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Strengthening IMS accountability through Functional Leadership

Abhishek Kaushik[1]

[1] Operations majors, NMIMS
Mumbai, Maharashtra-400056, India

Abstract

The purpose of this paper is to acknowledge the benefits of an integrated manufacturing system and its implementation in an industrial setup. The paper dives into the departmental level roles and responsibilities and further motivations for MOC implementation with examples of changes that could increase risk. The paper concludes by identifying the need of continual improvement in IMS, balancing the barriers on departmental basis and demonstrating & reporting of IMS performance.

Keywords: *Environmental permitting regulations (EPR), HIRA, SOP, OCP, Unit safety head (USH), Reference materials (RM), corporate responsibility for environmental protection (CREP), Manufacture, storage and import of hazardous chemical rules (MSIHC), Occupational Health and Safety Management System (OHSMS), Indian electricity rules (IE), Project management (PM), Optimally Hygienic conditions (OHC), central motor vehicles rules (MV), Health safety and environment, Transport emergency cards (TREM), Material safety datasheet (MSDS),State pollution control board, Emergency medical services (EMS), Environment, health & safety and quality (EHSQ)..*

1. Introduction

An Integrated Management System (IMS) integrates all of an organization's systems and processes in to one complete framework and thus enabling it to work as a single unit with unified objectives. It may include two or more management system standards for e.g. ISO 9001+ ISO 14001, ISO 14001+OHSAS 18001, ISO 14001+OHSAS 18001+SA 8000, and ISO 14001+ OHSAS 18001 SA 8000+ ISO 9001. Effective management systems take into consideration all activities that have an effect on the business and are implemented at all levels within an organization regardless of its size or function. A management system, be it health & Safety, quality, environment or financial, should operate flawlessly across all components as part of day to day functioning. Integration brings together the processes of these systems for effective business management.

2. Benefits of IMS

An Integrated Management System can benefit your organization through increased efficiency, effectiveness, and cost reductions while minimizing the disruptions caused by several external audits. It also highlights your commitment to improvement in performance, employee and customer satisfaction.

With an integrated management system, one works together, with each function aligned towards achieving a single goal: improving the performance of the entire organization. Instead of working in silos, we have a coordinated effort of all which is greater than the sum of individual's parts. An integrated system provides a uniform and clear image of the entire organization, how they impact each other, and the related risks. Efficiency is achieved from less duplication, and easier adoption of new systems in future.

An IMS allows the management team to create one unified system that can help to effectively and efficiently deliver the organization's objectives. From monitoring hazards and risks, to managing employees' needs, from maximizing resources to reducing inefficiencies, an integrated approach can help in achieving the objectives.

2.1 IMS implementation

The implementation phase of the IMS is an imperative stage of the process. It is in the implementation that the true efficacy of EHS management lies. It comprises:

1. Initial Gap assessment
2. Awareness training to senior management
3. Formation of core group and awareness training on aspect/risk assessment
4. IMs manual and department manual
5. Formation of IMS policy and objectives
6. Training to conduct IMS internal audits

2.3 Accessibility to information

IMS system implementation requires compilation of vital information. It must follow:

1. IMS manual, EPR accessible via safety net Web
2. Departmental manual consisting of policy, departmental roles and responsibilities, Aspect/Impact assessment and HIRA assessment details, OCPs, SOPs and objectives and targets-accessible via hardcopy
3. For all documents Master copy lies with USH.

3. Practical approach for Industries

1. All units/key departments shall be self-accountable for Incidents and Pollution load and will follow cradle to grave approach of operations.
2. All departments to be aware of the information desired by statutory bodies for consents and authorizations and input required for statutory returns
3. All departments to establish baseline of Resource usage: - Required number of competent persons, RM, chemicals, water, air, Thermal and electrical energy etc.
4. All departments to establish water and material balance of key resources under best possible system efficiencies
5. All departments to declare the number of incidents, ill health cases, pollution, load in terms of quality and quantity of waste water, air and fugitive emissions, solid and hazardous wastes against a fixed and approved production pattern, safety indices
6. To establish regular system of accounting, tracking and gap analysis for deviations for key parameters
7. All key personnel to understand their legislation and independently comply with the requirements and make improvement plan in phases ultimately to meet equipment efficiencies wherever possible
8. Any deviation in performance will be accountable to the polluters department such as a deviation in ETP performance due to shock and adverse loads will require analysis as an environmental incident with stream wise monitoring to provide regular input to HODs
9. The term ACCIDENT shall be linked with HSE incidents and accidents in departments and all key personnel supporting operation staff must be acquainted with operation process and be adequately aware of the plant design criteria, regulations, analysis of treated, untreated effluent and the solid hazardous waste generated etc.
10. Training department shall proactively focus that Human resource development is taking place in all areas to focus:
    a. Awareness on aspect management
    b. Accident prevention
    c. Regulatory requirements
    d. Emergency management
    e. Energy Conservation (Thermal, electrical etc.)
    f. Conservation of resources including forest department
    g. Fire management
    h. Critical suppliers and contractors and their aspects
    i. Stores and bulk storages
11. Training department also has to be trained on departmental aspects, Basics of the standards and legislations
12. All key operational personnel will understand the CREP(corporate responsibility for environmental protection) concepts framed for specific industries in the countries and prepare long term action plan in this direction
13. The development of internal HSE Co-coordinator in key departments be considered
14. All HODs to percolate the concept of “Prevention of Pollution” independently, train the Human resource under them and manage the trainings proactively within the department.
15. There has to be a focus on realistic, on the job trainings which should be an internal development process of all departments on regular basis.
16. Training department to be utilized proactively in a focused manner. The training department with the HODs or vice versa will prepare the inventory of trainings/subjects their juniors must know.

4. Emergencies and environmental accidents

Environmental Accidents to be defined, recorded, prevented, and data maintained by all departments for e.g. the accidents in a chemical industry are broadly classified as fires (including electrical fires), gas leaks and explosions Process failures and emergency data with the stoppages to be maintained in departments

Definitions of environmental incidents/accidents in relation to for e.g. chlorine, ClO2, Hydrogen related processes and control system be in place with safety reports and safety audits available and read/known to concerned HOD

7. On site emergency plan to be in line with schedule of MSIHC rules
8. Compatibility study of chemicals

5. Departmental level roles and responsibilities

The department level roles and responsibilities, job descriptions, linkages with policies, departmental activities related to EMS & OHSAS management to be explained in detail at the departmental level.

5.1 Quality control/assurance

1) Monitoring or advisory role to be spelt out
2) Monitoring environmental performance of departments
3) Objective based role to be laid down in development process on resource optimization
4) Assurance on correct/planned environmental monitoring pertaining to effluents, emissions, hazardous/solid waste
5) Reduction of resource losses due to repeated rejections by the customer
6) Coordinator and controller of internal reworks and advice to operation group

5.2 Production department

1) Aspects/Impacts, Hazard/risk identification /evaluation, risk management, policy and legislative compliances, operation control, classification of accidents/incidents in the plant and analysis of data/trends for improvement or continual improvement, accident/incident analysis, safety performance, hazards at workplaces, engineering control, safety instrumentation, interlocks, trainings/motivation, Noise/heat/dust/fumes management, legislative compliances, onsite contractor management. Safe operating procedures, safety equipment and its maintenance/inspection (scope may vary depending upon the activities)
2) Health & Safety performance and continual improvement

5.3 Safety department

1) Chemical process safety and monitoring and analysis of chemical process incidents
2) MSIHC rules compliance, submission of safety audit reports, safety audits, trainings
3) Safety aspects in vulnerable chemical and fuel storages.
4) Proper transportation of hazardous chemicals
5) Routine plant inspections to prevent environmental emergencies
6) Statutory periodic inspections
7) Management of chemical emergencies

5.4 Electrical department

1) Aspects/Impacts, hazards/risk management and statutory compliances
2) Compliance of IE rules in prevention of fires, sparks and explosions
3) Analysis of electrical failures resulting to resource loss.
4) PM practices and their alignment with IE rules, Indian standards and inspections there under
5) Energy conservation, monitoring and control of energy losses
6) Availability of uninterrupted power supply with quality of power
7) Efficiency control of electrical utilities
8) Inspection of critical electrical system, condition monitoring and safety devices
9) Purchase criteria of critical equipment
10) Inventory of anticipated electrical emergencies resulting in resource losses
11) Analysis of electrical emergencies, failures and their prevention
12) Internal development of human resources

5.5 Electrical safety officer

1) Hazard/risk identification/evaluation, risk management, electrical safety officer/electrical safety, conformance of IE rules, conformance to relevant safety codes, safety performance and loss management in electrical systems, electrical safety, preventive maintenance, safety in electrical systems applicable to petroleum storages, safety inspections, Electrical fire prevention & control etc.
2) Health & Safety performance and continual improvement

5.6 Mechanical Engineering department

1) Hazard/risk management and all relevant requirements under the head Production and safety department, safety performance
2) Health & Safety performance and continual improvement

5.7 Instrument department

1) Hazard/risk management and timely calibrations and safety interlocks
2) Safety Instrumentation equipment in plants and its maintenance/inspection
3) Analysis of Plants breakdowns and failures resulting to production loss

5.8 Occupational Health Services

1) Hazards and risk management in OHC, conformance to legislations, occupational hazards in the plants including Drivers, inventory of population exposed, monitoring of work environment, Data analysis, Medical surveillance in plants, maintenance of health

records, job safety analysis, accident/ Incident classification, analysis and root cause management, safety performance of the company and analysis of data on personnel accidents and injuries, statutory compliances emergency preparedness, biomedical rules, mock drills, Stores and storages in OHC, management of sanitary conditions communication of Health performance and plant inspection/ observations in safety committee
2) Health & Safety performance and continual improvement

5.9 Materials Management (Purchase and Stores)
1) To act as resource conservator and controller
2) Supplies and disposals under the Direct and indirect control
3) Batteries, Used and waste oil, Ferrous and nonferrous waste
4) Waste management and reduction, MIS generation on deviations
5) Transportation of Hazardous chemicals and wastes
6) Purchase of critical services and lay down communication procedures. HSE consideration in purchase of services
7) Regulatory compliances and storage
8) Evaluation of contractors and their inspections
9) Emergency prevention during transportation, MV rules, vehicle fitness
10) TREM cards, trained drivers, availability of MSDS
11) Storage of flammable and hazardous chemicals
12) Identify the areas of resource loss and planning for improvement
13) Greening the supply chain and compliance of HSE policy
14) Change management-New purchases DG sets, Heat exchangers, Gas cylinders, Other new developments having HSE concerns

5.10 Materials Department- Waste Management
1) Waste classification and categorization
2) Waste accounting and waste reconciliation
3) Waste segregation, waste disposal
4) Statutory record and submission of returns
5) Close loop accounting of wastes, waste reduction
6) Inventory controls-including control of inventory in departmental stores
7) Hazardous waste management viz. waste oil, copper cables, batteries, burnt motors, empty chemical drums, Nonferrous wastes
8) Transportation contracts for hazardous wastes/sludge disposal vis a vis consents, authorization and rules
9) Data generation, analysis and submission of statutory returns

5.11 Civil Engineering and water supply
1) Aspects/Impacts, Hazards/risks in civil construction
2) Availability of current drainage layout showing waste water, storm water and sewage drains
3) Management of civil contractors
4) Maintenance and periodic inspection of drains, roads, infrastructure material of construction used in drainage system to carry varying quality of corrosive and hazardous chemicals
5) Maintenance of water supply system, supply diagram and metering system
6) Methodology of submission of monthly cess returns, internal communication in areas of water wastage and excess usage than established water balance
7) Cleaning plan of drains, integrity of drains to avoid generation of fugitive emissions in the eventual mix-up of non-compatible chemicals
8) Materials of construction to carry hot water/ effluent
9) Maintenance of refractory, insulation work, life of refractory, control heat losses.

5.12 ETP operation and waste water management
1) Communication of ETP operation process to operation units
2) Development of complete approach on effluent treatment, control parameters in relation to design and operation criteria of the supplier and approval if any by SPCB
3) Analysis of influent and treated effluent and maintenance of statutory log book
4) Monitoring of effluent quality and quantity from process plants
5) Water/effluent management and generation of deviation reports against the established water balance and pollution load by the departments
6) To maintain chemical composition and power consumption data
7) Liaison with SPCB and maintenance of visit records
8) Chemical analysis from SPCB approved laboratories
9) Environmental Emergencies in ETP and their analysis with concerned HOD etc.

5.13 Contractor management
1) Identification of Aspects/Impacts, Hazards/risks of contractors and purchased services on which company has an influence
2) HSE selection criteria of suppliers, contractors, waste buyers and critical service suppliers

3) Selection criteria of suppliers & contractors based on HSE policy of the company and the application regulations
4) To Lay down procedure in line with above so that the supplier/contractor meets the criteria applicable to men, material, method, machine used by him
5) Communication of HSE procedures in Purchase orders/contracts, monitoring of procedural compliances including regulatory requirements
6) Incoming and Outgoing inspection/Audit of critical contractors against the laid down requirements preferably against the checklists
7) Training of Contractors and suppliers
8) Identification of hazards & risks pertaining to contractors, suppliers, waste buyers, transporters, onsite/offsite contractors, contractor selection, requirements to be met by the construction in respect of man, material, methods & Equipment used/brought by them, Statutory compliances, Compliance of company's HSE policy, contractor evaluation, assessment, of performance, accident/ Incident Analysis, safety performance, internal HSE audits of contractors
9) H & S performance & continual Improvement

5.14 Emergency Preparedness
1) Identification of emergency (Fires, gas leaks/releases, chemical spills, explosions etc.) their preventions & mitigation)
2) Onsite emergency plan
3) Public liability insurance, fire insurance and exclusion if any
4) Role of Safety officer, Security officer & Medical officer in chemical/process accident prevention & Mitigation
5) Maintenance of emergency related infrastructure, its PM and inspection
6) Statutory Compliances
7) Mock drills, Fire drills, Role of safety in loss control

5.15 Training & HRD
1) Process approach applicability to training process
2) Planning, inputs in planning process, objective based training , generation of dynamic training calendar
3) Accountability & involvement of HODs in development of individuals. Trainings & Knowledge base at departmental level, self-development by individuals, role of HODs in internal system development, skill enhancement of personnel, people involvement is system/self-development
4) Competence needs at defined levels. Auditors competence
5) Ongoing determination of training realistic to the needs e.g. behavioral Training, internal training/ external Training with focus on training execution and monitoring effectiveness.
6) Training of training Department and policy compliance

5.16 Communication
1) Internal & external communication
2) Reactive and proactive communication
3) Internal communication between various levels and functions of the organization
4) Internal customer satisfaction monitoring is the good tool but was not found to be effectively used in some functional areas. Concept can be used for internal environmental concerns
5) Training department to be communicated about the environmental aspects of the departments, regulatory requirements etc.
6) A procedure for receiving, documenting and responding to relevant communication from external interested parties to be laid down
7) At least two years data on communications from regulatory bodies to be available

5.17 General areas of concern
1) Internal transport via rail & road transport
2) Transportation of hazardous chemicals and steam via internal pipeline
3) Condition monitoring of internal civil & mechanical structure
4) Condition monitoring of foundations of vulnerable chemical storages
5) Condition monitoring of gas/fuel pipelines
6) Clarity on underground cables, pipelines, earth pits, underground drains
7) Battery limits for work permits for hot work in hazardous areas
8) Internal housekeeping, responsible care, prevention of leaks, overflows, gland leaks
9) Calibration of critical instruments related to monitoring of parameters related to EMS and the associated Aspects/Impacts

5.18 Initial Environmental Review
1) Identification of legislation & regulatory requirements
2) Identification of environmental aspects related to activities, product & services.
3) Evaluation of performance, existing environmental management practices & procedures
4) Review of existing policies and procedures dealing with purchase & contractors
5) Feedback of previous incidence of non-compliance
6) Review of other requirements

6. Management of Change

Management of change (MOC) is a process for evaluating and controlling modification to facility design, operation, organization or activities – prior to implementation – to make certain that no new hazards are introduced and that the risk of existing hazards to employees, the public, or the environment is not unknowingly increased

Changes occur when modifications are made to the operation or when replacement equipment does not meet the design specification of the equipment it's replacing. Other more subtle changes can occur when new chemical suppliers are selected, national fire protection association hazard classifications change, procedures are modified or site staffing and/or company organization is revised. Such operation and result in incidents

6.1 Guidelines for MOC systems

(Things that have happened in MOC since 1992)

1) More than 15 years MOC experience, particularly with incidents for which failure of MOC was identified as a root cause
2) Major increase in the use of electronic documentation of site information
3) Emergence of MOC software applications
4) Emergence of Web-based documentation sharing systems
5) Company-wide MOC systems(involvement of non-local personnel in MOC reviews)
6) Redistribution of process safety management (PSM) work to sites (lack of central monitoring of PSM/MOC)
7) Downsizing and integration of MOC duties within production jobs
8) Increased efforts to monitor MOC application via management reviews
9) Organizational upheaval (diversification, acquisitions lack of culture integration)
10) Use of MOC in process areas not covered by regulatory standards
11) Realization of the need for MOC for nontraditional types of changes
12) PSM regulatory creep (broadening of the application for the new change types and expanding the MOC work required)
13) Expansion of the six sigma approach and other productivity improvement initiatives , which has increased the workload associated with MOC systems involving subtle types of changes
14) Accident investigations that have revealed the risk significance of previously under considered sources of subtle change such as organizational changes

6.2 Goals of MOC Guidelines

1) Reduce the number of MOC related incidents and PSM audit findings
2) Expand MOC into the process/project lifecycles and nontraditional types of changes
3) Tailor MOC systems to the faculty size, perceived risk anticipated usage rate of the MOC system, and safety culture
4) Monitor MOC performance at sites from a far, in real time and cost effectively
5) Quickly diagnose MOC problems without having to perform or wait for a PSM audit
6) Make MOC systems more fault tolerant and resistant to circumvention or human error
7) Monitor MOC performance and efficiency in a practical way
8) Achieve better MOC results with fewer resources if possible

6.3 MOC systems: Examples of changes to be managed

Process equipment changes such as materials of construction design parameters and equipment configuration:

1) Changing piping from carbon steel to stainless steel without considering the potential for pitting due to presence of chlorides
2) Replacing a reactor with one of equal volume but different length to diameter ratio without considering potential changes in vessel mixing and heat transfer characteristics
3) Connecting the cooling system of a new reactor to an existing cooling tower, without assessing the impact of increased load on the tower
4) Substituting plastic pipe for steel pipe without considering the potential for generating static electricity that could ignite flammable vapors or combustible dusts or failure caused by lack of support, particularly at elevated temperature

Process equipment changes such as instrumentation, controls, interlocks and computerized systems, including logic solvers and software:

1) Raising the trip point on a safety related high level alarm beyond the safe operating limit established by prior safety analyses
2) Replacing a transmitter that produces an analog output with one that produces a digital output without considering the failure modes associated with the new transmitter and the potential effect on the reliability of the associated interlock circuit

3) Adding a new alarm within the DCS without considering the incremental impact for creating a process alarm overload situation for operators

Site infrastructure changes, such as fire protection, permanent and temporary buildings, roads, and services systems:

1) Increasing the occupancy of the control room building without considering the increased risk of building occupancy
2) Increasing the size of the chemicals warehouse without considering the impact requirements for sprinkler protection may have on the flow/pressure capability of the firewater supply
3) Relocating a unit's control room to a remote location to reduce operator exposure to unit hazards, without considering the impact of decreased operator presence in the process area (Fertilizer company)Accessibility, accessibility, communication etc. is a problem
4) Temporarily closing a major site road because of interferences from a construction project or a maintenance turnaround without considering the impact on the accessibility of emergency response vehicles to certain portions of the facility

Changes in procedures, such as standard operating procedures, safe work practices, emergency procedures, administration procedures and maintenance and inspection procedures:

1) Modifying operating procedures to reduce or eliminate operator rounds in an area without considering the benefits of operator presence, such as leak detection
2) Changing previously established safety, quality, or operating limits in the operating procedure
3) Moving from a hard-copy based operating procedure system to one where personnel access all procedures through the site intranet
4) Abandoning the OEM manuals in lieu of site-generated maintenance procedures

Organizational and staffing changes such as reducing the number of operations on a shift. Changing the maintenance contractor for the site or changing from 5 day operation to 7-day operation:

1) Relocating the site technical group to a remote central corporate location without considering the impact on their ability to provide support to the facility immediately
2) Changing from an 8 hour shift schedule to a 12-hour schedule without evaluating the potential effect of greater fatigue associated with longer shifts
3) Replacing an operations unit manager without considering the training needs for the new unit manager
4) Deciding not to replace a retiring corporate loss prevention expert who previously reviewed all relief system designs or replacing the expert with an inexperienced engineer
5) Realigning the corporate HSE auditing function, placing primary auditing responsibility at the site level without considering the possible reduced expertise or independence of local auditors

7. Continual improvement in IMS

Present problems

1) Currently the focus is on quality & efficiency of production but no focus on Environment & Health components
2) No self-initiatives for achieving bigger goals
3) Department centric attitude, lack of ownership
4) Intradepartmental delegation of key responsibilities at junior level

7.1 HOD's-To Do

1) Read through the Dept. manual, understand the EHSQ requirements
2) Understand the concept of IMS and the standards
3) Conduct periodic internal review of departmental level IMS implementation & help in closing the GAPs
4) Motivate employee for self-adoption of IMS
5) Conduct planned/surprise inspection of records, log sheets, workplace behavior
6) Keep himself aware of latest legal requirements and departmental obligations
7) Remain open to the suggestions & concerns from any workmen and seriously evaluate in view of IMS effectiveness

7.2 Reporting of IMS performance

1) Submission of Quarterly progress reports to USH
2) Assess the trend of incidents (LTI/Man-days lost etc.)
3) Trend analysis of natural resource use (electricity, water, compressed air)
4) Waste management initiatives, evaluation of compliance to legal requirements
5) Control of non-conforming product/services
6) Efficiency & effectiveness assessment of processes

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Author: Abhishek Kaushik is a current student of MBA program at NMIMS, Mumbai. He has previously worked at Vedanta resources for 35 months as Maintenance Engineer. He is basically a Production and Industrial engineer from Delhi College of Engineering from 2009 to 2013.