to the noise. This implies that the employer should be aware of the noise intensity that is produced during plant operations and should protect the employee from noise. Most workers in the food factories are not protected from that noise. This exposure to loud noise lowers employee morale and productivity.

Most OHS statutory instruments state that it is the employer's obligation to provide a safe working environment for the workers. These regulations further clarify that it is the duty of the employer to disclose accident statistics and to keep appropriate records. An employee should be informed of the dangers that are eminent in their work. These statutes, further, stipulate that this information should be posted on areas that all workers can see, for example notice boards.

Workers commonly refuse to work because of the health risk involved in their work and this can be used as an indicator of poor OHS in the workplace. He termed this situation "stop-work". In most developing countries, workers rarely consider safety of their jobs due to the high levels of unemployment in such countries (>70%). Since income is hard to earn and there are no efficient economic security social nets, a worker opts to work in any environment that is risky than losing a precious job. Therefore, data on stop- work, because of an unhealthy situation, is virtually nil in the developing countries. There

Table 1. Health hazards that are faced by different groups of people in different workstations.

Hazard	Extruder (%)	Loader (%)	Gunner (%)	Mixer (%)	Electrician (%)	Boiler maker (%)
Dust	65	3	12	10	0	10
Noise	10	5	70	5	5	5
Muscle movement	10	65	5	0	5	15
Heat/steam	40	0	45	0	0	15

is need for worker participation in setting up, monitoring and maintaining safe systems.

McCunney (2001) demonstrates that the health risks and failure of employees to participate in fitness and health promotion programmes are associated with higher rates of employee absenteeism. McCunney's contribution can only be valid if the fitness programmes are in place. There is need for the employer's participation in ensuring that OHS programmes and policies are existent. If these OHS programmes are in place, it is more likely that the worker participates in order to preserve his/her life. Towers (2003) explains that it is important to empower, educate and persuade workers to exercise their powers in the protection of their OHS. Employees are left to form their own OHS committees which are not taken seriously by the management.

RESEARCH METHODOLOGY

Research design

An action research strategy that involves studying the current situation to define the health and safety problems and finding the most suitable way of solving these problems was employed. This resulted in a large descriptive study of case studies. In this study data from archives, interviews and observations was weaved together. The case study research design was chosen because it focused on typical cases experiencing OHS related problems.

Study sample

The study sampling frame consisted of 73 shop floor employees, 1 industrial clinic nurse and 50 casual employees. The sampling frame was then exposed to stratified sampling method. The stratified random sampling technique was used because there was need to select only those units who were able to provide answers to the questions and ensure complete worker representation. The sampling frame was first divided into 5 groups (strata) of elements with similar desired characteristics. The respondents or sample for the research were randomly selected from the groups of production supervisors, health and safety committee members, workers in the maintenance department and industrial clinic nurse.

Data collection

The researchers collected both primary and secondary data based on the objectives of this study. Questionnaires were distributed with the help of production supervisors. The supervisors helped in the distribution of the questionnaires since they quickly located the respondents in their various workstations. The respondents also took the exercise seriously because of the involvement of fellow workmates.

Observations on OHS infrastructures were carried out with the help of the quality controllers because they are knowledgeable in the field of production operations. The quality controllers also helped in coming up with an objective observation guide. Interviews were also conducted in order to cross check responses provided in the questionnaires thus increasing the validity and reliability of data.

RESULTS AND DISCUSSION

Work related problems

Hazards in different workstations

It was discovered that employees at different workstations are faced with different types of hazards because the outputs produced are different at each stage of production. It was discovered upon observation that each type of hazard is more dominant in some areas of the factory than in others. The popcorn factory is very noisy and hot, whilst soya chunks factory is dusty as shown in Table 1. Different groups of workers are affected differently by OHS hazards due to the nature of their jobs. Table 1 depicts that 65% of the dust and steam in the factories affect the extruders. Extruders also face 40% of the heat and steam in the factory. Loaders face the greatest amount of musculoskeletal hazards (65%). Gunners, on the other hand, face the greatest health risk from high noise levels in the popcorn factory. Mixers and electricians face the least of the hazards in the factory but these show negative OHS practice because the little dusts and noise they encounter are a result of processes in other parts of the factory. It can be seen from these findings that there are well defined OHS hazards that endanger employees' health in foods factories.

Work related illnesses and infections

The researchers found out that workers are actually infected by occupational diseases due to the nature of their duties. The numbers of workers who suffer from different OHS problems are shown in Figure 1.

Of the entire workforce, only 25% claimed to be free of any illness that is caused by their work at any given time. The remaining 75% suffers from one or more types of illness. The industrial nurse confirmed that most workers

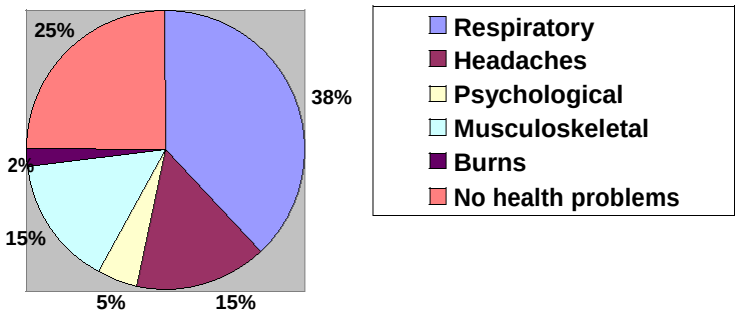

Figure 1. Prevalent health problems.

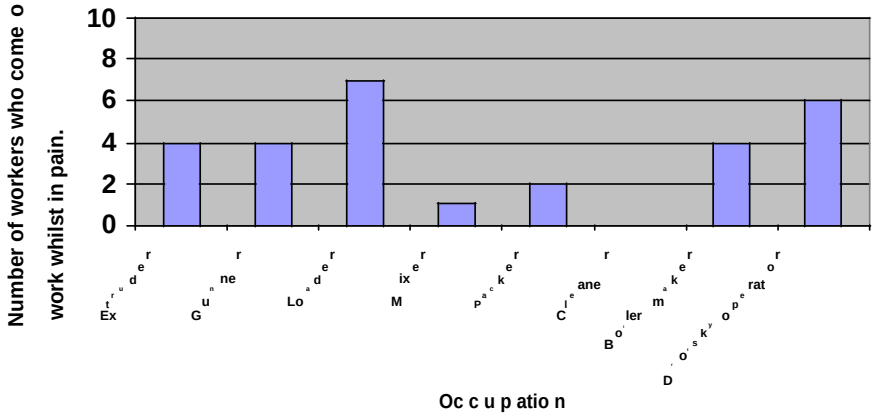

Figure 2. Workers coming to work whilst they are in pain.

have respiratory diseases. The major components of these are the Drotsky mill operators who were diagnosed with occupational pneumonia. It was also discovered that mixers and packers have the greatest complaints of psychological disorders. They mostly reported headaches and stress. These are attributable to their monotonous movements and duties that do not demand attention. The prevalence of burns and musculoskeletal disorders was found out to be as low as 2%. This is because the number of workers who are susceptible to burns is relatively low among the entire food factory workforce. Musculoskeletal disorders are common in more than one workstation, thus, their prevalence of 15%.

These statistics reveal that employees' fitness has been compromised by their occupations. When one is not healthy, his/her performance declines. A worker may become slow, inaccurate or reluctant in performing his/ her duties thereby compromising efficiency of production. Productivity declines when the workforce is not healthy.

Employee performance

Presenteeism

It was found that of all the workers in the factory, loaders come to work whilst in pain more than any group of employees as shown in Figure 2. The rate at which they do so is seven out of ten times. Loaders specifically referred to pain on the neck, back and shoulders. These health problems are classified under musculoskeletal disorders. Boiler makers and Drotsky mill operators also claim to come to work in pain but the prevalence of this is lower than that of loaders. Boiler makers claim to suffer from headaches whilst Drotsky mill operators suffer from upper respiratory diseases like throat and sinuses. They also claim to suffer from lower respiratory diseases such as tuberculosis, asthma and pneumonia but still come to work. The Drotsky operators who have a longer duration at work have been discovered to suffer from more respiratory diseases than those with a shorter duration at work. This shows that their health deteriorates with time. Gunners and packers also claimed to experience headaches due to the exposure to loud noises but they come to work in that state as they cannot abscond due to "simple headaches". Mixers and packers claim that their duties involve no serious pain and they have very few records of sick leave. These findings reveal that workers may be physically present at their jobs but they experience below normal work quality and productivity due to ill health. This is known as presenteeism.

Table 2. Number of workers affected by noise.

Workstations	Soya factory	Soya Packing	Popcorn Packing	Gunn machines	Extruding machines	Drotsky mills
Number affected by noise	6/25	0/5	25/25	6/6	4/8	4/7

Table 3. Workers observed to have fainted during Week 3 to 7 March, 2008.

Day	Monday		Tuesday		Wednesday		Thursday		Friday	
Workers who fainted	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	1	2	0	1	0	0	1	3	2	5

Occupational health safety (OHS) hazards

Noise

A lot of noise is released in popcorn production as shown in Table 2. All the workers in the popcorn factory said they are affected by noise in the production of popcorn. These workers are the 25 who work in popcorn packing and 6 who work on guns. It was discovered upon observation that there is no measurement of the noise produced in this factory because companies do not have instruments to determine the intensity of the noise. There is, however, another means of determining the impact of noise. If workers have to shout in order to be heard by someone at an arm's length, the noise level is too high (ZCTU, 2001). The noise in popcorn factories is deafening even if one covers his/her ears using his/her hands, so communication is impossible during the noise period. Impulse noise is produced and the nurse regarded it as one of the most dangerous type of noise as it causes headaches and hearing loss.

Heat and productivity

It was established that female employees in the popcorn factory faint at a high rate during the summer season when production is high (73%) as shown in Table 3. Targets of popcorn packing have been observed to be unattainable in most factories. The clinic nurse revealed that female popcorn packers commonly suffer from heat strain, heat strokes and cramp due to high temperatures.

The nurse claimed that extruders and gunners fare better probably because their bodies have adjusted to the heat by regulating it. This is done by faster blood flow that causes the body to sweat and cool. There is, however, a problem of loss of salt because of too much sweating. This results in salt deficiency which is dangerous to employees' health in that it causes inadequate blood flow to vital organs of the body. Production time is lost during clinic attendance as well as when packers faint. Production slows down thus, reducing productivity of the worker.

Protective clothing and equipment

It was found out from observations and interviews that protective clothing is used as forefront protection of workers from hazards. Protection of the worker is on the workers themselves and not on the sources of the hazards. Workers have dust masks that let fine particles of dust into their noses and throats. Contract workers wear old tattered clothing.

The study revealed that workers are given the reason of lack of money when they ask the management about protective clothing and equipment. The industrial nurse reported that drotsky mill operators suffer from occupational pneumonia from the dust that they are exposed to during work. Workers in the popcorn factory do not have ear protection devices to protect themselves from the loud noise. Welders have inadequate goggles which are too old thereby putting their eyesight at risk.

Electricians have no protection from rain water thereby exposing them to electrocution. Safety shoes are also lacking, making workers prone to feet injury. Workers are exposed to many risks due to lack of adequate protective clothing and this endangers their lives and they frequent the clinic due to work related illnesses like flu and chest pains. This reduces the time that they are at work and productivity declines. Lack of protective clothing reduces employee morale resulting in low productivity because workers become less willing to work. Lack of protective clothing and equipment also exposes workers' health to OHS hazards and diseases, thereby reducing their efficiency and productivity.

Management's attitude towards occupational health safety (OHS)

Heath and safety commitment by the management

Management in most food factories does not consider occupational health safety (OHS) as an important condition for high productivity. Most factory licenses have not been renewed as per Factories and Works Act (1976).

Management of companies gave the excuse of

Table 4. Health and safety requirements.

Key result area	Available	Not available
Disclosure of accident records		
Disclosure of first aid statistics		
First aid kit		
Health and safety policy		

Table 5. OHS induction training.

	Trained	Not trained	Total
Contract workers	2	48	50
Fixed contract workers	10	20	30
Permanent workers	35	9	44
Total	47	77	124

financial constrain when it comes to improving OHS. The workers are aware of this and they resultantly breed resentment towards the management. This reduces employee morale and workers' willingness to work, thereby reducing productivity.

Disclosure and provision of a safe working environment

The company's health and safety policies are not posted for all employees to see, although, they are available (Table 4), hence, employees do not know and understand how OHS issues are supposed to be handled as far as their rights are concerned.

The company does not disclose accident and first aid statistics to the workers as is required by statutory instruments. Injury records are not even recorded by the factory supervisors.

The study revealed that food factories are unsafe to work in as there are many hazards inside. Popcorn production produces a lot of noise that is not measured as required by the industrial law. Floors in most Zimbabwean food factories are uneven, chipped and slippery making the workers prone to falls. The factories are dusty and hot thereby reducing employees' strength and productivity.

State of machinery

The study discovered that rusty and old machines are used in most factories. These are dangerous because they may stop running abruptly and cause the machine operator unnecessary injury or death. The machines also let out large amounts of dust and loud noises. Old machines produce more occupational health safety (OHS) hazards that are more difficult to control than new ones. It was found out from the workshop and factory workers that the management does not consider capital investment in OHS as important. It perceives it as an expense with no immediate return benefit. Old machines cause health problems to the factory workers, thereby decreasing their performance. This implies a decrease in the level of productivity among workers in the factory.

Accident report and investigation

Accidents are not reported or recorded, therefore, they are not known to the management. The result is that accidents go unnoticed and no measures are taken to prevent occurrence of the same accidents in the future. Supervisors revealed that their duties do not include accident recording and reporting. They have not been furnished with an adequate job description. The result is that accidents are not prevented at all, thus putting the health of workers at risk. Workers are aware that they are not safe during work and their morale is low. This reduces productivity of workers.

Induction training on occupational health safety (OHS)

Induction training on occupational health safety (OHS) was found to differ according to employment status of workers as revealed in Table 5. It was found that most food factories do not carry out proper OHS induction training. Most of the employees who are not yet permanent, divulged that induction training on OHS was very low for them. Two contract workers claimed to have been inducted on OHS, while ten fixed contract workers out of thirty claimed to have been trained on OHS upon employment.

These statistics show that there is indeed a difference in the amount of induction training that is done with the three different groups. The least percentage of trained

workers is in contracts. Even though a high amount of training (80%) is done with the permanent workers, the overall training is as low as 39%. With a percentage of 61% uneducated employees, it is very difficult to eliminate potential hazards because these workers are not aware of the implications of bad OHS hazard practices. The workplace is thus more prone to accidents due to lack of knowledge.

The morale of contract workers is reduced because it appears that management does not recognize their importance to the organization or their safety at work. Low morale reduces productivity because workers breed resentment against management and they do not work to the best of their capabilities. Efficiency of production

declines thereby reducing productivity.

Conclusions

The study found out that bad occupational health safety (OHS) practices in food factories decrease the workers' performance, leading to the decline of productivity. A worker who is suffering from an occupational illness is slower and weaker, thereby, missing set targets. The morale of workers in the food industry is very low. The general attitude of management towards OHS is largely negative since little attention is paid to training on occupational health safety (OHS).

RECOMMENDATIONS

The study recommends the following for the food factories:

1. Machines should be used to load and off load trucks in order to eliminate musculoskeletal hazards that risk the health of loaders.
2. Hazards should be controlled at the source in order to avoid infecting workers.
3. Psychological disorders should be reduced by avoiding giving challenging jobs that provide learning opportunity or career options to packers and mixers.
4. Regular medical check ups so as to determine workers state of health should be done.
5. Workers must be inducted on the OHS issues that apply to their workstation and to the company as a whole.
6. Accidents statistics of a vacant workstation should be disclosed to a new worker so that he/she becomes more careful when working and thereby reducing accidents.
7. All workers should be seen and treated as equal in the eyes of the management.
8. Upgrade the factory by installing new machines that are free from occupational hazards.
9. Companies should provide adequate protective clothing only as the last line of protection.
10. An accident register of all accidents and near misses should be kept at the workplace.

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