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Ensuring Worker's Safety is a Very Important Motivating Factor in Apparel Production

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Abstract- In most of the Apparel Manufacturing Industries, the authorities always give a high emphasis to the higher rate of production and profit margin. But on most of the cases, the rate of production does not come to a satisfactory range due to the lower level of the worker's efficiency rate. Various reasons may be highlighted for this downfall rate of efficiency. But, does the authority know that their worker's are actually concerned about their safety factors? The fear factor of various sorts of mechanical / industrial accidents is always directly or indirectly playing in their mind while operating a machine in the Apparel manufacturing industries. As a result they are not being able to give their hundred percent efforts in their respective assigned duties. Therefore, ensuring their safety is definitely a very important motivating factor to increase the rate of production.

Keywords- Hazards, Machine guarding, Machine maintenance, Motivation, Productivity, Protective Equipments, Safety.

1 Introduction

There may be several reasons for which the worker's efficiency does not reach the satisfactory level. The reasons are like inexperience, lack of proper trainings, worker's fatigue, improper working environment, uncomfortable work-place (ventilation, air-conditioning, humidity, heat, temperature, and lay-out, etc. factors), worker's fear of machine accidents, etc. Among these reasons, the workers' fears of machine accidents play a very vital role resulting in the reduction of their working efficiency. In a country like Bangladesh, the garments factory workers lead a very marginal life. Whatever they earn, that is never found to be on a satisfactory limit; rather the earning hardly manages to meet their daily necessities. Their earning is so limited that, they cannot afford to bear the loss of even one hour's income. Either they must work for each & everyday otherwise they have to starve for that day along with their family members. Moreover due to various negligence of the management, they (workers) frequently become the witness of a lot of casualties / accidents occurring to their fellow colleagues at work, most of whom lose their job as they become physically handicapped. Due to these various reasons, these garment workers are incapable to give their hundred percent efforts to production. Their concentration is partially diverted as they are eager to avoid machine accidents and not to become physically handicapped. Now, what can become the role of the management to overcome this situation? Should they allow this lower rate of production due to workers' lower working efficiency to occur or should they make them bound by force to work faster without caring much about their safety? None of these attempts would work fruitfully to the greater interest of the factory. The management should sooner than rather find ways to ensure safety of the workers thereby motivate them and then expect high working efficiencies to run production. This will definitely serve to the greater interest of the factory and its overall economy.

2 Workers' Safety; Problems & Suggestions

In the garments factory the workers has to work taking a lot of risks of being injured in many probable accidents. Most of these probable accidents can be prevented or minimized if the management pays proper attention or cares for the personnel working under them. In the below section a lot of such accidental or hazardous factors been mentioned along with the probable ways of solutions. If these factors are taken into consideration & the solutions provided are adopted, then a healthy working environment will grow up in the apparel production floors that can motivate the workers to concentrate more on their work-duties without worrying about accidents and thus lead to higher working efficiencies.

2.1 Accidental / hazardous factors in the factory & probable ways to minimize them are as follows

2.1.1 Machine guards are essential for protecting workers from needless and preventable injuries. A good rule of thumb to

remember is that any machine part, function, or process which may cause injury must be guarded. Where the operation of machine, or accidental contact with it, can injure the operator or other workers in the immediate area, the machine must be guarded. There are three basic parts of a machine that must be guarded: 1) The point of operation – the actual point where the work is performed on the material, such as cutting or sewing; 2) The power transmission apparatus – all components of the mechanical system that transmit energy to the part of the machine performing the work. These components include flywheels, pulleys, belts, connecting rods, couplings, cams, spindles, chains, cranks, and gears; 3) Other moving parts – all parts of the machine which move while the machine is working. These can include reciprocating, rotating, and transverse moving parts, as well as feeder mechanisms and auxiliary parts of the machine. Machines in garment factories need to have safety guards in order to prevent serious injuries to workers. In particular, make sure that sewing machines have needle and belt guards installed. Make sure that all machines have appropriate safety guards installed. Make improvised guards for any machines which do not come with guards.

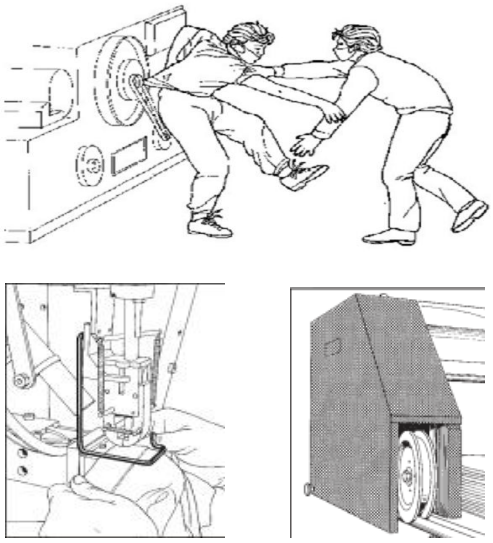

Fig. 1. Machines with and without guards

2.1.2 There are a number of mechanical motions and actions that can be hazardous to workers if safeguards are not present. Most machines perform their function of cutting, shearing, bending or punching by a series of mechanical motions, namely through rotation of machine parts (produces nip point hazards); through reciprocation of machine parts (this basically refers to up-and-down or back-and-forth motion as with sewing machines); and, transverse motion (movement in a straight, continuous line) in which a worker may be struck or caught in a pinch point by the moving part. There are a number of general requirements for all machine guards if they are to protect workers against mechanical hazards. These include:

- Prevent contact – the guard must prevent hands, arms, or any other part of a worker's body from coming in contact with dangerous moving parts. A good guard eliminates the possibility of the operator placing their hands near dangerous moving parts;
- Secure – the guards should be firmly fixed to the machine (or preferably an integral part of the machine) and not easily removed. (Remember that if a guard can be removed easily, it is no safeguard at all!). Guards should be made of durable materials that can withstand workplace conditions over the lifetime of the machine;
- Protect from falling objects – the guard should ensure that no objects (such as a tool) can fall into moving parts;
- Create no interference with work – any guard which impedes a worker from performing his/her job efficiently and in comfort, is likely to be removed. It should be pointed out that proper guards on machines can actually improve productivity as workers then have confidence that they will not be injured;
- Allow safe lubrication –The operator or maintenance worker should be able to lubricate the machine safely without removing the guard or having to reach inside the machine and into any hazardous area.

There are various types of guards that can be used to prevent injury in the workplace such as Fixed guards, Interlocking guards, Adjustable guards, Self-adjusting guards, etc.

2.1.3 If you take a walk-through survey of a garment factory, one of the most common observations is the number of machines that have guards missing or that the guards are inadequate. As has been discussed, it is important that you purchase so-called safe machines with fixed guards as an integral part – guards that cannot be removed, that allow for safe maintenance, and that provide clear visibility. Here is an example of unsafe conditions and unsafe acts (see picture below).

Pictures ⇒: Look closely at these pictures of two sewing machines next to each other. In one, the belts are fully guarded but not in the other. Managers said that they had only been removed for maintenance, but they were nowhere to be found. Look at the use of PPE – do you notice anything?

Fig. 2. Workers are performing unsafe acts by leaning over poorly guarded machines (unsafe conditions). Look at the workers clothing, hair etc.

Tragically, accidents occur in all workplaces and the garment industry is no different. Accidents are costly to the employer in terms of loss of productivity; to the worker in terms of injury, loss of wages etc.; and to society as a whole. The three factors that contribute to accidents are Faulty technical equipment, Working environment, and the Worker. In the analysis of workplace accidents, it is clear that they are always the result of either unguarded machines/unsafe conditions in the workplace and/or unsafe acts. In companies with poor industrial relations, there tends to be a "culture of blame". In apportioning blame: Many employers tend to "blame the worker" for unsafe acts. Many workers tend to "blame the employer" for faulty equipment and unsafe environments. (It must be remembered that international standards specify that it is the EMPLOYERS' duty to provide a safe and healthy workplace). In reality, accidents occur as a combination of unsafe conditions and unsafe acts.

2.1.4 Accidental contact with electric current may result in electric shocks, contact burns and even death, if proper protective measures are not taken. Wiring and electrical systems such as sockets, panels, motors, fuse boxes, and transformers that are not well maintained can overheat. The purpose of this section is to help reduce threats to workers, equipment, and buildings from electrical shock or electrical fires. Grounding is an electrical connection to earth. Use building ground for all 120V AC outlets, motor grounds, etc. Never use the neutral circuit wire as the electrical ground. Avoid hanging electric extension cords from the ceiling, if possible.

2.1.5 Machine installation should only be carried out by a qualified technician. Contact the machine company dealer or a qualified electrician for any electrical work that may need to be done. Do not connect the power cord until installation is complete, otherwise the machine may operate if the treadle is depressed by mistake, which could result in injury.

2.1.6 A well-designed iron workstation is crucial to productive and efficient work. Even minor changes in workstation design can make a big difference to productivity, health and safety. Attach an elastic spring to the iron to reduce worker fatigue and improve productivity. Provide an 'ironing pad' which the iron can rest on when it is not in use. This protects the surface and will keep the iron clean.

Provide a 'fatigue mat' to workers who iron in the standing position. This will help to reduce fatigue and improve productivity. Provide a foot platform so that shorter workers may iron at a comfortable height.

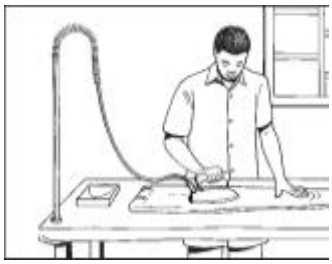

Fig. 3. Industrial ironing machine with elastic spring to reduce worker fatigue

2.1.7 Proper lighting conditions are critical for good productivity. Many employers have found that lighting improvements have improved productivity by 10 percent, and reduced errors by 30 percent. Conversely, poor lighting can cause eye strain, fatigue and headache. Make full use of natural lighting through windows or skylights. This reduces electricity bills and improves the work environment. Use a combination of natural and artificial light and adjust lighting to the task-related types of work. Use local lighting (needle lights) when necessary for some types of fabric, thread or seams at the needle point.

2.1.8 Some light-producing machines used in garment factories can be hazardous to workers. Glare from the light can cause dizziness, headaches and fatigue, which can lead to mistakes and reduce productivity. Long-term exposure can damage the workers' vision. Workers should wear suitable goggles, or guards should be fitted to the machines to deflect light away from the eyes.

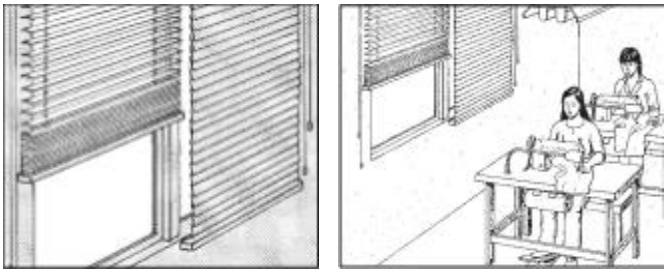

Fig. 4. Window shading to deflect glare from light sources

Cover windows with blinds, curtains, louvers, shades or plants. Use translucent windows, instead of transparent ones. Use shades to deflect glare from light sources. Reflective surfaces can distract workers as well – ensure that light from these sources does not shine in workers' eyes. Make sure that there is enough light for workers to be able to see their work without straining their eyes. Change florescent light bulbs as soon as they stop working to ensure good lighting.

2.1.9 Ensure that the worker is comfortable and has correct posture. An adjustable chair with a backrest can greatly improve the posture of seated workers.

2.1.10 A clean workplace can help to achieve better productivity and protects worker's health and safety. Factories should establish systems to make sure that waste is continuously cleared up and that the workplace is kept safe, healthy and hygienic at all times.

2.1.11 Spot cleaning is necessary in garment manufacturing, but some of the chemicals used can be dangerous. It is necessary to protect people who work in or near the spot cleaning area from chemicals, including chemical fumes. In particular, Trichloroethylene, a toxic chemical commonly used in spot cleaning, needs special care. It can cause harm if it is breathed in or if it touches the skin. Use a special room in a separate location for the spot cleaning area. Use water and detergent for spot cleaning instead of chemicals whenever possible. Make sure that workers read and understand Material Safety Data Sheet (MSDS) so that they learn about the dangers of the chemicals being used.

Fig. 5. Workers personal protective equipment in hazardous chemical handling floors

Ensure that the spot cleaning room has clean air at all times by fitting fans and installing fume captors where the fumes are located. Ensure sufficient fume caption per minute. Install exhaust ventilation fans in the spot cleaning area to make sure that clean air flows towards the workers and chemical fumes flow away from the workers. After taking all possible measures to improve the working environment, provide workers with proper personal protective equipment such as masks, overalls, gloves and safety goggles.

2.1.12 Good machine maintenance is an investment in productivity. Well maintained machines are more reliable, safer and last longer. Basic maintenance can often be done by workers. Workers should be taught skills such as machine cleaning, adjusting thread tension, changing broken needles, bobbin changes and emptying the dust filter. Good machine maintenance ensures safe working environment.

2.1.13 Management can use the Better Work training materials to support their own induction process to educate new workers on their rights and responsibilities when they are newly employed in the factory. Enterprise HR managers/trainers with induction responsibilities should participate in Better Work training sessions so that they clearly understand how to use the materials.

Fig. 6. Workers training session at garments factory

2.1.14 Fire safety is important; it can save money and lives. The best fire safety practices prevent fires by reducing the risk of fire. 4. Training workers is a very cost effective way to improve fire safety because it teaches workers how to prevent fires from starting and what to do in case of an emergency. Make sure that there is enough fire safety equipment and that it is checked regularly. Suitable types of fire extinguishers and fire hoses must be available. Common types of extinguishers are dry chemical, halon, and CO2. Place extinguishers and hoses where the risk of fire is greatest.

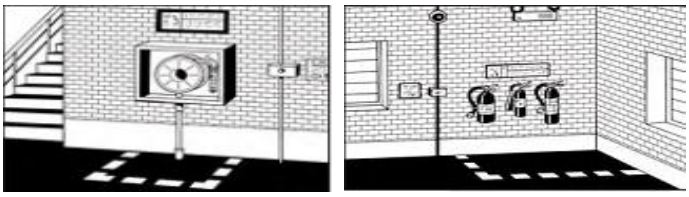

Fig. 7. Fire safety arrangements at garments factories

Form fire fighting teams. There should be at least one fire fighter for each section of the factory. Fire fighters must receive regular training, and the number of fire fighters should be proportional to the total workforce. Provide identification

to fire fighters. A good form of identification is a brightly colored armband or a badge on their shirt.

2.1.15 Personal Protective Equipment (PPE) needs to be provided to workers by the factory. PPE should be used only as a last resort after all other measures to improve safety have been taken. Provide chainmail (metal mesh) gloves to workers using cutting equipment to protect them from finger injuries, and make sure that gloves are available for left-handed workers. Provide adequate dust masks to workers (e.g. cutters) to protect them from breathing in chemical dust.

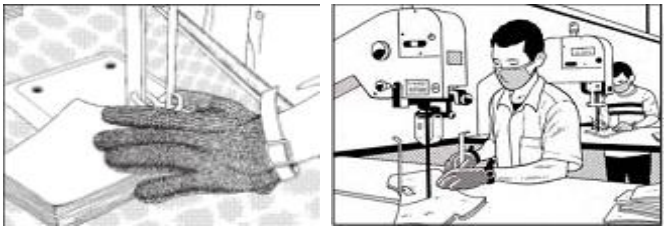

Fig. 8. Operators working with personal protective equipments (PPE)

Old or worn out PPE does not protect workers: Make sure that PPE is in good condition and always replace it when needed or after manufacturer's recommended period of use expires.

2.1.16 Stairways can be dangerous but a few simple precautions can make them much safer. Make sure that stairways are large enough and are not blocked or slippery. Stairways need to be large enough for large groups of people to use in case of an emergency evacuation such as a fire. Stairs should have non-stick 'treading' to prevent people from slipping. There should have handrails for support. Make sure that there are enough stairways in case of an emergency such as a fire. Stairways need good lighting; otherwise workers may trip and injure themselves.

2.1.17 Drinking water is very important for all workers especially those in hot and humid climates. Heat causes dehydration which leads to fatigue, loss of concentration and loss of productivity. Workers must be provided with sufficient hygienic drinking water. Drinking water containers should be located close to the workstations, but not near sanitation facilities, dangerous machines, or areas where chemicals are used frequently. This is so that the water doesn't get contaminated. Use disposable cups or materials to minimize the spread of infection. Anticipate water consumption increase according to number of worked hours, number of employees, and outside temperature.

3 Conclusion

It was practically observed through different interviews to the workers of different factories that they are more motivated to work for the factories which provide them assurances of safety along with payment issues. The job-place switching tendencies of the garment workers are mostly influenced by payment and safety issues. If the safety measures are taken highlighting the machine guarding, safety devices installation, ensuring electrical safety with good & healthy design of the work-station, proper hazardous chemicals and materials handling policies, induction training kit, adequate machine running & fire-safety trainings, etc. issues in the garment factory, then the workers will work harder with their heart and soul for the welfare of the factory. So the factory management should look forward to solve the workers' safety issues by implementing the above mentioned suggestions for the greater interest of the factory's prospective. No doubt, the effective application of the above discussed safety issues definitely would have an important impact in motivating workers performances' rate in working resulting in productivity improvement with quality products and thus playing a vital role in overall factory economy.

References

[1] www.viyellatexgroup.com
[2] www.opexgroup.com
[3] www.sepalgroup.com
[4] www.mbmgarments.com
[5] www.betterwork.org
[6] www.levistrauss.com//files/librarydocument
[7] www.brother.com
[8] http://www.eihms.surrey.ac.uk/robens/erg/Test%20area/GRA_revised_doc.pdf
[9] http://www.osha.gov/SLTC/emergencypreparedness/index.html
[10] UK: Society of Light and Lighting.
[11] http://www.cibse.org/index.cfm?go=home.show&PageID=68&TopSecID=11
[12] http://www.ccohs.ca/oshanswers/hsprograms/house.html
[13] Controlling Electrical Hazards: http://www.osha.gov/Publications/osha3075.pdf
[14] http://www.ascc.gov.au/ascc/HealthSafety/HazardsSafetyIssues/NoiseHearing/NoiseControl.htm
[15] http://www.cdc.gov/niosh/pdfs/79-117.pdf
[16] http://www.osha.gov/dts/osta/otm/otm_iii/otm_iii_3.html