

Safety, Health & Environment (SHE) Management Guide (2nd Edition)



ECI SHE Management Guide

A construction project management guide
to occupational safety, health and
environmental management

2nd Edition
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Foreword

Society's desire to be protected against any hazard, particularly accidents involving the public - for example a bridge collapsing under operation, a chemical pollution incident or wide-reaching medical errors - often generate scandals and political crises. Accidents during construction operations may be less sensitive to the public, but, in addition to the loss of human lives, they create financial losses and legal cases. Furthermore, quite rightly, today's individuals are tending to take less and less personal risks.

However, we must not forget that this logical evolution can sometimes be excessive. The "Principle de precaution", according to which we don't develop techniques which are not proved safe beyond all doubt, is sometimes stopping the progress at the same time as it can be trying to prevent risks which may not exist. Any risk analysis has to be carefully balanced. The prevention of accidents of any type is not easy, since it is difficult to foresee or imagine all possible mishaps and specifically human errors.

From my personal experience, behind a human error on site leading to an incident, there lies an erection method or technique which has not been perfectly analysed, which has created the possibility of a adverse incident. It is clear that the final and legal responsibility has to be borne by the individual – or the company – who designed the structure, who decided the concept, not by those who have been obliged to work on it once it is completed. Finally, accidents are often related to excessive financial pressure or to the division of the works and responsibilities between many contractors, sub-contractors and suppliers without a competent coordinator.

The European Construction Institute's SHE task force has prepared this new Guide to help all those involved in the design and construction process. Its aim is to limit the risks for safety, health and the environment. Understandably, as it covers many different professions and industries, it is forced to be somewhat generic. But it nevertheless aims to be a guide to develop a risk-prevention philosophy.

A more precise approach can certainly be obtained in each domain or for each application by following this guidance along with an objective analysis of similar accidents and of efficient organisations which have often prevented them, and also by external audits at regular intervals.



Michel Virlogeux FREng (France)
ECI President

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Executive summary

This construction project management guide to an Occupational Safety, Health and Environmental Management (SHE) Model has been produced by the Safety, Health and Environment task force of the European Construction Institute (ECI). It follows international standards such as EN ISO 14001:2004 and EN ISO 9001:2008 and relevant national guidance.

The SHE Management Model provides a goal-setting framework, within which the Project Management Organisation (PMO) can develop detailed policies, standards and procedures and incorporate them within their system. This can be applied from the start to the finish of the project. In addition to a framework, this guide provides exemplars of key procedures and documentation.

The main sections of the guide are: status review; developing: goal setting, planning, organising, implementing and measuring.

The **Status Review** section establishes the current status of the project and its management systems. Each project stakeholder will have their own management systems; however, it is essential that a project-specific management system is agreed by all parties to ensure effectiveness and consistency. Both the initial status review and periodic status reviews are required to develop and maintain management systems that are suitable for the project.

The **Developing** section covers the policies, plans and procedures to achieve the desired objectives. A project policy, endorsed by the project stakeholders must be developed from the Initial Status Review and the corporate policies of the stakeholders. This policy describes the overall aims that have been identified and the commitment to a continual improvement SHE performance approach.

The **Goal Setting** section establishes objectives and measurable performance indicators. Some objectives and indicators will be leading or proactive and others will be lagging or reactive.

Planning for SHE management builds upon the Initial Status Review and continues to reflect the changing hazard and risk profile of all activities as updated through the Periodic Status Reviews. It is a live and fully updated reference and outline plan for the management of all activities appropriate to planning and management. The section covers: hazard / risk assessment and control; the SHE plan; assessing and managing construction risk; constructability reviews; method statements; job safety analyses; environment; and emergency preparedness.

Organising is a key activity building on the Initial Status Review, particularly the resource implications and the identified required arrangements to accomplish the project objectives. The policy and performance indicators are assigned organisationally. Organisation also facilitates the application of the SHE plan principle of right information, right people and right time.

Implementing policies, plans and procedures requires the realisation of the objectives and plan within the project organisation, with appropriate and adequate control. The PMO should execute the SHE plan and related contingency plans: arrange audits and periodic status reviews; motivate all employees; assess, select and control of contractors and subcontractors; provide competent and effective management and supervision; prepare and maintain sufficient documentation; communicate, coordinate and consult.

The **Measuring** section covers the measurement, audit and review of performance and outcomes against the previously agreed performance indicators. This Guide recommends proactive measurement and audit in addition to a formal investigation procedure to respond to significant events during the project.

Effective leadership throughout the project organisation and across the supply network is fundamental to the success of SHE management and performance. More guidance on SHE leadership is available in the SHE Leadership Guide (www.eci-online.org).

Further guidance on specific SHE aspects is also available from www.eci-online.org.

Introduction

Management Model (SHE-MM)

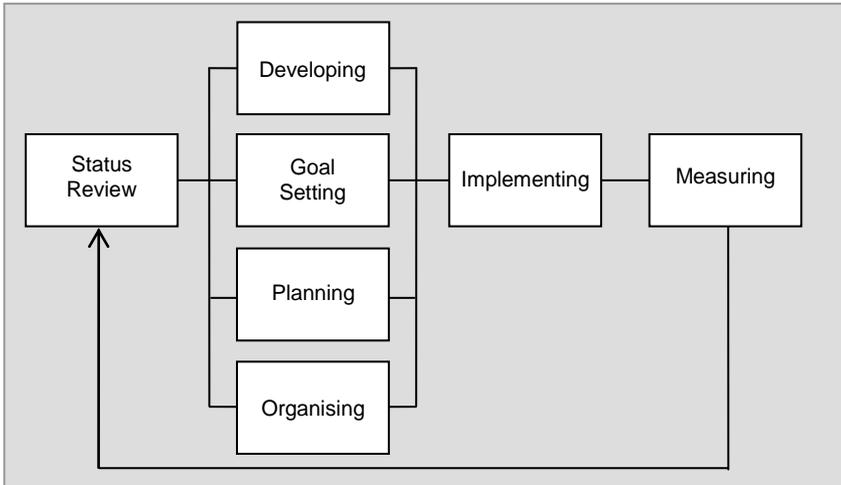
The European Construction Institute (ECI) has produced this construction project management guide to an Occupational Safety, Health and Environmental Management (SHE) Model.

This is in line with international standards such as EN ISO 14001:2004 and EN ISO 9001:2000 and relevant national guidance. This guide should be read in conjunction with other ECI guides to good practice such as ECI guide to managing health in construction and ECI guide to environmental management in construction.

The intent of the SHE Management Model (SHE-MM) is to provide a framework, within which the Project Management Organisation (PMO) can develop detailed policies, standards and procedures and incorporate them within their system. In order to achieve this, this guide has been developed by stating objectives that should be achieved, rather than prescribing detailed measures to be adopted. In this way, the guide provides a goal-setting format which can be applied right at the start and throughout the life-cycle of the project.

The SHE-Management Model (SHE-MM)

The main sections of the European Construction Institute’s SHE-MM are illustrated below:



- Status Review:** Establishing the current status of the project and its management systems
- Developing:** Developing the policies, plans and procedures to achieve the desired objectives
- Goal Setting:** Setting objectives and measurable performance indicators
- Planning:** Planning for SHE management
- Organising:** Organising people and resources to accomplish the objectives
- Implementing:** Implementing policies, plans and procedures
- Measuring:** Measuring, auditing and reviewing of performance and outcomes

The context of this document is occupational Safety, Health and the construction Environment (SHE) of projects. This includes activities in design, engineering, procurement and construction and concerns industries with the potential for accidents during construction, operations and maintenance of the building, structure or facility.

Hence, the full commitment to Safety, Health and Environment must be a basic foundation of the PMO's culture, embodied in the following statements:

- Safety equals control of risks which includes prevention of accidents
- Health equals protection of occupational health and arrangements for well-being conditions
- Environment equals prevention of environmental pollution

This commitment is confirmed by the establishment of a PMO Safety, Health and Environment management system, in compliance with society rules and legal requirements.

Validation of PMO commitment to the concept of Safety, Health, Environment (SHE) should be manifested in the policy.

SHE management is not a one-off process, but is a cycle involving feedback mechanisms to ensure continuous improvement.

To avoid excessive repetition, the term SHE is generally omitted from the remainder of this publication unless required by the context. Hence, phrases like 'SHE policy' are often simply stated as 'policy'.

Section 1: Status Review

Establishing the current status of the project and its management systems

Introduction

Each project stakeholder will have their own management systems. However, it is essential that a project-specific management system is agreed by all parties to ensure effectiveness and consistency.

Status Reviews (Initial Status Review-ISR and Periodic Status Reviews-PSR) must be conducted to develop and maintain management systems that are suitable for the project.

Examples of typical PMO roles and responsibilities

- SHE activities for PMO personnel in the home office which shall be in accordance with the applicable legislation requirements, as well as, during business trips and assignments, as per Corporate policies
- SHE activities in the design process, which shall be in accordance with legislation, client requirements, industry standards and PMO practices and procedures, relevant to design with related risk during fabrication, construction and erection as well as during operation and maintenance
- SHE activities at construction sites with related risks during the erection and commissioning of an installation, which shall be in accordance with local legislation and client requirements

Initial Status Review (ISR)

The ISR should answer the questions:

- Where are we now?
- Where do we want to be?
- What are the key steps that we need to take to get started?

The ISR will provide information that influences the PMO's decisions on the scope, adequacy and implementation of the current system and provide a baseline from which progress can be measured¹.

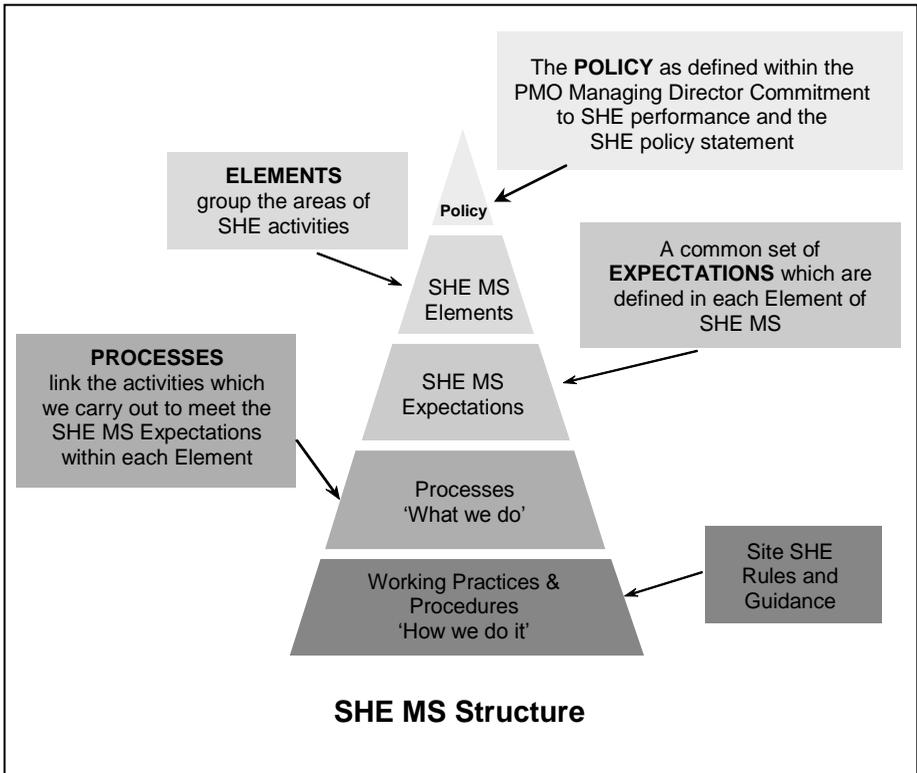
The Project Management Organisation (PMO), together with the Client and Contractor should conduct an initial status review (ISR):

- by comparing their existing Safety, Health and Environmental (SHE) management systems² with relevant legislation and contractual requirements. To ensure best practice, existing guidance on management systems available within the construction industry should also be consulted
- by determining in advance what is to be accomplished through:
 - identifying the project overall objectives and goals
 - assessing overall project hazards and risks
 - identifying the actions required to remove or mitigate hazards and risks
 - setting out project SHE priorities
 - identifying the arrangements for achieving them
 - establishing the financial and other resource implications arising from these arrangements
 - establishing measurable performance standards
 - agreeing arrangements for Periodic Status Reviews (PSR)

¹ Appendix 1 provides an template for an Initial Status Review – Hazard Study 1 (adapted from HAZOP: Guide to best practice, Institution of Chemical Engineers, 2000, ISBN 0 85295 427 1)

² Figure 1.1 shows a generic PMO SHE Management System Structure

Figure 1.1 Generic PMO SHE management system structure



Courtesy Fluor

Periodic Status Review (PSR)

These will have been organised as an outcome from the Initial Status Review (ISR).

As part of the PSR, the Project Management Organisation (PMO) should consider the following³:

- results of assessments and audits
- interested party feedback
- status of preventative and corrective actions
- follow up on actions from previous status reviews
- changes in circumstances (including legal developments, aspects and risks)
- recommendations for improvements
- data and information on project performance
- results of evaluation of legal compliance

The PSR should also identify the current status and any actions necessary to rectify deficiencies in, and make improvements to the project's management system.

The output from section 7 - Measuring, provides the primary input for the PSR.

³ *Adapted from PAS 99:2006 Specification of common management system requirements as a framework for integration, BSI, ISBN 0 580 49059 9*

Project Hazard Identification and Risk Assessment

An essential component of the ISR and PSR is a Hazard Identification and Risk Assessment used to estimate the project's overall risk profile. The findings will provide the basis to formulate project risk control strategies. This is a high-level, project-wide exercise and must be followed up by a series of more detailed hazard identification and risk assessments as the project develops (See section 4 - Planning).

The basic approach should include the following:

- to identify significant hazards in relation to each stage of the work and consider who or what may be harmed and how
- to make a subjective estimation of the risk associated with each hazard on the basis that planned or existing controls are in place and consider the effectiveness of the controls and the consequences of their failure
- to prepare risk elimination or control measures for any risk that is high and / or has no existing control measures

The following actions should be taken to eliminate or control the identified risks:

- procedures and risk control measures should be developed and maintained
- procedures and measures should be properly and fully implemented
- allocate responsibilities within the project for the management of hazard and risk
- review procedures and measures on a regular basis to address changing circumstances and ensure continuing effectiveness

Hazard & Risk Assessment should be carried out by a competent person(s)⁴ appointed by the PMO or Contractor.

Hazard & Risk assessment should be part of the project review programme.

⁴ For definitions of key terminology see Glossary

Section 2: Developing

Developing the policy to achieve the desired objectives

Introduction

According to legislative requirements across Europe and in many other countries, it is mandatory to prepare, implement and control a corporate SHE policy.

Each organisation involved in a project will have a corporate policy. In practice, these need to be developed into a project-specific policy to which all relevant parties will adhere. An example of a PMO corporate policy is provided at the end of this section.

This policy informs the project SHE plan. Developing and implementing such a plan will address the risks and define measures to exclude and / or minimize them. The SHE plan will also serve as a planning tool and will facilitate collaboration / consultation with the executing parties during the realisation of the project. The SHE plan should encompass the whole life-cycle of the project from design through to ultimate decommission or demolition.

This section concentrates on the development of a SHE policy. The plan and procedures are covered in section 4 – Planning.

Developing SHE Policy

A project policy, endorsed by the project stakeholders must be developed from the Initial Status Review (section 1) and the corporate policies of the stakeholders. This should describe the overall aims that have been identified and the commitment to a continual improvement SHE performance approach.

The SHE policy must be based on following fundamental principles:

- the prime duty, responsibility and authority for SHE activities is with line management and project management
- commitment to SHE is with all personnel
- compliance with contractual and legal obligations

- potential hazards shall be identified, eliminated or controlled
- risks shall be eliminated or reduced to a level which is defined by pre-determined acceptance criteria
- pro-active control of risks rather than detection of occurred accidents is emphasised

The policy should include, but not be limited to the following:

- recognise that SHE is an integral part of project performance
- compliance to legal requirements as a minimum
- commitment to a high and continually improving performance
- set and publish challenging goals and targets
- place the management of SHE as a prime responsibility of line management, from the most senior executive to first line supervisory level
- ensure that employees at all levels receive appropriate training and are competent to carry out their duties and responsibilities
- periodically review the policy, the management system and their compliance

All relevant stakeholders should be involved in the development of the policy to gain commitment.

Adequate and appropriate processes and resources are required to implement the policy. The PMO should ensure that the policy statement is understood, implemented and maintained at all levels in the organisation. This is developed further in section 6 - Implementing.

Example Safety, Health and Environmental Policy

It is the intent and policy of the PMO as appropriate, to design, procure, construct, commission, operate, maintain, decommission, demolish and remediate facilities in conformance with applicable safety, health and environmental legislation.

In order to achieve this, the PMO will endeavour to identify safety, health and environmental impacts and risks arising from its own activities, and to reduce these risks to levels deemed acceptable, so as to prevent harm to its own employees or any other person not in its employment, who may be affected by those activities, in particular members of the public.

The PMO will manage its impact on the environment in ways that are economically and socially justified. It will follow environmentally sensitive procurements and disposal arrangements for goods and services provided to its customers.

The PMO's Managing Director is primarily responsible for the development and implementation of the PMO Safety, Health and Environmental Policy.

The PMO's Managing Director is also responsible for planning and meeting Safety, Health and Environmental Policy objectives and targets.

Each Project Director / Manager is responsible for implementing the PMO Safety, Health and Environmental Policy on projects, with the responsibility for construction site activities being delegated to the Construction Manager.

The PMO endeavours to maintain and continuously develop awareness of safety, health and environmental matters, so as to be proactive in providing a value added service to clients. This is achieved by review of projects, review of relevant legislation, codes, standards and guidelines, through education, communication and definition of the safety, health and environmental standards appropriate to the PMO's own operations and those undertaken on behalf of each client.

To emphasise continuing commitment to safety, health and environmental issues the PMO will:

- maintain a documented safety, health and environmental management system
- address safety, health and environmental issues in all phases of its activities
- sets goals and standards, ensuring responsibilities are assigned, understood and acted upon
- provide appropriate safety, health and environmental resources
- train staff and contractors to carry out their duties responsibly

Signed by PMO Managing Director

Section 3: Goal Setting

Setting objectives and measurable performance indicators

Introduction

Meaningful objectives and measurable performance indicators must be set early on in the project, based on the Initial Status Review (ISR – section 1) and the Project SHE Policy (section 2).

The responsibility for measuring and ensuring the objectives and indicators are met must be clear and there must be clarity in who has accountability for them. These are spelt out in section 5 - Organising.

There are several factors or areas to consider in setting objectives and indicators including:

- business objectives of the PMO
- legislative issues
- country regulator priorities
- local culture and societal values
- client objectives and targets
- third party accreditation issues
- contract issues (subcontractor management)
- project hazards and risks (as identified in the ISR) that will require special interest

These factors can be built into the development of the project vision and therefore the objectives. For instance, the contract strategy and how the objectives will flow down to subcontractors, how they will be incentivised, how they are monitored etc, requires careful consideration at the planning stage.

Objectives

It is important, as a PMO, to recognise that some objectives and indicators will be leading or proactive and others will be lagging or reactive. It is imperative to achieve a good mix that requires both types of indicator to be examined. Leading indicators are becoming more prominent and are an absolute must for projects that aspire to be world class.

Typical PMO SHE Objective

PMO will identify and control potential risk which jeopardizes persons, environment and assets including commitments towards reduction of waste production and energy consumption all in compliance with applicable legislation, practices and contract conditions and based on the principles embodied in the PMO Operating System Requirements.

If the objectives and indicators are to be part of an incentive programme, then the PMO should ensure they are both achievable and stretching. Lagging indicators form a very poor basis for incentives as they concentrate on historical negative outcomes. Leading indicators are much more likely to provide effective incentives.

The objectives and indicators should be examined in the Periodic Status Reviews (section 1) for effectiveness and modified further for future projects.

Leading or proactive indicators

Monitoring and testing of the risk control systems has long been recognised as being paramount. However, all too often, it is only examined when something has gone wrong on a project and some form of incident has occurred. This area of management is a developing one that requires more uptake and encouragement in its use. The PMO, by setting the right leading indicators, utilising the monitoring systems in the existing elements of the management system, and the project hazard identification and initial risk assessment (see section 1 – Status Review), will improve the performance, measured against lagging indicators (i.e. reducing the number of actual events).

Leading indicators require careful selection and modification for use on individual projects, and should take into account the maturity of the culture of the organisations and project. It is imperative that these indicators are set out in the plan for the project and are integrated into the planning and management of the on-going project, only then will the benefits be seen in improved performance.

Using the project hazard identification and initial risk assessment can ensure a risk-based surveillance strategy is employed. This is a useful tool to ensure the higher hazard areas have a focus from senior managers, and ensures blanket type non-targeted surveillance is avoided. This principle should be employed in the following areas (adapted from Bennett & Foster⁵) whereby the indicators need to respond to the risks of the project:

- senior management leadership and commitment
- continuous performance improvement
- communication
- competence
- employee consultation and involvement
- occupational health management
- environmental strategies

Other 'leading measures' could also be used to indicate the performance of the plan such as:

- number of design changes required to address SHE issues or deficiencies
- schedule variation in audit programme, i.e. are audits timely
- number of planned audits not completed
- time to close near miss reports
- the proportion of construction hours used for on-site training
- the results of workforce surveys or consultations

⁵ Bennett J and Foster P. 2005 Predicting progress: the use of leading indicators in occupational safety & health. *Policy and practice in health and safety* Vol O3.Issue 2: 77-90.

Table 3.1 provides examples of leading indicators, organised into topics and language that are pertinent to construction projects. There is of course further scope, as suggested above, for designing the indicators so they are project-specific and meaningful to the organisation. As discussed previously, the maturity of the project, organisations and global context also require careful thought in the selection of leading indicators.

Table 3.1 Examples of leading indicators

Key Leading Indicator	Contributory Indicators	Proposed Objectives
Senior Management Commitment	Project manager accepts role as SHE champion for project. Visibility in the project induction	Accepts and promotes
	Project manager and senior project team members presents the SHE vision and objectives to all (including employees and subcontractors) – programme of presentations	Frequency tailored to project - at least quarterly
	Senior project team (eg. project manager; construction managers; production managers; works managers; design managers etc) are visible and seen to support SHE activity through planned activities	Monthly per manager (eg worker involvement activity, surveillance walk-about risk assessment reviews)
	All management team meeting agendas to include a review of SHE – in line with the programme or review of activities for learning	All

Key Leading Indicator	Contributory Indicators	Proposed Objectives
Continuous Improvement	SHE improvement objectives integrated into personal goals and into the project objectives setting and review process	Yes
	Competent SHE audit function in place	Yes
	Comprehensive SHE audit programme (all project stages and processes covered)	At least a one-year rolling programme
	Non conformity counts – low. Action plans in place (including for observations) and dealt within 4 weeks	100 %
	SHE Manager involved in operational project team meetings	100 %
	Significant SHE incidents investigated for root causes – grouped, analysed, trended and actions set	100 %
	SHE Risk assessments and systems of work – all reviewed before undertaking tasks or where there are significant changes to task	100 %

Key Leading Indicator	Contributory Indicators	Proposed Objectives
Communication	Every employee on the project receives instruction in behavioural observations (Including environmental)	100 %
	Every person on the site has received site SHE induction (if not accompanied)	100 %
	Each employee has received presentation from senior member of project team on vision and objectives of SHE on project	100 %
Competence	SHE Risk assessments (eg. jobs, tasks) include competence requirements.	100 %
	Managers and supervisors have competence reviews and receive development training (particularly communication and briefing skills)	100 %
	Each employee has confirmed qualifications / skills for work undertaken or is supervised trainee	100 %
Worker participation or involvement	All workers take part in a SHE related activity (reviewing / contributing to a risk assessment review or safe system of work, investigation, surveillance in peer group, contribute to site initiative, undertake site pre work briefs)	One per worker per annum or project
Occupational health management	Risk based health hazard monitoring (based on the project hazard identification and initial risk assessment), controls in place	100 %
	Health PPE in place and used	100 %
	Pre project health surveillance undertaken, general and risk based by competent occupational health function	100 %

Note: The above key leading indicators include environmental issues (SHE)

Decommissioning Standard – Leadership

Decommissioning leaders at all levels will spend time on each decommissioning plant or project with project personnel, communicating, evaluating and setting standards, assessing resource requirements and project health and coaching and mentoring their teams and subcontractors.

- Programme Superintendent zone 2 and 3 on plant / project once per quarter, with each Head of Programme Delivery
- Heads of Programme Delivery on plant / project once per month, with each Head of and Senior Project Manager
- Heads of on plant / project once per month, with Delivery Manager
- Delivery Managers / Project Managers on plant / project once per week, on each active project
- Principal Contractors on plant / project once per day, on each active project

To ensure the time spent on plant is valuable, training will be given on, task observations, or inspections. An effort will be made to ensure that the training selected is varied over a given group.

Behavioural observations will continue to be completed for each of the plant / project. Behavioural observations should be completed for every project visit conducted by Principal Contractors.

Time will be allocated for the visits, but the actual project will not be selected by the leader more than a day in advance.

- at the initiation of this process (first 6 months), Head of Delivery Managers will go onto their own projects
- after the programme is established, an effort will be made to go onto other projects for the evaluation and shared learning from peers within decommissioning

Decommissioning leaders within support organisations (engineering, business support, future decommissioning will receive training and participate in one assessment per quarter to be randomly selected from the decommissioning tracking spreadsheet.

The decommissioning lead team members will make themselves available to receive feedback from the workforce.

- a four hour slot will be staffed by a member of the lead team every week
- a schedule will be sent out to the decommissioning group indicating the location and time available
- the location will be rotated to ensure that all locations are manned at least once per month

Decommissioning safety personnel will receive training and participate in one assessment per month.

Lead team members will make themselves available for drop ins from the work force at least once per week this will be administered through rotation of the lead team and location; the sessions will be communicated through e-mail and posters around the decommissioning projects.

Assessment progress and planning will be tracked on a spreadsheet that will be maintained by everyone performing these assessments.

Assessment results will be evaluated monthly by the standards coordinator to look for trends and identify new standards.

SHE&Q meetings and Departmental Safety Committee will contain an agenda item to discuss current and additional standards resulting from the leadership assessments.

Decommissioning and project-specific standards will be communicated to all project personnel, including subcontractors and support personnel (waste, health physics).

Lagging or reactive indicators

Lagging or reactive indicators are mainly based on statistical methods for recording negative events. Typical lagging performance indicators are related to the scale and frequency of incidents or events and would normally include:

- number or frequency of near miss reports
- number or frequency of accidents
- number or frequency of major accidents
- number or frequency of environmental releases
- number, frequency and duration of sickness absences
- number or frequency of disciplinary actions for violations

The most commonly used are incidence and frequency rates. However these work better at larger scales of economy and there are limitations in their use for projects, usually because of the relatively low numbers of events and hours and man days to measure against. Raw data or actual numbers are a better indicator at these levels. A traffic light system has been applied to this type of indicator, where statistical rules have been applied to govern the system.

Table 3.2 shows the use of a database to record contractor performance against leading and lagging indicators.

Table 3.2 Example of database of some indicators - with simple colour representation of data**CONTRACTORS (includes Sub-Contractors)**

Indicators (with link to definition)	Company A	Company B	Company C	Company D
LEADING INDICATORS @ June 2013				
Safety Inspections - actions overdue <i>*See below for example legend / definition</i>				
LAGGING INDICATORS @ Period 7				
Number of accidents contributing to DACR <i>** See below for example legend / definition</i>				
Number of accidents contributing to TRIR				
Number of accidents contributing to RIDDOR				
Injurious events				
Non-injurious events				

***Safety Inspections - Actions overdue**

- **Red:** Any actions overdue the action date
- **Green:** No actions overdue

****Number of Accidents contributing to Days Away Case Rate (DACR)**

- Number of DAC accidents per Individual contract company
- Definition: The number of accidents contributing to Days Away Case Rate over previous 12 months for Contractors
- Data Source: Injuries from RE's Office Incident Log
- **Red:** ≥ Two DAC's in 12 months
- **Yellow:** One DAC in the previous 6 months
- **White:** One DAC in the previous 12 months
- **Green:** Zero DAC's

Section 4: Planning

Planning for SHE management

Introduction

Planning is an integral part of all business activities and objectives as defined by the full scope of work, from project conception through detailed design, scope definition, planning, construction and execution through to final commissioning and handover to the eventual client or end user.

Planning builds upon the Initial Status Review (ISR – section 1), and continues to reflect the changing hazard and risk profile of all activities as updated through the Periodic Status Reviews (PSR). It is therefore a live and fully updated reference and outline plan for the management of all activities appropriate to planning and management.

Section 2 has introduced a framework for a project SHE policy, endorsed by the PMO and Contractor.

Section 3 has described goal setting and commitment to improving SHE performance.

This section covers hazard / risk identification and control, developing the SHE plan and coordination and consultation.

Hazard / risk identification and control

Hazard identification, risk assessment and control is based upon the principle that all hazards must be understood and suitably controlled. The following essential steps must be carried out to successfully manage a hazard:

- hazard identification
- risk assessment
- control measures

The main principles embodied in this process should have been applied during the design phase⁶ for the identification and elimination of hazards during the period of construction, commissioning, use and maintenance of the project.

The identification of risks in terms of hazards and potential effects and the subsequent risk control is a line management responsibility and key element in the SHE-MS and concerns all positions, functions and levels within the entire PMO organisation.

Establishment of the level of risk requires that the identified hazards shall be:

- assessed and evaluated in terms of potential effects and probability (qualitatively or quantitatively)
- evaluated for existing control measures to their efficiency
- related to the appropriate acceptance criteria
- demonstrated that the risk is within the performance standards and acceptance criteria⁷

If the assessment identifies that the risk does not meet the relevant acceptance criteria then, additional control measures are bound to be taken.

The priority for the implementation of risk control measures is as follows⁸:

1. avoid, eliminate, design out the hazard at source
2. reduce severity and / or probability of potential effects
3. adapt activities and design to the individual and environment
4. allow for current technology
5. give collective measures priority over individual measures

Risk control measures are to be integrated including technical, organisational, human and external aspects.

⁶ *Design Guidance such as D4h (Design for Health) [available from ECI] should be consulted for advice.*

⁷ *This is covered in section 7 - Measuring*

⁸ *Based on the principals of prevention from the EC Framework Directive – 89 / 391 / EEC*

It is essential that the process is taken beyond the assessment of risk and developed into a safe system of work. A safe system of work is a formal process involving a systematic examination of a task to identify all the hazards. It goes on to define safe methods of working so that hazards are eliminated or risks minimised.

Figure 4.1 provides an example of a PMO SHE management process showing activity phases.

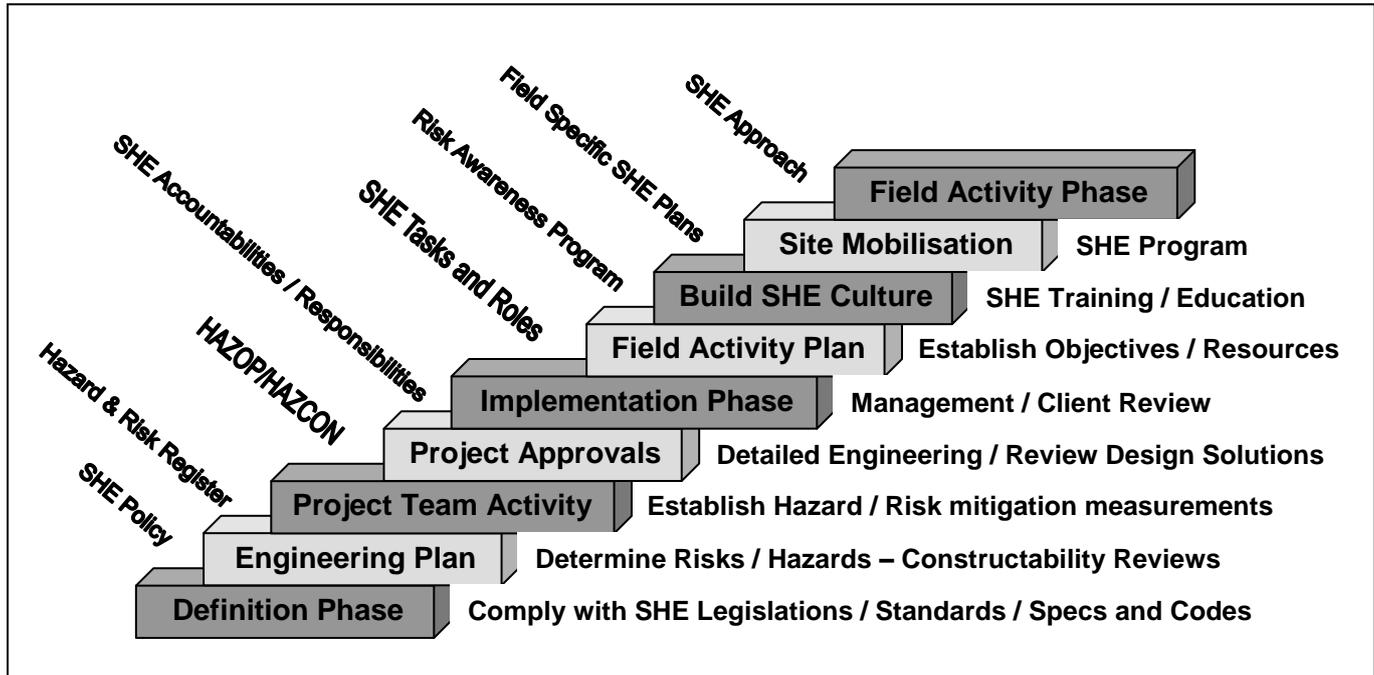
Various techniques for the systematic identification of hazard, risk assessment and control are available for use within the PMO organisation. A typical approach endorsed by the IChemE⁹ and CIA¹⁰ is detailed in Table 4.1. Each stage verifies that the actions of the previous stages have been carried out and signed off and that the relevant SHE issues have been identified and are being addressed in a timely manner. The various stages and components can be adopted or modified as required to meet Client and PMO requirements and take into account the Contractor scope of work. The specific approach for a particular project should be defined in the project SHE plan (Design).

A typical list of hazards and risks can be found in Appendix 1. This shows hazards and the relevant mitigation actions. Control measures are to be added by the user to suit the specific project.

⁹ IChemE – UK Institution of Chemical Engineers

¹⁰ CIA – UK Chemical Industries Association

Figure 4.1 Example PMO SHE management process



Courtesy Fluor

Table 4.1 Six stage approach

Stage	Description	PMO Activities			Responsibility	
		Design Reviews	Safety Documents	Safety Calculations	PMO	Client
One	Conceptual	<i>Initial Review</i>	Safety Scope Of Work (Hazard Identification)		Primary	Attend reviews Review documents
Two	Basic Engineering	Preliminary Hazard Analysis Plot Plan Review Constructability Review	<i>Project Quality Plan</i> <i>Environmental Management Plan</i> Safety Plan (Design) <i>Process Basis Of Design</i> <i>Basis Of Systems</i> Design Process Safety (Overpressure Protection) Specification	Relief & Blow-Down Calculations		
Three	Detailed Design	SIL ¹¹ Analysis HAZOP Study Design Model ¹² Reviews Process Hazard Analysis	Noise Control Specification Fire Protection Specification Fire & Gas Detection Specification Hazardous Area Classification Health & Safety Plan (Construction)	Radiation, Dispersion & Noise Modelling		

¹¹ *SIL – Safety Integrity Level*

¹² *HAZOP study – see appendix 2*

Stage	Description	PMO Activities			Responsibility	
		Design Reviews	Safety Documents	Safety Calculations	PMO	Client
Four	Construction / Design Verification	Pre-Start Up Safety Review	<i>Operating Procedures Construction Safety Audit Construction Quality Program Forms STAR13 Construction Project Turnover Package</i>			
Five	Pre-Commissioning Safety Review	As per client requirements			Attend reviews	Primary
Six	Project Close-Out / Post Start-Up Review	As per client requirements				

Note: Items in *italics* are not specifically related to SHE and address a wider range of design issues

¹³ STAR – Stop-Think-Act-Review

Developing the SHE plan

Planning is essential to achieve project SHE targets. To be effective, the SHE plan needs line management and supervision commitment from all parties involved, with the advice and support of SHE personnel.

It is essential that SHE information is gathered by designers and the coordinator to enable the plan to be drawn up at the early stages of the project prior to construction work commencing.

The plan should set out the specific arrangements, resources, responsibilities and measures to be implemented.

The plan incorporates:

- the system of allocation of responsibilities and accountabilities for the carrying out the policy, and
- the arrangements as to how these are to be executed

An effective plan should set out what is to be achieved, in what time scale and should include, but not be limited to:

- project description and scope
- list of SHE responsibilities and accountabilities for managing the works by everyone involved in the project
- register of hazards and risks
- preventative and precautionary measures
- arrangements for managing the work and the procedures for monitoring compliance
 - e.g. constructability reviews; method statements for specific work activities, job safety analyses
- requirement for emergency preparedness
- training of staff to carry out their responsibilities for the works so as to achieve the stated targets
- procedures for monitoring and assessing the implementation of these requirements

A typical SHE plan is provided in Appendix 3, under the following headings:

- Project Management System Structure
- Policies & Significant Authorities & References
- Project Scope and Outline Definition
- Roles & Responsibilities
- Key Interfaces & Co-ordination with all Project Stakeholders
- Applicable standards, procedures, and legislative references
- Key Training & Competency Requirements
- Support & Technical Resource
- Hazard Inventory & Risk Profile
- Promotion & Communication & Meetings
- Reporting & Measurement
- Audit & Review
- Contractor & Supplier Management

The SHE plan must not be limited to safety issues alone, but should include occupational health and environmental considerations. Further guidance is available from the ECI guide to managing health in construction and ECI guide to environmental.

Programme for Occupational Health

This programme should include regular monitoring, reduction of exposure through control measures, selecting, providing and maintaining suitable PPE and supervising its use, pre-employment and periodic medical examinations of exposed workers and training and education of personnel.

It is not intended that legal requirements and internal company processes and procedures are incorporated into the SHE plan – these should be referenced.

The scope and detail of the plan depend on the complexity and risks of the project as defined in the Initial Status Review (section 1). It may range from a simple statement from the PMO or contractor and their lower tier subcontractors identifying who is responsible for implementing and co-ordinating SHE matters, to more detailed documents covering legislative and contractual responsibilities of the work site.

The SHE plan is not necessarily contained in a single document. Relevant sections of the plan must be incorporated in all the contractual documents through all tiers of contractors, sub-contractors and suppliers and must be available on the construction site before the works begin.

Right info >> Right people >> Right time

Each project employer and self-employed person has to comply with the agreements / measures of the plan. All managers, supervisors and workers should be made aware of the plan and the role that they play in its implementation¹⁴.

Note

UK Legislative requirements mention just one SHE plan that encloses the entire cycle starting from the design phase through the delivery. However, many countries have **two** parts of the SHE plan¹⁵, one for the design phase and one for the construction phase. If the choice is made to develop separate SHE plans (Engineering / Design and Construction) there must be a clear relationship between both plans, to maintain a consistent build of the hazard / risk reducing measures during the design and also during construction.

As the project progresses, the plan should be reviewed and modified according to experience and any information received through, for example, Periodic Status Reviews (section 1).

¹⁴ For more on Implementation, see section 6

¹⁵ 92 / 57 EEC Minimum regulation concerning health and safety for temporary and mobile construction sites, 24 June 1992.

The following techniques¹⁶ can be used to develop the plan such that it is relevant to each particular section of the project and to ensure that it remains current:

- construction risk assessments
- constructability reviews
- method statements
- job safety analyses
- environment

Construction Risk Assessments

Following action by designers to eliminate and reduce risks, the residual construction hazards should be clarified. These could be identified by reviewing information in the project documents, existing drawings, site survey investigations, design stage and constructability reviews, or could emerge during the construction or commissioning phases.

Once potential hazards are identified, the risks to SHE must be assessed and a safe system of work should be developed by the contractor(s) as part of the working procedures.

Constructability Reviews

Constructability reviews consider the 'big picture' and form part of the iterative process to refine the design through construction expertise. Whilst these reviews consider project-wide issues, they form an important part of developing the SHE plan.

Table 4.2 provides a typical example of a constructability review checklist showing where SHE is considered alongside other issues such as logistics and coordination.

¹⁶ *This is not an exhaustive list*

Table 4.2 Typical constructability review check list

	Project Relevance High, Med, Low
1. Impact on Production & Site Operations	
2. Tie-ins, Interface, Optimised Shutdowns	
3. Ground Conditions & Underground Services	
4. Construction & Erection Methods	
5. Lifting	
6. Sequencing	
7. Pre-assembly	
8. Safety - Process & Construction Hazards	
9. Access for Installation of Equipment	
10. Personnel Access	
11. Delivery Access for Construction	
12. Materials & Equipment Handling / Storage	
13. Waste Handling & Disposal	
14. Welfare Facilities, Compound, Parking	
15. Temporary Works, Preparatory Works	
16. Parallel Works	
17. Adverse Weather Conditions	
18. Testing, Handover, Commissioning, Validation	
19. Maintainability & Operability	
20. Demolition & Dismantling	

Courtesy CEL International Ltd

Method Statements

Detailed method statements should be prepared by the relevant contractor(s) for all work which has risks to SHE¹⁷, as determined by the project risk assessment. These method statements should be reviewed by the PMO.

The method statements will describe the work procedures, sequence of operation and the controls necessary to achieve effective management of risk and efficient execution of the works. This requirement applies equally to demolition, refurbishment and maintenance activities as to new build.

A detailed job method statement could include:

- the job to be undertaken
- the individual activities required to complete the job
- the sequence of the various activities in the execution of the work
- plant, equipment, tools to be used in each activity
- substances / chemicals to be used in each activity
- hazards from existing buildings and facilities
- control measures and procedures to be used for each activity
- personal protective equipment required
- emergency resources required e.g. fire watchers, fire extinguishers, fire blankets
- name of supervisor for each activity
- name of person in overall charge of the job
- novel procedures may require demonstration or training exercises

¹⁷ Detailed job method statements should always be prepared for all SHE critical tasks such as novel techniques, piling, heavy lifts, general rigging and lifting, vessel entries, live line welding (hot taps), excavations, grating and handrail installation / removal, heat treatment / stress relieving and any erection work with specific risks.

Job Safety Analysis (JSA)

A Job Safety Analysis (JSA) is effectively dynamic risk assessment. This is a procedure used 'day to day' to review job methods by the supervisors and / or workers at the work face. It aims to uncover hazards that may have been overlooked in the layout or design of the equipment, tools, processes or work areas that may have developed after work started, or may have resulted from changes in work procedures or personnel.

One simple method to achieve this is STAR:

Stop – Think – Act – Review

Environment

A detailed review of construction activities and their impact on the environment should be done prior to the start of construction operations during the constructability review.

Environmental issues to be covered would include noise, spillage, waste materials, emissions, effects of earthwork on ground water, soil erosion and drainage.

Operations which create the risk of spillage (e.g. vessel opening, removal of pipe work) require investigation before the event. Prior to such operations, the PMO in conjunction with the Client should assess the risk of such occurrences. A full risk assessment should be conducted and as a result, the necessary precautions established i.e. prescribed personal protective equipment, containment measures such as provision and placement of absorbent matting / materials and methods of disposal. This information will be included in the detailed job method statement.

All waste material designated as toxic or hazardous must be notified to the PMO. A licensed subcontractor must be used to transport and dispose of material to a licensed waste disposal site. Hazardous waste such as contaminated materials must be packaged and labelled in accordance with current legislation and good practice. Disposal of material must be done in accordance with approved method statements and comply with environmental protection legislation. The disposal Contractor will be provided with a full description of the waste material.

Additional guidance is provided through the ECI Guide Environmental management in construction.

Emergency Preparedness

Emergency preparedness, or contingency development concerns the arrangements will be instigated to reduce the consequences of accidents and environmental violations, which are related to the several activities.

These arrangements include:

- emergency management
 - the control mechanism for effective handling of accidents and environmental violations
- emergency response
 - the actions to be taken to limit the consequences of accidents and environmental violations
- response training
 - e.g. training in first aid, fire fighting, evacuation, management of environmental clean-up
- emergency drills
 - actual testing of the effectiveness of the emergency management, emergency response and response training

Section 5: Organising

Organising people and resources to accomplish the objectives

Introduction

Organising is a key activity that the PMO must control, it builds on the Initial Status Review, described in section 1, particularly the resource implications and the identified required arrangements. When organising, the PMO must ensure the principles in the project policy, developed in section 2 are embedded into the organisation of the project.

The performance indicators (as outlined in section 3) are assigned organisationally. Organisation also facilitates the application of the SHE plan principle (section 4) of right information, right people and right time.

Effective organisation achieves the following:

- it ensures that SHE is fully integrated across the works and into all its activities, whatever the size and nature of the works
- it sets aside an adequate budget for the works for implementing the SHE plan and for properly establishing and maintaining the project management system
- it establishes and allocates responsibilities and accountabilities, and particularly it ensures senior management demonstrate by personal example their commitment by actively engaging in the continual improvement of SHE performance
- it makes arrangements for the formulation of a SHE project committee
- it ensures that all employees and appointees have the necessary authority to carry out their responsibilities
- it ensures there are arrangements for the effective communication and dissemination of information
- it takes the identified competencies required for all employees at all levels and ensures the necessary training is organised

SHE Philosophy

The operational culture of the PMO identifies a duality of corporate and project as follows:

- the SHE organisation for the operation of the PMO as a company as a whole
- the SHE organisation for the execution of PMO project(s)

SHE should be embedded in both corporate and project-based organisations as schematically reflected in Appendix 4.

Company Organisation

SHE should be integrated in the PMO corporate organisation. Overall coordination, support and advice of activities is ensured by the PMO corporate management.

The PMO corporate SHE function should have authority from the directors. This function should use the best available methods and techniques to develop, implement, manage and evaluate organisation, policy and practices in relation to SHE. It is important that this role is seen holistically as shown below. However, this section concentrates on organising.

Typical tasks of the PMO corporate function:

- monitoring, evaluation, development and control of the policy
- development of methods for hazard identification, assessment and control of risk
- advising organisational change in order to improve on the existing SHE-MS control system
- influencing the behaviour of all people at all levels of the organisation to fulfil their necessary part in improving SHE
- providing examples of methods and tools of well-performed SHE-MS activities for implementation on new projects
- monitoring activities of advisors

Project Organisation

Each project team must take responsibility for SHE for the project – it cannot rely on the corporate function alone. The duties, authority and responsibilities of the project should be detailed in the SHE plan (see section 4).

Example of Project Organisation approach

It is the objective and commitment of the PMO, to perform its activities in strict accordance with the safety regulations, prescribed by law, the authorities, contractual conditions and PMO in-house regulations.

The Managing Director of the PMO is primarily responsible for the development and implementation of SHE management. This includes responsibility for proper implementation of environmental conditions and working methods in accordance with the legal requirements. Monitoring is performed by the SHE Committee, chaired by the Managing Director. The General Manager is responsible for the implementation of decisions taken by the SHE Committee.

The responsibilities with respect to SHE in specifying engineering, design, fabrication, installation, inspection, testing and commissioning have been defined in the departmental quality manual.

In general the particular Department Heads and Project Lead designers are responsible for the proper carrying out of their specific duties, all of which are monitored and coordinated by the Project Manager, who, in turn, may delegate this activity to a specifically assigned "authorised engineer".

The PMO Manager of Construction is responsible for SHE in the execution of construction activities on site, all in accordance with the legal and contractual requirements and the PMO's Construction "SHE Manual for Construction Sites". This responsibility is delegated to the particular Site Manager.

The daily monitoring of proper implementation of the construction SHE regulations is generally performed by a specifically assigned Field SHE Coordinator.

Each individual employee of PMO is responsible for knowing, understanding and conforming to the requirements of each task assigned, which includes all SHE-related aspects referred to in the policy.

The implementation of the SHE requirements is subject to a quality system audit under the responsibility of the PMO Quality Assurance department. In addition, specific SHE audits will be performed on PMO construction activities, by the PMO's Corporate SHE Management.

Courtesy Fluor

Resourcing

The right people in the right place at the right time, doing the right things

The correct resource is essential for the proper completion of all work activities, including SHE issues. The planning for the project organisation must be confirmed in the project SHE plan.

In particular, in any intensive resourcing programme, for instance where a large number of workers are brought on to the project, the PMO must consider the SHE issues that are being imported (e.g. cultural variations¹⁸, language, religion, environment)

Competence

The PMO must make competent individual appointments within their own organisation. The PMO should assure themselves of the competence of all other organisations that they appoint. This is covered further in section 6 – Implementing.

Each organisation is responsible for SHE competence within their own scope of works and shall arrange for appropriate command, control and supervision.

Personal development in SHE matters is a joint responsibility between the employee and their employer. The individual employee has a personal responsibility to learn matters relevant to an employee's profession that will enable continued growth in professional knowledge and skills. The employer has an obligation to provide proper support for employee's personal development.

This may require additional training on a particular project to address specific competence issues.

¹⁸ Further information is provided in the *ECI Construction Health and Safety in Developing Countries manual ISBN 1873844638*

Documentation and Communication

The SHE management system must clarify and confirm the requirements and responsibilities for the creation and retention of appropriate documentation.

The effective implementation of the SHE management system will be highly influenced by open and effective communication with all parties involved. The chair of all meetings, irrespective of their purpose, should close each discussed agenda item by considering SHE. Meetings dedicated to SHE-relevant aspects must be held for all personnel.

Documentation and communication are also covered in section 6 – Implementing.

Section 6: Implementing

Implementing a project SHE plan

Introduction

Implementing means a process of realising the objectives and plan within the project organisation, with appropriate and adequate control. In this implementation stage, input from the PMO and the contractor(s) is required to:

- execute the SHE plan to implement arrangements to control the risks identified and to meet the legal and other requirements
- execute contingency plans for foreseeable emergencies and mitigate their effects
- arrange audits and periodic status reviews as an independent check of the efficiency, effectiveness and reliability of the SHE management system, and instigate the required corrective actions
- motivate all employees by a combination of rewards and sanctions to reinforce safe behaviour contributing to risk control and the promotion of a positive SHE culture
- assess, select and control of contractors and subcontractors
- provide competent and effective personnel to ensure that the policy and plan are effectively implemented
- prepare and maintain sufficient documentation to record and monitor the progress of policy and plan implementation
- communicate, coordinate and consult to ensure effective implementation

Execute the SHE plan and related contingency plans

The PMO construction contractors should establish programmes for:

- implementing the SHE plan to control risks identified and to meet legal and other requirements
- informing employees from senior management to workers and other parties of the relevant contents of the plan
- supervising and monitoring to ensure the plan is implemented effectively

The SHE plan will have established a management structure, reporting relationships and responsibilities. Systems are required to collect, monitor follow-up and close out all actions arising from work activities (see section 7).

A key part of implementation is to communicate, train and test plans for effectively managing an emergency. The PMO will have established procedures to identify, describe and respond to emergency situations. It is of prime importance that the emergency organisation and roles are well understood by all parties involved in order to maintain emergency response preparedness.

Arrange audits and periodic status reviews

Audits and periodic status reviews provide an independent check of the efficiency, effectiveness and reliability of the project SHE management system. These are covered in more detail in sections 1 and 7.

Motivate all employees

Employee motivation is key to achieving SHE goals and objectives. This can be achieved by a combination of rewards and sanctions to reinforce safe behaviour contributing to risk control and the promotion of a positive SHE culture.

A manager or supervisor influences the workers' attitudes and behaviour by actions – not words. They must 'walk the talk' (do what they tell others to do). The workers are not fooled by memos and exaltation, they are influenced by the behaviour of others particularly managers and supervisors.

This is a large topic and a full consideration is outside the scope of this Guide. The following example provides an insight into one organisation's approach.

Example of Lend Lease's Incident and Injury Free initiative¹⁹

Lend Lease will operate Incident & Injury Free and is committed to realising this wherever the group has a presence. This philosophy reaches every part of the group's operations and extends to clients, suppliers, subcontractors and other stakeholders.

Lend Lease will:

- invest in what it takes to achieve this vision
- empower its employees to demonstrate leadership in making this vision a reality
- proactively work with all stakeholders including clients, designers, contractors and the workforce to make this vision a reality, and remains prepared to walk away rather than compromise the group's commitment to safety
- own and act on this vision. This requires a mind-set intolerant of any injury or incident regardless of frequency or severity

Lend Lease believes:

- that working Incident & Injury Free is a choice and a basic human right
- those who view Incident & Injury Free working as a given, and make this happen, will become leaders in the property industry

Lend Lease recognises:

- that this vision is achievable if our employees and stakeholders are totally committed to it
- that the commitment to being Incident & Injury Free requires individuals to take a personal stand and in doing so, demonstrate great courage and trust

¹⁹ www.lendlease.com.au/llweb/llc/main.nsf/all/all_healthcommitment (accessed 03/01/08)

Assess, select and control of contractors and subcontractors

The PMO must ensure that potential contractors and subcontractors are fully aware of their safety and health obligations and that only those subcontractors that can demonstrate that they can meet these obligations will be offered work. The PMO must make subcontract personnel aware of the safety and health rules, standards and regulations as well as any instructions and procedures for safe, healthy and environmentally responsible work practices. Contractors and subcontractors must provide evidence that adequate resources will be available to correctly implement the SHE plan. The PMO should employ an effective system for the evaluation of the performance of contractors and subcontractors. A competence questionnaire is available from www.eci-online.org.

Provide competent and effective management and supervision

A full and detailed inventory of all minimum training and competency requirements should have been established in the SHE plan. This should be standard and applicable across all employers. To implement this, the minimum competencies of all disciplines and key personnel should be assessed through a robust and on-going process.

Typical generic training and competency requirements:

- the arrangements for project induction
- management and supervisory training
- technical based training
- behavioural expectations and training
- specific risk control and mitigation training
- training of all personnel and organisations in the requirements of
 - the SHE plan
 - the policies and minimum expectations
 - any particular, significant and key standards and other controls as identified for the control of any specified site activity
 - emergency preparedness requirements

Prepare and maintain sufficient documentation

Whilst, unnecessary bureaucracy should be avoided, appropriate documentation must still be prepared and maintained to record and monitor the progress of SHE plan implementation.

A typical list of SHE-related records would include, but not be limited to:

- initial and periodic status reviews
- SHE plan (including revisions)
- reference documents from SHE plan (e.g. constructability reviews)
- scope of works
- client requirements
- method statements
- competence assessments
- training and competency records
- legal requirements (e.g. statutory inspections)
- audits and investigations
- event records (e.g. accidents / incidents)

Communicate, coordinate and consult

Effective implementation of the SHE plan requires communication, coordination and consultation of SHE throughout all the phases of a project and adjacent works.

The common objective is to improve understanding of SHE matters and, from this, to obtain the support, co-operation and commitment of all interested parties.

Poor communication and lack of understanding are major causes of accidents; hence it is absolutely vital that every member of the work team understands how the job will be carried out.

This information could be conveyed solely by the written word but this assumes that all affected parties will:

- receive it
- read it
- understand it
- agree to it
- follow it

The vast majority of the workforce prefers to discuss a job rather than read about it. The advantages in having a face to face conversation are:

- it allows for an instant exchange of ideas
- feedback on understanding and agreement can be sought before the job starts
- all affected parties are involved and have the opportunity to contribute

There are many advantages in having this conversation at the site where the job will take place:

- requirements are easier to explain
- it is possible to walk through the job step by step
- new hazards may be spotted
- the workers feel more at ease in familiar surroundings

Many people call this meeting a 'toolbox talk' or 'tailgate meeting', unfortunately these names mean different things to different people so it may be best to refer to it as a 'worksite briefing'.

Communication can take many other forms, including for example:

- management meetings
- project briefings
- inductions
- workforce committees
- SHE initiatives
- poster campaigns
- incentive schemes
- project bulletins
- signage

The mobility of the modern workforce requires consideration of languages of the workforce and effective means of communication. Methods that avoid the need for a good standard of literacy should be encouraged.

The plan must be more than simply the sum of the risk assessments of the involved contractors and self-employed – it should include the interfaces between the different parties and their cooperation to respond to hazards and risks. The team should take an overall project view of residual hazards and risks and preventative management strategies.

Collaboration and coordination between the various parties active on the project has to be well documented. It particularly concerns the mutual interaction of the works which are simultaneous or consecutive.

Examples of interface issues

- mutual facilities for more than one contractor
 - for example welfare facilities or scaffolding that are used by multiple contractors
- measures needed to prevent the work of one contractor, or subcontractor, creating a risk for the employees of another
 - for example working above one another or with noise and dust production in each other's surroundings
- special measures to be taken where unusual or unfamiliar works are executed
- scope, roles and responsibilities of supervision
- information / education / training / instructions to employees
- measures to prevent unauthorized people accessing the construction site

The PMO needs to consult with all participants when there are matters that concern them. When the SHE plan offers relevant information to a particular contractor the PMO must make sure that the contractor receives a copy of that information. The PMO should provide suitable channels of communication and consultation for contractors or workers who have relevant SHE information or concerns. These should have been previously identified in the SHE plan.

Section 7: Measuring

Measuring, auditing and investigating performance and outcomes

Introduction

In section 3 - goal setting for project performance, the PMO identified and quantified performance indicators that were related to the significant SHE issues involved in the project. To make use of these, the PMO must establish procedures that can be used to monitor and measure performance against them.

Typically in construction organisations, an investigation of the effectiveness of SHE procedures will usually only be performed in case of an accident with serious consequences. These serious accidents occur only sporadically in most organisations and thus the effectiveness of relevant procedures will only be examined infrequently. This Guide recommends proactive measurement and audit in addition to a formal investigation procedure to respond to significant events during the project.

The PMO must also periodically review the overall performance of the management system (section 1 – status review) to ensure that it remains relevant to the project and that the results of monitoring, measurement and investigation are acted upon.

After organising and implementing the plan (section 4), the PMO should measure and monitor current performance (section 3) to verify that the goals and objectives have been met.

Measuring

Section 3 discusses the principles behind performance measurement. Wherever possible 'leading' indicators should be used, supported by 'lagging' indicators, based on historical results.

Measures must be compared against the targets set for the project, but can also be referenced against industry or organisational norms. Such benchmarking can provide a useful quick reference for all those involved in the project.

In addition to the reporting of performance measures, the PMO procedures must include mechanisms to ensure that those responsible for particular elements of the project are aware of the targets against which performance will be measured and how the measurement will be carried out, and to communicate performance throughout the project team.

Table 3.2 in section 3, page 26, is an example of a recording and communication system for SHE performance using a combination of leading and lagging indicators.

The following is an example of an internal monthly report

Example of an Internal Project Monthly Report				
Business Stream: Date: Project Manager: Business Stream: Date:				
Critical success factors for the month				
Risk / Issue	Impact	What needs or is being done about it		
-				
-				
-				
-				
-				
Commercial				
	Cost of Works (£)		Fee (Hours)	
	Current month	Previous month	Current month	Previous month
Budget				
Latest Allowed				
Committed				
Predicted Final				
Contingency				
Prediction	Next month	Month after	Month after that	
Budgeted Hours Spend				
Project Spend With Current Resource Allocation				

Progress	% Planned (Ex resource plan)	Physical % complete	% Hours burned (% budget spent)	Value (% complete / % hours burned)
Design				
Procurement				
Construction				
Overall				
Active critical path activities (<10 days float) (from programme)				
Key Issues				
Project management	Impact		Control means required	
-				
-				
-				
Design	Impact		Control means required	
-				
-				
-				
Construction	Impact		Control means required	
-				
-				
-				
Quality Control				
Date of last invoice		Date of last QIRI		Date of last customer feedback form
Amount		Date of next QIRI		Average score
Payments overdue				Items scoring < 3

Auditing

Performance monitoring must be proactive and will usually be in the form of an audit programme that looks at actual behaviour within the project environment to ensure that the project team, including contractors and subcontractors are following the plan and that the plan is effective, efficient and reliable.

The PMO will need to tailor the audit programme to suit the scale and nature of the particular project, but should plan to examine each stage of the project lifecycle and the management of the project as a whole. While a key focus will be the auditing of construction works, the other phases of the project must not be overlooked. Typical areas for examination include:

- project management
- design planning and execution
- procurement
- construction planning and execution
- commissioning and handover

The particular techniques required and the method of conducting and recording audits in each of these areas will be different and the PMO should give consideration to the following factors when developing the audit programme:

- What will the scope of each audit be?
- What skills and resources are required to carry out the different audits?
- How long will each audit take?
- When will the audits take place?
- What format will the findings take?
- How will the findings be communicated?

System Audit

SHE system audit on managerial level is a systematic and independent examination and verification of the suitability and effective implementation of the system to achieve the SHE policy and to evaluate the need for improvement or corrective action of the SHE plan. This audit would normally be executed by an experienced third party (external body). The frequency may be dependent on the findings of compliance audits and condition reviews.

Compliance audit

SHE compliance audit is a systematic examination and affirmative indication that activities on supervisory level are in compliance with the SHE plan and its purpose is to evaluate options for improvement and the need for corrective actions of the SHE plan implementation. This audit would normally be executed by an PMO audit team.

Appendix 5 provides an example of an compliance audit checklist.

Task Audit

The purpose of the task audit is to measure the actual effects of SHE management in operation at a task level. It measures what happens rather than compliance to prescription. Hence problems in the organisation will be unambiguously identified for corrective action.

Appendix 6 provides an example of a task audit checklist.

Investigating

During the project there will be significant events that could have an adverse effect on project performance. The most obvious event to consider would be an accident or incident such as a dangerous occurrence. However other events such as a failure to meet a design deadline, a lack of key information or late delivery of a project element can also have an adverse effect and may contribute to poor performance.

Accidents and incidents must be perceived as learning opportunities. Such events must be investigated to establish what happened and why. A documented process must be in place for reporting, investigating and analysing SHE incidents and significant near misses, to ensure appropriate action is taken to prevent recurrence. Each investigation should go through several distinct phases:

- recording and reporting of the event to a responsible person
- immediate actions to mitigate the effects of the event
- investigation to establish the facts of the event and its' immediate causes
- analysis of the causal factors to establish root causes and identify corrective actions
- implementation of corrective actions to mitigate the event and prevent a recurrence
- communication of the findings / learning points from the investigation

It is important to establish clear responsibilities for investigations before they occur and to determine the level of investigation required for each event.

For minor events such as first-aid incidents, it may be sufficient for them to be investigated by those directly responsible for the work or supply activity. However for significant events such as major injuries and late delivery of entire work packages, the investigation may need to be carried out by senior members of the project team and may require additional specialist support.

A Step-by-Step Guide to Health and Safety Investigations

Decision to investigate

All incidents should be investigated. However, the nature of the incident and its potential consequences should have an influence on the scale and extent of the subsequent investigation. Those immediately involved should investigate incidents with relatively minor outcomes that happen rarely, whereas incidents that could or did have serious consequences and could easily recur should be investigated as fully as possible by a diverse team.

Gathering the information

The aim is to gather as much information as possible about the immediate conditions and actions that influenced the occurrence of the event being investigated. The first set of important questions to ask is “Where?” “When?” and “Who?” This sets the scene of the investigation.

Once initial enquiries are satisfied it is important to gather further information about “How?” the chain of events occurred, taking note of the equipment involved and “What?” activities were being carried out.

The final stage of information gathering is to develop the raw information to include:

- find out if the working conditions were unusual
- establish what procedures were being followed
- determine the nature of any injuries sustained
- identify how any injury occurred
- determine what risk control measures were in place
- determine what maintenance had been carried out
- determine the extent of training received relevant to the activity
- examine the workplace layout
- question the materials, equipment, safety equipment and other factors that may possibly have influenced the event

Analyse the information

Analysis of the information gathered is a crucial step in understanding how an incident occurred and how recurrence can be prevented. Several techniques exist to assist in investigations, one of the simplest of which may be a fault tree analysis. In this approach, the information gathered is arranged to describe the sequence of events leading up to the incident occurring.

Through this approach it should be possible to determine events that are immediate causes of the incident occurring and trace back to the underlying root causes that contributed to the incident.

It is important to establish the causal agents at both the immediate level and the underlying root causes as action is required at both levels to prevent a recurrence in the immediate future and in the longer term.

Identifying suitable control measures

Once the causes have been established, alternative control measures can be identified to address both the immediate causes and the underlying root causes.

It is useful to consider whether similar events have occurred previously and the extent to which changes in procedures, equipment, materials and training have influenced the occurrence of events, however the main consideration should be to choose control measures based on the principles of prevention.

Action plan and implementation

Once new control measures have been identified and developed sufficiently for their implementation, an action plan should be developed. Actions should be SMART (Simple, Measurable, Achievable, Resourced and Time limited) to ensure that they are implemented.

The action plan must also be communicated and ownership established to ensure that it is implemented.

Based on HSG245 Investigating incidents and accidents, Health and Safety Executive, 2004, ISBN 0 7176 2827 2

Reviewing

At regular intervals the PMO should review the performance of the management arrangements through a Periodic Status Review (refer to section 1).

The PMO should ensure that audits have been carried out, investigations completed and performance measurement is taking place. Where actions have been identified through audits and investigations, the PMO should ensure that these have been implemented and that they have been effective in correcting performance and preventing recurrence.

Incidents and injuries should be reviewed to establish common causes or trends requiring management attention. Similarly, audits should be examined to identify common themes and issues.

This should prompt consideration of the management arrangements as a whole and the PMO should consider whether the arrangements are adequate given the results of measurement and auditing. Management review should also be forward looking and should consider whether there are significant risks or issues coming up that could have an adverse effect on project or performance. For example new legislative requirements, personnel changes or changes in project scope.

In addition, a Condition Review or Climate Survey will enable the PMO to assess the effectiveness of the overall SHE policy and management system. The intention of the condition review is to provide mechanisms which examine pro-actively the underlying cause of unsafe acts (i.e. not linked directly to the occurrence of an accident or incident). The condition review is basically a 'snapshot' of the SHE plan implementation.

Typical outline of Condition Review (Climate Survey)

- Phase I - safety poll
- The purpose of this is to collect and review the ‘statistical’ opinion of the perception of all employees towards the implementation of the SHE plan
- Phase II - condition survey
- This is a detailed continuation of the safety poll and its purpose is to collect and review the ‘statistical’ facts as experienced by all employees

The condition review is based on eleven Basic Risk Factors (BRF) covering human, organisational and technical issues.

Basic Risk Factor	Description
Tools and Equipment (TE):	Failures due to poor state or unavailability of equipment and tools
Design (DE):	Failures due to poor design of a whole plant as well as individual equipment
Maintenance Management (MA):	Failures due to poor quality of the maintenance procedures regarding quality, utility, availability and comprehensiveness
Procedures (PR):	Failures due to poor quality of the operating procedures regarding application, availability, easy to read
Error Enforcing Conditions (EE):	Failures due to poor quality of the working, social and cultural environment, regarding circumstances that increase the probability of mistakes
Housekeeping (HK):	Failures due to poor housekeeping
Incompatible Goals (IG):	Failures due to lower SHE priorities compared to other goals like time pressure and a limited budget
Communication (CO):	Failures due to poor quality or absence (of lines) of communication between the various regions, departments or employees
Organisation (OR):	Failures due to the way the project is managed and the company is operated
Training (TR):	Failures due to inadequate training or insufficient experience
Defences (DF):	Failures due to the poor quality of the protection against hazardous situations and inadequate emergency management system

The results of both the safety poll and the condition survey will be used to generate a BRF profile. This profile should identify shortfalls in the SHE plan and its implementation and enable priorities for action to be identified.

Appendices

Glossary of Terms

- Appendix 1: Typical design hazard and identification and risk assessment**
- Appendix 2: HAZOP**
- Appendix 3: Typical SHE management plan**
- Appendix 4: Typical PMO versus project organisation**
- Appendix 5: Compliance audit checklist**
- Appendix 6: Task audit checklist**

Glossary of Terms

Competent person: a person who is:

- appointed by the PMO or Contractor to ensure that the duty is carried out
- by reason of substantial training and practical experience is competent to perform the duty

Event: an occurrence or operational disturbance.

Hazard: the potential to cause harm, including ill health and injury, damage to assets, products or the environment, production losses or increased liabilities.

Hazard effect management process: the structured hazard analysis methodology involving:

- hazard identification
- assessment
- control and recovery
- comparison with objectives and acceptance criteria

To completely manage a hazard requires all four steps to be in place and reviewed.

ISR: Initial Status Review (ISR) - a baseline from which progress can be measured – see section 1

Job Safety Analysis (JSA): a procedure used to review job methods and uncover hazards that may have been overlooked in the layout or design of the equipment, tools, processes or work areas that may have developed after work started, that may have resulted from changes in work procedures or personnel – see section 5.

Personnel: any person involved in and affected by the company's operations. This can be a company and client employee, but also contractor staff, agencies and third parties.

PMO: Project Management Organisation – the organisation responsible for managing the overall project. The PMO's specific responsibilities and relationships with other parties will differ with the various procurement routes. Some responsibilities may be novated to a contractor. Within the UK, the PMO will often be the Principal Contractor with specific duties under the regulations.

Project: A project which includes construction work incorporating all planning, design, management or other work involved until the end of the construction phase – ie. this includes construction, alteration, conversion, maintenance, fitting out, commissioning, renovation, repair, upkeep, redecoration, decommissioning, demolition or dismantling. A full definition is available in the Temporary and Mobile Construction Sites Directive (92 / 57 / EEC) and relevant national legislation.

PSR: Periodic Status Review (see section 1)

Risk: the product of the chance that a specified undesired event will occur and the severity of the consequences of the event.

Risk assessment: the process of identifying hazards, analysing and evaluating risk. It involves both causal and consequence analysis and requires determination of likelihood and risk. Assessment is not an end in itself, it must lead to risk management where the risk is eliminated, reduced or controlled.

SHE: occupational safety, occupational health and construction environment

SHE incident: an event or chain of events which has caused or could have caused injury, illness and / or damage (loss) to assets, the environment or third parties. An incident involves the release or near release of a hazard.

SHE management: the application of organisational and management principles in order to assure with high confidence the timely realization of an optimal standard in terms of SHE.

SHE objective: the broad goals, arising from the SHE policy, that a company sets itself to achieve and which should be quantified wherever practicable.

SHE-MS: Management System for Safety, Health and Environment.

SHE performance: the degree of risk control, expressed as the ratio of actual executed SHE-related activities over planned activities.

SHE plan: documentation setting out the specific SHE practices, resources and activities for a defined period and / or project.

SHE policy: a public statement of the intentions and principles of the company regarding its SHE strategy, giving rise to its strategic and detailed objectives.

Appendix 1: Typical design hazard and identification and risk assessment

Project:

Discipline:

Phase:

Area:

Risk assessment number:

Drawing number:

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
	Access / egress	To specific work areas Onto site	<ul style="list-style-type: none"> • Provide safe means of access to all work areas at all times • Designate routes and methods for access, Traffic management plan • Identify key routes and methods in pre-construction SHE information, SHE file / manual (including any planning restrictions) 	
		Interfaces with Plant / Traffic	<ul style="list-style-type: none"> • Specify arrangements in tender documentation for warning staff at locations where they leave one site area and enter another site area with differing operational rules and / or constraints • Specify design arrangements in initial proposals / plans for enabling plant / traffic access for maintenance activities 	

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
2	Asbestos	Contaminated land Demolition Refurbishment of structures	<ul style="list-style-type: none"> • Where asbestos is likely, carry out survey to determine nature & location of asbestos • Inform Statutory authorities • Avoid or minimise disturbance to asbestos • Provide information on asbestos in pre-construction SHE information • Ensure disposal to a registered land fill site using licensed waste carrier with sealed containers • Provide information on asbestos and residual risks for maintenance and demolition in SHE file / manual 	
3.	Biological / Chemical health hazards	Anthrax Asbestos Leptospirosis Isocyanates Solvents etc	<ul style="list-style-type: none"> • Liaise with appropriate authorities • Provide information on uncommon risks in pre-construction SHE information • Provide information on uncommon residual risks in SHE file / manual. • Where possible avoid disturbance • Otherwise, minimise time and personnel spent working in the environment • Ensure appropriate disposal 	

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
4	Cleaning > 2 metres	Access / egress Safe system of work Working at height	<ul style="list-style-type: none"> • Design structures to enable safe access and egress to areas requiring cleaning • Design structures so that there will be a safe system of work for cleaning operations • Where possible design structures so that permanent edge protection exists for cleaning purposes • Provide information on access / egress, safe system of work and residual risks for cleaning in SHE file / manual. 	
5.	Confined spaces working	Asphyxiation, explosion, flooding, heat, humidity in: <ul style="list-style-type: none"> - existing confined spaces - confined spaces to be constructed / maintained 	<ul style="list-style-type: none"> • Wherever possible eliminate confined spaces from design • Reduce the need for entry into confined spaces during construction and maintenance • Provide information on residual risks in pre-construction SHE information, SHE file / manual • Consider control measures, method statement, risk assessment, permit to work, tag system 	

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
6.	Contaminated land	Contaminated ground Ground gas	<ul style="list-style-type: none"> • Examine ground investigation reports to determine nature and location of contamination • Check local authority and Client records to determine nature and location of contamination • Avoid or minimise disturbance to contaminated ground • Provide information on contamination in Pre-construction SHE information, SHE file / manual • Ensure disposal to an appropriate land fill site, using appropriate licensed waste carrier with sealed containers 	
7.	Demolition and site clearance	Existing structures	<ul style="list-style-type: none"> • Structural survey and study of existing construction details, including fragile roofing • Consider stability of partially demolished structures, eg. arches when planning work sequences • Plan and phase work to minimise effect on public (spread of dust, traffic routes) • Provide information on structure in pre-construction SHE information 	

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
			<ul style="list-style-type: none"> Specify site fencing and security around demolition area in pre-construction SHE information Ensure fencing does not block traffic routes eg.. maintenance traffic access, third party access to their land 	
		New structures	<ul style="list-style-type: none"> Design structures to facilitate a practical sequence for demolition works Provide information for subsequent demolition of structures in design statements, SHE File, Ensure demolition does not interfere with third parties eg. owner, general public 	
8.	Earthworks	Ground Movements	<ul style="list-style-type: none"> Examine ground investigation reports for design Minimise extent of earthworks Consider effect of earthworks on stability of existing structures and foundations – review by applicable design discipline where appropriate Provide information in documentation to allow contractor to design all necessary temporary works, monitoring systems, etc 	
		Contaminated ground, ground gas	<ul style="list-style-type: none"> Refer to Contaminated Land 	

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
9.	Excavation	Collapse Falls into Ground movements	<ul style="list-style-type: none"> Examine ground investigation reports for design Minimise extent of deep excavation Consider effect of excavation on stability of existing structures and foundations – review by applicable design discipline where appropriate Provide information in documentation to allow contractor to design all necessary support works, monitoring systems, etc Consider early installation of site roads / paving / ground conditions 	
		Areas prone to flooding	<ul style="list-style-type: none"> Liaise with authorities to predict possibilities of flooding Provide information in documentation to allow contractor consider safety in case of flooding Provide information on residual risk in pre-construction SHE information and tender documents 	
		Contaminated ground, ground gas	<ul style="list-style-type: none"> Refer to Contaminated Land 	

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
10.	Fire / explosion	General construction Confined spaces and tunnels	<ul style="list-style-type: none"> • Design structures using materials that are non or less combustible and do not produce noxious fumes • Avoid specifying or designing in the need for site welding, cutting or hot working methods where reasonably practicable. • Specify the use of enclosed plant and / or fire suppressant systems where appropriate. • Specify compliance with relevant fire legislation (eg in the UK - The Fire Precautions (Workplace) (Amendment) Regulations 1999) • Provide information on Control of Major Hazards sites within influencing distance of the construction works in pre-construction SHE information and tender documents 	
11.	Fragile surfaces / glazing	Demolition of existing structures	<ul style="list-style-type: none"> • Refer to Demolition and Site Clearance 	

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
	Fragile surfaces / glazing	Structures to be constructed	<ul style="list-style-type: none"> • Avoid use of fragile surfaces • Design structures to enable safe access / egress and a safe system of work to maintain or replace glazing units at height • Where possible design structures so that permanent edge protection exists to allow maintenance or replacement of glazing units at height • Provide information on access / egress, safe system of work and residual risks for maintaining / replacing glazing units in SHE file / manual • Refer to cleaning above ground level 	
12.	Lead	Demolition of existing structures Grit blasting of lead based paints	<ul style="list-style-type: none"> • Specify methods to minimise generation and spread of dust • Provide information on residual risks in pre-construction SHE information 	
13.	Mechanical lifting operations	Impacts	<ul style="list-style-type: none"> • Design works to minimise possible interaction with existing structures, highways, railways and services - review affected interface where appropriate 	

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
	Mechanical lifting operations	Loads	<ul style="list-style-type: none"> • Design works to minimise number of lifting operations • Design structural elements to include lifting points • Provide information on casting and handling requirements in documentation 	
14.	Maintenance	Access / egress Working environment, eg. Working space	<ul style="list-style-type: none"> • Incorporate maintenance requirements into design • Consider the use of high durability, low maintenance materials where appropriate • Consider access and egress for maintenance, safe systems of work, permit to work, isolations 	
			<ul style="list-style-type: none"> • Allow sufficient working space for maintenance, including proximity to overhead live equipment • Provide information on residual risks for maintenance in SHE file / manual and maintenance manuals 	

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
15.	Manual handling	Weight Size Availability of secure hand-holds Hazardous surfaces (rough / slippery) Unstable Confined spaces Difficult travel routes (e.g. corners, ramps, stairs etc) Temperature and humidity extremes	<ul style="list-style-type: none"> • Where possible specify systems which promote mechanical handling and minimise manual handling • Where manual handling necessary, select and / or design materials and components which meet requirements of current legislation • Ensure unit weights and sizes of materials (e.g. cement bags, building blocks, kerbs etc) are reduced to acceptable levels where manual handling is unavoidable. Specify easily achievable tolerances where possible 	
16.	Noise and Vibration	General construction	<ul style="list-style-type: none"> • Where possible specify construction techniques / equipment, that produce reduced levels of noise, eg, silent piling, plant with lower noise emissions, muffling of jack hammers and compactors • Specify in pre-construction SHE information limits in accordance with legislative requirements 	
		Commissioning	<ul style="list-style-type: none"> • Plan for steam blows and venting to be carried out outside work periods whenever practicable 	

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
17.	Pressure testing, hydrostatic / pneumatic / vacuum	Possibility of overload Possibility of sudden release	<ul style="list-style-type: none"> • Design foundations / structures to support the combined weight of the equipment and test medium • Where possible specify pressure test systems to maximise separation between active test area and other activities • Specify nature and location of security fencing where critical • Design structures so that effect of subsequent maintenance work is minimized • Where appropriate, assess risks to site personnel and public, evacuation and emergency services access; include in pre-construction SHE information and tender documents 	
18.	Public safety		<ul style="list-style-type: none"> • Phase construction works to minimise disruption to public (pedestrians and traffic) and to reduce conflict between adjacent construction sites • Design construction works to maximise separation between active work area and public • Specify nature and location of security fencing where critical 	

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
			<ul style="list-style-type: none"> • Design structures so that effect of subsequent maintenance work on public is minimised • Where appropriate, assess risks to public; evacuation and emergency services access, include in pre-construction SHE information 	
19.	Services	Overhead services Underground services	<ul style="list-style-type: none"> • Implement colour coding for service / product lines of; electricity, water, steam, gas, hydrocarbons, telecom cable, etc. • Agree positions of services with Client / utility providers at design stage, arrange disconnection if possible • Specify the use of cable location device to locate underground services prior to and during construction • Avoid service diversions and the need to work in the vicinity of services where possible • Identify requirements and / or constraints of utility provider and incorporate measures for safe construction, maintenance and demolition into design • Provide information on services and residual construction risk in pre-construction SHE information 	

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
			<ul style="list-style-type: none"> • Provide information on services and residual risks for maintenance and demolition in SHE file / manual • Always treat utility as gas, hydrocarbons, steam or electricity until otherwise proven • Liaise with Client / service provider • Remove all personnel from the area and secure the area • Warn occupants of potentially affected buildings 	
20.	Site plant / traffic	Emergencies, collisions, damage	<ul style="list-style-type: none"> • Secure sufficiently large site to allow for safe movement of plant with segregation of pedestrians • Phase the construction works to reduce the plant / personnel interface • Design works to maximise separation between operational plant and personnel • Where appropriate review by owner interface 	
21.	Substances hazardous to health	Carcinogenic diseases Respiratory injuries Skin diseases	<ul style="list-style-type: none"> • Identify substances hazardous to health during the design and control so far as reasonably practicable using the following hierarchy • Eliminate the hazard, by choosing another method 	

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
			<ul style="list-style-type: none"> • Avoid specification of known carcinogenic materials and substances where possible. Where no alternative, ensure that adequate information is available and provided in pre-construction SHE information. • Substitute with a less hazardous alternative Reduce the exposure to the work group Issue Personnel Protection Equipment as a last resort 	
22.	Temporary stability of structures	Existing structures affected by works	<ul style="list-style-type: none"> • Consider effect of construction works on stability of existing structures, – review by applicable design discipline where suitable • Provide information in documentation to allow contractor to design all necessary support works, monitoring systems, etc. 	
		Existing structures to be demolished	<ul style="list-style-type: none"> • Refer to Demolition and Site Clearance 	
		New structures to be constructed	<ul style="list-style-type: none"> • Design structures for stability at all stages of construction • Design structures for pre-fabrication of elements • Ensure contractor has sufficient information to produce suitable temporary works support system in pre-construction SHE information 	

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
	Temporary stability of structures	New structures to be maintained	<ul style="list-style-type: none"> • Ensure owner has sufficient information to design alterations to structures in design statements, SHE file / manual 	
		New structures to be demolished	<ul style="list-style-type: none"> • Refer to Demolition and Site Clearance 	
23	Unexploded ordnance	Bombs Shells Cartridges	<ul style="list-style-type: none"> • Obtain and inspect records held by Local Authorities and other sources • Survey sites to locate any recorded suspected ordnance • Prior to main construction works employ specialist contractors to clear site where needed • Provide information and warning in pre-construction SHE information 	
24	Working at Height	Falls of persons from height Falls of materials from height	<ul style="list-style-type: none"> • Design works to maximise prefabrication at ground level • Design works to minimise time working at height • Design works to enable safe access and egress • Design structures so that permanent stairs, walkways and edge protection are constructed as early as possible 	

	Hazard	Aspects of hazard	Mitigation / Actions	Controls
25	Working over or adjacent to water	Falls of persons into water	<ul style="list-style-type: none"> • Design works to minimise time spent working over or adjacent to water • Design works to enable safe access and egress • Design structures so that permanent stairs, walkways and edge protection are constructed as early as possible 	
26	Working with or near to electricity	Services	<ul style="list-style-type: none"> • Refer to Services 	
		Installation of electrical supplies	<ul style="list-style-type: none"> • Design so that live work is never necessary 	

Appendix 2: HAZOP

HAZOP: Guide to best practice

This appendix has been adapted from HAZOP: Guide to best practice, Institution of Chemical Engineers, 2000, ISBN 0 85295 427 1.

Hazard Study one - concept stage hazard review

In this first study, the basic hazards of the materials and the operation are identified and SHE criteria set. It identifies what information is needed and the programme of studies required, to ensure that all safety, health and environmental issues are adequately addressed. The aspects covered may include reaction kinetics, toxicity data, environmental impact and any special process features that need further evaluation. In addition, any constraints due to relevant legislation are identified. A decision may be taken on which of the remaining hazard studies (two to six) should also be undertaken. It is also important at this stage to apply the principles of inherent SHE within the design.

Application of Principles

Hazard Study 1

A study to ensure that the understanding of a project, the process and the materials involved is sufficient to enable safety, health and environmental issues to be properly assessed. Hazard Study 1 contributes to key policy decisions. It also ensures that contacts are established with the functional groups, site management and the authorities who may contribute to, or impose constraints upon the development of the project. Also see 3.4 and 5.1.5 regarding curtailment.

This is the first formal study applied to all projects. However, a preliminary study may be useful early in the development of new products to highlight, for example, inherent Health, Safety and Environmental issues.

Key aspects for Hazard Study 1 should include:

- ensuring there is a clear understanding of the objective and scope of the project / process
- reviewing information on any previous incidents on the plant being studied, or those elsewhere which use the same technology
- collecting information on the physical properties and safety, health and environmental hazards of all chemicals and materials involved (individually and in combination)
- providing a broad appreciation of the hazards of fire, explosion and harmful releases (e.g. toxic gases, effluent, radioactivity, bio-hazards etc)
- reviewing application of the concepts of inherent safety, health and environmental protection
- reviewing the draft 'Environmental Impact Assessment' (see ICI Process SHE Guide No: 13) for the project and ensuring that this covers all relevant on-site and off-site environmental issues
- ensuring that the project meets Company policy and objectives for health, safety and environmental performance
- reviewing the 'Occupational Health Statement' for the project
- reviewing on-site and off-site transport for raw materials, intermediates, products and wastes
- identifying and considering the interaction of the project with other plants, buildings, services and activities both on-site and off-site
- considering the human and organisational aspects of the project and the subsequent operation, including project design and management and emergency services
- reviewing the application of national legislation and considering other aspects of regulatory approval and consents
- setting criteria for safety, health and environmental aspects of the project to comply with relevant Company guidance (eg. on the Tolerability of Risk and on Environmental Standards)
- reviewing which Codes of Practice apply, including Engineering Codes of Practice, both published and being developed

- agreeing the extent and timing of further Hazard Studies, and the need for any additional specific studies or assessments (e.g. Chemical Process Hazards, Quantified Risk Assessment, Computer Hazards, Pressure Relief and Blowdown or Construction / Demolition Hazards, Design Safety Review)

Team

The leader of Hazard Study 1 should have received recognised training and normally be independent from the project team. The team composition should be proposed by the Business and Project Managers and agreed by the Hazard Study Leader. It should normally include:

- Hazard Study Leader
- Business Manager (Responsible Executive or Nominee)
- Project Manager
- Appropriate Functional Engineer(s) eg. Process Engineer
- Operations or Site Representative
- Safety Advisor
- Occupational Hygienist (or other representative of the Occupational Health function)
- An Environmental Adviser or Specialist
- Chemist (where appropriate)
- Construction representative, where major construction / demolition work is involved

The full team should agree the final outcome of Hazard Study 1. Separate subgroups may be formed to progress specific parts of Hazard Study 1.

Responsibilities

The Business Manager (Responsible Executive or Nominee) is responsible for ensuring that Hazard Study 1 is initiated, documented and completed.

The Project Manager is responsible for ensuring that all actions identified in Hazard Study 1 are completed.

The Hazard Study Leader is responsible for the thoroughness of the study and the standard of the documentation produced.

Timing

The completion of Hazard Study 1 at an early stage in the project is essential.

Since Hazard Study 1 defines the key parameters for the project on safety, health and environmental issues it should be completed prior to the production of a sanction estimate on every project.

Documentation

A report should be prepared and issued for use by all those involved in the specification, design and operation of plant, as soon as practicable, giving details of the information still lacking. Outstanding actions should be reviewed at the commencement of Hazard Study 2. A copy of the report should be included in the Project Health, Safety and Environment Master File.

Curtailment

In some cases where there are no hazards inherent in the chemicals, process conditions, equipment, buildings, services, operations, or their environment, it may be inappropriate to apply the full procedure and carry out every one of the Hazard Studies. Where it is decided that the procedure can be safely curtailed this should be agreed by the Responsible Executive. Such curtailment and the basis for the decision should be recorded in the Project Specification and in the record of Hazard Study 1 in the Health Safety and Environment Master File. Outstanding actions should be completed, and their documentation filed in the Master File.

Action Arising

A large number of actions can arise from Hazard Study 1. It is important that the Hazard Study Champion / Project Manager, as appropriate, institutes formal review meetings on a regular basis to monitor progress on these.

Hazard Study 2

This study helps to identify significant hazards, providing the opportunity for their elimination by redesign. Where this is not practicable, it ensures that any protection measures needed to meet the relevant criteria are provided. This study establishes the Basis of Safety for plant operation.

The study produces most of the information and assessments needed to meet the requirements of the regulatory authorities on safety, health and environmental protection.

Key aspects for Hazard Study 2 should include:

- consideration of any impact (either safety, health or environmental), which the project may have either on-site or off-site)
- identification of significant hazards with special attention being paid to loss of containment which could lead to toxic, flammable, biological or explosive hazards to employees or the public, or to environmental pollution
- identification of those changes to process conditions which could lead to the consent level for gaseous, liquid or solid effluents being exceeded
- a review of the measures proposed to prevent employees being exposed to either chronic or acute health hazards
- production of information which can be used in other Health, Safety or Environmental related studies and design procedures e.g. trips and alarms, pressure relief etc

The study will form the basis for discussions with regulatory authorities.

At the end of Hazard Study 2 all project information necessary for the completion of the Environmental Impact and Occupational Health Statements should have been assembled.

The Basis of Safety should also have been identified for each part of the process. This consists of a thorough identification of the hazards in the process and an explicit statement of the protective measures proposed to minimise risk - in many cases this is the specification of the relevant design codes.

Appendix 3: Typical SHE management plan

Typical contents of SHE Management Plan

Plan Structure

Critical areas of the plan should include the following key items as a minimum

Project Management System Structure

The plan will outline the main structure of the management system, its relationship with other company / organisation arrangements (eg. the Quality Plan, Project Execution plan), its relationship to and with other key stakeholders management arrangements in particular the system as implemented by the Client organisation, and finally its relationship to and with the application of key international management systems and arrangements.

Project Scope and outline definition

Clearly specified within this section shall be all aspects of the project, the details of all applicable parties and responsibilities of those company's / organisations contracted to undertake work, critical timelines, geographic / location references, pricing structure, prime function of project, contractual relationships.

Roles & Responsibilities

The organisation and roles and responsibilities of all parties and project personnel shall be identified with particular emphasis on the achievement and daily management of the aims and objectives of the project. The plan will specify not only the legal requirements of all parties, but also those requirements as specified by the Client and how these are to be achieved, the contractual responsibilities of all individuals in the employ of the organisation / project, the expectations to be applied by all contractors and suppliers, and the disciplinary arrangements in the event of any failure to comply with the roles and responsibilities defined. Also specified shall be the core requirements of each and every person

employed on, for and through the project from conception to final completion and handover.

Key Interfaces & Co-ordination with all Project Stakeholders

Following on from the key roles & responsibilities section shall be the outline details of all organisations connected with the project at all stages of the project and the arrangements by which all interfaces shall be effectively managed. This will include arrangements for risk communication and control, period reporting, activity planning and execution etc.

Critical also to this section shall be the arrangements for liaison with all external stakeholders including local communities, private organisations, enforcement authorities, key action groups, local and other governmental authorities and on-going communication and liaison with the general public.

Applicable standards, procedures, and legislative references

A summary and detail as necessary shall be made of all key controls in the execution of all project activities, including critical risk management arrangements through design, construction and commissioning activities. Reference shall be made to the application as necessary of all Client minimum expectations, National & Local legislative control and authority plus those details of all standards, procedures, instructions etc as developed and implemented by the project.

Key Training & Competency Requirements

A full and detailed inventory of all minimum training and competency requirements shall be specified and which shall be standard and applicable across all organisations including the arrangements for project induction, management and supervisory training, technical based training, specific risk control and mitigation training, and the training of all personnel and organisations in the requirements of the overall plan, the policies and minimum expectations, and any particular, significant and key standards and other controls as identified for the control of any specified site activity. The behavioural expectations and training plan as appropriate shall also be detailed.

The minimum competencies of all disciplines and key personnel shall be specified with a robust and on-going assessment process defined.

All training arrangements in the planning and execution of all emergency arrangements and controls shall be specified.

Support & technical resource

Full details of the organisation in place to provide competent information, support and counsel shall be specified and which shall make reference to the minimum competency expectations of this resource. This will include and make reference to project resource at a local level, the corporate resource available, plus the expectations in terms of competent resource within other key stakeholders and project parties in particular the support available to other contractors and suppliers. How these interfaces are managed shall also be specified.

Detailed also shall be the arrangements by which personnel can obtain technical data through electronic or other media applications.

Hazard Inventory & Risk Profile

A full and detailed profile shall be available identifying and recording all key and significant hazards and risk mitigation including and links to training and key reference and control criteria. The arrangements by the inventory is updated and communicated shall also be specified.

Promotion & Communication & Meetings

The arrangements by which issues are identified, communicated and briefed shall be clearly detailed. This will include the types of media used, the on-going briefing process, links to key activities and organisations and the role that all individuals and organisations are expected to play and participate in the promotion and communication of issues shall be specified.

The regular an on-going meeting and interface management arrangements shall be specified in a matrix. This will include the key attendees and stakeholders in each meeting, the aims and expectations, key agenda issues, the management and action tracking of key meeting outcomes,

and the cascade process for the escalation of all significant meeting issues and subsequent follow up and de-briefing arrangements.

Reporting & Measurement

The regular and minimum reporting requirements shall be specified across all project and activities and organisations including a full suite of minimum criteria including all relevant Client, Project and other organisation key performance indicators leading and trailing metrics, key scheduling for all reports and the dissemination criteria of all relevant data with reference to the client and Project document control arrangements.

Audit & Review

The regular scheduling of reviews and audits shall be specified in a project matrix showing key interface and liaison requirements and interfaces across other stakeholders and organisations.

The key competency requirements of all personnel involved in the audit and review process shall be detailed. Also included will be the reporting arrangements and tracking process for all audits / reviews undertaken.

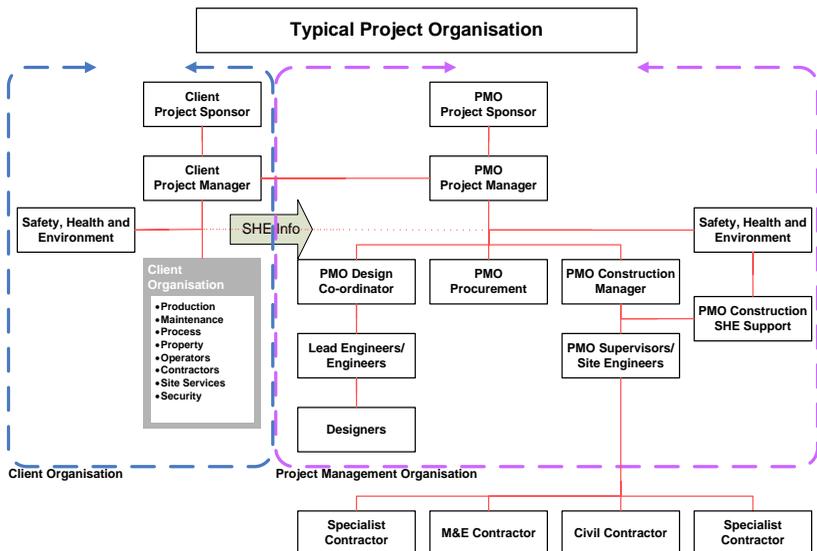
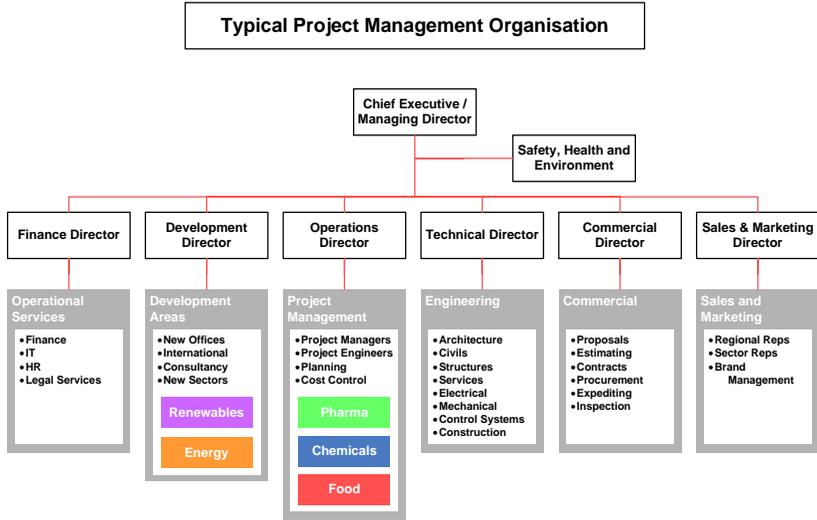
Critical to the audit and review process shall be its alignment to the risk profile and significant activities of the project.

Contractor & Supplier Management

The minimum expectations selection criteria for sub-contractor / supplier assessment both pre-contract award and post contract award shall be specified. Detailed shall be the on-going monitoring arrangements of the performance of these organisations and the contractual disciplinary arrangements for failure to meet the expectations of the Client and the arrangements as specified by the project through the plan.

Appendix 4: Typical PMO versus project organisation

Corporate and project based organisations showing SHE embedment



Appendix 5: Compliance audit checklist

1.0 Set Project Policies / Objectives

1.1 Policy Objectives and Corporate Acceptance of Responsibility				
	Yes	Partly	No	N/A
Is there a fully endorsed statement of health and safety commitment for the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have health and safety goals and objectives for the project been defined?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				

2.0 Involvement of the Workforce

	Yes	Partly	No	N/A
Have arrangements been agreed for consulting, involving and communicating with the workforce on health and safety?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is there a plan to involve Employee Safety Representatives in specific health and safety management activities? (e.g. performance monitoring and reviews, worksite inspections, audits and accident and incident investigations)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have Employee Safety Representatives been consulted on and participated in these discussions and agreements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				

3.0 Plan and Set Standards

3.1 Hazard Analysis and Controlling Risks				
	Yes	Partly	No	N/A
Have all interested parties agreed a process for identifying and assessing health and safety hazards that may arise from the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have arrangements for identifying, assessing and controlling the health and safety risks arising from the work of third parties been defined and agreed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have the parties confirmed that all significant workplace and project risks arising from the project have been identified, assessed and documented and appropriate controls and recovery measures put in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have all job specific risk assessments, including manual handling, COSHH assessments, etc been completed and documented?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have the parties agreed how the results of risk assessments will be communicated to appropriate personnel?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has a check been made to establish the statutory health and safety provisions relevant to the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have the parties identified and drawn up a list of their respective systems, policies, standards, procedures etc which they propose to apply to manage the health and safety risks arising from the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has a review of the content of the agreed standards, procedures etc, been carried out to confirm that the arrangements and controls in them comply with the law, are adequate to manage the health and safety risks, and do not present any conflicts which may prejudice health and safety?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are processes in place to ensure that all work equipment and plant is suitable for its purpose and maintained in an efficient state, efficient working order and in good repair?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have QA, certification and / or verification requirements with respect to materials, plant and equipment to be used been met?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Yes	Partly	No	N/A
Have arrangements been agreed and defined for reporting any known hazard or risk related deficiencies with work equipment or plant?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have arrangements been agreed and defined for ensuring that materials hazardous to health are identified, risks arising from exposure adequately assessed, and suitable controls applies? (Including the necessary information, instruction and training)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				

3.2 Competency and Training				
	Yes	Partly	No	N/A
Have arrangements for selecting, placing and assessing personnel with the necessary competencies been discussed and agreed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is there a system to confirm that all personnel involved in the shared project have the necessary competencies to fulfil the requirements of their job / role?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have specific arrangements for induction training, additional health & safety training, and emergency response training been defined and agreed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				

3.3 Control of Change				
	Yes	Partly	No	N/A
Is there an agreed method of developing, agreeing and keeping under review the programme for execution of the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have responsibilities and arrangements been defined for managing changes which may impact upon health and safety? (eg. changes to work programmes, plans, key personnel, work instructions, method statements, materials and equipment, health and safety standards and procedures, etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				

3.4 Selection and Control of Third Parties				
	Yes	Partly	No	N/A
Have arrangements been defined and agreed for qualifying and selecting third parties in terms of their health and safety management capability and performance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have arrangements for interfacing with third parties been defined and agreed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have the parties verified that suitable Interfacing Arrangements with third parties have been established and documented? (and tested by a check similar to this one?)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				

3.5 Control in Emergencies				
	Yes	Partly	No	N/A
Have the parties' respective responsibilities for emergency response, including evacuation and rescue, and onshore / offshore emergency control and recovery been defined and agreed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has the information to be communicated between parties and to third parties in the event of an emergency been defined and agreed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is there an agreed schedule of emergency exercises and drills?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				

3.6 Occupational Health				
	Yes	Partly	No	N/A
Have arrangements for ensuring that personnel meet the standards of health and fitness required by the job, including pre-employment health screening, drug and alcohol abuse policy, smoking, hygiene and welfare, been defined and agreed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have any additional health & fitness requirements specific to the project been identified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are health screening and monitoring arrangements required?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				

4.0 Measure performance

4.1 Active Monitoring				
	Yes	Partly	No	N/A
Has a set of key health and safety performance indicators been agreed, and has a system been set up to gather, collate and analyse the information and report it to all parties?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have project health and safety targets been agreed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have arrangements for the regular review of health and safety performance against targets been agreed and defined? (Including implementation of improvement actions and shared learning)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is there an agreed schedule of health and safety meetings at all levels within the project? (With agreed scope and participants)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is there a structured health and safety monitoring system in place? (Including observation of work behaviour, worksite, plant and equipment inspections, joint management visits etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does worksite health and safety monitoring cover all work tasks materials, equipment and plant, relevant to the project, including the work tasks, equipment etc of third parties?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				

4.2 Investigation and Recording of Accidents and Incidents				
	Yes	Partly	No	N/A
Have the arrangements and responsibilities for accident and incident notification (both internally and to the authorities) been defined and agreed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have arrangements for investigating and reviewing accidents and incidents, including cases of occupational illness, been defined and agreed? (Including arrangements for communication, tracking and implementation of corrective actions and shared learning.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				

5.0 Audit and Review

5.1 Audit, Review and Apply the Lessons				
	Yes	Partly	No	N/A
Is there an agreed programme for health and safety audits and management reviews? (including arrangements for tracking and implementation of audit and review actions)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has participation in and the scope of health and safety audits and management reviews been defined and agreed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do health and safety audits cover effective implementation at all levels within the project? (Including the health and safety management of third parties)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is there an agreed programme for reviewing the effectiveness of the Interfacing Arrangements? (Including periodic review and update of relevant documentation and demobilisation and close out reviews)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is there an agreed programme for joint management review of health and safety performance and confirming the achievement of agreed targets and improvement plans?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have arrangements for communicating lessons from audits and management reviews to relevant personnel, including senior management, been defined and agreed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				

Appendix 6: Task audit form

Safety Audit Form

Area / Project:

Carried out by:

Number of people observed:

Date:

Subcontract Companies:

Item No.	Observation	Action	Injury Potential H, M, L	Priority A, B, C	Date action complete
1	Work at Heights				
2	Work Methods				
3	PPE				
4	Fire Hazards				
5	Scaffolding & Access equipment				
6	Housekeeping				
7	Welfare				
8	Procedures				
9	Tools & equipment				
10	First Aid Arrangements				
11					
12					

Key

Injury Potential	Timescale Priority
H - High e.g. Electric shock	A - Immediate action (48) e.g. Housekeeping
M - Medium e.g. Twisted ankle	B - Within 2 weeks
L - Low e.g. Minor cut / bruise	C - Over 2 weeks (time to be specified)

Safety Tours – The six principles

Inform local management /supervision of your visit	Help employees understand and achieve high standards
Look for unsafe acts and talk to people about them	Fix as much as you can there and then
Keep audits brief but frequent e.g. 30 minutes every 2 weeks	Follow up and close out actions

Safety Observation Tour Checklist / Ratings

Date:

Main contractors:

	Observation	above average	acceptable	action required	Guidance
1	Head				PPE & CLOTHING Provision of effective barrier Reflects state of mind Compliance? Identified in Risk assessments? Clearly Specified? Condition of PPE? Type / Suitability?
	Eyes				
	Ears				
	Breathing				
	Body				
	Hands				
	Feet				
2	Evaporative acts				POSITIONS OF AND REACTIONS OF PEOPLE Evaporative acts: stopping / leaving job, attaching grounds / lockouts / rearranging job, changing position suddenly, adjusting / adding PPE Injury causes - Striking against, being struck by, being caught in, on, between. Falling at same or to different level. Contacting temp extremes. Contacting electrical current. Inhaling, absorbing through skin. Swallowing harmful material. Overexerting. Questioning attitude - What if the unexpected happens? How can this job be done more safely?
	Injury causes				
	- Safe positioning				
	- Work methods				
	- Actions / omissions				
	Questioning attitude				
	Awareness				
	Supervision				
	Management				

	Observation	above average	acceptable	action required	Guidance
3	Right for Job				TOOLS / EQUIPMENT Right for the job? Used correctly? In safe condition? Right for the job? Used correctly? In safe condition?
	Correct use				
	Good condition				
	Employees using or operating equipment				
4	Adequate for the job?				PROCEDURES (Standards) Permits, HSP, Method statements, Risk Assessments, Audits, Modifications, Inspection records, Authorised users of equipment, training
	Established?				
	Maintained / Updated?				
5	Standards established?				ENVIRONMENT/ ORDERLINESS Housekeeping, dust vapour gas smells, temperature, noise, storage, fire hazards, obstructions, floors
	Standards understood?				
	Orderliness maintained?				

Any category rated 'Action Required' should be expanded on Safety Audit Form
Numbers shown under Action refer to observations on Safety Audit Form



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