

## AMOS - A PRACTICAL APPROACH TO AUDITING SAFETY MANAGEMENT SYSTEMS

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The AMOS (Auditing the Management Of Safety) system is a PC-based package which can be used to audit a Company's Safety Management Systems. The audit uses a series of checklists to cover key areas relating to health and safety management. The information gathered from the audit enables areas of deficiency to be identified, corrective actions to be recommended and action plans to be implemented to rectify these deficiencies.

Key Words: Safety Management Systems, Auditing, Organisation

### INTRODUCTION

The safety culture and Safety Management System of a Company is crucial to its safety performance. However, for many companies it is difficult to assess the current status of its systems and to identify areas where improvement is required. A Safety Management System (SMS) audit is a thorough and systematic method for auditing the systems that are in place, within a Company, to ensure the safety of its personnel, the public and the Company assets. In addition, an SMS audit reviews the occupational health and safety standards that are in place to ensure that they fully satisfy legal requirements and those of the Company's written safety policies, objectives and programmes.

The AMOS (Auditing the Management Of Safety) system developed by EQE International, is a PC-based package which can be used to audit a Company's safety management systems. The key elements of the AMOS auditing system are based on those defined in "Successful Health and Safety", HS(G)65, published by the HSE (1). These key elements are:

- Policy;
- Organising;
- Planning and Implementing;
- Measuring and Reviewing Performance; and
- Auditing.

AMOS comprises of a series of checklists, developed around these key elements, which are used as the basis for structured interviews with key employees within the Company and for reviewing relevant items of documentation. The objectives of these checklists are:

- To establish the current status of the Company's SMS;
- To identify areas where improvement can be made; and,
- To establish a basis for comparison year on year.

This paper discusses the six key areas and presents a selection of typical questions.

## AUDIT SCOPE

The AMOS audit divides the Company's activities into six key areas (referred to as "Modules") related to the management of health and safety within the Company. These are discussed in the following sub-sections along with the objectives of each module and a selection of the questions that are covered by the checklists.

### **Safety Policy and Arrangements**

This module covers each of the elements itemised above and involves a detailed and systematic review of the Company's Health and Safety Policy and the arrangements in place for implementing it. The objectives of this module is to determine if the Company has in place an effective health and safety policy that covers all its operations.

Policy - Has a written Health and Safety Policy Statement has been prepared)? Does the Policy: Commit the Company to high standards of health and safety for employees including contractors, visitors and the general public; Define the responsibilities and accountabilities of all employees, and explain the contribution that employees can make to the objectives laid down in the Policy; Commit the Company to full compliance with all relevant health and safety legislation; Commit the Company to pursuing progressive improvements in health and safety; Make reference to the relative importance of safety compared to other business factors and commit the Company to providing the appropriate funding to achieve these targets?

Has a Safety Plan been developed to ensure that the objectives laid down in the Safety Policy are achieved and does this plan define the management positions responsible for ensuring that the objectives are met?

Has a Safety Manual been produced which makes reference to the general arrangements of the Safety Policy? Does this manual contain, or make reference to, the appropriate procedures for performing all aspects of work and the safety management system including (for example) safe systems of work, emergency procedures, operational procedures, permit to work systems, training, and health and safety welfare?

Organisation - Are the contents of the Safety Policy and Manual disseminated and explained to all personnel including, where appropriate, contractors and visitors? What forums are provided for discussing health and safety matters with personnel?

Is the management structure of the Company defined and is this communicated to all Company employees? Is there a system in place for identifying key safety responsibilities within the management structure and are these positions issued with a Safety Responsibility Statement?

Is there a Company Health and Safety Manager? Is the Health and Safety Manager involved in formulating and developing Company Safety Policies, the long term planning of safety objectives and the monitoring of the Company's safety performance?

Is there a system in place which allows for direct communication between the workforce and the management on safety issues, eg. a Safety Committee?

Have job/skill profiles been developed for all positions against which candidates can be selected? Is the competency of candidates verified and professional qualifications checked?

Planning and Implementation - Are comparisons with the annual targets, as specified in the Safety Plan, made on a regular basis? Are Company personnel made aware of these targets? Are trends used as a basis for demonstrating performance?

Have training syllabi been prepared for each individual job function and is this syllabi reviewed on a regular basis? Is training carried out by suitably qualified personnel, using outside consultants where no suitably qualified personnel exist within the Company? Do the training schemes ensure that appropriate training is

given to personnel who have transferred within the Company? Are arrangements in place to ensure that all new employees receive essential introductory training relative to personal safety? Are training records maintained for all staff and are they set up in a manner such that the need for re-training and, where appropriate, re-certification can be readily identifiable? Does the training system cover contractors?

**Auditing and Monitoring** - Is there a written schedule for planned, regular inspections? Does this schedule define the type(s) of audits to be carried out and the frequency with which they should be performed? Have procedures been developed which prescribe the methods by which these audits should be carried out? Are audit teams chosen to ensure that a thorough, un-biased audit is performed? Are contractor's activities subject to audits? Are audit recommendations/actions prioritised? Are recommendations assigned a target date and the outcome of these actions reviewed?

Are there written procedures for the reporting of accidents/incidents and are all employees aware of this reporting system? Do these procedures enable the identification of breaches in statutory or Company regulations, previously unidentified hazards and the remedial measures which can be adopted to prevent reoccurrence?

### **Health and Safety Arrangements**

This module reviews the health and safety arrangements that are in place within the Company and includes the identification of hazards arising from the Company's operations. The objective of this module is to determine if the Company has in place an effective means for managing the health and safety of its personnel and for ensuring that it complies with all relevant legislation.

**Occupational Health and Safety** - Are procedures in place for identifying all hazards to health in terms of equipment, substances and processes? Are these assessments carried out at an early stage such that safer, alternative equipment, substances or processes can be substituted? Are procedures in place or assessments carried out to identify hazards from all operating states including start-up, shut-down, and maintenance?

Has an assessment of noise levels, lighting levels, electrical systems and equipment, visual display units and manual handling operations been performed in accordance with the relevant legislation?

Have all the hazardous substances handled/stored on site been identified and staff handling these substances made aware of the dangers? Do monitoring schedules exist for areas where the substances are handled/stored? Is there an associated health care programme in place which covers all personnel at risk?

Is an upto date, documented inventory kept of all substances used and stored on site and does it include details of the hazard classifications of the substances, eg. corrosive, flammable etc.? Are all substances used and stored on site clearly and properly labelled? Have hazard data sheets been prepared for all these substances? Is exposure to these substances minimised and controlled?

Are all potentially hazardous reactions and processes documented? Are all safe operating constraints and limitations documented for all processes and equipment items, eg. pressure and temperature.

Are risk assessments carried out in line with the relevant legislation? Is risk assessment used as an integral part of the risk management of the site or just to satisfy statutory legislation? Is risk assessment used to assess the implications of modifications, maintenance operations and shutdown operations?

### **Documentation**

This module reviews the documentation that is produced and used by the Company. The objective of this module is to determine if the Company ensures that all documentation used in the design and operation of its site is current and that systems are in place to ensure the accuracy and the current status of the documentation.

Documentation, Company Standards, Codes and Regulations - Are formal procedures in place for the production, review and issue of all safety related documentation? Are all safety related documents and records dated, uniquely identified, signed and issued on a controlled basis?

Are copies of all codes and standards, relevant to the design and operation of the Company's site, kept? Is there a system in place for ensuring that revised copies of these documents are obtained when they are published and that personnel using these documents are made aware that an updated version is available?

Is there a system in place for ensuring that the accuracy of as-built drawings are maintained? Are drawings annotated to ensure that electronically produced drawings are not manually modified?

Operating Procedures - Is there a system in place to ensure that operating procedures/instructions are written for every process/plant items for all operating states, eg. commissioning, start-up, shutdown, normal operations, emergency shut-down, etc.? Have operating procedures been developed in line with these requirements? Are critical parameters and tasks highlighted and safety precautions identified? Have operators been adequately trained in the operating procedures?

### **Engineering Controls**

This module reviews the documentation and systems that the Company has in place for designing and specifying plant and equipment. The objective of this module is to determine if the Company ensures that all plant and equipment are designed and maintained in accordance with current Company and legislative requirements.

Design Engineering - Are all personnel involved in design engineering suitably qualified? Are all the relevant Company standards and legislative codes and regulations followed for all new design work and modifications? For engineering work that is put out to contract, are the design engineering controls specified in the contract? Are formal safety reviews undertaken for all new designs and modifications? Is there a system for identifying hazards, not previously identified or mitigated against, during the design/installation stage, prior to start-up?

Materials of Construction - Is there a written procedure covering the purchase and use of materials of construction? When selecting materials of construction are the following taken into consideration: Compatibility with existing materials; Chemicals which may attack or destroy the materials integrity and process parameters eg. pressure and temperature? Are materials quality clauses included as standard in contracts and purchase orders?

Quality Assurance - Is there a written quality assurance plan for the design, construction, build and commissioning of all new plant materials and equipment? Are tests of the materials carried out as standard? Are appropriate checks and inspections made to ensure that the equipment is installed correctly and is consistent with the design specification and manufacturer's instructions? Is the need to acquire spares and replacements, consistent with design criteria, understood and followed by the purchasing authority?

Maintenance Philosophy - Is there a maintenance philosophy which defines the maintenance categories, eg. routine maintenance, emergency maintenance and routine inspection and test? Is there a central register which defines the maintenance regimes for all items of equipment? Have maintenance instructions been produced for all items of equipment and do these procedures identify the necessary safety precautions to be taken during the maintenance operations?

Is there a register of all equipment requiring statutory inspection and maintenance? Are there procedures which detail the steps to be taken if statutory maintenance or inspection is not carried out, eg. if it invalidates an insurance policy?

Have special procedures been developed for non-routine maintenance operations, eg. vessel cleaning or pipeline cleaning? Do these procedures take account of potential hazards that may arise during the operations, purging requirements, sampling requirements and any special tools that may be required?

#### **Estate Management**

This module reviews the systems and procedures in place which cover site security and access and the control of non-Company personnel. The objective of this module is to determine if access to the site and the control of contractors and visitors is adequate, when taking into consideration the Company's operations.

Site Security - Are all plant boundaries clearly defined, fenced and in a good state of repair? Are site security personnel employed and are their responsibilities clearly defined and appropriate training given?

Site Access - Are visitors and contractors registered on arrival and departure from the site and are they closely supervised whilst on the site?

Visitor and Contractor Control - Is there a written procurement policy and procedure for appraising and controlling contractors? Are these contractors assessed to determine their competency? Is a list of approved contractors maintained?

#### **Management of Change**

This module reviews the procedures that are used by the Company for performing modifications to the plant. The objective of this module is to ensure that suitable and appropriate analyses and assessments of the modifications are carried out and the relevant authorities notified.

Modification Procedures - Are all proposed modifications to the operation of a process or item of equipment reviewed by a project review committee or team? Is there a procedure in place for ensuring that all drawings and other items of documentation are updated as a result of the modification?

Analyses - Are hazard analysis techniques used to determine the effect of a modification on the operation of a process or item of equipment? Are pre-commissioning tests carried out, prior to starting up the modified plant or equipment, to ensure that all modified equipment has been correctly installed?

Notification and Implementation - Are the regulatory bodies consulted and notified about proposed modifications prior to fabrication? Are staff retrained in the safety aspects of the modification after it has been commissioned?

### **PROGRAMMING THE AUDIT**

Planning is essential to ensure that the audit is effective both in terms of the information collected and the time taken to collect the information and hold interviews. The typical stages in an audit programme are described below.

Confirming the scope of the audit - The scope should be defined to ensure that all relevant areas of the Company's operations are covered by the audit.

Selection and tailoring of the checklists - The above are typical questions from the standard checklists. Checklists can also be tailored to meet the requirements of a particular industry and the terminology changed to reflect the different technical terms that may be used for various types of procedures. In other cases the safe operation of a facility also depends on complying with other relevant legislation, for example, the storage of pressurised gases. In such cases, additional checklists can be added to cover these areas. The use of a PC-based system enables the existing checklists to be tailored and additional checklists to be prepared quickly and efficiently.

Identifying suitable interviewees and developing a programme for the interviews - A review of all areas of operation within the Company are made. From this review, key positions are identified which will include both management (eg. Engineering Manager, Health and Safety Manager) and the workforce (eg. Safety Representatives and Engineers). Requests are then made to interview the personnel identified from this review and an interview schedule is drawn up.

Conducting the interviews - Interviews of the relevant personnel are carried out. Prior to conducting the individual interviews, a review of each of the questions sets is made to identify the questions relevant to the position of the person to be interviewed. This maximises the time allocated to each interview.

Reviewing Documentation - Key items of documentation are identified and copies of the documents obtained for the purposes of the review. Such documentation typically includes the Safety Policy, Safety Manual, Operating Procedures and other documentation that is safety related or is covered by the ISO 9000 system. The documents are reviewed in turn in order to provide answers to specific questions within the question sets and to gain an overall feel for the way in which documentation is prepared, used and updated.

Assessing the results of the audit - Following completion of the interviews and the reviews of the relevant documentation, the answers to the questions sets are compiled using the information collated. Recommendations for improving the safety management systems can then be made and an action plan formulated to ensure that the recommendations are implemented.

## CONCLUSIONS

The AMOS package is a PC-based system which can be used to audit a Company's SMS. The audit enables the identification of non-compliance with Company Policies, Standards and legislative requirements. The package also enables the identification of areas where further improvements and refinements can be made to the SMS. An action plan can be formulated, based on the recommendations arising from the audit, to rectify these areas of concern.

The advantages of using a PC-based audit system are:

- The question sets are already established, ensuring that areas are not missed during an audit.
- Checklists can be modified as necessary in line with changes in legislation.
- Question sets can be tailored for the particular requirements of a Company.
- Additional checklists can be developed and used to audit against specific items of legislation.
- The results of the audits can be stored to allow comparison year on year.

## REFERENCES

1. HS(G)65 "Successful Health and Safety Management", HSE: Accident Prevention Advisory Unit, HMSO ISBN 0 11 885988 9.