

HEALTH AND SAFETY MANAGEMENT SYSTEM FOR A MANUFACTURING COMPANY

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ABSTRACT

Occupational health and safety is one of the prime concerns at present day where improved safety performance is a common goal for any company. Beyond simple compliance, it has found that the benefits of having a well-developed and managed worker health and safety program include: better relations between employees and management, fewer lost workdays due to injury, increases employee productivity and finally increase the profit of the company.

A Health and Safety Management System (HSMS) is developed working at country leading lead acid battery manufacturer Rahimafrooz Batteries Ltd. To prepare this proposed HSMS OSHA and ILO health and safety guide lines are also considered. In proposed HSMS a health and safety organization exists to perform health and safety related programs and activities. The proposed HSMS includes a well defined safety organization, specific responsibility for each responsible person, a detailed reporting system, training, safety audit system, only nine month time bounded action plan, pragmatic recommended action etc.

Keywords: Health and Safety Management System, Safety Organization, Safety Audit

1. INTRODUCTION

Improved safety performance is a common goal for any company. The objective is to conduct all aspects of business in a manner that assures the safety and health of employees, contractors, and the public, while protecting the environment in where the company operates. To achieve this goal, management must be constantly aware of the conditions in all work areas that can cause potential injuries and take corrective actions immediately.

To develop a Health and Safety Management System (HSMS) for a manufacturing company here country leading lead acid battery manufacturer Rahimafrooz Batteries Ltd. (RBL) is used as ground.

2. FACTORY OVERVIEW

In 1994 Rahimafrooz Batteries Ltd. (plant-2) was established at Zirani Bazar, Kashimpur, Gazipur with the acquisition of YUASA Battery (Bangladesh) Ltd. Plant at Zirani Bazar.

Rahimafrooz Batteries Ltd. Manufactures automobile battery. It has three major units such as plant preparation, assembly, store along with-quality assurance unit, maintenance unit, warrantee sales and service unit. It comprises an ATP (air treatment plant) and ETP (effluent treatment plant) to ensure plant and outside

environmental safety. It has an own canteen, a laundry and maintains a good security system.

3. PROPOSED HEALTH AND SAFETY MANAGEMENT SYSTEM FOR RBL

A Health and Safety Management System (HSMS) is developed for RBL considering the present company organization and mode of operation. Being aware of the requirement of and effective program we develop an implementable health and safety system for RBL. OSHA and ILO health and safety management system guide lines are also considered in developing this proposed management system.

The proposed Health and Safety Management System (HSMS) contains four major sections which are planning, implementation, assessment and review. Each section consists of several elements.

3.1 Planning

a) Organization: Along the main organization a safety organization is existed to performed the health and safety program and activities.

b) Qualification: Certain qualifications are needed for the health and safety personnel, especially health and safety organization's key personnel to perform health activities properly.

c) Management program: Health and safety program and activity are set and approved by management.

d) Emergency response planning: An active planning is done for emergency situation. It includes necessary

instructions to be followed and action to be done in emergency situation.

3.2 Implementation

a) *Training:* Appropriate training programs are arranged for different levels of employee on health and safety topics such as PPE, fire fighting, first aid, hazard analysis etc. Effective trainings materials are also developed.

b) *Documentation, manuals:* Safety policy and statement, safety rules, meeting minutes, working procedure, safety manuals, hazardous material information, plant layout and design, maintenance procedure etc. are documented.

c) *Operational procedures:* Standard operational procedures are documented for sound and safety operation.

d) *Instructions:* Necessary instructions related to incident, accident, operation, machine and human safety are determined and documented.

e) *Physical controls:* Safety practices are monitored and ensured through physical control to avoid accident and injury.

f) *Records:* Any kind of unwanted events such as accident, injury etc. are recorded. Issue and control of PPE, operator's training and qualification are also recorded.

3.3 Assessment

a) *Risk analysis:* Work and machine related hazards are identified and their risk level is estimated by analyzing consequences.

b) *Objectives and targets:* Health and safety objectives and targets are set by management and employees.

c) *Regulatory requirements:* The exiting health and safety practices are checked and compared with govt. rules and regulation, various recognized standards.

3.4 Review

a) *Monitoring:* Time to time all the safety related activities are monitored through a monitoring system.

b) *Reporting:* Various reports are generated by observing, checking, measuring and monitoring health and safety related incident, accident, injury and practices. It includes investigation report, checklist, accident and injury report, monthly safety report, annual safety report etc.

c) *Reviewing:* Health and safety program is reviewed considering the progress of exiting program and targets.

d) *Corrective actions:* Corrective actions are taken if it is necessary to achieve target and to ensure safety.

4. SAFETY ORGANIZATION

In proposed HSMS a health and safety organization exists to perform health and safety related programs and activities. It exists along with main organization. Health and safety organization consists of top management to lower level employees including health and safety personnel. As top management is closely involved with HS management this organization is started with COO and then goes downward to operators.

The key person of health and safety organization is

health and safety manager (HS Manager). He reports to General Manager-Operation. His work station is head office. Under the HS Manager there are health and safety executives (HS Executive). Based on function they worked in different locations. One Executive, called Plant HS Executives, is dedicated for each plant. He is responsible for implementing the health and safety policy, standard and ensuring its practices. One executive, called HS Executive-Training is always worked in head office with HS Manager. He is responsible for developing the training materials, scheduling and conducting trainings.

4.1 Responsibilities Of Personnel Of Health And Safety Organization

The responsibilities of personnel of various levels are describer below:

a) *Responsibility of COO:* Chief Operating Officer (COO) is the key authority of Health and Safety Management System. He approves the policy, safety programs and initiatives in formatting health and occupational safety maintenance, surveillance, and promotional activities. He also coordinates Health and Safety Policy and activities with Group Policy and strategic Business Unit Policy.

b) *Responsibility of GM – Operations:* The responsible of this post is to assume leadership of the Health and Safety Committee when the COO is unavailable on a short-term basis, or for some reason, resigns from the Committee. He facilitates designed safety executive implementing safety program also guides in this regard.

c) *Responsibility of HS Manager:*

- 1) Develop meeting agendas.
 - 2) Coordinate and conduct orderly meetings.
 - 3) Established necessary deadlines and sub-committee assignments.
 - 4) Provide appropriate and timely follow-up on problems and recommendations developed by the committee.
 - 5) Serve as a communication liaison between management and the committee.
 - 6) Incident investigation, reporting and analysis; Safety specifications, standards and procedures; Facility survey and inspection.
 - 7) Safety education, training and promotion.
- He should also serve on one more subcommittees or task forces and tale an active role in other committee activities.

d) *Responsibility of HS Executive-Training and program:*

- 1) Develop and upgrades training materials.
- 2) Schedule training program for different plants and different levels of employee and executives.
- 3) Develop safety related special program.
- 4) Publish safety related bulletins, magazines, posters, manuals etc.
- 5) Collect various resources such as video, CD, presentations, rules, regulations and publications.
- 6) Assist EHS Manager's activity.

e) *Responsibility of Shift in charge or Shift engineer:* The responsible for this position is to maintain a safe and healthful workplace by:

- 1) Complying with all applicable safety and health standards, rules, regulations and orders issued by competent authority pertaining to the activities immediately under their jurisdiction.
- 2) Ensure that employees are instructed and/or trained in safe practices and methods of job performance as pertains to their assignment.
- 3) Ensuring that risk and/or injured employees performing official duties receive appropriate first aid and/or medical attention.
- 4) Investigating and reporting each incident and/or injury in accordance with established procedures.
- 5) Initiating, to the limit of their authority and capability, such actions necessary to correct unsafe or unhealthful working conditions determined to exist and promptly advising appropriate management when such conditions require corrective actions beyond their authority.
- 6) Conducting regular surveys of their operations to ensure compliance with such safety standards, codes, regulations, rules and orders applicable to the work area concerned.
- 7) Ensuring that employees under their supervision are aware of their responsibilities.
 - f) Responsibility of the employees: Employees at all levels throughout the agency are responsible for:
 - 1) Promptly advising their supervisor regarding all work related incidents resulting in personal injury, illness and/or property damage.
 - 2) Promptly report to their supervisor or appropriate Health and Safety manager any unsafe or unhealthful conditions in the work environment.
 - 3) Taking all necessary and appropriate safety precautions to protect themselves, other personnel and the environment.
 - g) Responsibility of Medical officer: The RBL factories must have a medical officer who is concerned with:
 - 1) The development and supervision of controls for hazardous processes and materials, in particular lead, and ensuring compliance with the relevant statutes. In summary they consist of:
 - a) Assignment of work, which expose persons to lead.
 - b) Giving of information, instructing and training.
 - c) Supervising daily checks and annual examination of control measure.
 - d) Specifying procedures to avoid the spread of contamination.
 - e) Advising on the enforcement of the rules for eating, drinking and smoking.
 - 2) Conducting of the hearing conservation program for reducing the exposure if employed persons to noise.
 - 3) Community noise levels at factory boundaries are maintained at levels so that there is no risk of annoyance to local residents.

4.2 Safety Committees

Various safety committees can be formed to performing and evaluating safety activities. These are as follows –

Table 1: Safety Committees

<i>Name of committee</i>	<i>People involved</i>	<i>Meeting schedule</i>
Central Safety Committee	COO, GM-Operation, HS Manager, Factory Manager, QMS Manager	Every three months
Activities : Setting health and safety standard, economic feasibility analysis, approve annual safety program and budgets etc.		
Plant safety Committee	Factory Manager, HS Manager, HS Executive, Head of the Departments, Medical Officer.	Every month
Activities: Setting health and safety standard, economic feasibility analysis, approve annual safety program and budgets etc.		
Department Safety Committee	Department heads, shift engineers, worker(2)	fortnightly
Activities: Ensure machine safety, ensure safety documentation, use of PPE etc.		

5. REPORTING AND RECORDING SYSTEM

In reporting and recording system reports are generated and data are recorded in two ways. One is regular based in time or frequently. Another is instant or when any recordable events are occurred.

The following report can be generated in practicing safety activities in RBL:

- a) Daily check list: Plant HS Executive fills up this checklist daily through general inspection.
- b) Fortnightly PPE Report: Maintenance department issues PPE and generates this report every month.
- c) Monthly Status Report of Fire Fighting Equipments: This report represents current status of fire fighting equipments of the plant. Maintenance department generates this report every month.
- d) Log of Work – Related Injuries and Illnesses: Shift engineer fills up this log after any incident or injury. Plant HS Executive also maintains this log.
- e) Injury recording system: Plant HS executive is responsible in generating this report taking data from log of work related injuries and illness. Recording Criteria Decision Tree can be used to identify record ability of accidents and injuries; its classification. It is shown in the following page.
- f) Summary of Work – Related Injuries and Illness: Plant HS Executive generates this summery report. HS Manager also use this summery in generating Annual safety report including other reports.
- g) Calculating Injury and Illness Incidence Rates: Plant HS executive also responsible for this calculation.
- h) Monthly HS report: HS Manager generates this report every month to observe plant and company HS status regularly.

- i) Annual safety report: HS Manager generates an annual safety report every year taking data from different reports and information which are through the year. It may including the following topics: Present RBL Plant safety status, Accident and injury report, Safety audit report, Annual safety progress evaluation, proposed targets and objectives

Table 2: Various Safety Report

<i>Report type</i>	<i>Name of report</i>
Instant report	Accident and injuries report
Daily report	Daily HS check list
Fortnightly report	PPE report
Monthly report	Injury and illness report, Fire fighting equipment report.
Quarterly report	Safety audit report – internal and external
Annual report	Annual safety report, Injury and incident report

6. SAFETY AUDIT

Three types of safety audits are proposed for RBL

- Internal safety audit:** Plant safety committee will arrange an internal safety audit in every three month. The audit team may consist of three members from various departments including HS executive.
- External safety audit:** it will be conducted every 6 month. HS manager, HS executive and expert line managers from another plant will audit the plant. This audit is scheduled in central safety committee meeting.
- Expert safety audit:** Audit team consists of experts of different fields may audit the plant. Central safety committee will arrange this audit considering urgency.

A plant health and safety audit can be done by internal and external body. Plant safety issues and practices are covered major six elements. Each element has several sub elements. The major six elements are -

- 1) Premises and housekeeping
- 2) Mechanical , electrical and safe guarding
- 3) Ergonomics and personal protective equipment
- 4) Fire protection and prevention
- 5) Accident record and investigation
- 6) Safety organization

7. OTHER SAFETY PROGRAMS

a) Annual safety program: Every year a special health and safety program will be taken besides established management system and routine health and safety activities. It contains a slogan for each year.

b) Safety day celebration: Creating and maintaining health and safety awareness among the employees a particular day will be observes as plant safety day. Mass gathering of all employees will be arranged to celebrate this day. Top managements presence on that occasion will inspire them in practicing health and safety activities. Various events are arranged to observe this day. Some of

them are—

- 1) Safety training: Fire fighting drill
- 2) Safety competition
- 3) Health and safety audit
- 4) Publication
- 5) Safety sign and display board
- 6) Emergency shutdown
- 7) Safety award

8. RECOMMENDED ACTIONS

After working at Rahimafrooz Batteries Ltd Plant for certain period, numbers of health and safety issues were addressed. Based on these issues and existing company management structure actions are recommended which are listed below-

1) Established and communicate a clear goal for the health and safety program and objectives for meeting that goal, so that all members of the organization understand the result desire and the measures planned for achieving them. A goal and implementing objectives, make the safety and health policy more specific. Communicating them ensures that all in the organization understand the direction it is taking.

2) Provide visible top management involvement in implementing the program, so that all will understand that management's commitment is serious. If top management gives high priority to safety and health protection in practice, others will see and follow. If not, a written or spoken policy of high priority for safety and health will have little credibility, and others will not follow it.

3) Provide adequate authority and resources to responsible personnel, so that assigned responsibilities can be met. It is unreasonable to assign responsibility without providing adequate authority, training and resources to get the job done. For example, a person with responsibility for the safety of a piece of machinery needs the authority to shut it down and get it repaired. Needed resources may include adequately trained and equipped personnel and adequate operational and capital expenditure funds.

4) Provide for and encourage employee involvement in the structure and operation of the health and safety program and in decisions that affect their safety and health, so that they will commit their insight and energy to achieving the safety and health program's goal and objectives.

5) Ensure employee participation in the health and safety program in any or all of a number of the following forms:

- a) Inspecting for hazards and recommending corrections or controls.
- b) Analyzing jobs to locate potential hazards and develop safe work procedures.
- c) Developing or revising general rules for safe work.
- d) Training newly hired employees in safe work procedures and rules, and/or training their co-workers in newly revised safe work procedures.
- e) Providing programs and presentations safety meetings, and
- f) Assisting in accident investigations.

6) Conduct job hazard analysis to identify hazards and potential hazards not previously recognized, and to determine protective measures. Through more careful attention to the work process in a particular job, analysts can recognize new points at which exposure to new hazards may occur or at which foreseeable change in practice or conditions could result in new hazards.

7) Arrange education and training for all as a means of communicating practical understanding of the requirements of effective safety and health protection to all personnel. Without such understanding managers, supervisors, and other employees will not perform their responsibilities for safety and health protection effectively.

8) Design and undertake an annual health and safety program for each year with a defined target and objects to achieve mentionable success in established the health and safety program through the company.

9) Develop computer based health and safety management information system (HSMIS) and make it online by utilizing the exiting computer network of RBL. HSMIS contains accident and injury data; health and safety audit; hazard analysis inventory of PPE, Fire fighting equipments, training and event schedules etc. Thus monitoring, communication, report generation and control of HS activities will be easy.

10) Implement reporting and recording system of accident and injuries immediately. It will be better to use and convenient if the reporting and recording system will be computer based.

11) Document all health and safety papers such as health and safety meeting minutes, safety instructions and manuals, layout of the plant showing fire extinguishers, service color code, hazardous material information etc.

12) Collect original copy of all the local legislation and rules on health and safety, recognized international standards and guidelines papers and publication, reference books, journals, manuals, CD, video, presentations etc. regarding industrial health and safety management system and practices.

13) Select proper and effective PPEs keep workers more safe from any kind of occupational hazard. Simultaneously endure the use of PPE through continuous physical control.

14) Arrange lead related medical test such as Blood Lead Level (BLL), ZPP for workers to measure the effect of lead on worker in the existing plant environment. As it is expensive so initially test the selected workers who have been working RBL in lead exposure for several years.

15) Measure and monitor noise level in the selected area where the noise level is high. If the noise level is above the exposure limit take necessary steps to reduce noise level. Keep away the worker from continuous expose of high noise level.

16) Measure lead contents in indoor and outdoor air of the plant. Take expert help and suggestions to identify possible hazards and mal practices involved with lead.

17) Consider off the job safety of the employee with great importance. So make the employee conscious about off the job safety.

9. ACTION PLAN

To implement the proposed Health and Safety Management System with exiting company organization and facility the following action plan is to be taken. Emphasis have to given on the following three topics –

1. Top management commitment and leadership.
2. Creating awareness to all employee
3. Training for all level of management and employee
4. The duration of action plan is 9 months and will be implemented in 3 phases of three months duration.

a) In first three month: First Phase

1. Top management (COO, GM) meet with all functional managers and factory managers and review the exiting health and safety policy and proposed health and safety management system. In that meeting targets of next three month and necessary decision are taken to implement the program.
2. Top management send written instruction and order to all level of employee regarding the target.
3. GM operation and Factory manager meet with all departmental head, executive, shift in-charge / shift engineer and discuss about plant safety and take suggestion from them.
4. Factory manager arranges a mass gathering of all plant employee and states top management's decisions and upcoming activities regarding health and safety. Top management presence in that gathering shows their commitment towards health and safety to worker and creates a positive effect on worker.
5. Create safety awareness among the workers through promotional campaigning, video shoe, demonstration, lectures etc.
6. Following trainings are arranged for all employees in a convenient schedule without hampering functional activities.

Table 3: Training

<i>Training Concentration</i>	<i>Participants</i>
Health and safety policy and management system.	All managers, executives and engineers.
Auditing	Departmental head , HS officer
Recording, reporting, hazard, analysis and documentation.	Shift in-charge/ shift engineer
General health and safety rules	All employees

7. Set display board in front of plant premises, (showing plant safety and company status), safety sign, and posters in important locations.
8. Assign personnel to assist HS officer in documentation process and collect reference books, video, CD, training materials. Then develop own training materials and promotional materials.

b) In second three month: Second Phase

- 1) Review the targets and take necessary actions by for top management

- 2) Start the recording and reporting system
- 3) Conduct internal safety audit
- 4) A complete safety manual is prepared by this phase.
- 5) Maintain safety awareness among the workers through campaigning, video show, demonstration, lecture maintain regularly.
- 6) Arrange training for worker on use of PPE, fire fighting equipment and first aid. All workers must be trained on general health and safety rules by this phase.

c) In third three month: Third Phase

- 1) At the starting of this a mass gathering of all plant worker is again arrange to take feedback from them.
- 2) Arrange BLL (Blood Lead Level) test for selected workers and who has been working in the plant for several years in lead exposure.
- 3) Conduct external audit and arrange expert audit.
- 4) Arrange lead hazard analysis by expert.

10. CONCLUSION

Our main objective was to develop an implementable health and safety management system. To fulfill our objective we observed the plant operations and working environment and study the existing company and plant organizational structure. We prepared accident recording,

reporting forms and procedure, hazard analysis form and procedure, annual safety program and safety audit procedure and forms. Through all walk we keep in considered local legislation and internationally recognized safety standard.

Though the HSMS is developed considering RBL case, it can be replicated at any organizational levels and irrespective of the type of production.

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