Present Situation Analysis of Environmental Management System on a Proposed LEED GOLD Sweater Manufacturing Company

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Abstract

The textile industry has become the backbone of the economy of the country, but recently it also has risks. Large businesses on the higher end of the value chain are increasingly placing pressure on small and medium enterprises to satisfy minimum environmental and social requirements with quantity, quality, and price-cost requirements. Environmental management is the management of the responsibility of an organisation for its environmental impacts. The proposed LEED GOLD sweater manufacturing company is a brand-new subsidiary of the Rashid Group. The aim of this study is to examine the current situation of sweater manufacturing company's environmental management system and to find out the shortcomings of Environmental management system practices. In this analysis, two data collection strategies were adopted. One of them is field based study along with questioner survey and another one is collection assisted by official paper, literature review, etc. This study found that general environmental policies and approaches to management are strictly defined in this factory. The research demonstrates that strict monitoring and compliance of existing laws led the owners of the factory to prevent a poor system of environmental management. In addition to the problem of emissions, factory owners strictly comply with environmental laws and pollution regulations except for wastewater discharge management. Furthermore, the study results and recommendations will be of great benefit to the authority, including HR & Environmental Enforcement Management, EMS Management, which would show best practices and pathways for the industry to help achieve LEED GOLD certification in order to minimize its environmental impacts and improve its operating efficiency.

Keywords: Environmental management system, Environmental policies, Environmental laws, Environmental compliance checklist, Environmental Enforcement Management, Audit

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1 Introduction

The manufacturing industry can no longer neglect environmental concerns. Companies face increasingly strict regulatory restrictions and rising prices of utilities and raw materials. For company to thrive in a competitive market, the efficient and successful use of raw materials and enhanced process operations are essential. Suppliers and clients are now exerting pressure on businesses to reduce their negative environmental effects. All of these considerations mean that an important aspect of the business strategy should be environmental concerns. Setting up an environmental management system (EMS) would provide a company with a structure by which it can monitor and enhance its environmental efficiency. An EMS will enable to define opportunities by reducing waste generation and reducing the use of water and other utilities to minimize operational costs. According to Khanna and Anton (2002) EMS represents an organizational transformation within companies and a self-motivated attempt to rationalize environmental externalities through the implementation of management practices that combine environmental and production decisions that recognize pollution mitigation opportunities and enable the business to make continuous improvements in production methods and environmental performance. Clement (1996) notes that, the standard refers to those environmental factors over which the business has control, or which may be expected to affect the company. Aboulnaga (1998) pointed out that, the adoption and use of an EMS will provide companies and organizations that want to compete on the international stage a competitive advantage. Other proponents of ISO 14001 like Stapleton et al (2001) argued that the requirement could act as a framework to enhance organizational performance significantly. A company will increase its market share and reduce expenses related to environmental taxes, electricity, waste, water use, pollution, and fines by adopting and being accredited. Bangladesh embarked upon rapid industrialization after its independence from Pakistan in 1971. The establishment of industries for the country's rapid economic growth is being promoted. In urban areas such as Dhaka, Narayanganj, Narshingdi and Chittagong, most of these factories are located (BBS, 2010). A number of environmental concerns have now been identified and traced to industrial facilities in Bangladesh. The four major rivers near Dhaka Shitalakhya, Balu, Turag and Buriganga receive more than 1.5 million cubic meters of wastewater every day from the surrounding industrial units, according to a World Bank report. The report demonstrates that the improper treatment of wastewater by a number of factories results in the release of highly toxic waste causing

significant harm to the atmosphere and to marine life. More than 30 to 40 lakes suffer from the effects of poor water quality exacerbated by untreated industrial waste in the river system. The proposed LEED GOLD sweater manufacturing company is a brand-new Rashid Group subsidiary. They have existing environmental management system with have some deficiencies. They have an existing system for environmental management with certain deficiencies. The study will help to understand the present situation of environmental management system of proposed LEED GOLD sweater manufacturing company along with find out the drawbacks of EMS practices. It will be of great use to the authority, including HR & Environmental Enforcement Management, EMS Management, to take measures in future research and development and in all decision making on environmental management system concerns.

2 Methodology

2.1 Study Area

The study was conducted on a proposed LEED GOLD sweater manufacturing company, which has the most advanced sweater manufacturing system in the RMG sector of the country and manufactures the highest quality sweaters for the world's leading brands. The facility is a member of ACCORD and other compliant bodies concerned. The 110,000sft factory is fitted with 600 sets of automatic jacquard knitting machines and other branded machinery of the Shima Seiki, Gousheng & Hongqima brand for linking to final finished goods. And the factory also has a sufficient number of specialists, trained & qualified staff to empower these machines. Thus, the technology combined with experience results in the factory providing valued customers with approx. 400,000 pcs of finished sweaters every month. This Factory goal is to well survive heightening the image of the group along with maintaining environmental management system. This factory called green factory because:

i. Sustainable Sites: The factory is conveniently located close to all important services, where school and market are located. The site also offers secure bicycle parking facilities and facilitates the use of non-fossil fuel transportation within 500 meters of the mosque and bus stops.

ii. Water Efficiency: Fresh, drinkable water is a precious commodity that is only available in a limited supply. Therefore, prudent use and treatment of

are very important as we look to expand our built environment and shrink natural treatment areas by reducing indoor & outdoor water use.25% water saving fixtures & fittings are used all over the premises along with proper flow meters to maintain use sand consumptions.

iii. Energy & Atmosphere: The factory building has been designed in a way which saves energy and renewable power sources are also added to the project.25KW solar power is infused on grid with the main power source. The project is using NONCFC (Chlorofluorocarbon) Evaporative Cooling Systems complying the perspective measures of ASHRAE Standard 90.12010. Hence resulting to optimized energy performance and enhanced refrigerant management to avoid global warming.

iv. Indoor Environmental Quality: The quality of the air on the inside of a building is important to all the occupants, as it can contribute to illness and lack of productivity. The factory design allows an increased amount of fresh air by using building materials and products without harmful chemicals to improve the air quality. It has a wide access to the outside views for providing day light and natural lighting and ample of space for better thermal comfort.

v. Innovation & Design: The innovative & exceptional designing of all environmental aspects the factory has been done by a professional LEED accredited personnel with the special ability for green buildings.

vi. Materials & Resource: What materials are used, where they come from, how they are made, and how they are disposed of are instrumental in determining how green a project is. The factory uses more green materials, including renewable materials, recycled materials, and natural materials.

2.2 Research Design

This research design was focused on the common understanding of the EMS model's control/corrective action in Bangladesh. Considering the Standard Policy of Bangladesh, environmental aspects such as: air emissions; waste generation and management; river wastewater releases; land contamination; use of energy and natural resources; Local and Community issues (Noise, odour, aesthetic condition); Positive aspects of operation on the environment and Environmental Impacts including Local air pollution; Global air pollution;

Adverse impact on employee health; Degradation of local water quality; Depletion of natural resources; Degradation of flora and fauna and Noise pollution. As shown in figure the backbone of the study is the "Existing Situation Analysis" which is macro scale analysis on environmental management system. At the end of the study the most significant results revealed from the study were listed briefly and recommendations were developed.

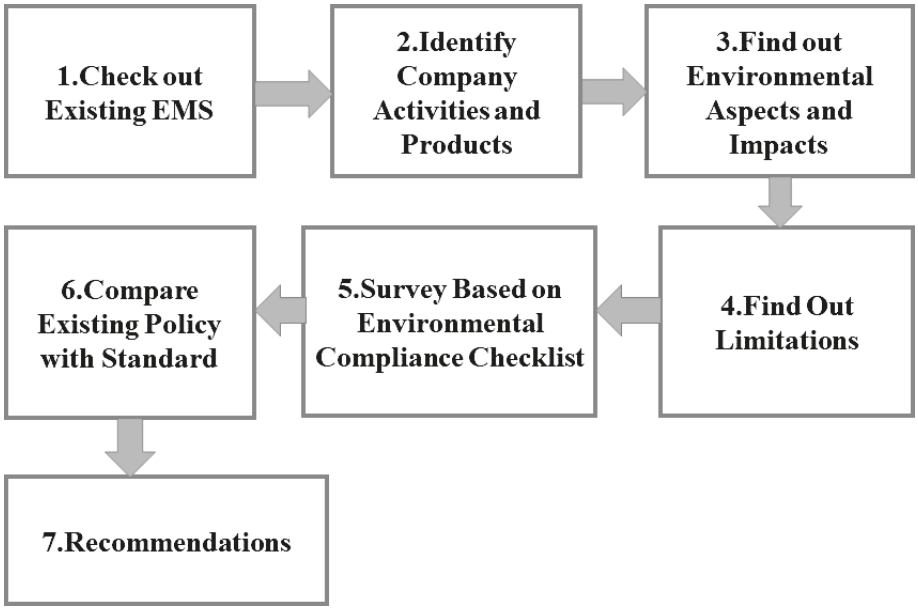

Figure 1: Research Design of this Study

2.3 Data Collection

A questionnaire survey and field survey were carried out to accomplish the study goals. At the outset of the research, a study design was developed to frame the study as well as to design the questionnaire and field survey. To collect the primary data from the questionnaire, a field survey was carried out. Then the data was analysed to obtain the results. Primary data was the main source of information for the study. Some secondary data sources have also been implemented. Books, official reports, published electronic and print journals, and information from local environmental experts were among the secondary data sources.

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2.4 Questionnaire and Field Survey

The design of the questionnaire and field survey was based on the proposed LEED GOLD sweater manufacturing company environmental compliance checklist, including Environmental Management System; Waste Management; Wastewater and Effluent Management; Air Emissions Management; Water and Food Management; Energy Usage and Greenhouse Gas Management; Land Use and Biodiversity; Hazardous Substances and Noise Management. The standardized questionnaires were administered over the four hundred staff and management authority of proposed LEED GOLD sweater manufacturing company in order to carry out the survey most effectively. Some questionnaires were left with in which the questionnaire could not be administered personally. A convenient purposeful sampling technique was used for the field survey over the employees and authority to collect data from the proposed LEED GOLD sweater manufacturing company. Industry was chosen on the basis of their availability and accessibility to the author and their willingness to participate in the survey, including environmental enforcement management and employees from each production section.

2.5 Data Analysis and Presentation

The analysis was considered to be exploratory and did not statistically analyse the results. In terms of the general patterns that emerged from the study, the findings were then compared with the Standard Environmental Management System outlined. And, based on the results obtained from the study, recommendations have finally been developed.

3 Research Findings and Analysis

Research findings were found out from questionnaire and field survey that was administered over the four hundred staff and management authority of the proposed LEED GOLD sweater manufacturing company. The next sections illustrate the research findings.

3.1 Environmental Management System

The proposed LEED GOLD sweater manufacturing company is a green sweater factory and has an existing environmental management system to comply with environmental policy, minimize its environmental impacts and improve its operational performance. It has three storey buildings and different sections are apprehended by each building. Each section apprehends fire equipment, work-related procedure, emergency evacuation plan, section wise policy sheet, BSCI code sheet, leaving procedure, ETI base code, pest control, emergency plan, etc.

3.2 Temperature & Humidity Level

This factory has separated production area and all required Temperature and humidity level quality assessment carried out by green tech Environmental Company according to the CSA & OSHA standard. The Temperature and humidity level present within the acceptable limit in all areas.

3.3 Light Level Quality

The Green Tech Environmental Company checked the appropriate light quality parameter for separate production area in compliance with the Bangladesh Labor Laws, Bangladesh National Building Code & OSHA Standard. The light level quality found in all areas within the acceptable limit.

3.4 Policy

Seventy-five policies have been adopted by the proposed LEED GOLD sweater manufacturing company and among them forty policies relate to the environmental management framework, including environmental policy, health & safety policy, healthy chemical handling policy, fire safety policy, environmental risk assessment and management policy, etc., according to National Environmental Policy 1992, Environmental conservation Act-1995(Amended in 2000, 2002 & 2010); Environmental Conservation Rules-1997(Amended in 2002, 2003 & 2010); Industrial policy-2010; Labor act-2006 etc.

3.5 Audit

They carried out three types of audit schemes, including internal audit, external audit (buyer requirement basis) and requirement-based environmental audit.

3.6 Legal Document

They apprehend Certificate of incorporation, Factory License, Trade License, BGMEA Membership License, Group Insurance, Noc, Custom Bond, TIN Certificate, Income tax, Boiler use certificate, Generator Weaver, load certificate, electricity approval certificate, bond licence water test report, Fire License etc.

3.7 Training

This factory conducted different type of training on the basis of requirement. Security Awareness Training, Wastage Disposal, Environment Health and Safety, Risk Assessment Training, occupational Health & Safety Training, Anti-Corruption Awareness Training, Fire Fighter Training , PPE Training ,First Aid training, HIV Aids, Malaria, Risk Assessment training, Chemical safety & Handling Training(MSDS),Labour Law awareness, Expected Mother Awareness Training, Management And Mid-Level Management Training, Transmitted & Non Transmitted Diseases, Trauma & Serious illness, Injury Training etc. are among them.

3.8 Emergency Evacuation Plan

Each section apprehends the emergency plan in this factory as if employees and other authorities are able to follow the emergency situation easily.

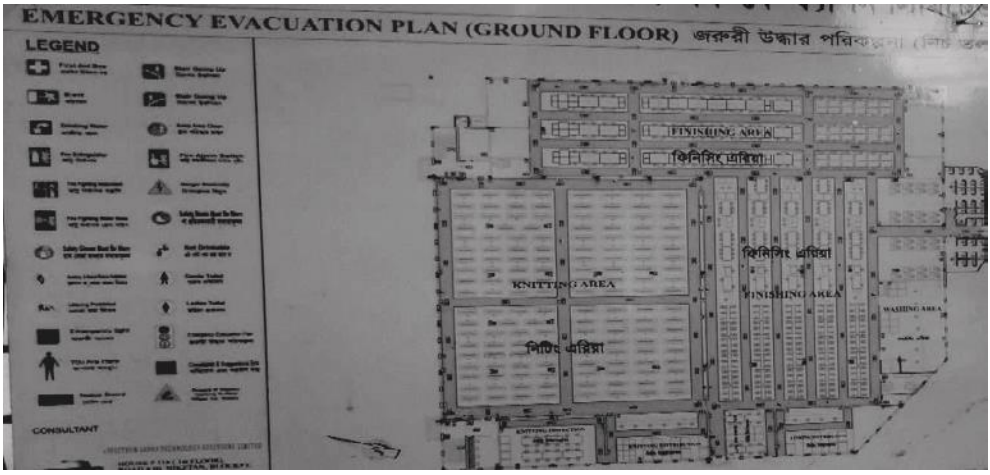

Figure 2: Emergency Evacuation Plan of the Proposed LEED GOLD Sweater Manufacturing Company

3.9 Fire Equipment and First Aid Kit

Fire equipment including Fire Hock, Fire Beater, Stretcher, Gas Mask, Belcha, and Lock Cutter, Fire Blanket, Hand Gloves, Helmet, Water Dram, Gumboot, Bucket Hose Reel, Fire Alarm Switch, Fire Alarm, Fog Light, Exit Sign, fire extinguisher (ABC, CO2) etc. are being apprehend each section with requirement. First aid kit including First Aid Box, Burna Cream, Povisep Liquid, Scissors, Surgical Gauge, Roller, Bandage, Povisep Cream etc. also being apprehend each section with requirement.

3.10 Workplace Risk Assessment

Risk assessment is a method used by managers to provide decision-making information (Through risk characterization and scoring). Separate production area apprehension of the risk assessment process depending on the area of production to be informed of the current production area. One of the section area's risk assessment procedures is given below:

3.10.1 Risk assessment

Machine Name: Swing Machine, Overlock Machine, Button Hale, Two Needle Machine, Button Machine, Weaving, Jacquard, Linking, Wash etc.

Explanation:

Possibility

1. Absolutely less
2. Chances are low
3. There are possibilities.
4. Chances are
5. More likely
6. Almost sure

Type of damage

1. Insignificant (first aid is sufficient)
2. Significant (injured but time will not be wasted)
3. Medium (casualties that will take time)
4. Large (horrific casualties)
5. Critical (mutilation)
6. Excessive damage

Risk value = probability X type of loss

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Table 1: Risk Assessment Measurement

serial	Risk type	Risk description	Probability	Loss	Risk value = probability X type of loss	Risk prevention	Possibility after prevention	Loss After prevention	New Value
1	Component and producing product	Swing, overlock, islet the combustion of such machines and the oil produced are actually products in contact with the inadvertent fire. Fires can occur.	2	5	10	1. Fire inside the Floor is completely forbidden. 2. Initiation of welding or fire, when doing any necessary work that must work with security personnel.	2	2	4
2	Light	If there is not enough light while working on the machine. Drowsiness / headache may occur. Through this increases the tendency to get injured.	5	5	10	1. The amount of light will be kept adequate while working on the machine. 2. Regular light (Lux. Level) should be checked.	2	2	4

3	Work environment and efficiency	Pain in the waist and spine when sitting and working for a long time.	2	1	2	1.Sometimes without working one pull, Will take a break in between.	2	2	4
4	Control process	Overlock, swing, two needle machine class fire can occur in the meter if the switch is turned on by pressing with the foot.	3	5	15	1. The class of the machine cannot be switched on by pressing with the foot. First you have to switch on and increase the speed of the machine according to the rules.	2	2	4
5	Strength of different parts	If the meter, wheels, etc. of the machine are not firmly attached, they can be displaced at any time and cause an accident.	3	4	12	1. All parts of the machine needs to be firmly attached. 2. Need to do regular maintenance.	2	2	4
6	Rotating part	Machine mats and any other rotating wearables. Horrible if clothes or body parts enter. Accidents may happen.	3	4	12	1. All rotating parts should be covered with pulley. 2. Regular maintenance has to be done.	2	2	4
7	Sound	If the compressor / airline of the islet machine leaks, the noise generated can damage the ear	2	3	6	1. To maintain the airline of the machine regularly	2	2	4

8	Electricity supply	If Machine class, body, meter etc. ECC connection is not properly checked then short circuit occurred and the operator is electrocuted	3	4	12	1. ECC connect ions will be provided to all Machines. 2. ECC connections need to be maintained regularly.	2	2	4
9	Stuck with machine	If more trolleys are placed around the machine, the trolley on one side of the machine gets stuck in the other machine causing problems when getting out in an emergency.	2	5	10	1. The trolley keeping one side of the machine and the ilce mark keeping clear	2	2	4
10	Maintenance	If the machine is not maintained Regularly, it can cause problems, which can easily lead to various accidents	3	5	15	1. Regular maintenance of the machine have to check 2.Problematic machines somehow Will not be paid for work on the floor	2	24	
11	Personal safety equipment	Incidents of physical illness and injury Can happen. If the needle guard, eye guard and other safety equipment of the machine are not used while working.	3	5	15	All PPEs should be used where necessary.	2	24	

3.11 Waste Management

Garments jute, polythene bags, carton box, cone box and medical wastage are the main wastage of this factory. Jerin Enterprise collects this solid waste from this factory per week and Aichi Medical College & Hospital collects medical waste from them. They have permits for onsite waste disposal as per applicable legal requirements. Wastes are segregated by type and hazard and have maintain waste inventory and tracking system. Training is provided for waste identification, labelling and disposal.

3.12 Wastewater and Effluents Management

Washing effluents and boiler discharge are the key source of this factory's wastewater and are discharged without treatment directly to the Turag River. They have no current ETP to handle these effluents and wastewater monitoring is not carried out as per applicable requirements. But with regards to wastewater discharge, the corrective action plan has found that they planned to develop ETP, and their building is taking place.

3.13 Air Emission Management

According to the Department of Environment (DOE) and EPA, stack air quality parameter assessment of generator and boiler room is conducted by green tech environmental company. All tests were performed using continuous test methods for stack emission monitoring. KANE940 continuous analyser was used to track CO, SO_2, CO_2, NO, NOx and SPM. CO, NO and SO_2 are measured using electrochemical sensors and CO_2 is measured using the nondispersive infra-red process. In these sections, suspended particulate matter, SO_2 and NOx are found in all areas within the DOE and World Bank limit. PM 10, PM 2.5, CO, CO_2, and has not yet been set.

3.14 Water and Food Management

Groundwater and local water supply are used for factory and drinking purposes and have sufficient water use permits as per applicable legal requirements. Drinking water quality evaluation is performed by the ICCDRB Environmental Microbiology Laboratory. The total coliform, faecal coliform, faecal streptococci count, and water pH are an acceptable limit recommended for drinking water by the Bangladesh Standard and WHO.

The total aerobic bacterial count < 500/ml indicated that according to the Environmental Protection Agency, proper hygienic practice was preserved. Water usage inventory log is kept, and water use is tracked and recorded. The state of the facility including rest room, canteen room is clean. Employees carry food from their home and take it during interval. There is no food service available in this factory.

3.15 Energy use and Greenhouse Gas Management

The GHG inventory estimates the GHG emission as CO_2 emitted by JFK Fashion Ltd from its utility sector. The annual GHG emission is estimated is following scopes:

Scope 1: The direct emission from stationary combustion sources is:

Name of unit	Types of fuel used
1.Generator	1.Diesel
2.Electricity	2.Purchased electricity

Energy consumption data for direct emission in case of Diesel:

CO_2 emission	Diesel consumption of 6970 litres/year CO_2 emission is 18.716 ton/year
CH_4 emission	CH_4 emission is 0.7552692 kg CH_4/year CH_4 emission in equivalent carbon-dioxide using GWP 21 is e = 0.0007552692 ton CO_2/year
N_2O emission	N_2O emission is 0.15105384 kg N_2O/year N_2O emission in equivalent carbon-dioxide using GWP 310 is e = 0.00015105384 ton CO_2/year
Total CO_2 emission	18.716 ton CO_2/year

Scope 2: Indirect emission from purchased electricity indirect emission from electricity consumption:

Total CO_2 emission = 0.605859ton CO_2/MWH per year

Total GHG emission = 624.575 ton CO_2/year

Scope 3: Corporate value chain

Total CO_2 emission is considered as the main and major source of their GHG emission for the utility sector. In this inventory scope 3 is not considered as no data has been obtained from the supply chain of the factory. In this inventory 3 greenhouse gases emissions are considered, and these are CO_2, CH_4 and N_2O.The total GHG emission is considered for total natural gas in this factory and total electricity used by the factory in last on year. The GHG inventory has prepared in accordance with "2006 IPCC guidelines for National greenhouse gas inventories for stationary combustion". From the GHG inventory has been observed that about 97% CO_2 is emitted by indirect emission, and CO_2 emission from indirect emission 3% from diesel is negligible. Per month Energy Consumption of electricity, diesel, water and coal are given below:

Table 2: Energy Consumption

SL	Month	Electricity (KWH)	Diesel (Lt)	Water (Lt)	Coal (Kg)
1	Jan-20	42455	200	40000	19958
2	Feb-20	44400	1020	41000	27674
3	Mar-20	57600	600	40500	28925
4	Apr-20	12127	0	0	0
5	May-20	26400	0	45800	20750
6	Jun-20	120100	600	47000	30080
7	Jul-20	148800	1200	46200	33080
8	Aug-20	132000	800	45020	34920
9	Sep-20	158400	1400	42500	36911
10	Oct-20		200		
11	Nov-20				
12	Dec-20				
	Total	742282	6020	348020	232298

3.15 Land Use and Biodiversity

Initial environmental assessment has been carried out and submitted to the requisite public authority and has sufficient land use/construction permit in compliance with applicable legal requirements. Factory operations have no adverse effect on local area and biodiversity.

3.16 Hazardous Substance and Management

Hazardous substances mean chemicals that are used in the washing section and are permitted to manage or store hazardous substances in compliance with relevant legal requirements. Each chemical has its own separate dispenser and empty chemical, and hazardous material containers are immediately removed from work areas, stored in a safe designated area and regularly removed from the facility and, when not in use, bulk chemical containers are closed. They have eye-wash stations and shower stations and PPE provided to employees in the entire factory. The necessary safety measures have been provided, training is monitored by the individual concerned and all of these activities are monitored by workers at the management level. Material safety data sheet, stock chemical log and daily consumption are maintained. The inventory of hazardous materials is managed and there has adequate ventilation in the chemical storage room.

3.17 Noise Pollution

Green tech environmental company performs noise level quality assessment based on electric condenser microphone. The instrument is based on type 2 economic type. For each section of the facility, assessment was carried out to assess the sound level. In most sections, the workplace noise level was found to be adequate relative to the standard of ambient noise. But both the noise level requirement of OSHA, ECR 97 and WHO were met by the generator room and boiler room. Earmuffs and earplugs are used by high-range noise level section factory staff.

4. Conclusion and Recommendation

The clothing and textile industries have been the single dominant exporting industry since the Bangladesh Liberation War and are the major export items in terms of currency earnings. As a result of the textile industry, the country's economic growth has been remarkably steady over the last decade. The country exports 60% of its clothing products to Europe and 40% of its clothing products to America. The proposed LEED GOLD sweater manufacturing company goods have already been exported to Europe and America and are very promising for this field. While they are proposed as a LEED GOLD certified factory and called a green factory, they have some form of deficiencies in their environmental management system that have been discovered through analysis. Analysis is being carried out on the basis of a checklist for environmental compliance. For this factory, the following recommendations are given based on analysis and results:

a) Enforcement in Policy and Procedure: The Separate Production Area Policy and Procedure should be developed and enforced, and system legislation on Separate Production should be prepared and implemented.

b) Increase Service Facility: For general environmental management, current and future legislation, and a cleaner production strategy, including tracking, benchmarking and environmental performance metrics, specialized resources such as training, counselling, audits, etc. should be provided.

c) Developed Wastewater Effluents Treatment Plant: This factory has no ETP and effluents are released into water without being treated, which can have a detrimental effect on the aquatic environment. Industries should develop and regularly run usable ETPs. No water without adequate treatment should be discharged.

d) Ensure Health and Safety Management: All employees need daily health check-ups by the doctor employed by the company. Ensure that there are proper fire protection equipment and fire doors in each factory and must periodically check electrical equipment, outlets, wires and dust-free clean electrical outlets. They should make own inspection group to check the safety concerns and risk factors on a regular basis.

e) Raising Awareness: Awareness-raising, capacity-building developments and activities should be carried out among all the employee of this factory, beginning with public agencies, in relation to the environmental concerns of this factory.

Furthermore, the research findings and recommendation would be of a great use to the JFK Fashion Ltd. Authority including HR & Environmental compliance management, MS management for taking action in future research and development and also in all decision making on matters pertaining to environmental management system. Thus, it could help to create a sustainable environment.

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