Implementation of ISO 45001 Occupational Health & Safety Management System in Explosives Manufacturing Industry

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Abstract - ISO 45001:2018 is an International Occupational Health & Safety Management Standard by International Organization for Standardization. The purpose of this standard is to help organizations to prevent work-related injury and ill-health and to provide a safe and healthy workplace to all employees. The system can be implemented by adopting a systematic approach through PDCA Cycle, Risk Based Thinking and Performance Evaluation. Safety and Health is life, managing Occupational Safety & Health is managing life. Industrial activity is on increasing trend to cater the needs of population in various ways. Industries perform hazardous activities during various operations and it is utmost necessary to prevent hazards exposure, ill health effects, incidents or accidents causing harm to employees. The implementation of the standard in the industries ensures safe work place, positive safety culture and employee wellbeing.

This paper describes the steps taken in effective implementation of ISO 45001:2018 Occupational Health & Safety Management System in Explosives Manufacturing Industry. Explosives industry deals with highly hazardous chemicals and energetic materials which are widely used in mining, space, defence and industrial applications. Explosives manufacturing, handling and storage is one of the highly hazardous activities among the industrial sector because of its sensitiveness towards friction, impact, static and heat hazards. The objective of this paper is to emphasize the importance of OH&S Management System in hazardous industries and to demonstrate the systems approach for safety and health of employees, organizations, societies, communities and nations at large.

Index Terms - ISO 45001, Occupational Health & Safety Management Systems, Risk Based Thinking.

1. INTRODUCTION TO THE ISO 45001 STANDARD

Human resources are the valuable and important deliberate resources in an organization (Hecklau et al., 2016), in the era of industrialization, occupational safety and health has become major concern because of hazardous activities in the industries. International Labor Organization (ILO) is already dealing with OS&H and issued relevant guidelines to the industry, but there are no specific requirements. British Standard has come up with a management system called OHSAS (Occupational Health & Safety Assessment Series), but was not accredited internationally. Over time it has become increasingly apparent that too many workers are suffering from OHS related illnesses, injuries and deaths, placing an unacceptable burden on people, their families and with moral and welfare costs to society overall. Therefore, supervision on health and safety risks of human resources at work is one of the major international concerns (Lafuente and Abad 2018, Abad et al., 2013, Taylor et al., 2014). This was recognized and hence the need to have a systematic structure for the management of the activities has been realized. ISO 45001:2018 is an ISO standard and has been designed to have greater compatibility with existing ISO standard management system revisions including ISO 9001:2015 and ISO 14001:2015. The purpose of this standard is to help organizations to prevent work-related injury and ill-health and to provide a safe and healthy workplace. the history of the quality area principles, it has been observed that they evolved from the first standards with narrow applicability, such as MIL-Q-9858 in the military domain in 1942-1952, to the British national standards as BS 9000 and, finally, to international standards in the ISO 9000 series, with the latest version ISO 9001:2015 (Darabont 2010).

The standard provides a framework, regardless of size, activity and geographical location, to manage and continuously improve Occupational Health and Safety (OH&S) within the organization. After standardizing the policy framework, the system can be implemented in-line with the policy through commitment from leadership and consultation and participation of all the employees for continual improvement and sustainability. Preventing occupational diseases and accidents in line with civilizing efficiency and observing health and safety of workers, contractors, and individuals entails with competent management structure (Omidvari et al., 2013). By avoiding OHS problems and captivating to health and safety of workers and other contributors in daily activities of the organization, such a management is take a step towards improving the productivity (Darabont et al., 2017), One of the factors in preserve work forces is occupational health and safety (OHS) (Azim Karimi et al., 2020). Preventing occupational accidents and creating a healthy and safe work environment are important and these lies with the requirement of lowering the rate of occupational accidents and creating a safe work environment for workers (Karimi et al., 2017).

2. ANNEX SL HIGH LEVEL STRUCTURE

Annex SL is the high level structure in ISO management systems standards with 10 core clauses termed as Scope, Normative References, Terms & Definitions, Context, Leadership, Planning, Support Emergency Preparedness, Performance Evaluation and Continual Improvement.

The same structure has been followed in implementation of the standard and it enabled the organization to integrate with existing ISO 9001 QMS & ISO 14001 EMS within the organization making it easier to harmonize 10 core clauses.

3. IMPLEMENTATION OF ISO 45001 OHSMS IN EXPLOSIVES MANUFACTURING INDUSTRY

This paper describes the steps taken in effective implementation of ISO 45001:2018 Occupational Health & Safety Management System in Explosives Manufacturing Industry. According to International Labour Office (EASHW 2015) every fifteen seconds a worker dies from a work related accident or disease and 153 employees were suffer from work-related accidents. This statistic caught exposed that more than 2.3 million employees were died annually due to work-related accidents or with occupational diseases (Doru et al., 2017), The objective of this paper is to emphasize the importance of OH&S Management System in hazardous industries and to demonstrate the systems approach for safety and health of employees, organizations, societies, communities and nations at large.

An overview on Explosives Manufacturing Industry: Explosives industry deals with highly hazardous chemicals and energetic materials which are widely used in mining, space, defence and industrial applications. Explosives manufacturing, handling and storage is one of the highly hazardous activities among the industrial sector because of its sensitiveness towards friction, impact, static and heat hazards. Manufacturing, handling, storage, transportation and usage of explosives are few of the most hazardous aspects for personnel engaged in one or combination of these activities. Knowledge, skill, awareness and special care are imperative to carry out activities related to explosives. Any activity required Man, Machine, Material and Process to successfully accomplish a job, a proper link up of all these can be achieved through a proper system. The present paper emphasizes the implementation of ISO 45001 through integration of the above key parameters.

4. IMPLEMENTATION PROCESS

The implementation of ISO 45001 OHSMS has been carried out through PDCA Cycle, Risk Based Thinking and regular performance evaluation through Audits.

1) PDCA Cycle: Plan-Do-Check-Act is the systematic process of continual improvement through systems approach method.

PLAN: Identification of the context of the organization including OH&S risk and opportunities. Establishing OH&S objectives, processes and resources required to deliver results in accordance with the organizations OH&S Policy.

DO: Implementation of the processes as planned through risk based thinking, participation and consultation, hazard identification, mitigation and emergency preparedness.

CHECK: Monitoring, measuring and evaluating OH&S activities and processes.

ACT: Actions taken to continually improve the processes addressing key functions of the processes like incidents, addressing non-conformance and audit findings etc.

2) Risk Based Thinking: Risk Based Thinking (RBT) is the major key element in ISO 45001. Risk based thinking is the special emphasis on OH&S of the employees involved in various processes and to ensure that all the possible risks are identified and addressed to create a safe work place. The methodology for risk-based thinking was determined in consideration of compliance obligations and the participation of workers. For operational aspects the standard clearly defines the hierarchy of control for hazard identification, risk assessment and the reduction of risks with the involvement of workers. This methodology requires the organization to reduce risks associated with hazards to a reasonably practicable level.

3) Performance Evaluation through Audits: The operation of OH&S management system ensures there are effective measures to evaluate performance which enables continual improvement internally, Audit operations have different methodologies of auditing in relation to the OH&S system to ensure it is effective at all levels of the organization and meets the requirements of the standard. Audit planning has been done through audit methodology focusing higher risk areas to identify operational aspects including compliance obligations, management review and documented information. Different types of audits were carried out for monitoring and measurement of OH&S objectives, such as internal audits, walk through audits, external audits and certification audits. Audits are useful for performance evaluation as follows…

❖ Monitor compliance to policy and objectives

❖ Provide evidence that all necessary checks are carried out

❖ Ensure all current legislative and other requirements are met

❖ Assess the effectiveness of risk management

❖ Worker engagement leading to a positive safety culture

❖ Identify improvement using 'fresh eyes' to review a process

❖ Aid continual improvement

5. ISO 45001 STANDARD REQUIREMENTS

The implementation of ISO 45001: 2018 Occupational Health & Safety Management System in Explosives Manufacturing Industry through systems approach has been done through employee consultation and participation, and support through strong commitment from the top management. Paucity of space does not permit the author to furnish the complete details but a very concise form of the implementation process is described in this paper.

I.   SECTION 1: SCOPE

The applicability of the OH&S management system has to be defined with intents and parameters within an organization to attain its intended outcome. The scope for the study is

manufacture, storage and supply of explosives, blast initiating devices and energetic materials for defence, space and industrial applications, outsourced processes and application services. The intended outcome of the OH&S management system is to:

❖ Provide a safe and healthy workplace(s)

❖ Prevent work related injury and / or ill health

❖ Proactively monitor and improve OH&S performance

❖ Eliminate hazards and minimize OH&S risks (including system deficiencies)

❖ Take advantage of OH&S opportunities for improvements

❖ Fulfil legal and other requirements

❖ Achieve OH&S objectives

❖ Integrate other aspects of health and safety including worker wellness / wellbeing

II. SECTION 2: NORMATIVE REFERENCES

Normative References are the essential documents which are referenced within the management system standard. Reference to 'normative references' are common across all management system

Standards however in the case of ISO 45001 there are no normative references. This clause was retained by ISO simply to maintain consistent numbering across all ISO management system standards.

III. SECTION 3: TERMS AND DEFINITIONS

Implementation of ISO 45001 should be clear to all without any confusion. Hence, all associated prescriptive terms of definitions are clearly mentioned for clear understanding of all employees. During the process of implementation, it is highly recommended to have a clear understanding of words described in this section. Like the terms Organization, Supplier and Customer are clearly identified and mentioned clear definition for internal processes, outsourced processes, employee and worker etc.

IV. SECTION 4: CONTEXT OF THE ORGANIZATION

The context of the organization is the operating environment and affecting the OH&S of the organization. The system focuses on the processes and requirements needed to achieve the OH&S policy objectives. This can be achieved by understanding the organization and the 'context' in which it operates.

Understanding the Context: The OH&S of the organization determined by internal and external factors, Special emphasis has been made on how relevant factors arising from legal, political, economic, social, and technological and health & safety issues influence the strategic direction and issues related to values, culture, knowledge and performance of the organization which define the organizational context. To ensure that the organizational context is aligned with strategy, whilst taking account of relevant, influential, internal and external factors; the information has been collated and

analyzed pertinent to those influential factors to identify issues that have the potential to be affected by activities, products and services.

Macro-environmental external analysis has been conducted using "PEST" (political, economic, social and technological) analysis. The factors are independent i.e. these factors cannot be controlled. The PEST factors can be classified as opportunities and threats in a SWOT (strengths, weaknesses, opportunities and threats) analysis. These are used to review a strategy or position or direction of an organization.

Political Factors	Economic Factors
Ecological / Environmental Issues	Seasonality or other weather issues
Legislation & Regulatory Issues	Customer/end-user drivers
Government policies, terms and change	Globalization
Wars and conflicts	Global pandemics
Lockdown orders by governments like pandemic / strike / curfew etc,.	Recession
Social Factors	Technology Factors
Demographics	Technology legislation
Media views	Innovation potential
Image of the organization	Technology access, licensing, patents
Major events and influences	Intellectual property issues
Rapid urbanization issues & neighborhood	Global communication

Similarly, internal and external issues are also identified that could be capable of affecting the organization's ability to deliver products, services or activities. Pertinent information has been collated, assessed and reviewed about these relevant influential factors to ensure that a continual understanding of each factor and its affects is derived and maintained in order to develop the contextual intelligence.

Understanding Needs & Expectations: Understanding needs and expectations of the interested parties is very important in implementation process of any management system. Interested parties are those that can influence OH&S positively and negatively in a management system. Interested parties are categorized into internal and external. Internal interested parties include employees, contractors, partners and directors, whereas statutory and regulatory authorities, customers, suppliers and investors etc are considered to be the external interested parties.

OHSMS: Pertinent information and relevant provisions has been provided to the work group about occupational health and safety policies, procedures, codes of practice and programs; Information about identified hazards and the outcomes of risk assessment and risk control procedures is

regularly provided and is accurately and clearly explained to the work group; Personal, peer and staff attitudes towards occupational health and safety and risk management practices are addressed as part of information provision, in accordance with organizational policy. Implemented and monitored the organization's procedures for identifying hazards and assessing risks. Existing and potential hazards in the work area are identified and reported so that risk assessment and risk control procedures can be applied. The organizations OHSMS is also applied to outsourced processes also. These findings are reliable with Tremblay et al. (2018) who showed that OHSMS was helpful in preventing occupational accidents. In addition, consistent with Coleman and Kerkering (Coleman et al., 2007), Goldenhar et al. (2001), Hamidi et al. (2012), Omidvari et al. (2011), Fernandez-Muniz et al. (2009), and Laal et al. (2019), Azim Karimi et al, (2020).

V. SECTION 5: LEADERSHIP & WORKER PARTICIPATION

Leadership & Commitment: Leadership and commitment from 'Top Management' is very critical to the success of the OH&S management system as it provides the necessary resources to protect workers from harm. The leadership has been demonstrated within the OH&S management system through the following…

❖ Take overall responsibility and accountability for the prevention of work related injury / ill health, as well as the provision of a safe and healthy work environment

❖ Facilitating positive culture and continual improvement

❖ Ensure the OH&S system is integrated within business processes Promote communication internally and externally and at all levels (cascading from the top)

❖ Protect workers from reprisal when reporting incidents, hazards, risk and opportunities

❖ Provision and support for safety committees

OH&S Policy: It is a 'Statement of Intent' or 'Mission Statement' sets out the framework to manage the Occupational Health and Safety Management System. The OH&S Policy stated that the organization provides safe and healthy working conditions for the prevention of work related injury and / or ill health, eliminate hazards and reduce OH&S risks and continually improve the OH&S system in consultation and participation with employees and fulfill legal and other requirements. The OH&S policy has been approved by the top management and communicated to stakeholders including workers and made available to all interested parties.

Roles & Responsibilities: The organizational roles and responsibilities of the personnel has been defined and communicated the same within the organization to ensure that the processes are effective and delivering the intended results. Any change in the organization is being communicated to all concerned. The responsibility and authority of different key personnel are demarcated keeping in view the main activity of each department. In addition, they are also responsible for identifying OH&S related problems encountered in their areas of activity and initiating action to prevent the occurrence of any non- conformity related to OHSMS.

The Specific Responsibilities of Top Management, Middle Management and Executives are defined as well as other functions including Management Representative are precisely demarcated along with HR Functions and are being reviewed annually.

Consultation & Participation: Consultation and participation of all the resources plays a key role in implementation of OH&S management system. Employee consultation and participation is emphasized in review of policies and procedures, which have a wider employee interest, different committees are established such as suggestion committee, purchase committee, production incentive committee, employee welfare committee, transport committee, canteen committee, POSH committee and central safety committee. The "Central safety committee" is constituted to discuss matters related to occupational, health & safety issues in the plant.

VI. SECTION 6: PLANNING

Risks & Opportunities: As part of implementation system all the activities are planned to execute in a safe way by identification of risks and opportunities for improvement. The risks are identified through available process documentation and site conditions. Work Instructions and Standard Operating Procedures are prepared through consultation and participation of all concerned employees and standardized robust process documentation. The opportunities for improvements are identified in the process and all the observations are addressed with suitable action plan. This helped us to achieve OH&S goals and objectives. As and when any change in any documentation is envisaged, the other concerned documents are also modified as per the requirement.

Hazard Identification & Risk Assessment: The aim of risk and opportunity management is to identify all kinds of hazards and take necessary actions to ensure a safe and healthy work place in the organization. Top management is responsible for incorporating risk based thinking in the organization's culture. This includes the establishment of risk management procedures and processes to ensure the effective risk and opportunity management principles are undertaken throughout the lifecycle of OH&S, products, services, and activities to achieve intended results, mitigate risks by prevention or reduction of undesired effects, enhance desirable effects and achieve improvements.

Action plans are initiated through Management Programs for all the risks and opportunities identified, regular monitoring through regular safety meetings and monthly safety review meetings, suitable revisions are made on relevant SOPs after effective implementation. Established, implemented and maintained a procedure for identification and evaluation of hazards for all activities, products & services within its defined scope. The significant risks thus identified form basis of setting OH&S objectives which are comprehensively reviewed once a year. This register is up-dated based on any change in process, work practice, incident / accident, and any information received from interested parties after previous review.

Legal Requirements: Compliance Obligations requirements are determined and fulfilled with the aim of enhancing management system. The statutory requirements are identified along with needs and expectations of customers and reviewed and the compliance of the same is ensured. As a part of Management Review, focus is laid on communicating the compliance obligations related to the HIRARC which are applicable to the organizations. Established Statutory, Regulatory Compliance Monitor through Intra Net and given access to all the concerned. Risks and Opportunities are identified for all the compliance obligations and reviewed through compliance monitor. The evaluation of compliances are recorded and monitored through the controlled format of Legal Register.

In addition to this, we have also carried out Secretarial Audit through an independent third party agency to check all the compliance obligations are fulfilled against to the applicable Acts and Laws. The secretarial audit was scheduled on quarterly basis and reported to the Top Management for review and action plan implementation as per PDCA cycle.

Planning Action:

The hazard identification and risk assessment process followed by action plan for mitigation of high risk activities to control and reduce the risk to make it within the acceptable range for smooth operations, the action plan for the hazard control is within the OH&S activities. Top management ensures that policies and objectives, including those needed to meet requirements for product is established at relevant functions and levels within the Organization. The objectives are established through individual Department Process Manuals and are updated every year, which are measurable and consistent with OH&S Policy and applicable requirements.

OH&S Objectives: Objectives are identified with main aim to provide safe work place within the organization by reducing occupational health risks and continuous improvement of the processes. Sufficient resources are provided to achieve the targets and the progress is being reviewed in MRM. The OH&S Objectives and targets are fixed keeping the following factors in view and communicated to all process owners.

a) Significant aspects and impacts related to the environment

b) High & moderate risks related to OH&S

c) Current and future needs of the organization and the customer

d) Relevant findings from management reviews and opportunities for improvement

e) Concerns of Employees, customers and Interested parties

f) Lessons learnt from past experiences and continual improvement

g) Legal and statutory requirements

h) Operational requirements

i) Technical feasibility and financial viability

j) Linkage to policies and organizational objectives

VII. SECTION 7: SUPPORT

Necessary support requirements are identified and provided resources like competent personnel, proper working environment and adequate infrastructure needed to implement and maintain OH&S Management System and continually improve its effectiveness. Equipment's, instruments and PPE needed for work and verification are identified, procured and processes are laid down to ensure that the same are in a fit condition for carrying out work and verification activities.

Resources: Functional Heads / Shift In-charges identify the resources required for implementation; performance and verification activities related to OH&S Management Systems. These are further examined, reviewed and provided as and when required, to enhance customer satisfaction by meeting customer / legal requirements.

Competence: The organization has identified the competence levels through competency matrix. The "Job Description" for key functions has been defined on the basis of requirements related to appropriate education, training, skills and experience for the specific jobs. Hence the personnel performing such work, which affects conformity to product requirements, are assigned the tasks on the basis of defined competence. The "Job Descriptions" / routine appraisals are also used for identifying the training needs of the personnel to make them competent to do their activities.

All the competence requirement records are being maintained and communicated by HR and these are used for new recruitments as well as training requirements based on the gaps. The competence and training requirement is given a special emphasis in the annual appraisal system where the individual employee can propose for their self-training need for improvement in competence which will be taken up by the HR & Safety Departments in finalizing the training schedule and further training programs.

Awareness: It is very important that every employee must be aware of the OH&S policy; relevant objectives; their contribution to effectiveness of the management systems, including benefits of improved OH&S performance; and the implications of not conforming to system requirements.

All employees are trained on the awareness of OH&S policy and they are aware of the benefits of Management Systems and implications and potential consequences of not conforming to the management system requirements or not fulfilling the organizations compliance obligations. The HIRARC & JSA documents are clearly addressing the issues with possible incidents and the outcomes of investigations that are relevant to the processes and hazards, OH&S risks and actions determined that are relevant and applicable to the processes.

Communication: The channel for communication is established through Management Representative. OH&S Policy is displayed at prominent locations and communication boards have been installed to ensure the information flow and relevant information is being communicated regularly through e- mails. This communication emphasizes on achievement of Objectives, their progress and actions to be taken against the observed non-conformance. The feedback received from employees / interested parties are reviewed for inclusion in Register for risk analysis. Inspecting official feedback register is also maintained to record any comments / appreciations

from the authorities. Any communication from Government agency is treated as significant. Communication having significant impact on the OH&S is also considered as significant.

Documented Information: The standard requires the organization to maintain documented information relating to the procurement of products and services including contractor arrangements. Below is a list of examples of documented information considered for retention?

❖ Risk assessment and method statements between the organization and contractor

❖ Material safety data sheets

❖ Email exchanges relating to safety aspects

❖ Certificates of conformity – Harnesses, guarding, emergency stops, PPE

❖ Contractor permits and licences

❖ Completed external provider questionnaires

❖ Worker training records

The documentation process has been implemented with preparation of different manuals like the Apex Manual, Process Manuals, Standard Operating Procedures (SOPs), Operational Control Procedures (OCPs), HIRARC & EAI Assessments, Work Instructions, Audit Procedures, Objectives etc.

VIII. SECTION 8: OPERATION

Operational Planning & Control: All process operations are properly planned, implemented, and controlled to meet requirements for the provision of products and services requirements. The operational planning includes establishing criteria for the processes; determining the resources needed to achieve conformity; implement control of the processes; determining, maintaining and retain documented information; to carry out as planned and to demonstrate conformity of OH&S requirements. The planning action provides control on planned changes and review consequences of unintended changes, taking action to mitigate any adverse effects, as necessary.

Elimination of hazards and reducing OH&S risks: Eliminating hazards and reducing OH&S risks has been standardized by the 'Hierarchy of Controls' like Elimination, Substitution, Engineering Controls, Administrative Controls and Personal Protective Equipment; the risk control system is in place to eliminate or reduce hazards to the lowest practicable risk. On completion of risk assessment, results are communicated with those workers directly affected within the operation and to aid the development of control measures. Workers are included in the process of assessment and other system elements.

Management of Change: It is recognized that accidents can occur when processes deviate from defined established control measures. This may include changes in competent supervision and workers or the introduction of new materials, machinery, processes and procedures.

Operational process defined and implemented considering change throughout the business and applicable for different scenarios based on risk and opportunities. The change process was supported by a documented system known as "Alteration Authority" to acknowledge issue and receipt of the notification to ensure it is communicated and understood. Alteration Authorities are raised for the proposed change for any modification in equipment, process, procedure, specification and any other criteria. The proposed change is assessed for hazard identification and risk assessment with new change and necessary control measures are addressed before approving and executing the change. Notification of change is being supported by training and competence requirements and the SOPs are amended accordingly.

Procurement: A standard procurement policy has been established, implemented and maintained to control the procurement of products and services in order to ensure their conformity to its OH&S management system.

Contractors: All contractors are consulted and participated in order to identify hazards and to assess and control the OH&S risks arising from the activities and operations that impact the organization, contract workers and other interested parties in the workplace. It was ensured that the requirements of the OH&S management system are met by contractors and their workers. The procurement policy clearly defines the safety criteria for the selection of contractors and OH&S requirements.

Outsourcing: Outsourcing processes is one of the main aspects in implementation of OH&S management system since it involves the processes which are out of the organization control. Hence, this outsourcing process has been given special emphasis in establishing OH&S management system requirement even at the outsourcing agency work place to ensure effective implementation of OH&S within the process. As part of this awareness training sessions has been conducted to the employees of outsourcing agency on the OH&S requirements and are being regularly inspected and audited by the internal auditors for performance evaluation of the system and for continual improvement of the processes. On the other hand, the combination of legal requirements and the structures that promote implementation of OHSMSs by organization are essential but not enough. In fact, without the authorities' pressure to eliminate or attenuate occupational risks, implementation of OHSMS and obtaining licenses are no guarantee for attenuating occupational risks and improving health and safety at work (Martin et al., 2007).

Emergency Preparedness & Response: Planning for unexpected events is a good all-round organizational discipline. The risk based thinking of all the processes and assessments of risks and an opportunity has resulted in identification of anticipated emergency situations. A robust Onsite & Offsite Emergency Plan, Emergency Response Plan and Safety Management Plans are prepared and the employee awareness has been tested through periodic mock drills.

The emergency plans includes very important information like emergency situation, communication process during emergency, specific responsibilities of individual and teams during emergency, procedure for evacuation & emergency control, emergency control equipment, their capability and location, mitigation of likely illness & injury and environment impact arisen due to emergency.

IX. SECTION 9: PERFORMANCE EVALUATION

The organization has planned and implemented the monitoring, measurement, analysis and improvement

processes for demonstrating conformity to the product requirements; ensuring conformity, and continually improves the effectiveness of the management systems. One of the methods chosen by the organization is Statistical Techniques. The applicable methods like Sampling Plans, Control Charts, Pareto diagram, Trend charts, Fish bone diagram, etc. have been determined based on the extent of use.

Monitoring, Measurement & Analysis & Evaluation: The organization has defined the criteria for the different processes adopted for meeting the customer requirements. All processes are suitably monitored by respective Heads of Departments in order to ensure that the requirements meet Internal as well as external customer / interested party requirements as well as applicable legal requirements.

The Organization has developed systems and identified suitable methods for monitoring all such processes, the criterion have been defined and the same are mentioned in their relevant Process Manuals. These criteria are monitored and measured at the specified frequency as mentioned in the above Process Manuals to ensure that these processes achieve the planned results. When planned results are not achieved, the non-conforming outputs (products / information) non-conformities are corrected and the suitable corrective actions, as applicable are taken to ensure conformity of the products/ (outputs)/ Processes.

Internal Audit: Internal Audits has been carried out twice annually to identify the drawbacks in the system and opportunities for improvement. Corrective actions have been implemented in order to bridge gaps and ensured effectiveness of OHSMS standard. Internal Auditors from different functions are selected and trained for conducting audits and inspections. Cross functional teams has been formed for conducting audits of individual departments. These internal audit reports are summarized and used in management review for further assessment of the implementation status of OH&S management system.

Management Review: Management Review is one of the important elements in performance evaluation system, where the implementation status and continual improvement is assessed by the functional heads and ensures that the compliance obligations are fulfilled. Management Review is an important tool for top management to ensure the OH&S management system requirements are ensured according to the process operations creating a safe work place and ultimately preventing injury and harm to employees. The objectives including compliance are assessed for continual improvement and status is recorded in minutes for further follow-up and used to set new objectives. The review includes assessing opportunities for improvement and the need for changes to the Management System.

The following provides an overview of prescribed management review agenda requirements:

- ❖ Summary of the status of actions from the output of the previous management review.

- ❖ Changes to internal and external issues relevant to the context of the organization to ensure the needs and expectations of interested parties including workers are fulfilled.

- ❖ Legal and other requirements and actions to address compliance obligations.

- ❖ Review the organizational risk and opportunities.

- ❖ Review OH&S policy and objectives. Compliance status of continual improvement.

- ❖ Discuss any incidents or non-conformities including trends. actions have been taken to prevent re-occurrence.

- ❖ Effectiveness of monitoring and measurement to meet the expectations.

- ❖ Results of internal audits and actions taken to resolve any non-conformities and opportunities for improvement.

- ❖ Overview of consultation and participation of workers. This is the feedback from central safety committee meetings and actions to address risk and opportunities.

- ❖ Discuss risk and opportunities including performance of hazard identification and opportunities to mitigate harm to workers.

- ❖ Continuous improvement of the management system.

- ❖ Communications with interested parties, regulatory authorities or external providers providing materials which have an impact on safety and health.

- ❖ General discussion with the provision of information on performance of OH&S management system and continual improvement in future.

X. SECTION 10: IMPROVEMENT

Opportunities for improvement has been selected and determined for implementation of necessary actions to create safe work place. This includes improving products and services to meet requirements as well as to address future needs and expectations; correcting, preventing and reducing undesired effects; improving the performance and effectiveness of the OH&S Management System. Continual Improvement has been implemented through corrections, corrective actions, breakthrough changes, innovations and re-organizations.

Incident, Non Conformity & Corrective Action: Unlike ISO 9001 Quality and ISO 14001 Environmental management systems, ISO 45001 introduces 'Incident' alongside nonconformity and corrective action. Clause 3 'Terms and Definitions' within the standard provides the parameters in which 'incident' can be interpreted and reported. An 'incident' is an unusual occurrence that does not result in an injury and / or ill health. Therefore, a reporting system has been implemented that captures events which have not necessarily been foreseen within processes of the management system.

Any incident in the process activities is treated as Unusual Occurrence. An unusual occurrence is any condition or event which has jeopardized or could jeopardize the health, safety, security or well-being of an employee or any other person while in the facility resulting in physical damaged to the man, material or property or a significant event which disrupts the normal operations. The criteria for identification of unusual occurrences in the process operations are categorized into a Near-Miss event or Injury Cause event. The injury cause event is further categorized into First Aid Case, Non-Reportable Incident and Reportable Incident.

Continual Improvement: The organization aims to utilize the analysis of product / process related data and continually enhances for making improvements for the effectiveness of the Management System. Continual improvement projects are identified keeping in view, the OH&S objectives, feedback for improvement through audit results, analysis of data, corrective and preventive actions and discussions held in management reviews. The continual improvement results are being revised in relevant SOPs and process manuals.

6. BENEFTIS OF IMPLEMENTATION

The implementation of OHSMS, recognition of the health and safety risks will be enhanced and the integer of controlled risks increased particularly. In this area, the findings are reliable with Gilberto Santos et al. who argued that the implementation of OHSMS improved risk identification and management performance (Santos et al.,2013).

Every individual has a right to work safely and every organization has a moral and legal duty to protect workers from accidents and ill health and to create a safer work place for employees. An overview of a selection of positive benefits from implementation of ISO 45001 is detailed below.

1) Adoption of the high-level structure of 'AnnexSL' enabled to integrate ISO 45001 with other ISO management systems.

2) The standard provides a systematic approach for senior leadership to assess OH&S risk and opportunities, monitor and review safety performance and set objectives for continual improvement within the 'context' of organizational activities.

3) Implementation is a demonstration and commitment from senior leadership to internal and external interested parties of the intent to protect workers from accidents including short and long term ill health effects.

4) This commitment also provides assurances to the Board of Directors, Trustees or owners that management controls regarding OH&S risks inherent within the organization.

5) The standard promotes worker participation when identifying hazards, elimination or reducing risk by implementation of controls integrated with other business process. This approach can improve safety culture, minimize risk and embed best practice resulting in increased productivity.

6) Positive transition in procurement of products and services which can influence OH&S.

7) Monitor and review compliance obligations to ensure the organization is legally compliant including products and services.

8) Both internal and external audit programs provided scrutiny and effectiveness of the OH&S management system including processes. The program promoted communication and participation of workers with identification of gaps leading to continuous improvement.

9) Emphasis on workers taking an active role in OH&S matters, resulted in positive benefits on organization's reputation as a safe place to work leading to staff retention, motivation and greater productivity.

10) Implementation is also recognition for having achieved an international standard benchmark which has positive influence on existing and potential customers in fulfilling their own social responsibility commitments.

7. HIGHLIGHTS OF IMPLEMENTATION PROCESS OF ISO 45001 OH&S MANAGEMENT SYSTEM IN EXPLOSIVES MANUFACTURING INDUSTRY: THE 10 STEPS FOR CERTIFICATION.

1) *AWARENESS TRAINING*

i. Awareness training sessions conducted on ISO 45001 Standard requirements.

ii. Separate sessions have been conducted for top management, middle management and junior level management to create a motivating environment, ready for implementation.

2) *POLICY AND OBJECTIVES*

i. Standardized OH&S Policy, Sustainability Policy and Vision Statement and relevant objectives to meet the requirements.

ii. Conducted workshops with all levels of management to outline the OHSMS objective along with top management.

3) *INTERNAL GAP ANALYSIS*

i. GAP Analysis was carried out to identify and compare the level of compliance of existing systems against requirements of the standards.

ii. Operations of the organization are made clear to all the staff and developed a process map for the activities within the business.

4) *DOCUMENTATION / PROCESS DESIGN*

i. Process documentation has been created in 4 levels as per requirements of ISO 45001:2018 standard.

ii. The documentation structure in 4 levels includes Manuals, Procedures, Guidelines and Records for all the processes within the plant operations.

5) *DOCUMENTATION / PROCESS IMPLEMENTATION*

i. Processes / Documents developed in step 4, has been implemented across the organization covering all the processes and activities.

ii. Workshops has been conducted on the implementation process as per applicable for the ISO standard requirements.

6) *INTERNAL AUDIT*

i. A robust internal audit system has been developed by identifying internal auditors from all the processes and provided training relevant to the standard along with certifications.

ii. Internal audits have been conducted to identify the drawbacks in the system and opportunities for improvement. Corrective actions have been implemented

in order to bridge gaps and ensured effectiveness of OHSMS standard.

7) MANAGEMENT 'SYSTEM' REVIEW MEETING

i.   Management Review Meetings were scheduled with key managerial personnel representing key functional roles including Top level management and reviewed various aspects relevant to the standards being implemented.

ii. Review the policy, objectives, results of internal audit, process performance, complaints/feedback/legal compliance, risk assessment/incidents and develop an action plan following the meeting – and preparation of minutes of all the proceedings.

8) THOROUGH GAP ANALYSIS OF IMPLEMENTED SYSTEMS

i.   A formal pre-certification gap analysis was conducted to assess effectiveness and compliance of system implementation in the organization.

ii. The final gap analysis prepared the organization for the final certification audit.

9) CORRECTIVE ACTIONS

i.   Corrective actions have been addressed for the gap analysis and all the non-conformities (NCs) have been assigned action plans with target dates.

ii. All the significant NCs are closed and the documentations are updated accordingly.

10) FINAL CERTIFICATION AUDIT

i.   Demonstrate the implementation of standard to the external certification agency and obtain systems certification upon successful completion.

ii. Continue ahead the implementation process with continual improvement and sustain the certification.

Several studies have highlighted the necessity of OHSMS to monitor and ensure effective implementation of health and safety strategy in any industry and organization. Studies have also highlighted the necessity of periodical performance assessment (Omidvari et al., 2018). Among studies on the effects of OHSMS, Gholami et al., (2015), Mohammadfam (2016) and Azim Karimi et al., (2020) are notable.

8. CONCLUSION

ISO 45001 Occupational Health & Safety Management System is the international standard for managing safety & health at work place. This standard ensures better compatibility with other management standards which makes the application user friendly. The unusual occurrence within the operational processes has been reduced to minimal level and occupational safety and health status of the organization has been improved. The ISO 45001 standard will definitely provide a bench mark to an organization in a global level by demonstrating the standard requirements.

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