



Integrated Management System

A Quality, Environment & Safety Synergy

By Shibu Davies



Shibu Davies is an electronics and telecommunication engineer. He has wide experience in implementing ISO 9001, ISO 14001 & OHSAS 18001 for various organizations (consist of various sectors like government, oil & gas, engineering, manufacturing, trading ... etc) as a consultant and trainer across the Middle East and India. He is a registered lead auditor for ISO 9001, ISO 14001 and OHSAS 18001.

He has launched many training / workshops in GCC and India. Other areas of his expertise are QA / QC, statistics ... etc.

He is one of the pioneers who have implemented integrated management system in the world.

His work experiences consist of working in manufacturing industry, army, consultancy companies and certification bodies.

This book has been dedicated to my wife Jisha and son Frank

Contact:

Shibu Davies

shibu_davis@hotmail.com



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1. Introduction

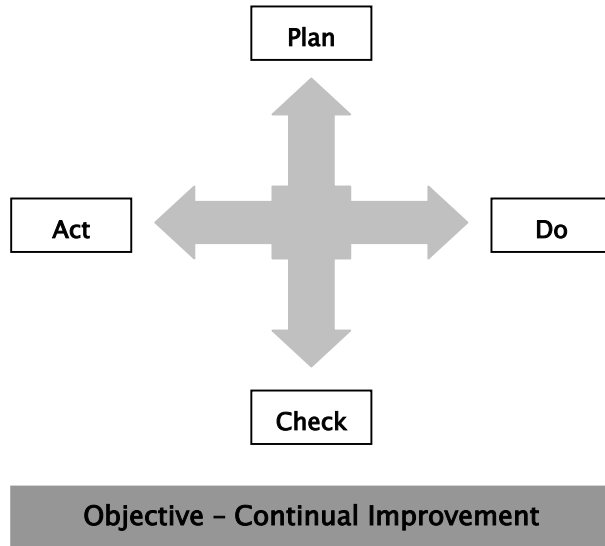
This book is detailing how an integrated management system can be developed covering the requirements for standards ISO 9001:2000 Quality Management System, ISO 14001:2004 Environmental Management System & OHSAS 18001:1999 Occupational Health & Safety Management System.

ISO 9000 series (Quality Management System)

The popularity of management system certification started with ISO 9000 series of standards. ISO 9001/02/03 (presently ISO 9001) was and is the most popular, recognized and accepted standard presently available across the world. ISO 9000 series of standards were initially (1987 version & 1994 version) designed for manufacturing and engineering sector. Later due its benefits, acceptance and recognition all other sectors started to follow this (including financial, trading, educational ... etc). The latest version of ISO 9000 series of standards, which is 2000 version, has been designed such a way that it can be practiced in any sector as an excellent quality management system.

ISO 9000 series of standard has been developed based on the famous PDCA cycle (Plan – Do – Check – Act).

The plan, do, check and act cycle flow can be shows as given the figure below:



This quality management system is based on the following quality management principles:

- Customer focus
- Leadership
- Involvement of people
- Process approach
- System approach
- Continual improvement
- Factual approach to decision making
- Mutually beneficial supplier relationships

Plan – Establish the objectives and processes necessary to deliver results in accordance with customer requirements and organizations policies.



This consist of the following:

- Establishing the policy statement
- Identification and selection of quality needs and expectation
- Identification and selection of resources (5M – man, machine, method, material and money)
- Identification and selection of organizational structure, roles, responsibilities and authorities
- Identification and selection of documentation requirements
- Identification and selection of monitoring and measurement requirements

This can be done through brain storming sessions, group exercise, past performances, bench marking, review of industrial practices, review of product and process requirements, identification of customer needs and expectations ... etc.

Do – Implement the above identified requirements.

This consist of the following:

- Establishing quality objectives
- Developing organization structure
- Defining the roles, responsibilities and authorities
- Defining, documenting and communication the processes and their flow including procedures, guidelines, work instructions, formats ... etc



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- Establishing process, product monitoring and customer satisfaction criteria

All the above should be communicated to the relevant staff according to their involvement. The methodology for communication can be through discussions, trainings, issue of documents ... etc according to the nature.

Check – Monitor and measure processes and product against policies, objectives and requirements for the product and report the result.

At this stage the organization has to monitor and measure the quality management system to see its effectiveness and efficiency. This monitoring and measurement shall look in to effectiveness and / or efficiency (as applicable) of policy, objectives, product conformance, process conformance, non-conformities, customer satisfaction ... etc.

Various methods for that can be internal audit, key performance indicators, management review, customer satisfaction survey, non-conformity analysis, supplier performance analysis, product / service performance analysis ... etc.

The data received from the monitoring and measurement may be analyzed for finding out the trend, effectiveness, efficiency ... etc.

Act – Take actions to continually improve process performance.



The action can be corrective or preventive action according to the outcome of “Check”. This can be taken in the form of:

- Review of policy, objectives, organization structure, roles / responsibilities / authorities, procedures, guidelines, work instructions, formats ... etc
- Training
- Resource management
- Review of monitoring and measurement mechanism

This PDCA cycle will be a living cycle, this should work always as always there is a room for improvement and objective is continual improvement.

The benefits of this quality management system are:

- Coordination
- Consistency
- Effectiveness and efficiency
- Cost minimization
- Continual improvement
- Foundation for quality
- International recognition
- Customer acceptance

ISO 14000 series (Environmental Management System)

This environmental management system was launched in 1996 and since that time it started to pick up the popularity in the market. This standard covers the requirements an organization need to define and implement in order to take care of the



environment. This standard was later revised in 2004, there were only very minor changes.

This standard requires an organization to:

- Establish an appropriate environmental policy
- Identify the environmental aspects arising from past, existing or planned activities, products and services and determine their significance
- Identify the applicable legal and other requirements
- Identify priorities and set appropriate environmental objectives and targets
- Establish programme (s) to implement the policy and achieve the objectives and meet targets
- Facilitate planning, control, monitoring, preventive and corrective actions, auditing and review activities
- Be capable of adapting to changing circumstances

For the aspect identification organization must consider:

- Emission to air
- Emission to water
- Releases to land
- Use of raw materials and natural resources
- Use of energy
- Energy emitted
- Waste and by-products
- Physical attributes



To identify and evaluate the significance of an aspect, the organization must consider all the activities, products and services, such as:

- Design and development
- Manufacturing process
- Packaging and transportation
- Environmental performance and control of contractors and suppliers
- Waste management
- Extraction and distribution of raw materials and natural resources
- Distribution, use and end-of-life of products
- Wildlife and biodiversity

This standard again is developed based on PDCA cycle like ISO 9000 series of standards. The methodology for implementing this system is same as that explained earlier for ISO 9000, only thing here the organization need to cover the environmental requirements (shown above). The same Plan - Do - Check - Act step can followed here.

The benefits of this environmental management system are:

- Compliance to an international recognized environmental management system
- Compliance to legal and other requirements
- Customer's preference
- Contribution to the society (present and future)
- Management commitment
- Continual improvement



OHSAS 18000 series (Occupational Health and Safety Management System)

This occupational health and safety assessment series gives requirements for an occupational health and safety management system to enable an organization to control its occupational health and safety risks and improve its performance in the area of occupational health and safety.

This standard was released in 1999, now this standard is picking up in the market very much.

This standard requires an organization to:

- Establish an appropriate occupational health and safety policy
- Identify the hazards and related risks arising from past, existing or planned activities, products and services and determine the significance
- Identify the applicable legal and other requirements
- Identify priorities and set appropriate occupational health and safety objectives and targets
- Establish programme (s) to implement the policy and achieve the objectives and meet targets
- Facilitate planning, control, monitoring, preventive and corrective actions, auditing and review activities
- Be capable of adapting to changing circumstances

For the hazard and related risk identification organization must consider:



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- Employee
 - Employer
 - Subcontractors
 - Visitors

To identify hazards and related risks and to evaluate the significance, the organization must consider all the activities, products and services.

This standard again is developed based on PDCA cycle like ISO 9000 series of standards. The methodology for implementing this system is same as that explained earlier for ISO 9000, only thing here the organization need to cover the environmental requirements (shown above). The same Plan - Do - Check - Act step can followed here.

The benefits of this occupational health and safety management system are:

- Health and safety of staff, visitor, subcontractor ...etc
- Compliance to an international recognized occupational health and safety management system
- Compliance to legal and other requirements
- Customer's preference
- Management commitment
- Continual improvement
- Reduction in cost

By looking in to the above three standards it is quite clear that even though they are looking in to the different element of



management like quality, environment and safety they have a common approach, lot of similarities ... etc. This makes it easier for integrating all these three standards.



2. Integrated Management System

Integrated means putting all the internal management practices into one system but not as separate components. For these systems to be an integral part of the company's management system there have to be linkages so that the boundaries between processes are seamless.

What is a management system?

A management system is an organized set of elements that serves to achieve one or more goals of the organization. The goal may be to improve the quality, or to minimize losses due to accidents and injuries, or to reduce environmental impacts. A management system channels, organizes and simplifies complexity – it provides order, structure and consistency of purpose.

The power of management system is now broadly recognized and there is a growing trend towards international standards like ISO 9000 series of standards for quality management system, ISO 14000 series of standards for environmental management system and OHSAS 18000 series of standards for occupational health and safety management system.

All the management system has one basic methodology, which is PDCA (Plan – Do – Check –Act).



Plan – Establish the objectives and processes necessary to deliver results in accordance with customer requirements and organizations policies

Do – Implement the processes

Check – Monitor and measure processes and product against policies, objectives and requirements for the product and report the result

Act – Take actions to continually improve process performance

What is integrated management system?

Now it has become that quality, safety and environment are unavoidable elements in any organization. The most popular and accepted management systems for quality, safety and environment are ISO 9001:2000, ISO 14001:2004 & OHSAS 18001:1999.

An integrated management system (IMS) is a management system, which integrates all components of a business into one coherent system so as to enable the achievement of its purpose and mission.

The benefits of an integrated management system are:

- Reduce duplication and therefore costs
- Reduce paper work
- User friendly
- Reduce risks and increase profitability
- Balance conflicting objectives
- Eliminate conflicting responsibilities and relationships



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- Diffuse the power system
 - Turn the focus onto business goals
 - Formalize informal systems
 - Harmonize and optimize practices
 - Create consistency
 - Improve communication
 - Facilitate training and development

If you do not apply a proper approach for implementing these three systems in an organization, it can lead to complexity. This complexity can be poor quality, accidents / incidents, unfriendliness, unnecessary paper works, poor efficiency, confusions, duplication of work ... etc.

For something to be integrated it does not just sit next to the other components – it has to be fixed to the others so as to make a whole. Therefore, putting the quality system, the environmental system and safety system into one book of policies and procedures is not integrating management systems. Creating one national standard for management systems is not integration. Buying a software package that handles quality, safety and environmental documentation is not integration. Merging disciplines such as putting the quality manager, safety manager and environmental manager in one department is not integration.

In order to avoid the above, all organization shall manage activities more holistically rather than the traditional approach of peripheral arrangement for each standard – ISO 9001, ISO 14001 & OHSAS 18001.



Coming in to the integration of these three management system, the organization shall consider the following elements:

- Holistic
- Clear
- Simple
- Cost effective
- Effective and efficient

Model

An appropriate model for this integrated management system can be:

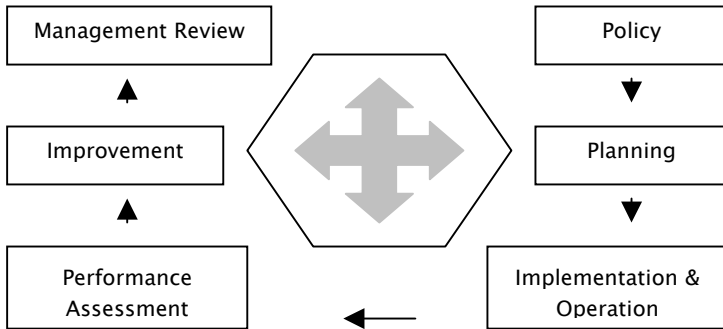
This model has been taken from the ISO Guide 72, this guide is used as an guide for developing any management system by ISO (International Organization for Standardization). Again here it is very clear that this guide is also following the famous PDCA (Plan – Do – Check – Act) principle.

As shown in the above figure, the total management system can be divided in to 6 basic elements as follows:

- Policy
- Planning
- Implementation & operation
- Performance assessment
- Improvement
- Management review



Continual Improvement



Each element can be seen in detail in the following part of this book.

Policy:

This is the prime element of an integrated management system. This is where the organization defines its vision and mission towards quality, environment and occupational health and safety.

While developing this integrated management system policy, the organization needs to consider the following clause of each standard.

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	5.1 & 5.3	4.2	4.2	1. Policy Statement



The top management is responsible for the development of this policy. While developing this top management shall consider the following:

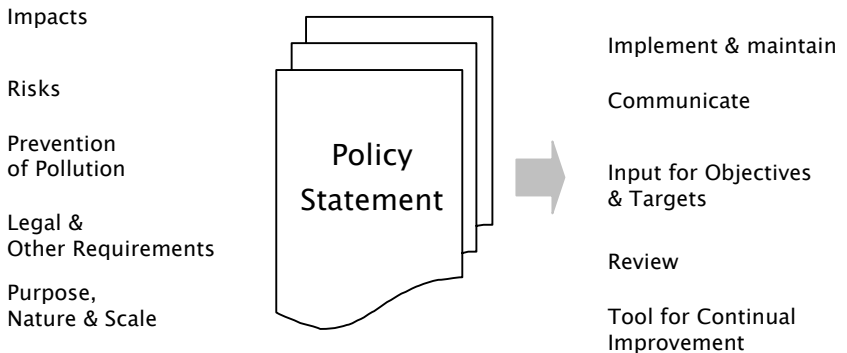
- This should be appropriate to the purpose and nature of the organization
- This should be appropriate to the scale of its activities, products and services
- This should be appropriate to the nature and scale of its environmental impacts and occupational health and safety risks
- This should include a commitment to continually improve the effectiveness of the integrated management system
- This should include a commitment to comply with applicable legal and other requirements
- This should include a commitment to prevent the pollution
- This should provide the framework for setting and reviewing integrated objectives and targets
- This should be documented, implemented and maintained
- This should be communicated to all persons working for and on behalf of the organization
- This should be available to the public

While the preparation of this policy the top management should make sure that this is prepared in a short, simple, clear ... etc way.



Communication of this policy within the organization can be through discussions, trainings, posting in high traffic areas ... etc. Communication to external parties can be through having it in brochures, having it in the web site ... etc.

This policy must be reviewed by the top management as appropriate to ensure the adequacy and suitability, this can be done during the management review meetings.



Policy is usually a short written statement developed in an easy understandable language. This should be developed by the top management, this top management could be Managing Director, General Manager, Department Heads, Management Representatives (quality, environment and health & safety) ... etc according to the nature, size ... etc of the organization.

It is very important to complete the initial review (this is explained in the later session) as this will provide adequate information to the organization regarding its issues, relevance, nature ... etc towards quality, environment and health & safety.



First a draft can be prepared and the top management can review it for its suitability and adequacy, once finalized this can be approved and issued. As stated above this should be communicated to all levels of the organization in a suitable manner.

Level of understanding of this policy at different levels need not be the same, it depends on the position they are working, competency, involvement ... etc. For instance a Department Head is suppose to know the policy in a in-depth manner and a shop floor staff suppose to know the basic content, what is his contribution, where a copy can be accessed ... etc.

As mentioned earlier review of policy at relevant intervals is very critical as it is a living document. Purpose of review is to see whether the organization is working towards that or not, is it still suitable and adequate for the organization, can it be improved ... etc. This is due to the dynamism of every organization, the organization might have changed / added scope of work, might have changed the structure, might have merged with other organization, might have expanded to other locations, might have diversified, legal and regulatory requirements might have changed ... etc.

These reviews can be done during management meetings, management review meetings, board meetings ... etc. Important point is all such reviews should be recorded and changes should be done under the control of documents requirements.

A sample policy could be as follows:



Policy

Planning:

The organization has to plan their integrated management system. The planning may cover identification of quality requirements, significant aspects / impacts, significant hazards / risks, identification of legal and regulatory requirements, setting of objectives / targets / programme (s), development of structure & responsibilities, development of documentation (manual, procedures, work instructions ... etc), emergency preparedness & response ... etc.

This planning stage can be classified as following.

- Identifications of needs, requirements & analysis of critical issues (1)
- Selection of significant issues (2)
- Selection of objectives, targets & programme (s) (3)
- Identification of resources (4)



- Identification of organizational structure, roles, responsibilities and authorities (5)
- Planning of operational processes (6)
- Emergency preparedness & response (7)

Identifications of needs, requirements & analysis of critical issues (1)

The linking of clause of the 3 standard will be as follows:

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	5.2, 5.4.2, 7.2.1 & 7.2.2	4.3.1 & 4.3.2	4.3.1 & 4.3.2	2.1 Identification of needs, requirements & analysis of critical issues

At this stage the organization need to identify organization's requirements towards quality, environment and safety.

- Customer requirements and their expectations related to quality, safety and environment
- Requirements for quality, environmental and safety planning
- Product / service requirements (specified by customer, mandatory requirements ... etc)
- Aspects and hazards
- Legal and other requirements

This can achieved through doing a market research, bench marking, initial quality / environment / safety review, collection



of applicable legal / other requirements, collection of applicable international standards, review of similar practices, review of process, review of past data ... etc.

At the end of this exercise the organization should be in a position to identify all applicable quality, environment and safety issues that are applicable.

Quality	Environment	Safety
Customer requirements Customer expectations Product requirements Statutory requirements Basic requirements	Aspects Legal & other requirements	Hazards Legal & other requirements

The first requirements to be identified are the quality, environment and health & safety related requirements.

Organization needs to identify the quality issues by analyzing the whole processes of the organization, these needs include what processes (including support processes) are required for the effective and efficient operation of the organization. The organization need to identify what are the customer requirements, product requirements, basic requirements, what standards should be followed, what are the applicable legal & other requirements ... etc.

Regarding the environment the organization needs to identify the relevant environmental issues of the organization. This can be done by a initial environmental review. To perform this the



organization need to identify the key and support processes of the organization. Break down each process in to sub process and later to activities. For each activity identify the aspects and the related impact. By doing so the organization will get to know the aspects of the organization.

Regarding the health & safety the organization need to identify the relevant health & safety issues related to the organization. The process remain same as mentioned (can be named initial health & safety review) in the earlier only difference is after the identification of activities the organization need to identify the hazards and related risk related to each hazard.

For the environment and health & safety the organization needs to identify the applicable legal & other requirements.

A simple approach can be as follows:

Process	Sub Process	Activity	Legal or Other Req.	Quality Issue	Aspect	Impact	Hazard	Risk

Selection of significant issues (2)

The linking of clause of the 3 standard will be as follows:

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	5.2, 5.4.2, 7.2.1 & 7.2.2	4.3.1 & 4.3.2	4.3.1 & 4.3.2	2.2 Selection of critical issues to be addressed



At this stage the organization need to select the critical issues related to quality, environment and safety from the above-identified issues. The whole integrated management system will be developed based on these selected critical issues.

The critical issues will be quality parameters, performance requirements, customer needs, mandatory requirements, legal and other requirements, environmental aspects, occupational health and safety hazards, emergency situations (both environmental and occupational health and safety) ... etc.

Environmental aspects are selected based on the occurrence, significance, legal and other requirements, cost implication, time factor, view of interested parties ... etc. This can be done as a part of environmental impact study or initial environmental review.

Occupational health and safety hazards are selected based on the likelihood, severity, legal and other requirements ... etc.

The above has to be carried out by a team consisting of the process owner, environmental expert and safety expert (if required consultant support can be taken). Involvement of process owner is very critical as they know the process more than any one and they are the one who is going to practice it later also.

Selection of quality issues can be done through discussions, references ... etc and this should be recorded.



Process	Sub Process	Activity	Legal or Other Req.	Quality Issue	Significant Issue

For the selection of critical environmental issues the approach can be:

Process	Sub Process	Activity	Legal or Other Req.	Aspect	Impact	Severity	Probability	Significance

For the selection of critical health & safety issues the approach can be:

Process	Sub Process	Activity	Legal or Other Req.	Hazard	Risk	Severity	Probability	Significance

The severity and probability rating can be done numerical or alphabetical or alpha-numerical. This is up to the organization to decide. Decision should ensure that this is based on an accepted practice, customer expectation ... etc.

Significance will be decided by the combination of severity and probability. A matrix can be developed for this purpose.

A sample matrix for risk evaluation can be as follows:



Probability > Severity V	Unlikely	Likely	Very Likely
	No Injury	1	2
Minor	2	3	4
Major	3	4	5

A sample matrix for impact evaluation can be as follows:

Probability > Severity V	Unlikely	Likely	Very Likely
	Nil	1	2
Minor	2	3	4
Major	3	4	5

The control decision based on the above can be taken from the table below:

No.	Control
Trivial (1)	No actions required but documentary records need to be kept.
Tolerable (2)	No additional controls are required. Consideration may be given to the most cost effective solution. Monitoring is required to ensure the controls are maintained.
Moderate (3)	Efforts should be made to reduce the risk / impact. Risk / impact reduction measures should be implemented within a defined time of period. Need for improved control



	measures.
Substantial (4)	Work should not be started until the risk / impact has been reduced. Considerable resources may have to allocated to reduce the risk / impact. Where the risk / impact involves work in progress, urgent action should be taken.
Intolerable (5)	Work should not be started or continued until the risk / impact has been reduced. Work has to remain prohibited.

Setting of objectives, targets & programme (s) (3)

The linking of clause of the 3 standard will be as follows:

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	5.4.1	4.3.3	4.3.3 & 4.3.4	2.3 Setting of objectives and targets

At this stage the organization need to establish the objectives, targets and programme (s) at relevant levels of organization, and this should quality, environment and occupational health and safety.

The objectives should be made “SMART” (S – Specific, M – Measurable, A – Achievable, R – Realistic and T – Time Bound).

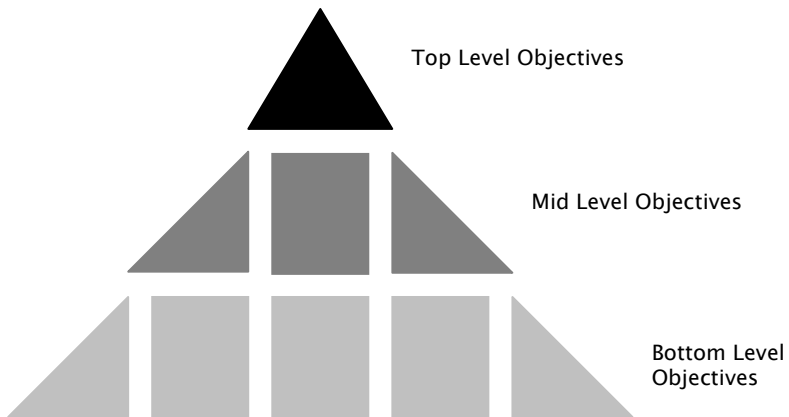
Through setting and achieving objectives the organization is achieving continual improvement.

While setting objectives the organization must first establish the top–level objectives. The input to establish the top–level objectives will be:



- Policy
- Critical quality, environment and occupational health and safety issues
- Legal and other requirements
- Needs and expectation of interested parties (employees, owners, society, customers ... etc)

This top-level objectives later should be divided in to sectional / divisional / departmental / territory ... etc wise objectives according to the relevance. Later even this should be divided in to sub-sectional / sub-divisional ... etc wise objectives. This distribution should be done until it reaches the last level of the organization according to their relevance.



All objectives should have the following:

- Objective
- Sub objectives (if any)



- Steps for the achievement of these objective / sub objectives
- Time frame for the achievement of each step
- Responsibility for the achievement of each step
- Monitoring mechanism

The above elements and mechanism will ensure the compliance and achievement of objectives, targets and programme (s).

These objectives should be communicated to all levels of the organization according to their involvement. These communication can be done through meetings, documentation, distribution, training ... etc.

These objectives should be monitored through out its life to see whether it is going in the right direction, does it need any amendment, does it need further resource support, does it need further attention ... etc.

A sample format can be as follows:

No	Objective	Sub Objective	Responsibility	Time Frame

Identification of resources (4)

The linking of clause of the 3 standard will be as follows:



No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	5.4.2, 6.2.1, 6.3 & 6.4	4.3.3 & 4.4.1	4.3.4 & 4.4.1	2.4 Identification of resources

At this stage the organization need to identify the resources required for the organization for the effective and efficient implementation of the integrated management system.

These resources should cover 4M (man, machine, method & material). While identifying the resources the organization should consider the following:

- Policy
- Objectives, targets and programme (s)
- Critical quality, environment and occupational health and safety issues

The resources should cover human resources, infrastructure, work environment ... etc.

Human resources should cover how many staff required, what should be their competencies, what type of certifications do they need ... etc.

Infrastructure should cover the issues like layout of the plant, machinery requirements, storage facilities, storage conditions, vehicles required, hardware required, software required, transportation requirements ... etc. There is no hard rules applicable here, it will be based on experience, industrial



practices, legal & other requirements, nature of products / services ... etc.

Work environment should cover ergonomics, working conditions (like pressure, temperature ... etc), working timings ... etc. Again this should be identified based on the experience, industrial practices, legal & other requirements, nature of products / services ... etc.

Identification of organizational structure, roles, responsibilities & authorities (5)

The linking of clause of the 3 standard will be as follows:

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	5.5.1, 5.5.2 & 5.5.3	4.4.1	4.4.1	2.5 Identification of organizational structure, roles, responsibilities and authorities

This is a very important stage in the planning as the structure plays a big role. At this stage the organization need to identify the following:

- Organization structure
- Management representative
- Flow of reporting
- Job functions
- Duties and responsibilities ... etc



While doing the above the organization need to consider all quality, environmental and occupational health and safety elements.

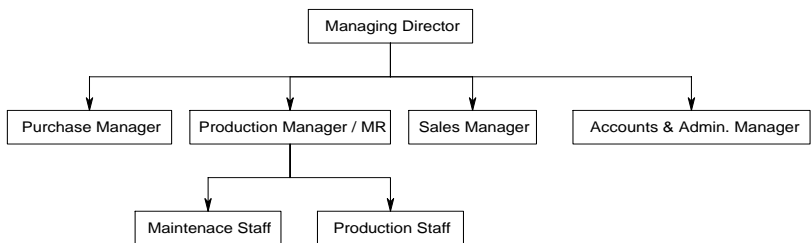
Up to what level or depth it needs to be developed will depend on:

- Nature of organization
- Size of the organization
- Criticality of processes
- Competence of the staff ... etc

Usually the organization will need to identify organization chart, job description, management representative, competency requirements ... etc.

Management representative should be selected from the top management level as this person will need the power to coordinate issues, discuss things with the top management, good knowledge of the organization ... etc. Nothing wrong in having management representative for all 3 systems, or 1 for each system, this is up to the management to take decision.

A sample organization chart can be as follows:





A sample job description can be as follows:

Production Manager
Reporting to:
Key Functions:
Quality Specific:
Environmental Specific:
Health & Safety Specific:
Date: DD/MM/YY
Approved By:

It is very important to identify the functions of each position in relevant to quality, environment and health & safety. It is advisable to identify it by position that name as the person can change but the system should work.

A sample competency matrix can be as follows:

Position	Education	Experience	Skill	Others

Planning of operational processes (6)

The linking of clause of the 3 standard will be as follows:



No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	7.1	4.4.6	4.4.6	2.6 Planning of operational processes

At this stage the organization need to identify what are the various processes required for the organization to meet the:

- Product requirements
- Environmental requirements
- Occupational health and safety requirements

For this the organization needs to identify:

- Quality requirements for the product
- Processes, documents and resources
- Required verification, validation, monitoring, inspection and test activities
- Policies
- Procedures
- Work instructions
- Formats
- Records ... etc

For this it will be better if the organization formulates a team consisting of process owners, quality specialists, environmental specialists, occupational health and safety specialists ... etc. Similar industrial practices, legal and other requirements, international standards ... etc should also be considered at this stage.



Emergency preparedness & response (7)

The linking of clause of the 3 standard will be as follows:

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	8.3	4.4.7	4.4.7	2.7 Emergency preparedness & response

At this stage the organization need to identify:

- What possible non conformities can arise, if so how it should be dealt with
- What are the various emergency situations that can arise in the organization related to the environment and occupational health and safety, is so how these shall be dealt with

While identifying the emergency situations and their controls organization should consider:

- Nature, type and scale of these emergency situations
- Control plan
- Internal and external communication plans
- Minimization plan
- Mitigation and response plan
- Post emergency evaluation and corrective / preventive mechanism
- Training requirements
- Testing mechanism



The emergency situation can be in terms of quality, environment and health & safety. Legal and other requirements has to be considered here very seriously (like civil defence, industrial requirements ... etc).

It is very critical to understand the scale, nature ... etc of these emergency situations as this will be the basis on which the control mechanisms will be developed.

Control mechanism can be in the form of procedures, cooperation with relevant authorities like civil defence, environmental authorities ... etc. It should also consider how to control the situation and how even it can be mitigated from further developments.

Consideration should be given how these situations will be communicated internally (i.e. with the staff, management ... etc) and externally (i.e. with civil defence, environmental authority ... etc).

Trainings can be given by classroom trainings, video presentations, booklets, display boards ... etc.

Testing can be done by simulations, MOK drills ... etc.

Implementation & Operation:

Now the organization has to implement and run the planned integrated management system.



This implementation & operation stage can be classified as following.

- Operational control (1)
- Management of human resources (2)
- Management of other resources (3)
- Documentation and its control (4)
- Communication (5)
- Relationship with suppliers and contractors (6)

Operational control (1)

The linking of clause of the 3 standard will be as follows:

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	7.2 - 7.6	4.4.6	4.4.6	3.1 Operational control

At this stage the organization needs to develop the operational control procedures required for the effective and efficient running of the quality, environmental and occupational health and safety management system.

At this stage the organization will need to identify the various process within the organization and develop procedures for that. While developing these procedures the organization has to ensure that the quality, environment and occupational health and safety elements are integrated in to the process procedures.

This should ensure the following:



-
- Establishing and maintaining key processes and support process to ensure effective and efficient control for quality, environment and occupational health and safety issues
 - Stipulating operating criteria
 - Stipulating required verification, validation, monitoring, inspection and test activities
 - Defining the required to be maintained

These should cover sales and marketing, design and development, purchasing, production and service (planning, production, maintenance, identification and traceability ... etc), control of monitoring and measuring devices, operational control procedures for environment, operational control procedures for occupational health and safety ... etc.

At this stage the organization need to do the process mapping linking all quality, environment and health & safety issues. While doing the process mapping the organization need to identify the key and support processes Key processes are those which play the main role in the running of the organization and the support processes are those which support the key processes for their effective and efficient running.

Widely used and efficient manner of process mapping is by flow chart.

Benefits of flow-charting are:

- Promote process understanding

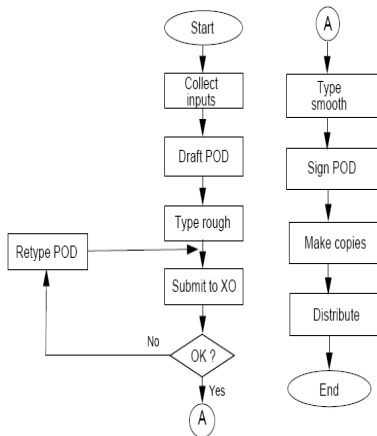


- Provide tool for training
- Identify problem areas and improvement opportunities
- Depict customer-supplier relationships

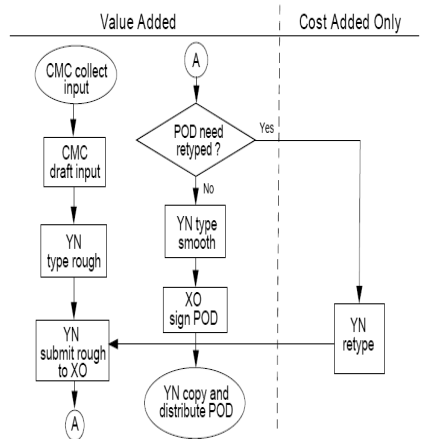
There are various types of flow charts:

- Linear
- Deployment
- Opportunity

Linear Flowchart Example Producing the POD

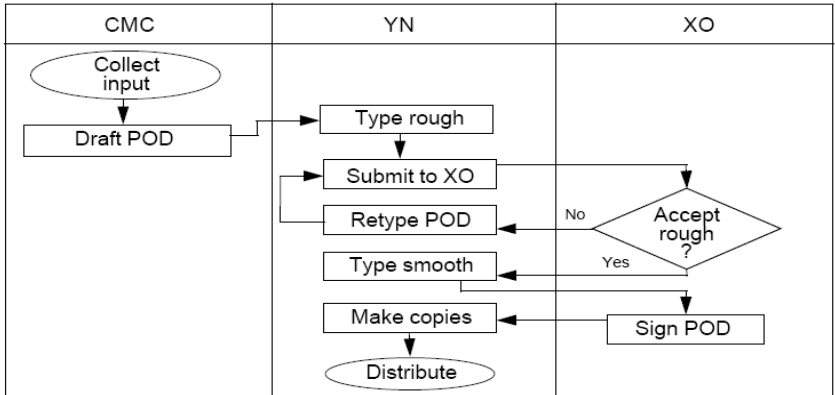


Opportunity Flowchart Example Producing the POD



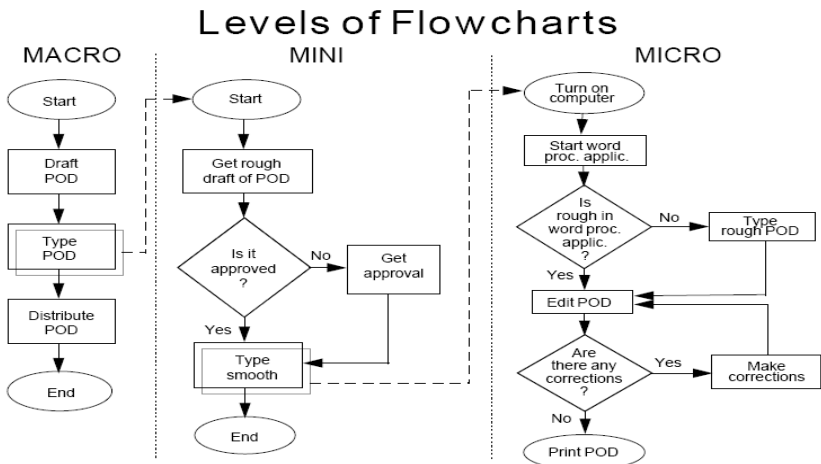


Deployment Flowchart Example Producing the POD



Within each there are different levels of flow charts:

- Micro
- Mini
- Macro





According to the nature of organization, scope, processes, competency of staff ... etc various types of the flow charts can be developed. Once the basic flow charts are developed then the quality, environment and health & safety elements can be integrated in to that.

A sample format can be as follows:

No	Process Flow Chart	Quality Elements	Env. Elements	H & S Elements

Management of human resources (2)

The linking of clause of the 3 standard will be as follows:

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	6.2.2	4.4.2 & 4.4.6	4.4.2 & 4.4.6	3.2 Management of human resources

The organization need to establish human resources based on the identified competence requirements (as stated in the planning stage). These resources should be competent in terms of education, experience, training, skills ... etc. This competency should be for all quality, environment and occupational health and safety issues.



This can be initially established by a competency matrix. While recruiting human resources the established competency requirements can be used as bench mark. Organization need to then evaluate the competence of the human resources in the organization (through appraisal, test ... etc) and if they lack any of the competency requirements then training needs has to be identified and planned to provide. After providing the training organization should evaluate the effectiveness of the training provided. Records of all these should also be maintained.

Organization should also ensure that the personnel are aware of their role in the achievement the objectives, targets and programme (s), procedures, duties / responsibilities / authorities ... etc.

Management of other resources (3)

The linking of clause of the 3 standard will be as follows:

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	6.3 & 6.4	4.4.6	4.4.6	3.3 Management of other resources

At this stage the organization need to establish and maintain the resources like infrastructure, work environment ... etc.

In order to establish and maintain the infrastructure, work environment ... etc the organization need to consider:



- Quality, environmental and occupational health and safety issues
- Industrial practices
- International standards
- Legal and other requirements ... etc

These should cover:

- Building, workplace and associated utilities
- Process equipment (both hardware and software)
- Supporting services
- Lighting, space, temperature, quality of air ... etc

Documentation and its control (4)

The linking of clause of the 3 standard will be as follows:

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	4.2	4.4.4, 4.4.5 & 4.5.4	4.4.4, 4.4.5 & 4.5.3	3.4 Documentation and its control

At this stage the organization need to establish the structure of documentation, control of these documents and control of the relevant records.

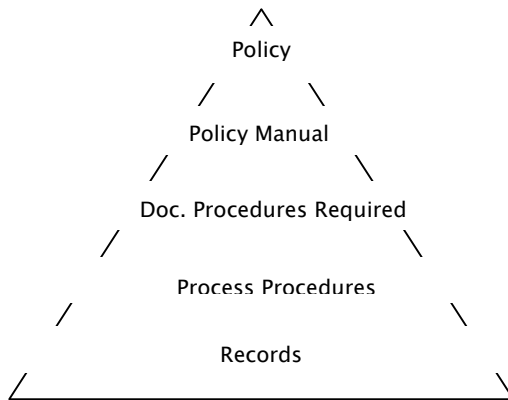
The documentation should consist of:

- Integrated policy statement
- Integrated objectives, targets and programme (s)
- Integrated policy manual



- Documented procedures required by the standard
- Documents (procedures, work instructions, guidelines ... etc) required for the organization for the effective and efficient planning, operation and control of processes
- Records

A typical structure could be:



The extent of documentation will depend upon:

- The size of the organization
- Type of activities, quality issues, aspects and impacts and hazards and risks
- The complexity of processes and their interactions
- The competence of personnel

This documentation can be in any form (statements, flow chart ... etc) or type of media (hard copy, soft copy ... etc).

Organization needs to establish a mechanism for the control of documents and control of records.



Control of documents should consider:

- Approval
- Review
- Document status
- Revision control
- Control of documents of external origin
- Distribution ... etc

Control of records should consider:

- Identification
- Storage
- Protection
- Retrieval
- Retention
- Disposition

The mandatory procedures required by this integrated management system are:

- Control of documents
- Control of records
- Internal audit
- Control of non-conformity, incidents and accidents
- Corrective action
- Preventive action

Communication (5)



The linking of clause of the 3 standard will be as follows:

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	5.5.3	4.4.3	4.4.3	3.5 Communication

Organization needs to establish a good mechanism for internal and external communication.

Methods for internal communication may include regular work group meetings, newsletters, bulletin boards, trainings, posters ... etc. According to the information required to be communicated the organization can use any of these methods.

External communication could be with legal bodies, customers, contractors, other interested parties ... etc. There should be an appropriate method for the receiving, documenting and responding to these types of external communication, the method can depend on the nature of the external communication. These method could be logbook, e-mails, annual report, newsletter, community meeting ... etc.

Relationship with suppliers and contractors (6)

The linking of clause of the 3 standard will be as follows:

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	7.4	4.4.6	4.4.6	3.6 Relationship with suppliers and contractors



Organization needs to establish a mechanism for communicating the requirements for quality, environment and occupational health and safety. These shall include:

- Product specification
- Type and extent of control
- Quality requirements
- Environmental requirements
- Safety requirements

The extent of control an organization will apply over its suppliers or sub contractors will depend on the nature of product / services.

There should be a mechanism for evaluating and re-evaluating suppliers or sub contractors. These evaluation could be done based on quality of product / service, safety and environmental concern, pricing, service performance, history of service ... etc.

All products / services purchased should be verified prior to acceptance, these verifications can be done to ensure quality, environment and occupational health and safety. Various types of acceptance verification can be site inspection / test / audit for quality, safety and environment, inward inspection / test, third party certification, profile ... etc.

Performance Assessment:

Organization has to monitor and measure the integrated management system to see its effectiveness and efficiency. This



monitoring and measurement may look in to policy, objectives / targets / programme (s), product, process, non-conformities ... etc. This may cover quality, safety and environment. Internal audit is also a mode of monitoring and measurement. The data received from the monitoring and measurement may be analyzed for finding out the trend, effectiveness, efficiency ... etc.

This performance assessment stage can be classified as following.

- Monitoring & measurement (1)
- Analyzing and handling non-conformities (2)
- System audits (3)

Monitoring & measurement (1)

The linking of clause of the 3 standard will be as follows:

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	8.2	4.5.1 & 4.5.2	4.5.1	4.1 Monitoring and measurement

At this stage organization requires to establish a mechanism for monitoring and measurement of the product / service, processes, integrated management system, customer satisfaction ... etc.

These monitoring and measurement should cover:



-
- Monitoring and measurement of customer satisfaction
 - Monitoring and measurement of process
 - Monitoring and measurement of product (including services)
 - Monitoring and measurement of integrated management system
 - Compliance to legal and other requirements
 - Monitoring and measurement of environmental and occupational health and safety parameters
 - Monitoring of non-conformities, incidents and accidents

Customer satisfaction has to be monitored and measured to see whether the organization is meeting customer needs and expectations. It is very important to measure customer satisfaction from the point of view of customer as what the organization thinks could be different from what actually customer thinks. Customer satisfaction could be done through feed back questionnaire, meetings, complaints ... etc.

Organization should monitor and measure all processes for its effectiveness and efficiency. What elements should be measured can be decide according to the nature, scale ... etc of the organization.

Products / services should be monitored and measured at all stages of its processing, it could be at inward, in-process and final stages.

There should be a mechanism to monitor and measure the environmental and occupational health and safety parameters, non-conformities, accidents, incidents ... etc. Organizations



compliance to the applicable legal and other requirements should also be monitored and measured.

These monitoring and measurements can be done through:

- Internal audit
- Log books
- Inspection / testing
- Site visits
- Third party inspection / testing / certification
- Reports ... etc

Analyzing and handling non-conformities (2)

The linking of clause of the 3 standard will be as follows:

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	8.3	4.5.3	4.5.2	4.2 Analyzing and handling of non-conformities

At this stage the organization needs to analyze the data, which is collected from the above-mentioned monitoring and measurement. Data should be analyzed to see the compliance, trend, effectiveness, efficiency, supplier performance, capability ... etc.

For the analysis purpose the organization can use various tools like Pareto analysis, fish-bone analysis, scatter diagram ... etc.

System audits (3)



The linking of clause of the 3 standard will be as follows:

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	8.2.2	4.5.5	4.5.4	4.3 Systems audit

Organization needs to establish a system for internal auditing of the integrated management system. Purpose of this is to see the compliance, adequacy and suitability of the integrated management system.

All auditors should be competent and impartial to the activity to be audited. All the auditors have to be trained adequately on all the three management system and the audit can be conducted simultaneously for all the three system, which is the integrated management system. The audits should be planned considering the status and importance of the activities and the results of the previous audit.

All the non-conformities came based on the internal audit should closed out without undue delay.

A sample audit plan can be as follows:

Process	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	...



Non Conformity Report	
Date:	
Audit Team:	
Auditees:	
NCR No.:	No. of Imp. Potentials:
Non Conformity:	
Auditor:	Auditee:
Cause of Non Conformity:	
Auditee:	
Corrective / Preventive Action:	
Closing Date:	Auditee:
Status of Closing:	
Auditor:	Date:

Improvement:

Based on the analysis of data that is received from the monitoring and measurement, the organization may initiate corrective / preventive actions there by achieve the continual improvement.



This improvement stage can be classified as following.

- Corrective action (1)
- Preventive action (2)
- Continual improvement (3)

The linking of clause of the 3 standard will be as follows:

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	8.5.2	4.5.2	4.5.2	5.1 Corrective action
2	8.5.3	4.5.2	4.5.2	5.2 Preventive action
3	5.4.2 & 8.5	-	-	5.3 Continual improvement

Corrective actions are taken when non-conformity has been occurred, this is to ensure that the cause of the problem is identified, corrected and prevented from recurrence. Preventive actions are taken when a potential non-conformity has been identified based on the analysis of data, this is to ensure that the cause of the potential problem is identified and prevented.

Based on the above analysis (as mentioned in the earlier section), the organization need to take appropriate corrective action or preventive action. These corrective action and preventive action mechanism should cover the following elements:



-
- Review of non conformity / potential non conformity
 - Determining the cause
 - Evaluating the action
 - Determining and implementing the action
 - Recording the results of action
 - Reviewing the corrective and preventive action

Through the above corrective and preventive action the organization will achieve continual improvement.

Other ways of achieving the continual improvement will be through the policy, objectives / targets / programme (s), management review ... etc.

The five keys for continual improvement in an organization are:

- Measuring and monitoring
- Internal audit
- Corrective action
- Preventive action
- Management Review

Management Review:

The top management of the organization may monitor the performance of the integrated management system in defined intervals.

The linking of clauses for the three standards can be as follows.



No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	5.6	4.6	4.6	6 Management review

The elements to be reviewed during this review should be:

- Results of audit
- Evaluation of compliance
- Customer feedback
- Communication with external organizations
- Objectives, targets and programme (s)
- Process performance and product conformity
- Status of corrective and preventive action
- Follow-up actions
- Changes that could affect the integrated management system
- Recommendation for improvement

The results of these management reviews should be documented, communicated and implemented.

These management reviews can conduct at various levels according to the involvement of staff.

Management review minutes can be prepared as follows:

Management Review Minutes
Date:



Attendees;

Agenda:

Points Discussed & Actions Planned:

Next management review date:

Date: DD/MM/YY

Prepared By:



3. Table

No	ISO 9001:2000	ISO 14001:2004	OHSAS 18001:1999	Element
1	5.1 & 5.3	4.2	4.2	1. Policy Statement
2	5.2, 5.4.2, 7.2.1 & 7.2.2	4.3.1 & 4.3.2	4.3.1 & 4.3.2	2.1 Identification of needs, requirements & analysis of critical issues
	5.2, 5.4.2, 7.2.1 & 7.2.2	4.3.1 & 4.3.2	4.3.1 & 4.3.2	2.2 Selection of critical issues to be addressed
	5.4.1	4.3.3	4.3.3 & 4.3.4	2.3 Setting of objectives and targets
	5.4.2, 6.2.1, 6.3 & 6.4	4.3.3 & 4.4.1	4.3.4 & 4.4.1	2.4 Identification of resources
	5.5.1, 5.5.2 & 5.5.3	4.4.1	4.4.1	2.5 Identification of organizational structure, roles, responsibilities and authorities
	7.1	4.4.6	4.4.6	2.6 Planning of operational processes
	8.3	4.4.7	4.4.7	2.7 Emergency preparedness & response
3	7.2 – 7.6	4.4.6	4.4.6	3.1 Operational control
	6.2.2	4.4.2 & 4.4.6	4.4.2 & 4.4.6	3.2 Management of human resources
	6.3 & 6.4	4.4.6	4.4.6	3.3 Management of other resources
	4.2	4.4.4, 4.4.5 & 4.5.4	4.4.4, 4.4.5 & 4.5.3	3.4 Documentation and its control



	5.5.3	4.4.3	4.4.3	3.5 Communication
	7.4	4.4.6	4.4.6	3.6 Relationship with suppliers and contractors
4	8.2	4.5.1 & 4.5.2	4.5.1	4.1 Monitoring and measurement
	8.3	4.5.3	4.5.2	4.2 Analyzing and handling of non-conformities
	8.2.2	4.5.5	4.5.4	4.3 Systems audit
5	8.5.2	4.5.2	4.5.2	5.1 Corrective action
	8.5.3	4.5.2	4.5.2	5.2 Preventive action
	5.4.2 & 8.5	-	-	5.3 Continual improvement
6	5.6	4.6	4.6	6 Management review