



**A NATIONAL PRIORITY ON OCCUPATIONAL HEALTH AND SAFETY
MANAGEMENT SYSTEM**

In the changed industrial scenario, an emphatic world-wide endeavour is visible in improving quality in all functions of an organization¹. Recognizing that the workplace safety and health is a decisive factor in an organizational effectiveness, several management frameworks have been proposed to implement cost-effective occupational health and safety (OHS) in preventing workplace ailments and promoting health and welfare of workers revolving around the International Standards Organization families of management standards (eg. ISO 9000 and ISO 14000)²⁻³. Broadly, an ideal OHS management system (OHSMS) should provide a structured process to minimize potentials of work-related injuries and illnesses, increase productivity by reducing the direct and indirect costs associated with accidents, and increase the quality of manufactured products and/or rendered services. It must provide a direction to OHS activities, in accordance with the organizational policies, regulatory requirements, industry practices and standards, including negotiated labour agreements. Therefore, conforming to an OHSMS may be of significant value to an organization. This approach has drawn significant attention among the standards organizations, the accreditation and certification bodies and the national agencies in formalizing, implementing and evaluating OHSMS. This write-up gives an account and analysis of

the OHSMS development, including its scope in the context of our diverse employment sectors.

OHSMS Development and Certification

The British Standard (BS 8800)⁴ is perhaps the first formalized template to transform into a global OHSMS framework⁵. Prior to the BS initiative, the US Occupational Safety and Health Administration (OSHA) introduced voluntary protection programme (VPP) to approve worksites with exemplary safety and health management programmes⁶. Further, the US OSHA recommended OHS guidelines to institute and maintain an organizational programme that provides systematic policies, procedures and practices to protect employees from, and to allow them to recognize and control health and safety hazards, including general workplace hazards, specific job hazards and potential hazards⁷. The major elements of the guidelines covered are – management commitment, employee involvement, worksite analysis, hazard prevention and control, safety and health training.

Structurally, the BS 8800 guidelines are based on the general principles of good management⁴ having increased visibility with two approaches. The first approach is based on the British Health and Safety Executive (HSE) guidance – HS (G) 65 (Fig.1)⁸. The second approach is

based on International Standards Organization (ISO) 14001 environmental management standard (Fig.2)³. The guidance presented in each approach is essentially the same, the only difference being the order of presentation. Either of the approaches may be adopted to integrate OHSMS with other management systems in practice in the organization. The BS guidelines also contain annexes giving guidelines on the ways that organizations can develop OHSMS will conform to other ISO standards. The American Industrial Hygiene Association (AIHA) issued OHSMS guidelines (ANSI accredited) as a voluntary form of management for the organization⁹⁻¹⁰. One can comprehend similarities in BS 8800 and AIHA guidelines, however, the BS 8800 is explicit on the requirement of root cause analysis, whereas the AIHA

The framework for certification of OHSMS, namely Occupational Health and Safety Assessment Series (OHSAS) specification (OHSAS 18001:1999) has been developed by an association of national standards and

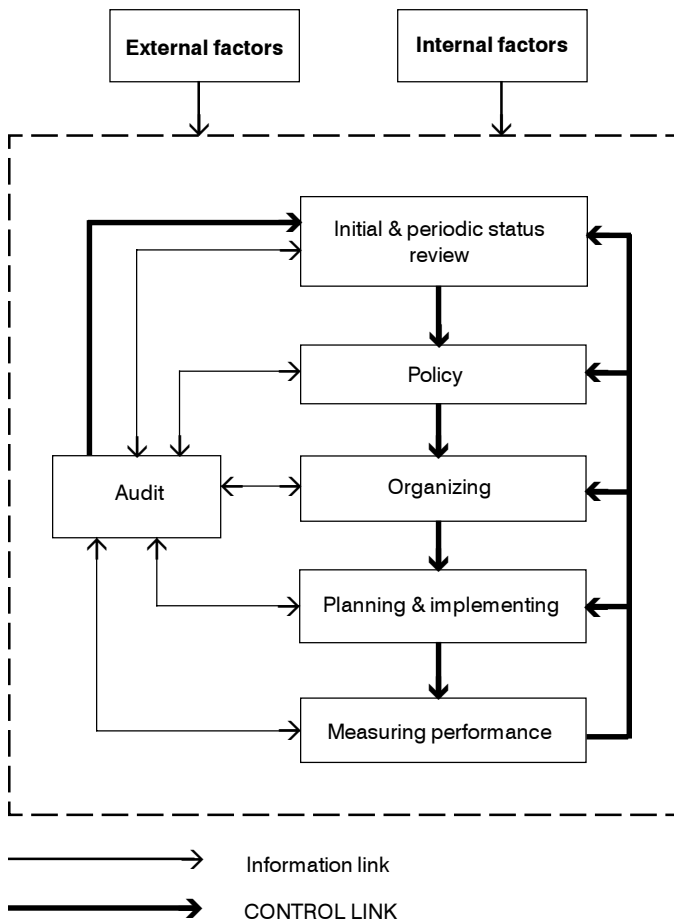


Fig.1. Element of Occupational Health and Safety Management Systems in Health and Safety Executive Guidance –HS(G)65.

OHSMS assessment procedure implies the need for root cause analysis, and that brings in fair degree of flexibility for stage-wise implementation.

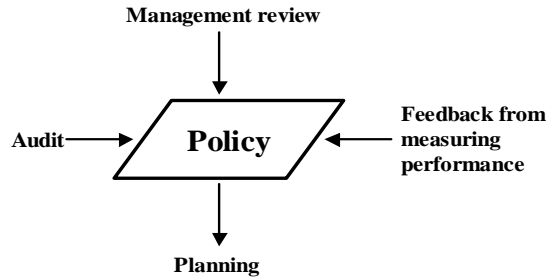


Fig.2. Element of Occupational Health and Safety Management Systems in British Standards (BS) 8800 Occupational Health and Safety Assessment Services (OHSAS) 18001 approach, based on International Standards Organization (ISO) 14001 Environmental Management System.

certification bodies, and specialist consultants¹¹. It has been developed to be compatible with the ISO 9000 (quality)² and ISO 14000 (environment)³ standards in order to align and integrate quality, environment and OHS management systems in organizations. An accompanying publication, OHSAS 18002 is a guidance document¹² to implement OHSAS 18001 and corresponds directly to the specification¹⁰. The organization, which has established, implemented and maintained OHSMS meeting the specification, is eligible to apply for certification. The scheme is established with the aim that upon receiving the certification, the organization will become more aware and self-regulatory in promoting health and safety at their work places. The certification offers independent verification and auditing that an organization has taken reasonable measures to minimize workplace risks and injuries. The specifications used for OHSAS 18001 (Fig. 3a to e) is identical to that of the second approach of BS 8800. In order to implement

OHSMS, adopting the OHSAS 18001 specification, an organization requires to:

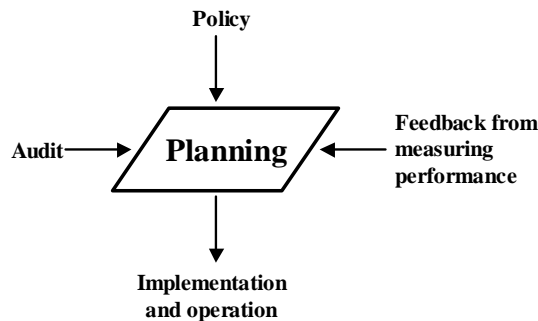
- Establish OHS policy (Fig.3a),



Top management establishes OHS policy, stating health & safety objectives, and commitment to continual improvement of health and safety performance and comply with OHS legislation and other requirements. The policy shall be documented, implemented, maintained and communicated to all employees and other interested parties. It shall be periodically reviewed to ensure it is appropriate to the nature and scale of OHS risks of an organisation.

Fig.3a. Occupational Health and Safety Assessment Services (OHSAS) 18001 specifications — Occupational Health and Safety policy.

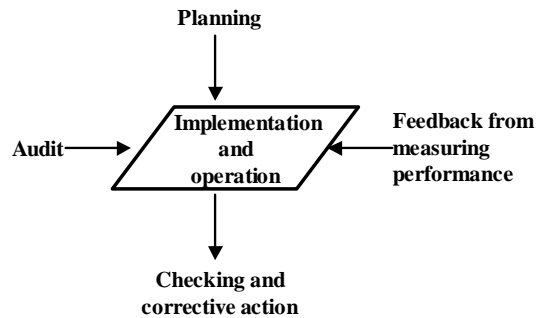
- Plan and integrate concepts of hazard prevention, meet statutory, regulatory and policy requirements, develop OHS goals and objectives, and establish OHS management programme (Fig.3b),



Establish and maintain procedures for (a) hazard identification, risk assessment and implementing control measures. Consider the results of assessment and effects of controls in setting OHS objectives; (b) identifying and accessing the legal and other OHS requirements, and communicating information to employees and interested parties. Establish and maintain (i) documented OHS objectives at each relevant function and level within the organization, and (ii) OHS management programmes to achieve its objectives.

Fig.3b. OHSAS 18001 specifications – Planning.

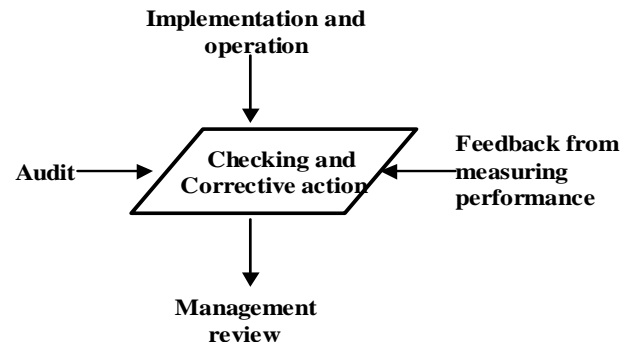
- Implement the OHSMS, prioritizing the use OHS resources, defining the structure and responsibility of personnel, establishing documentation of the core system elements and its interaction, including procedure for controlling documents and data (Fig.3c),



Define the structure and responsibility to facilitate OHS management. Establish procedures to ensure that (a) personnel are competent to perform tasks that may impact on OHS at workplaces; (b) OHS informations communicated to and from employees and interested parties. Document the core elements of the OHSMS and their interaction. Establish procedures to (a) control document and data required by the OHSAS specification, (b) identify operations and activities where control measures need to be applied, (c) plan activities to ensure that they are carried out under specified conditions, (d) identify and review the emergency preparedness and response plans.

Fig.3c. OHSAS 18001 specifications – Implementation and operation.

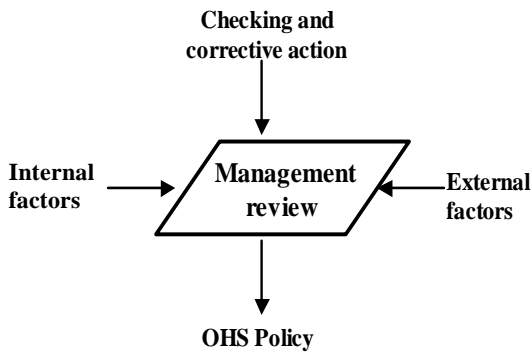
- Evaluate, monitor and control OHS hazards through corrective and preventive actions (Fig. 3d), and



Establish and maintain procedures to (a) monitor and measure OHS performance on a regular basis; (b) define responsibility and authority to handle accidents, incidents, non-conformances, corrective and preventive actions; (c) identify, maintain and dispose of OHS records, as well as the results of audits and reviews. Establish an audit programme and procedures for periodic audits to determine and review whether the OHS management system conforms to the planned arrangement for OHS management, including to OHSAS specifications.

Fig.3d. OHSAS 18001 specifications – Checking and corrective action.

- Undertake management review to monitor progress of OHSMS implementation (Fig.3e).



Review the OHS management system periodically to ensure its continuing suitability, adequacy and effectiveness. The review process shall ensure that the necessary information is collected to allow management to carry out this evaluation. The management review shall address the needs for changes to policy, objectives and other elements of OHSMS, in the light of audit results, changing circumstances and commitment to continual improvement.

Figure 3e. OHSAS 18001 specifications — Management review.

The OHSAS 18001 certification process is schematically shown in Figure 4. In pre-audit review of an organization's application, the certification body conducts a document review and an optional site visit to focus on the scope and planning aspects covering the entire OHSMS. In completion of the pre-audit review, the organization undertakes emendations in the system, and once the follow-up actions have been executed, the organization re-submits its revised OHS manuals and procedures for OHSMS audit. The objective of the second audit is to confirm that the organization conforms to requirements of the OHSAS 18001. It is a minimum requirement that the organization undertakes one internal audit and management review prior to the OHSMS audit. In case of major non-conformities identified during the audit, the organization may require to go through a re-audit. All nonconformities shall be closed out within the specified time frame, and based on which a recommendation for the award of the

certification may be made. During the three years validity period of the certificate, at least three annual surveillance audits are to be conducted to ensure that the certified organization continues to comply with the OHSAS 18001

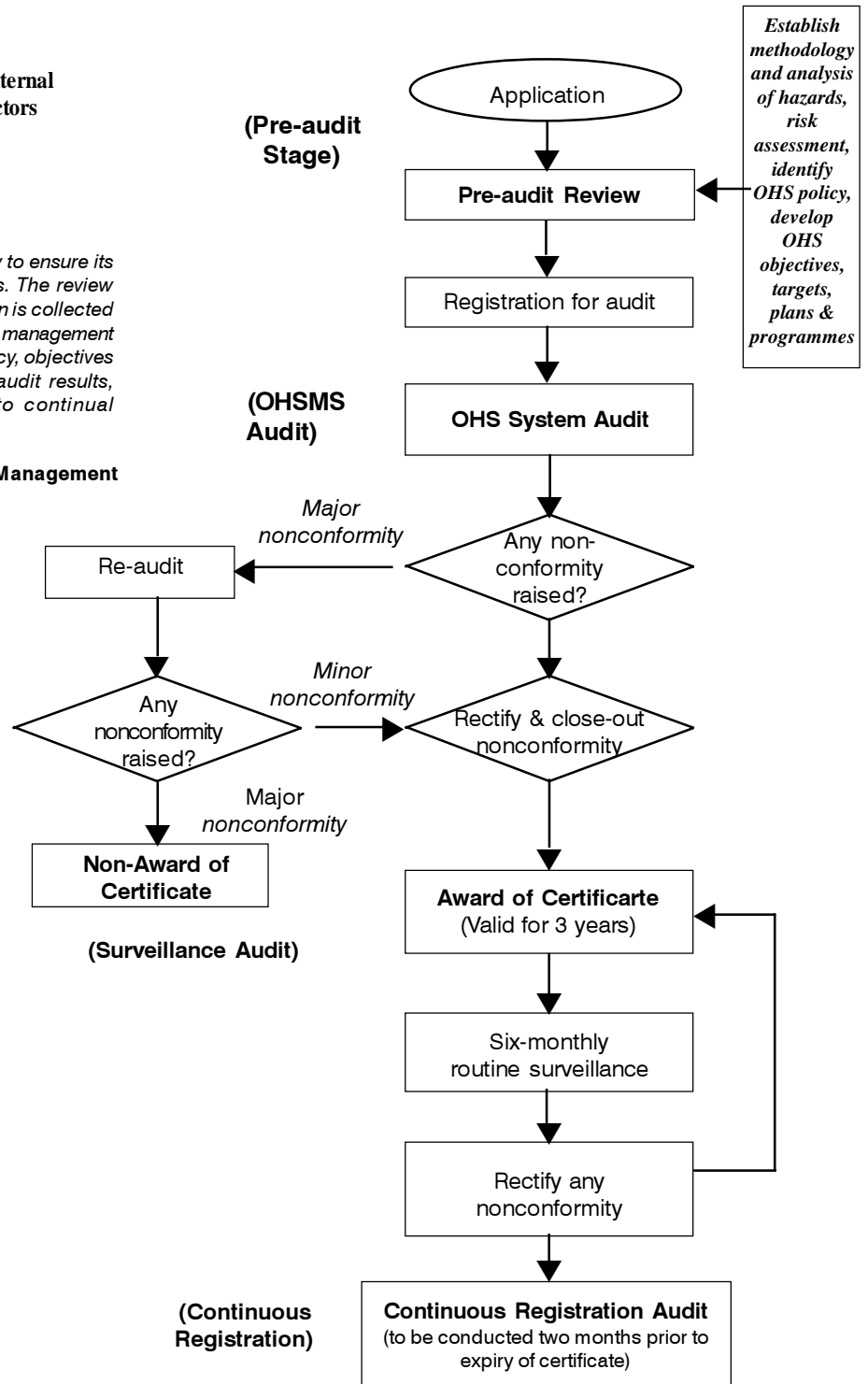


Fig.4. The OHSAS 18001 certification process.

requirements. The organization may use combined quality, environment and OHSMS routine surveillance audits to optimize their time and resources. A full reassessment for the renewal of certificate shall be conducted every three years. The certification body shall schedule the reassessment about three months before expiry of the certificate. Upon successful completion of reassessment, the organization will be issued a new certificate valid for a further three years.

The International Labour Organization¹³ brought out a consensus OHSMS model (ILO-OSH: 2001) that reflects the ILO values such as tripartism that advances the objectives of labour conventions, eg., the occupational safety and health convention¹⁴, the chemicals convention¹⁵, the occupational health services convention¹⁶, and the prevention of major industrial accidents convention¹⁷. The ILO-OSH model addresses developing national guidelines, including tailored OHSMS for small and medium-sized organizations (Fig.5)¹³. It may be noted that the ILO-OSH model is referred to as the Occupational Safety and Health Management System (OSH-MS). However, in this write-up, it has been referred

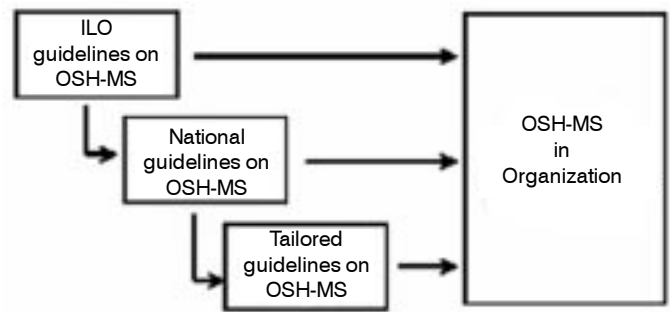


Fig.5. International Labour Organization OHSMS (ILO-OSH) national framework for OSH management system.

to as OHSMS. A total of 16 fundamental elements of the ILO-OSH model (Fig. 6) formed the basis for continual improvement in ensuring protection and well being of workers. Apart from its unique focus in developing national guidelines, the contents and elements of the ILO-OSH model resemble the BS 8800/OHSAS 18001 framework^{4,11}. However, the distinction may be noted that the ILO-OSH addresses developing national guidelines for implementing an OHSMS, and the model is not intended for certification purposes.

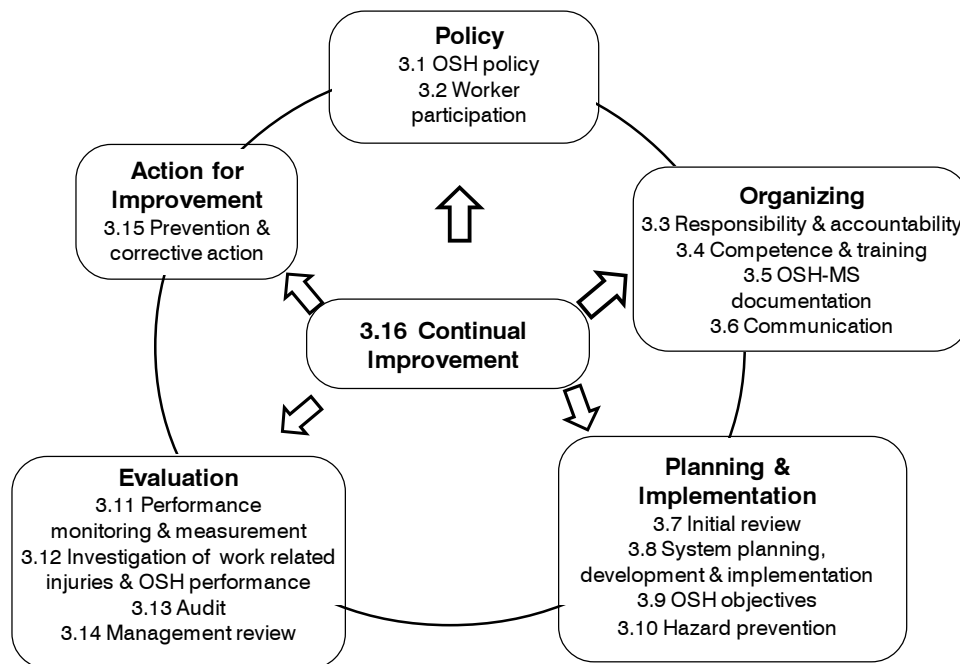


Fig.6. Elements of the ILO-OSH guidelines on OSH management System.

OHSMS Documentation

The industrial managements have been advised to implement OHSMS for the systematic identification, evaluation, and prevention or control of general workplace hazards, specific job hazards, and potential hazards. As the size of a worksite or the complexity of a hazardous operation increases, the need for written guidance increases to ensure clear communication of policies and priorities as well as a consistent and fair application of guidelines and instructions. Since the basic premises of most of the OHSMS frameworks, eg., BS 8800, AIHA, OHSAS 18001, ILO-OSH, are built upon the voluntary approach, these do not set any rigid technical requirements and prescriptive implementation regimen. The organizations may develop flexible strategies within their unique operating environments. The objective is to bring an orderly arrangement of interdependent activities and procedures that define the processes, resulting in an organization's OHS performance. As a general rule, the OHSMS documentation might be followed aligning the ISO 9000 and ISO 14000 systems²⁻³, with three levels of documentation in a pyramidal structure.

- The top level is the OHSMS Manual, referring to the policies of OHS management.
- The second level is made up of the standard operating procedures (SOPs) — task procedures, health and safety procedures, and specific instructions to the processes and products.
- The third level is referred to as forms and format that essentially mean the documented evidence of OHS performance (records and data).

The OHSMS documentation depends on the structure of the OHSMS model adopted. Importantly, it must outline the scope of the management system applicable to the organization. It may be noted that the OHSMS guidelines are applicable to OHS issues, rather than product and services safety. The organizations opting to adopt ANSI accredited AIHA, OSHA programme or ILO-OSH framework may consult documentation details given by Nag¹⁸. Brief descriptions of the element-wise documentation requirements under the BS 8800 and OHSAS 18001 specifications are given as under (refer Fig. 3a to e also). However, the extent

of the application varies with the OHS policy of the organization, the nature of its activities and the risks and complexity of its operations.

Occupational Health and Safety Policy

The OHS policy is the basis for developing, implementing and improving an organization's OHSMS. A documented policy statement that gives an overall sense of direction and sets the principles of action for an organization should be produced and authorized by the organization's top management. It sets OHS objectives for OHS responsibility, performance and continual improvement throughout the organization. The policy reflects the formal commitment of the top management towards good OHS practices and management.

Planning

Planning for hazard identification, risk assessment and risk control

The organizations should have a total appreciation of all significant OHS hazards in its domain, after using the processes of hazard identification, risk assessment and risk control. The documented procedure(s) should be established and maintained for:

- (i) identification of hazards, and determination of the level of the risks associated with the identified hazards;
- (ii) description of, or reference to, the measures to monitor and control the risks, particularly those are not tolerable;
- (iii) where appropriate, the OHS objectives and actions to reduce identified risks, and any follow-up activities to monitor progress in their reduction;
- (iv) identification of the competency and training requirements to implement the control measures;
- (v) necessary control measures as part of the operational control; and
- (vi) records generated by each of the documented procedures.

Legal and other requirements

The organization needs to be aware of how its activities are affected by applicable legal and other requirements, and to communicate this information to relevant personnel. The organization must have procedures for:

- (i) identifying and accessing information, and identifying which requirements apply and where; and
- (ii) monitoring the implementation of controls consequent to changes in OHS legislation.

OHS objectives

The organization shall develop and document OHS goals and objectives, in consistent with the OHS policy. The goals and objectives shall be periodically reviewed and communicated to employees and other stakeholders. The intent of OHS goals and objectives is to meet OHS performance expectations, and therefore these must be measurable for each function in the organization viz. (i) reduction of risk levels; (ii) introduction of additional features into the OHSMS; (iii) steps taken to improve existing features, or the consistency of their application; and (iv) elimination or the reduction in frequency of undesired incident(s).

OHS management programme(s)

The organization shall have a documented OHS management programme (strategies and plans of actions) to achieve its policy and objectives. The programme should identify and allocate responsibility and authority to deliver the OHS objectives (at each relevant level). It should identify the tasks to be implemented, allocate time-scales to meet the related objectives, and provide for the allocation of resources (eg. financial, human, equipment, logistics) to each task. Where significant alterations or modifications in working practices, processes, equipment or material are expected, the programme should provide for new hazard identification and risk assessment exercises.

Implementation and operation*Structure and responsibilities*

The organizations shall define the responsibility, authority, and relationship of personnel who manage, identify, evaluate and control OHS hazards. An

organization having multiple departments of OHS functions (eg., budget, health and safety committee, medical services, emergency preparedness, training and awareness) should define the authority and responsibility of each function and describe how each relates with the other. The executive ownership and accountability of OHS performance is a critical feature, where the designee of the management is held directly accountable for each aspect of the OHS programme, eg., anticipation, recognition, evaluation, and control of OHS hazards. The role and responsibilities shall be documented in manuals/procedures/training packages, including the process to communicate roles and responsibilities to all employees and other relevant parties.

Training, awareness and competence

Organizations should have effective procedures for ensuring the competence of personnel to carry out their designated functions. The documentation may include:

- Competency requirements for individual roles;
- Analysis of training needs, training programmes for individual employees, including the range of training courses/products available for use within the organization; and
- Training records, and records of evaluation of the effectiveness of training.

Consultation and communication

The organizations should encourage participation in good OHS practices, and support for its OHS policy and objectives, from all those affected by its operations, by a process of consultation and communication. Such as:

- Formal management and employee consultations through OHS councils and similar bodies;
- Employee involvement in hazard identification, risk assessment and risk control;
- Initiatives to encourage employee OHS consultations, review and improvement activities in the workplace, and feedback to management on OHS issues;
- Employee OHS representatives with defined roles and communication mechanisms with management, including, for example, involvement in accident and incident investigation, site inspection, etc.;

- OHS briefings for employees and other interested parties, *eg.* contractors or visitors; and
- Notice boards containing OHS performance data, newsletter, poster, *etc.*

Documentation

The organization should maintain up-to-date documentation to ensure that its OHSMS can be adequately understood, and effectively and efficiently operated. This may include: (i) OHSMS documentation; overview document or manual; (ii) document registers, master lists or indexes; and (iii) procedures and work instructions.

Document and data control

All documents and data critical to the operation of the OHSMS and the performance of the organization's OHS activities should be identified and controlled. The written procedures should define the controls for the identification, approval, issue and removal of OHS documentation, together with the control of OHS data. Typically, it should include: (i) document control procedure, including assigned responsibilities and authorities; (ii) document master lists or indexes, and list of controlled documentation and its location; and (iii) archive records (some of which may need to be held in accordance with legal or other time requirements).

Operational control

The organization should establish procedures to control its identified risks (including those introduced by contractors or visitors), documenting these in instances where a failure to do so could lead to incidents, accidents or other deviations from the OHS policy and objectives. The risk control procedures should be reviewed periodically, for its suitability and effectiveness. The examples of areas in which risks typically arise, and the control measures against them are:

- (i) Purchase or transfer of goods and services and use of external resources –
- Approval to purchase or transfer hazardous chemicals, materials and substances;
- Availability of documentation for the safe handling of machinery, equipment, materials, chemicals at time of purchase, or the need to obtain such documentation;

- Periodic evaluation/re-evaluation of the OHS competence of contractors; and
- Approval of the design of OHS provisions for new plant or equipment.

(ii) Hazardous tasks –

- Identification of hazardous tasks;
- Pre-determination and approval of working methods;
- Pre-qualification of personnel for hazardous tasks; and
- Permit-to-work systems to control the entry and exit of personnel to hazardous work sites.

(iii) Hazardous materials –

- Identification of inventories, and storage locations;
- Safe storage provisions and control of access; and
- Provision and access to MSDS and other relevant information.

(iv) Maintenance of safe plant and equipment –

- Provision, control and maintenance of the organization's plant and equipment;
- Provision, control and maintenance of PPE;
- Segregation and control of access;
- Inspection and testing of OHS related equipments and high integrity systems;
- Operator protection systems, guarding and physical protection, shutdown systems, *etc.*
- Fire detection and suppression equipment;
- Handling equipment (cranes, forklifts, hoists and other lifting devices);
- Radiological sources and safeguards, and essential monitoring devices; and
- Local exhaust ventilation systems, medical facilities and provisions.

Emergency preparedness and response

The organization should actively assess potential accident and emergency response needs, develop plans, procedures and processes to cope with them, test its

planned responses, and seek to improve the effectiveness of its responses. This may include (i) identification of potential accidents and emergencies; (ii) identification of the persons to take charge during the emergency; (iii) details of actions to be taken by personnel during an emergency; (iv) responsibility, authority and duties of personnel with specific roles (eg. fire-fighters, first-aid staff, nuclear leak/toxic spillage specialists); (v) documented emergency plans and procedures, including evacuation procedures; (vi) identification and location of hazardous materials, and emergency action required; (vii) interface with external emergency services; (viii) communication with statutory bodies, neighbours and the public; (ix) protection of vital records and equipment; (x) availability of necessary information during the emergency, eg., plant layout drawings; (xi) hazardous material data, procedures, work instructions and contact telephone numbers; (xii) emergency equipment list (alarm systems, emergency lighting and power, means of escape, safe refuges, critical isolation valves, switches and cut-outs, fire-fighting equipments, first aid equipments, emergency showers, eye wash stations, etc.); (xiii) test records for emergency equipments; and (xiv) records of the practice drills, reviews of practice drills, recommended actions arising from the reviews, and progress against the recommended actions.

Checking and corrective action

Performance measurement and monitoring

The organization should identify key performance parameters for its OHS performance. These should include, but not be limited to, parameters that determine whether:

- OHS policy and objectives are being achieved;
- Risk controls have been implemented and are effective;
- Lessons have been learnt from OHSMS failures, including hazardous events (accidents, near misses and illness cases);
- Awareness, training, communication and consultation programmes for employees and interested parties are effective;
- Information that can be used to review and/or improve OHSMS is being produced and used, etc.

The documentation may include:

- Procedure(s) for monitoring and measuring;
- The critical equipment lists and also the equipment inspection checklists;
- Workplace conditions standards, and inspection schedules and checklists;
- Measuring equipment lists, and measurement procedures;
- Calibration scheme, calibration records, maintenance activities and results;
- Completed checklists and OHSMS audit outputs;
- Non-conformance reports; and
- Evidence of the results of implementing the procedure(s).

Accidents, incidents, non-conformances, corrective and preventive action

The organization should have effective procedures for reporting and evaluating/investigating accidents, incidents and non-conformances. The prime purpose of the procedure(s) is to prevent further occurrence of the situation by identifying and dealing with the root cause(s). Furthermore, the procedures should enable the detection, analysis and elimination of potential causes of nonconformities. Progress in the completion of corrective and preventive actions should be monitored, and the effectiveness of such actions reviewed. The documentation may include (i) accident and non-conformance procedure; (ii) non-conformance register and reports; (iii) investigation reports, including updated hazard identification, risk assessment and risk control reports; (iv) management review input; and (v) evidence of evaluations of the effectiveness of corrective and preventive actions taken.

Records and records management

The records should be kept to demonstrate that the OHSMS operates effectively, and that processes have been carried out under safe conditions. The OHS records that document the management system and conformance to the requirements should be prepared, maintained, legible, and adequately identified.

OHSMS Audit

The OHSMS auditing is a process whereby organizations can review and continuously evaluate the effectiveness of their OHSMS. An internal audit programme should be established to allow reviewing its own conformity to OHSAS 18001. Planned OHSMS audits should be carried out by personnel from within the organization and/or by external personnel selected by the organization, to establish the degree of conformity to the documented OHS procedures, and to assess whether or not the system is effective in meeting the OHS objectives of the organization. In either case, the personnel undertaking the audits should be in a position to do so impartially and objectively. The documentation may include:

- OHSMS audit plan/programme and procedures;
- OHSMS audit reports, including non-conformance reports, recommendations and corrective action requests;
- Signed-off/closed-out non-conformance reports; and
- Evidence of the reporting of the results of OHSMS audits to top management.

Management review

The top management should review the operations of the OHSMS to assess whether it is being fully implemented and remains suitable for achieving the organization's stated OHS policy and objectives. The review should also consider whether the OHS policy continues to be appropriate, and whether changes are needed to any elements of the OHSMS. The documentation may include:

- Minutes of the review;
- Revisions to the OHS policy and objectives;
- Specific corrective/improvement actions, with assigned responsibilities and target dates for completion;
- Review of corrective action; and
- Areas of emphasis to be reflected in the planning of future internal OHSMS audits.

Global Acceptance of OHSMS

The OHSMS provides a foundation for an organization to implement a documented approach to continually improve its OHS performance. There has been unanimity that the OHSMS objectives carry positive values in the economic equations – safety, health and environmental issues are integral elements of other priorities such as employment, industrial relations and enterprise development¹⁹. The information available from different countries (Table) shows the national developments of OHS programmes, harmonizing with the international standards and guidelines. The national and enterprise level approaches may be seen under the following broad outlines:

- Mandatory OHSMS with regulatory and advisory measures;
- Nationally applicable voluntary OHSMS standards with certification support;
- Promotion of national OHSMS models through a statutory body; and
- Promotion of self-regulatory OHS management.

The countries like Hong Kong, Indonesia and Singapore favoured the first approach in which the emphasis is placed on mandatory OHSMS in combination with regulatory and advisory measures. Indonesia and Singapore are unique in making OHSMS mandatory in specified undertakings. The second approach is based on nationally applicable OHSMS standards with certification support. This is taken in Australia and New Zealand, China and Thailand. In Australia, the implementation of OHSMS measures is regulated by state-level legislation, and the governments of Australia and New Zealand have a joint agreement in establishing mechanism for OHSMS certification. The third approach concerns the promotion of national OHSMS models through statutory bodies. Within the provisions of OHS law, this third approach is taken by Japan and Korea to promote OHSMS on voluntary basis. While in Japan, there is no officially approved certification system, the republic of Korea supports programme in line with OHSAS 18001. The fourth approach, taken by India and Malaysia as well as by some other countries in the region, concerns the promotion of enabling steps toward improved OSH management. The statutory standards given in the Indian Factories Act (1948)²⁷

Table : Regulations, standards and guidance documents on occupational safety and health management systems.

Country	Standards, guidelines and certification systems
Australia/ New Zealand ²⁰	Issued by Standards Australia and Standards New Zealand — AS/NZS 4801, 4804:1997 on OHSMS general guidelines on principles, systems and supporting techniques. Other voluntary standards are also applied. Within the national OHS improvement framework, most states and territories of Australia develop OHSMS model or guidance. The Joint Accreditation System of Australia and New Zealand (JAS-ANZ) controls certification.
Australia, Victoria ²¹	Issued by Health and Safety Organization (HSO), Victoria, widely referred to as Safety Management Achievement Programme (SafetyMAP).
Brazil ²²	Ministry of Labor guidelines, NR-9 (PPRA) — Environmental Risk Prevention Programme.
China ²³	The State Administration of Work Safety issued (December 2001) the national OHS management system guidelines, based on the ILO-OSH (2001). The OHSMS guidance committee of the State Commission of Economy and Trade Trial Standards develops national guidelines, and the accreditation organizations and auditors are certified by the guidance committee.
European Union ²⁴	The Council of the European Communities Regulation 1836/93 — Community Eco-Management and Audit Scheme (EMAS).
Hong Kong ²⁵	Occupational Safety and Health Council as a statutory body is responsible for safety audit schemes in selected industries and auditor accreditation. OHSMS models also include do-it-yourself kit for small and medium-sized enterprises.
Indonesia ²⁶	The ministry regulation (PER. 05/MEN/1996) directs the implementation of OHSMS including audit for enterprises with 100 or more workers or high workplace risk. The ministry issues certificates to industries, recommended by an independent audit body.
India ²⁷	The Factories Act includes directions and procedures in respect of industrial installations, work environment and occupational health and safety guidelines. Refer to rule provisions (41A to 41H) — industrial site appraisal, compulsory disclosure, hazardous process, emergency standards, exposure of chemical and toxic substances, workers' participation in safety management, etc. The provisions (85 to 91A) cover dangerous operations, accidents, work-related diseases, safety and occupational health surveys. Three schedules include the list of 20 industries involving hazardous processes, the permissible levels of certain chemical substances in work environment, and the list of 29 notifiable diseases. However, the OHSAS 18001/ILO-OSH 2001 and other models bring voluntary approach to OHSMS. The structured systems approach has primarily been motivated by the ISO management systems, obviating the commands and controls.
International ²⁸	Oil Industry International Exploration and Production Forum (E&P Forum) Report No. 6.36/210 — Guidelines for the Development and Application of Health, Safety and Environmental Management Systems.
International ²⁹	ISO – TC 67, Subcommittee 6, Workgroup 1, ISO/WD 14690, N46 rev.2; Petroleum and natural gas industries – Health, Safety and Environmental Management Systems.
Ireland ³⁰	Issued by the National Standards Authority of Ireland. Draft standard for code of practice for an occupational health and safety (OH&S) management system.
Jamaica ³¹	Jamaica Bureau of Standards (Draft OH&S 1/2) — Guidelines for occupational health and safety management systems provides general guidelines on principles, systems and supporting techniques.
Japan ^{25,32}	The ministerial ordinance (March, 1997) on OHSMS guidance by the Japan Industrial Safety and Health Association (JISHA) and other industrial organizations. JISHA provides guidelines of OHSMS and operates

Country	Standards, guidelines and certification systems
	OHSMS promotional programmes. No official certification of OHSMS and only certifies those who are trained in OHSMS.
Korea ³³	Ministry of Labor, Republic of Korea, Industrial Safety and Health Act, Chapter II - Safety and Health Management Systems (1998). The Korea Occupational Safety and Health Agency (KOSHA 2000) issues guidelines and certification.
The Netherlands ³⁴	Nederlands Normalisatie-Instituut, NPR 5001; Dutch Technical Report — Guide to an occupational health and safety management system.
Malaysia ³⁵	Occupational Safety and Health Act 1994 includes OHSMS elements for self-regulation of OHS programmes, in addition to certification of OHSAS 18001 by a private Programme.
Norway ³⁶	Norges Standardisingsforbund 96/402803, August 1996; Management principles for enhancing quality of products and services, occupational health, safety, and the environment.
Poland ³⁷	Labour Inspector; Worker Protection Programme PL 9407, Nov 1996; Safety and health management in SME's, that describes the best EU practices regarding safety and health management in small and medium enterprises (SME's).
Singapore ²⁵	Factories regulations and mandatory implementation of OHSMS in shipyards, specified construction worksites and three classes of factories in the manufacturing sector. No mandatory certification, ministerial audit and accreditation guidelines.
South Africa ³⁸	Reg. No. 51/0001/08. HB 0.0050E; The National Occupational Safety Association (NOSA 5 Star) Safety & Health Management System. 1998.
Spain ³⁹	Asociacion Espanola de Normalizacion y Certificacion, UNE 81900, Dec 1996; Prevention of occupational risks – general rules for implementation of an occupational safety and health management system.
Thailand ⁴⁰	The Ministry of Labour and Social Welfare and the Ministry of Industry cooperated in setting up the Thai Industrial Standards on Occupational Health and Safety Management System (TIS 18000); The Thai Industrial Standards Institute (TISI) provides general rules on certification.
UK ^{4,41}	<ul style="list-style-type: none"> • British Standards Institution — BS 8800:1996; Occupational health and safety management systems⁴. • Chemical Industries Association, 1998 — Responsible Care Management System⁴¹.
USA ^{6-7,10,42-43}	<ul style="list-style-type: none"> • American Industrial Hygiene Association (AIHA) OHSMS 96/3/26, released occupational health and safety management system guidance document¹⁰. • Chemical Manufacturers Association, Employee Health and Safety Code — Responsible Care: A resource guide for the employee health and safety code of management practice⁴². • Occupational Safety and Health Administration (OSHA), Federal Register, 12/4/1988; Voluntary Protection Programmes (VPP) to approve worksites with exemplary safety and health management programmes⁶. • Occupational Safety and Health Administration (OSHA), Federal Register 1910.700; Draft proposed safety and health programme standard⁷. • Department of Labour and Industrial Relations - California State; Cal OSHA Title 12, Subtitle 8, Part 2, Chapter 60-2; General safety and health requirements: safety and health programmes⁴³.

and the model rules framed thereunder, and Dock Workers' Safety and Health Regulation, and other related legislation, such as the Environment (Protection) Act⁴⁴ have jurisdiction referring to compliance of OHS guidelines. The enabling nature of legislation with the multiple provisions of OHS facilitates the government action, in addition to supporting self-regulation in OHS management. In spite of the multiple approaches, there is a general agreement on the key OHSMS elements and support of the models to the current national policies. One of the core elements in the models is related to the compliance to legislative provisions and national level guidelines. Therefore, the enabling nature of the national legislation compatible with the generic elements of OHSMS, has the potential in establishing self-correcting management systems that overcome the limitations of the command and control. For example, in the OHS provisions the Indian Factories Act does not require the organizations to set OHS goals and objectives, and this can be a critical issue in promoting OHS.

Many of the national OHSMS systems have not been developed with the certification component in mind; however, the types of certification support differ across the nations. In Australia and New Zealand, OHSMS based on AS/NZS 4801 and also OHSAS 18001 have been widely adopted with the support of the governments. China has promulgated OHSMS standards based on the ILO-OSH model, and the national guidance committee regulates the auditor registration as well as the accreditation and certification work. In Thailand, the Thai Industrial Standard series on OHSMS (TIS 18000) has been launched since 1999. In India, many enterprises have been certified to OHSAS 18001 and other systems. There are several examples that the Indian enterprises have been certified under the Joint Australia/New Zealand (JAS/ANZ) guidelines.

Contexts in India

Up to December 2002, nearly 8110 management systems conforming to ISO 9000 (quality) and ISO 14000 (environment) standards have been implemented by organizations and certified in India, *ie.*, about 30% more than the total number of certification issued till December 2001. The number of enterprises certified to the ISO management systems is only about 5% of the total number of registered enterprises in India, which leaves a large scope for systematic development of the management

systems. Many enterprises have their OHSMS implemented; however, no official estimate is available of the number of certification in OHSAS 18001 and other internationally recognized systems. Irrespective of whether an organization decides to adopt OHSAS 18001, ILO-OSH or other systems, the organization that is certified to process based model of ISO 9001:2000 (quality management system)² has already in place the framework to integrate quality, environment, health and safety, and other management systems. The goal is to establish cost-effective operational structures for streamlined and synergistic delivery of OHS services, within the scope of the quality and business plan of the organization. The relative effectiveness of an OHSMS model, to a large extent, depends on its compatibility with other systems in practice, however, the ILO-OSH model has a weak link, since it does not specifically refer to certification issues and leaves flexibility in this respect.

In the country like India, the large workforce has been employed in diverse settings. Today we have about 360 million workforce of which about 120 million are in the industrial sector. The organized sector of industries employs less than 30 million workers, and this small segment of work force is generally assured of legally regulated working conditions. Notably, there is no substantive account of the unregistered small industrial units (estimated to be over 3.5 million units) that employ a workforce several times larger than that in the registered enterprises. Also, the occurrence of injury fatalities has been recorded highest in the small enterprises⁴⁵. Due to poor specialization in the performance of management functions in the small enterprises, the tailoring of OHSMS in practice is a critical issue. In view of alarming proportions of injury fatality (19 per 100,000 workers-years) in four categories of Indian industries, such as chemical and dye manufacturing, ship breaking/dismantling and textile, and engineering, there is urgency for situation specific tailoring of the OHSMS so as to make appropriate risk assessment and control in these workplaces. The scope of existing OHSMS models does not exclude small enterprises; however, the structurization of the management system demands a more flexible approach for the small organizations⁴⁶. The absence of long-term links between the employers and the employees (casual and temporary work force) is the obvious bottleneck in evolving useful OHSMS in the small enterprises. For example, the ceramic and pottery, coir, fish processing, beedi making, wool, slate industry, jute and textile workers, including those in trade and commerce are the cases

for systematic study to implement suitable OHSMS model. It may be worthwhile to bring out national OHSMS model in the line of the existing generic framework and develop action-oriented enterprise-level programmes. This may be useful to reexamine the existing national OSH policy frameworks from practical viewpoints including legislation, roles of inspections, and training for employers and workers.

Spread over 640,000 villages, nearly 225 million workforce is dependent on farming, and the OHS services are by and large non-existent in this segment. The farming sector will continue to remain as an implied challenge for effective OHSMS transfer. The training is an open link for success in OHS movement whether it is the small enterprises or the rural farming sector. Conceivably, the small step progress is indispensable, tailoring in the line of ILO-OSH model, and that may be possible by organizational enabling of the local infrastructure, such as block development, rural agricultural extension services, and primary health services, to permeate OHS in the rural sector.

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