

Integrated Management System for JSW Steel Melt Shop of 5 MTPA Capacity

Kommireddi Avinash, S. Bala Murugan, Sachin Vaidya, Venkataramana Kota

Abstract: Over the last few years we have been facing many problems related to the Occupational Health and Safety, Environmental Safety and Quality in construction sites during the execution of project. Now-a-days the clients need the work to be done with full quality in safety manner. This Paper explains the "Integrated Management System (IMS)". which integrates various departments like Execution, Planning, Design, Occupational health and safety, Environmental Safety, Human Resources, Quality Assurance/Quality Control etc., according to standards such as ISO 9001, ISO 14001 and OHSAS 18001. This IMS is one of emerging techniques that brings all the departments into a single one. This study was done by collecting the data by conducting interviews with professionals from all the departments in the Steel Melt Shop Construction Project such as Human Resource team, Design team, Procurement team, Execution Team, Quality team, Safety team etc. This Paper concludes with a detailed framework of IMS for a steel Melt shop Project by integrating the functions of various departments in the project and develops a basic plan of IMS for both Top level Management and Bottom Level Management. This IMS Plan has been Prepared for Contractors, its sub-contractors and other Stack holders if any involving in this project. This Integrated management system will minimize the overall cost, time and manpower.

Keywords: Environmental Safety, Quality Assurance/Quality control, Integrated Management System (IMS), standards.

I. INTRODUCTION

Integrated Management System (IMS) is explained in such a way that it integrates various departments like Execution, Planning, Design, Occupational health and safety, Environmental Safety, Human Resources, Quality Assurance/Quality Control etc., according to standards such as ISO 9001, ISO 14001 and OHSAS 18001. ISO 9001 explains the basic requirements for Quality Management System (QMS) such as responsibilities of management, document information, planning, management of human resources & work environment, measurement of productivity, analysis and improvement of QMS. ISO 14001 explains the basic requirements for Environmental Management Plan (EMP) such as Environmental Policies, Organizational

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approach for Interaction with environment, Identification of Environmental Impacts. OHSAS 18001 explains the basic requirements for Occupational Health and Safety such as Hazard Identification, risk assessment & control, Legal requirements, Objectives and OHS Programs, Competence, Awareness and Training.

This IMS Plan was created for the Steel Melt Shop (SMS) project which includes IMS Policy, IMS Objectives, Management Commitment, Communication and Review, Organization, Roles and Responsibilities, OHS Committee, Management System, Document Control, Control of Records, Resource Management, Planning and Implementation, Interface Management, Legal requirements, Hazard Identification, Risk Assessment and Control, Design, Procurement, Construction Management, Environmental Planning and implementation, Monitoring and Measuring equipment, Emergency preparedness and response, Performance measurement and monitoring, Management Review Meeting etc.

II. REVIEW OF LITERATURE

In Many Construction sites there will be lack in time, Manpower or Cost that leads to delay in the project and also if there is any lack of understanding between any other departments that may also leads to some serious circumstances in site. So, IMS is basically a process of developing a project by means of time, cost and Manpower. The management is concerned with the actions that can make an organization setting in which the labor, staff can be trained to perform a safe productive work in the site that can satisfy both the contractor and owner/client [1]. The three basic standards in which the IMS will follow ISO 9001, ISO 14001 and OHSAS 18001 which explains the Quality management System (QMS), Environmental Management System (EMS), Hazard Identification and Risk Assessment etc., [2]. For many contractors and sub-contractors IMS will be a change in outlook for operating procedures and other external recognition [3].

III. PURPOSE OF IMS PLAN

The main purpose of the IMS plan is to provide Contractor, its sub-contractors and other stakeholders with management framework, requirements, and performance expectations relating to:

1.Process interface between Contractors, the Employer, Employer's Representative and sub-contractors appointed by organization, Processes by which Contractor, shall meet the customer's requirements related to design and construction works.

2. Processes by which Organization, shall eliminate or minimize risks to personnel and other interested parties while carrying out the works under the above contract.
3. Processes by which Organization, shall manage significant environmental aspects while carrying out the works under the above contract.
4. Processes by which Organization, shall Continually improve the performance of its IMS.
5. Processes by which Organization, ensures and demonstrates compliance to the systematic approach, practices procedures, statutory and regulatory requirements applicable to works under the above contract.

IV. METHODOLOGY

The Present study is focused from the real-time Industrial project in which the data is collected from various departments like Planning, Execution, QA/QC, Safety, OHS, HR etc., by taking Interviews and also a survey has been done for around 35 Companies in India through google forms. Fig.1 shows the flowchart for the IMS.

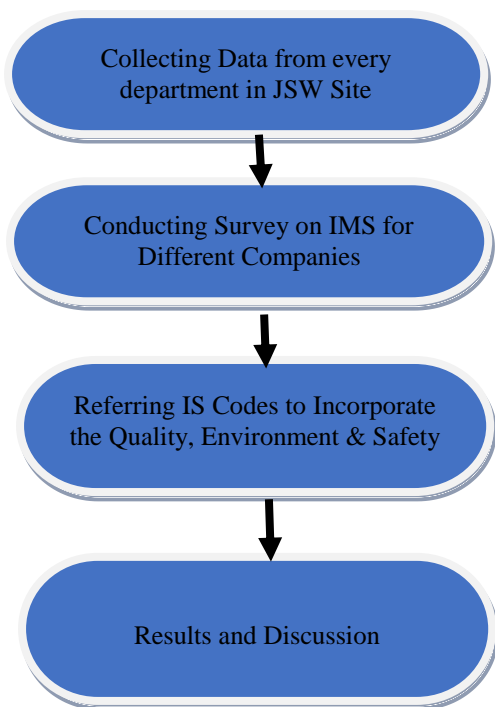


Fig.1 Flow chart for IMS

A. Collecting data from every department in JSW Site

This IMS is made Jindal Steel Plant, Dolvi Works for Steel Melt Shop (SMS) 5 MTPA Capacity, there we would have so many departments in construction site from those departments data have been collected as follows:

1.Planning Department: In this Department, I have collected about the Organization like Roles & Responsibilities, OHS Committee, Management system, Document control, Control of Records, Resource Management, Planning and Implementation etc.,

Roles & Responsibilities will explain the roles of each person in the management and what for they responsible. This would explain from bottom management to top management.

OHS Committee is a joint committee of Occupational health and Safety. It will act as a direct communication for worker

and the concern management regarding the Health and Safety. The OHS Committee shall be established and chaired by project in-charge and the in-charge for Construction, Safety, Plant, Procurement, Personnel/ Administration/ HR shall be committee members. All the workers shall have access to the workforce OHS representative who are responsible to communicate directly with the labor force regard with regard to safety and health. The committee shall review the previous month's performance to include, inspections, audits undertaken, accidents and incidents and any concerns or complaints that have been raised. Minutes of committee meeting shall be issued and promulgated to all members including the corporate safety. The minutes of meeting shall also be posted on all sites within the workforce area.

Management System is designated to ensure the objectives that are planned and delivered to an agreed quality and price in such a way that those results should be repeated and sustained. This will be achieved by a series of linked business processes and activities that are communicated, controlled, coordinated and repeated by others consistently throughout the organization. This management system is integrated to produce a single management system from a number of separate management systems namely Planning, Execution, Design, Safety, Quality & Environment.

Document Control plays a crucial role in IMS as each document within the management system should be uniquely identified and suitably controlled. There will be so many documents such as Vision/Mission/policy statements, organizational/ departmental objectives, procedures, work instructions, method statements, aspect-impact document, HIRA document, etc. The issue of the management system documentation shall be done by the MR by uploading the document into a central electronic repository, which is accessible by all authorized personnel. This repository shall contain the master-list, indicating the current version status of documents maintained by repository. Table. 1 shows the example for check list required for a Gas cutting works.

Control of Records shall be prepared clearly, legibly and there should be appropriate standard forms and controlled through document/drawing control register and stamps. This process for control of documents and drawings generated by EDCTC. Typically records shall include the project name and specific reference number, relevant inspection & test plan number, results or observations, date of activity, name of person making the record, approval/authorization, signatures and distribution. Archived records shall be maintained in secure conditions at appropriate locations to prevent or minimize damage and deterioration. Electronic records shall be backed up in accordance with corporate guidelines.

Resource Management includes provision of resources, human resources, competence, awareness and training, OHS induction training, environmental training & awareness, labor welfare. Provision of resources is established to determine the resources required to maintain and improve the IMS. The resources needed shall include manpower, plants & equipment, suitable workspace, suitable support services etc. The project head is responsible to prepare control estimates,

Table.1 Check list required for a Gas cutting works

INSPECTION CHECKLIST FOR GAS CUTTING WORKS		OBSERVATIONS OK/NOT OK						
SR.NO	POINTS TO CHECK	MON	TUE	WED	THU	FRI	SAT	SUN
1	Gas Trolley provided							
2	Cylinders kept upright in secured manner							
3	Flash back arrester fitted at both ends							
4	Hose are in good condition							
5	Hoses connections are made tity with clamps							
6	Condition of regulators							
7	hoses connections not leaky							
8	hoses colour coding							
9	Gas Trolley condition							
10	No kinks in gas hoses							
11	Soap water bottle kept in cutting set							
12	Cutting torch condition							
13	Torch cleaner available							
14	Spark igniter condition							
15	Cylinder key available							
16	Valve cap provided in cylinder							
17	Gas cutter PPE's cutting goggles, apron, leg guard, sleeves							
18	Availability of fire extinguisher at site							
19	Personnel trained to operate the fire extinguisher							
20	Any other points							

And make forecast the resources required like those of funds, plants, equipment & manpower. Adequacies of the resources are reviewed in management review meeting.

Human Resources is established to decide the competency for each function based on the requirement such as their qualification, experience etc. The Project Head shall get state for main functions from head office as per the requirements given to them and should review his manpower requirement and should send reports to CMS & HR department stating the head office manpower he shall utilize. The site organization should maintain a record of education, training, skill and experience for personnel who performs work, affecting conformity to product requirement, and those who take responsibility for OHS and environmental requirements. The training conducted gives awareness among the personnel to understand individual's role in performing their duties. Induction Training is must in a working project as the project management is responsible to develop induction training schemes that are tailored to the level of responsibility the employee has been assigned. Engineers and persons with supervisory responsibilities are inducted in addition to the project specific content, into their specific responsibility to manage the safety aspects of their operations. Fig.2 shows the flowchart for induction training program. Environmental training and awareness shall be provided to realize environment consciousness effectively. In the simplest form, it must include provision of training to staff prior to commencement of works in field. It must involve training to staff prior to commencement of works in field. It must involve the training of staff before works starts in field. Some of the environmental related programs should be explained to the workers such as IMS awareness programs, Environmental legislations, Waste management and disposal, Environmental pollution- causes and effects, handling and storage of hazardous chemicals, cement handling and storage, Water and effluent management, On-site Emergency and Preparedness etc.

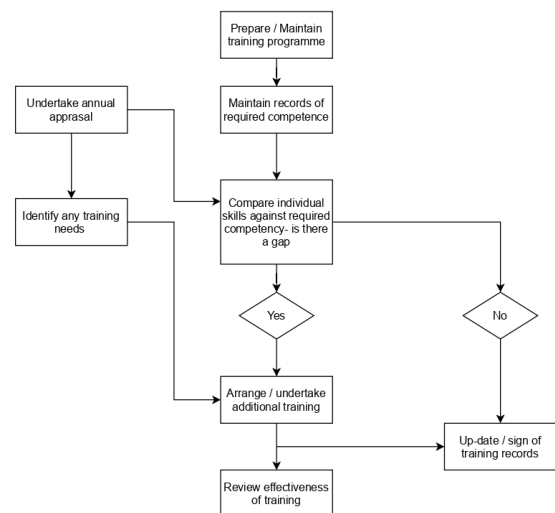


Fig.2 Flowchart for induction training program

Labor welfare activities should be prepared for all the activities and the persons who are responsible for the welfare activities shall ensure that staff is provided with welfare such as drinking water, hygienic working conditions, site and labor colony, area of disposal of waste, proper ventilation & temperature, control over dust & fumes, adequate lighting, facilities of latrines & urinals, medical facilities etc.

Planning and Implementation plays a crucial role in construction job site. Through the provisions described by the IMS plan, the project management team should establish and maintain the procedures to comply with the objectives such as controlled construction activities and deliver work that would meet contract requirements, ensure adherence to/ management of aspects and associated impacts pertaining to activities, Hazards and associated risks pertaining to the activities, Complying with statutory and regulatory,

legal and other requirements applicable to the products, Provide a means of monitoring and controlling the construction process through an Inspection and Test plan, Keep the records of supervision and the circumstances under which the work was accomplished and include the measures required to protect the permanent works, Maintain records of special processes (e.g. Concreting, welding, complex computer programs, use of ground anchors, etc.) including equipment and personnel information as appropriate.

2.Design Department: IMS describes the outline for design procedure and strategic approach to meet all the requirements as specified in the bid document. The primary objective of management of design and drawing production is to ensure the development of the design, drawing and relevant documents in a manner throughout the various design stages and the consent/ approval procedure as defined in the bid document. In particular, the characteristic features of this project, its various data, critical elements and interfacing issues shall be managed and be reflected into the design work within the contractual frame upon the coordination with the relevant parties, other contractors including external bodies such as local governments, authorities.

3.Purchasing department: In this department it classified into sub-stages such as Evaluation and Selection of Vendor, purchasing process for products, purchasing process for services and subcontracting, purchasing data, verification of purchased product. In Evaluation and Selection of Vendor stage capital equipment, materials and services are procured from selected vendors. Selection of vendors is on the basis of evaluation of their ability to meet the required specifications, delivery and pricing. Performance records of such selected vendors is established and maintained their performance is evaluated periodically. Fig.3 shows the Procurement overview. In Purchasing process for services and subcontracting stage, the sub-contractor will first identify he requirement of client and they draw up list for each category of work, then client will collect information from each sub-contractor, then auditing will be started and finally monitor of performance will be done by contractor.

4.Construction Department: It has mainly three different phases namely Pre-Construction phase, Construction Phase, Post construction phase. Pre-Construction phase involves reviewing the client letters of intent, enlarge bid team to form construction team, Processing of files, procure design team, Mobilization meetings, reviewing the client requirements, establishing lines of communication with design team, statutory authorities, safety planning, preparing the procurement, planning the work schedule. Construction phase involves execution of work, preparing the documents required to site, implement standard format procedure, monitoring and controlling time, quality, design, valuation and payments, health safety plan, inspection plan and records, weekly/ monthly reports, allocation sheets/ time sheets, project completion and handover.

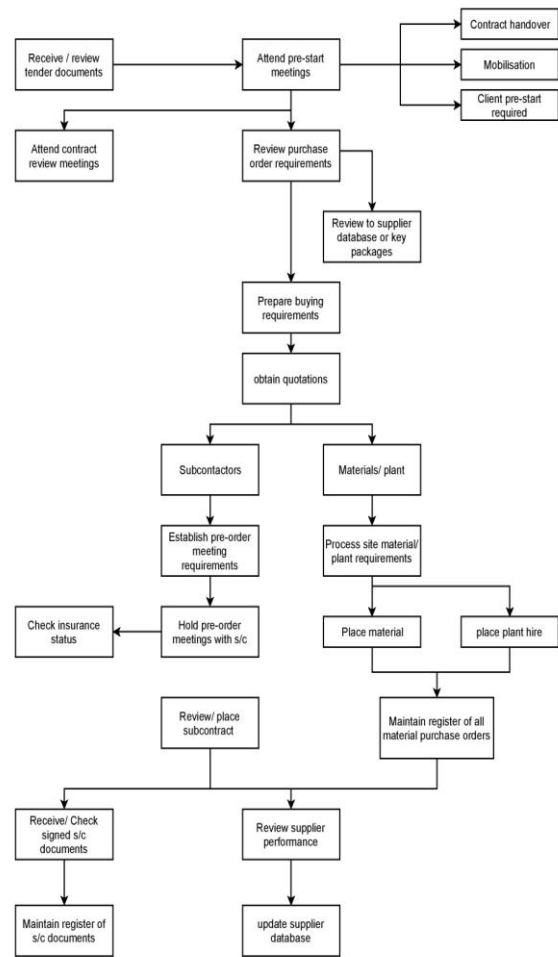


Fig.3 Procurement process overview

Post-Construction phase involves client inspection after project handover, receiving practical completion certificate, releasing of initial retention, closing of project.

5.Health, Safety and Environment Department: This department mainly focuses on Hazard Identification Risk Assessment & Control, Environmental aspects and significant impacts, Environmental operations and control procedures, Air quality management, Water quality management, Water quality management, Noise quality management, Landscape management, Energy management etc.

B. Conducting Survey on IMS for different construction companies:

A survey has been conducted through google forms for around 35 companies about IMS. The outcome of this survey gave me data about the importance of IMS, key components to prepare the IMS, how IMS would improve the performance of project, how it would reduce the cost & maintenance of the project and organization that are using IMS. The importance of IMS in a construction project was the effective way of handling the multitude management. The key components to prepare this IMS is to acquire all process details/readings from every department involved. The IMS can improve the project performance by understanding project progress,

expenses, flaws etc. Around 20% of companies in India are using this IMS effectively.

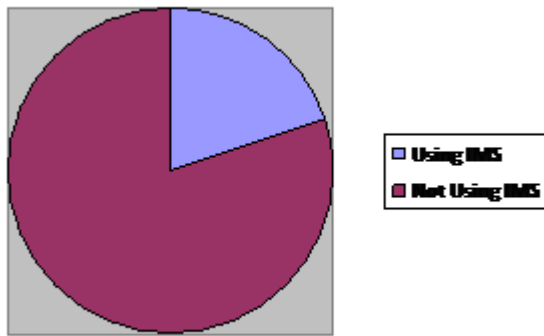


Fig.4 Pie Chart Shows the companies presently using IMS.

Companies which are showing interest over IMS is 90%. The following Fig.

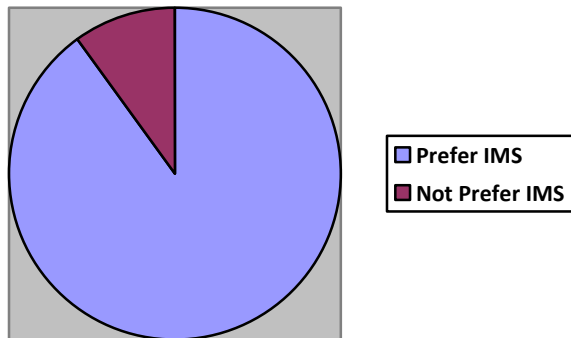


Fig .5 Pie Chart shows companies prefer IMS

C. Referring IS Codes to Incorporate the Quality, Environment & Safety:

This IMS is prepared based on requirements of ISO 9001, IS 14001, OHSAS 18001 that incorporates the quality plan, environmental plan, occupational health and safety plan.

V. RESULTS & DISCUSSION

IMS in a Construction projects used to optimize the cost, Manpower, Time and it is an effective way of handling the multitude management, also used for integrating all the facets of a project such as safety, quality and Environment. It helps in reducing the Maintenance of project by referring to the ongoing compliance checks and ensuring that you are upholding the management system standard requirements. When you have an integrated management system you can maintain the requirements concurrently, streamlining the process and allowing the organization to focus on improvements rather than maintaining multiple systems when that is unnecessary.

There are so many advantages by using IMS like Improving performance, eliminating redundancies, accountability, establishing consistency, reducing bureaucracy, cost reduction, low maintenance, decision making, standardized workflows, clearly defined roles and responsibilities.

Using the data from different departments in site a template has been prepared that can understand the importance of IMS to every employer/ employee. Fig.6 shows the template of IMS that has been prepared for Jindal Steel Plant, Dolvi works, Mumbai.



Fig.6 Template of IMS

Majority of organizations are not using the IMS because it is a live document meaning it needs a constant inputs and reviews to keep updated, needs an experienced mind with a clear idea on project and its outcomes, Failure of one part of system will impact other part.

VI. CONCLUSION

The proposed study gives the detailed information about preparing an IMS by acquiring the data from every department in construction site that will be useful to optimize the time, cost, performance and manpower of the project.

This Study will also help in elimination of safety concerns, along with hazard and clutter free site and to create environment friendly atmosphere. The Mission of this study is to develop, build and service physical atmosphere for better living, work environment, transportation and with a vision to make a leader in innovative engineering and timely delivery of quality construction services, upholding our tradition of best construction habits.

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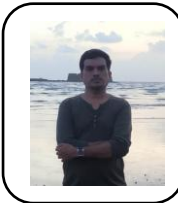
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Mr. Avinash Kommireddi received his B. E degree in Civil Engineering from Raghu Engineering College, Visakhapatnam, Pursuing his M. Tech in Vellore Institute of Technology, Vellore. His Major research Interests in fields of Construction Management. He has 2 years of Industrial Experience and published journal in IRJET.



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Mr. Venkataramana Kota has been working as Senior Manager in Civil Department for JSW Steel Ltd, Dolvi, Mumbai. He is presently for Steel Melt shop project for 5 MTPA Capacity. He has 26 years of Experience in Industries and he also worked at M/s KMC, BHEL, NTPC Simhadri thermal power projects, M/s GEA Energy's, Adani Power plant etc.