

BSI Standards Publication

Occupational health and safety management systems – General guidelines for the application of ISO 45001

Part 3: Guidance on incident investigation



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Summary of pages

This document comprises a front cover, and inside front cover, pages i to ii, pages 1 to 14, an inside back cover and a back cover.

Introduction

Based upon the facts that are discovered, the incident investigation needs to establish the:

- immediate and root causes of the incident;
- deficiencies and/or inadequacies in the relevant risk assessments and control procedures; and
- need for preventative measures and any necessary improvements in the occupational health and safety (OH&S) management system to prevent similar incidents.

There are also legal, moral, societal and business reasons for carrying out an investigation.

Scope

This British Standard describes the intent of individual clauses in BS ISO 45001 and provides guidance to help organizations implement an accident/incident investigation process based on BS ISO 45001.

NOTE This British Standard does not add to, subtract from, or in any way modify the requirements of BS ISO 45001, nor does it prescribe mandatory approaches to implementation.

Normative references 2

There are no normative references in this document.

Organizations can use this document without direct reference to BS ISO 45001, however, organizations that wish to claim conformity to <u>BS ISO 45001</u> need to refer directly to <u>BS ISO 45001</u> when using this document.

Terms and definitions 3

COMMENTARY ON CLAUSE 3

There are a number of terms defined in BS ISO 45001, including commonly used terms. However, when using BS ISO 45001 it is important to take note of these technical definitions to ensure there is no misunderstanding in its application. For example, small businesses do not always realize that the term "organization" refers to small businesses as well as larger companies (or public bodies, charities, etc). Organization can also be used to describe one part of a business, e.g. one department or one site - if that is the extent of the OH&S management system. Similarly, the term "top management" refers to whoever directs or controls the organization – the top level decision maker(s). In practical terms, top management can mean a small business owner, the executive board or, in a non-hierarchical structure, everyone involved in taking high level decisions.

The definition of "worker" is also worth noting. In <u>BS ISO 45001</u> worker is all-inclusive and refers to everyone working under the control of the organization, including business owners, executive boards, senior managers, interns, volunteers, all employees and contractors.

All of the terms and definitions within <u>BS ISO 45001</u> can be found on the ISO Online Browsing Platform: <u>http://iso.</u> org/obp [Last viewed 31 July 2018].

For the purposes of this British Standard, the terms and definitions given in BS ISO 45001 and the following apply.

3.1 immediate cause

obvious reason for an adverse event

For example, wrong valve opened, guard removed.

3.2 root cause

initiating event or failing, from which all other causes or failings spring; or an initiating cause of either a condition, or a causal chain, that leads to an outcome or effect of interest

NOTE For example, failure to identify training needs, assess competence, plan to assess risks.

4 Context of the organization

Organizations can improve the effectiveness of accident/incident investigation by proportionate and focused consideration of their context. Both external and internal factors are likely to be relevant.

Relevant external factors could include:

- a) relevant legal and other requirements, e.g. RIDDOR [1], industry standards;
- the expectations of external parties (e.g. openness), such as customers, suppliers, contractors, trade associations, relevant trade unions, members of the public, emergency services; and
- c) supplier changes to product/equipment specifications, and how these are communicated.

Organizational size, complexity and the nature of its health and safety risks are all relevant internal factors. Other internal factors might include:

- 1) the internal culture of the organization, e.g. a no-blame approach and willingness to learn lessons;
- 2) the expectations of workers, e.g. worker involvement (including worker representatives where they exist) in investigations; and
- the need to ensure and maintain effective organizational competence and control in identifying and implementing corrective actions.

Any recent changes within or external to the organization that might have contributed to the incident should also be taken into account.

5 Leader and worker participation

For an investigation to be effective and support a positive culture, it is essential that top management encourage and support the workforce to be fully involved.

The organization should take into account the complexity and potential level of risk according to the type of hazards within the organization in order to determine the appropriate approach.

Depending on the level of the investigation required (and the size of the organization), supervisors, line managers, health and safety professionals, trade union safety representatives, worker representatives and top management could all be involved.

A team approach to investigating incidents helps the organization involve appropriate workers in the investigation, and ensures that the correct people in the organization are aware so that other implications for the business can be considered and improvements can be identified and implemented.

NOTE There are legal requirements on involving safety representatives in accident/incident investigations and providing information on the outcome and actions taken.

Planning

6.1 Planning for investigations

To aid effective reporting and investigation, it is useful to have pre-defined criteria agreed by the organization, and documented, which address:

- types of incidents (e.g. injury, ill-health, property damage, near miss) and associated methods of notifying and reporting (some ill-health conditions have a long latency and this needs to be taken into account when planning criteria);
- b) to whom, when and how the occurrence of incidents is to be reported (internally and externally) and investigated, bearing in mind the potential significance of the incident; when planning the investigation of health conditions this might require additional considerations such as what the investigation procedure should cover, e.g. evidence of direct cause and effect, records of health or medical surveillance, if appropriate, the literature review on exposure and health effect and timeline, whether the health effect physical or psychological, evidence-based explanation for management and affected parties;
- c) who internally and externally is to be contacted to take charge of the investigation, and how, dependent on the type of investigation;
- d) defining and communicating the expected levels of investigation, in terms of resource allocation, depth and overall approach;
- the tools and techniques to be used by those carrying out the investigation;
- the competency levels needed by those involved in investigating and investigation report f) preparation;
- the process for reviewing recommendations and implementing actions; and g)
- h) the process for drafting, approving and signing off the report prior to release.

Pre-investigation actions

The organization should put in place arrangements for reporting incidents as soon as possible to a designated person(s) in the organization responsible for:

- taking steps to ensure continuing risks are assessed;
- b) making the incident scene safe;
- treating casualties; c)
- d) making the incident scene secure; and
- e) reporting internally and externally on the incident.

NOTE Not all investigations are "immediate" following an incident. Some might be repeated over time and only come to light when a health effect is reported.

Arrangements for assessing risks, making safe and treating casualties 6.3

The organization should put in place arrangements to ensure that the first people on the scene can assess any risks and make the scene safe, including requesting emergency services assistance if required.

Once it is determined that it is safe to do so, appropriate actions should be taken to make the scene of the incident safe, e.g. by isolating any electricity to the area or machinery. The priority should then be to give first aid to any casualties and await emergency services if they are needed. Depending on the circumstances and seriousness of the situation, the organization's emergency procedures or disaster

recovery plan might need to be implemented at this stage, along with the assembly of a disaster recovery team.

NOTE If the incident has led to a fatality, the incident scene could potentially be a crime scene.

6.4 Planning to make incident scene secure

The organization should put in place procedures to ensure vital evidence can be preserved by ensuring it is not unnecessarily disturbed or degraded, or where this is necessary, recording it as accurately as possible, e.g. by photography, video, a scaled sketch, written description or marking its position in situ, before it is moved. The procedures should also make provision for ensuring the scene can be secured at the earliest possible stage. This should not take priority over rescue work, treating casualties or making the incident scene safe.

Where the incident has occurred on a worksite, the primary scene (the actual location of the incident) should be secured at the earliest possible stage following the incident, in order to preserve relevant information, e.g. by locking access to a particular room, or taping off access to a work area. Where the emergency services decide it is appropriate, they will take control of a serious incident.

6.5 Reporting

In a larger organization it is useful to have a matrix setting out who should be contacted for specific types of incidents (see Annex A). This should include:

- a) internal and external parties;
- b) relevant contact details; and
- c) who reports what to whom.

In a smaller organization this might be as simple as contacting the emergency services and the owner/manager.

Even in the smallest organization, employees should know who to contact if the designated person is not available. Examples of those who might need to be contacted include:

- 1) emergency services;
- 2) next of kin;
- 3) regulators;
- 4) relevant managers;
- 5) insurers;
- 6) human resources;
- 7) head office; and
- 8) worker representatives, where they exist.

This information should be easily available.

7 Support

7.1 Resources and competence

The organization should provide resources and competent investigators. This could include training for workers to take part in incident investigations.

NOTE In organizations where there are few incidents to investigate, investigating non-serious incidents could be a way of maintaining investigating skills and competence.

7.2 Communication

The organization should determine how, when and to whom it communicates findings and lessons learnt from incident investigations. This includes workers, and their representatives (where they exist), contractors and other interested parties.

7.3 Documented information

The method, format, content and retention policy of investigation reports and associated paperwork (such as witness statements) should be:

- a) appropriate to the complexity of the organization, e.g. this could be a blank piece of paper, or for a more complex organization, pre-printed witness statements, or even recording or electronic recording facilities;
- b) available when needed;
- c) secure (this includes protection of confidential data in line with relevant legislation and ensuring it is easily accessible); and
- d) reviewed in line with the OH&S management system requirements.

8 Operation

8.1 General

When an incident is reported the following steps should be taken in proportion to the severity of the incident, to ensure that an effective investigation takes place, including recommendations of actions necessary to prevent recurrence.

- a) Ensure a prompt response.
- b) Maintain and secure the evidence.
- c) Determine and collate the facts.
- d) Determine the immediate and root cause(s).
- e) Make recommendations.

8.2 Response to an incident being reported

8.2.1 Prioritize incident investigation

All incidents should be investigated in a timely and proportionate manner.

A risk assessment process should be used to identify those "critical incidents" where better controls are most needed as a priority, and where a more thorough investigation or additional assistance/competence is required.

With a less critical incident, e.g. paper cut requiring stitches, with no previous similar incidents, the facts and remedial actions could be established during the recording of the incident, and then this record reviewed by the designated person to confirm its adequacy.

8.2.2 Determine who to report to and who investigates

Who to report to and who is part of the investigation process depends on the potential severity of the incident. Reference to a matrix developed in the planning stage can be useful (see <u>Clause 6</u>).

When a team approach is taken to investigate the incident, team members should ideally not have been directly involved in planning or managing the tasks associated with the incident.

8.3 Maintain and secure the evidence

Initially, the site should be made safe before ensuring that, wherever possible, equipment at the scene and conditions at the time of the incident remain unchanged and not moved. As each piece of evidence is moved, the scene begins to change and vital information is lost.

8.4 Determine and collate the facts

8.4.1 General

Under the direction of the team leader, the team should decide on what is required, ensuring that all relevant activities are allocated to named team members, such as:

- a) identifying witnesses and organizing statements;
- b) photography;
- c) equipment checks;
- d) acquiring relevant documentation and records;
- e) working and surrounding environment; and
- f) identifying interested parties/experts.

NOTE 1 The above might not occur in the order listed.

NOTE 2 Some occupational health conditions might be reported a long time after any specific incident but still need investigating even though there might no longer be a scene or witnesses.

8.4.2 Interview witnesses and other key personnel

NOTE Witnesses are those present at the scene leading up to and/or at the point of time the incident occurred and who saw what actually happened.

The interview process, in terms of resource allocation, depth and overall approach, should be proportional to the health and safety significance of the incident and the size and complexity of the organization.

Witnesses should be identified and interviewed as early in the investigation as possible whilst their recollection is fresh.

It should be borne in mind that different witnesses could have a different recollection due to factors such as their location, and their frame of mind at the time. Interview of a witness might need to be delayed if workers are injured, ill or psychologically traumatized and require treatment.

Other key personnel to interview should include those:

- a) in the vicinity who might have seen, heard, felt or smelled something relevant;
- b) with knowledge of the incident or surrounding circumstances; and
- c) who can corroborate the actions of others and/or validity of data gathered.

The investigation team should avoid prejudging and/or making assumptions about both worker(s) and situations, as this could result in the investigator leading witnesses and receiving answers which they desire rather than the actual facts.

A suitable location should be selected for witness interview, providing privacy and freedom from interruption or distraction.

The interview process, in terms of resource allocation, depth and overall approach, should be proportional to the health and safety significance of the incident, size and complexity of the organization. In simple cases, brief written statements of the facts might remove the need for formal interviews. For more complex incidents where a more formalized response might be needed to

> prevent a recurrence, formal interviews, supported by brief written statements prior to interview, could help the interview team prepare for the interview.

> The needs of individuals should be considered and appropriate support provided, and reasonable adjustments made.

Workers should be interviewed separately, and at the end of the interview the interviewee should confirm the facts and sign the statement to indicate that it is an accurate reflection of the interview.

8.4.3 Inspect the scene

Wherever possible, the scene at the time of the incident should remain unchanged until records (e.g. photographs, written notes) have been made (see 8.2).

Early inspection of the scene, if safe to do so, allows investigators to make and record initial observations, e.g. positional information, physical condition of premises/plant/equipment, substances present and also the work environment, such as weather, temperature, humidity, light, noises and odours, including sampling and testing.

There might be unavoidable delays in gaining access to the scene, e.g. to allow external authorities to conclude their investigations and/or allow completion of actions to make safe for entry.

The use of drawings, sketches, detailed plans and photography to record location evidence could assist in re-creating the scene of the incident, especially for those reviewing/reading the investigation report.

8.4.4 Releasing the scene

Where the severity of the incident warrants it and all relevant information has been gathered from the scene, a formal handover of the scene from the investigation team leader to the area line manager should take place. Where recovery of normal operations requires significant planning and resource due to their complexity, it is appropriate for recovery teams and investigation teams to liaise, with large incident scenes possibly being released in stages.

8.4.5 Information gathering

8.4.5.1 **Environmental conditions**

The design and layout of the worksite, together with the surrounding environmental conditions, can also be contributory factors in incidents occurring. On many occasions, the worker is faced with a set of circumstances and reacts to overcome the potential or actual issues, thereby becoming vulnerable and leading to the incident. Information to be gathered can include:

- noise background and worksite noise levels; a)
- b) ventilation level of fresh air, fumes, gases, smells;
- light was it at night and/or was there sufficient natural/artificial light?
- space how much space is required for the task, was it available, cluttered, badly laid out?
- heat what was the temperature/humidity at the worksite and was it higher/lower than expected?
- workload, intensity of work, and working hours.

8.4.5.2 Equipment and material evidence

The interaction between worker and equipment can provide vital clues. Important facts can be established regarding equipment, such as the following.

Is it the correct equipment, in serviceable condition, and are the required safeguards in place?

- b) Checking any labels or markings on the equipment or substances.
- c) Is there a requirement for personal protective equipment (PPE) usage and if so, was it provided?
- d) Has the personal health of the individual had a bearing on their capability and reactions.

Gathering information regarding the rationale for preventative maintenance programmes and formal equipment checks can be useful.

8.4.6 Review documented information and records evidence

Essential information can also be obtained from documented information, such as:

- a) policies, processes and work instructions;
- b) risk assessments, maintenance records, workplace environment monitoring, anonymized health surveillance records, test certificates, training records; and
- c) previous incident reports, including any recommendations made and their implementation.

All relevant documented information should be retained or copied, referenced, logged and kept securely.

8.5 Establishing the causes

Once the investigators have the facts, they can determine the causes of an incident. It is not unusual for there to be more than one cause leading to an incident. Causes can be categorized into:

- a) immediate causes, which are normally present at the worksite, and at the incident location, and are usually prompted by:
- b) other more underlying root causes, which typically lie elsewhere and lead to deficiencies in the occupational health and safety programme or policy.

Immediate causes can fall into two main areas:

- 1) behaviour (e.g. failure to follow rules, not wearing PPE, incorrect use of equipment); and
- 2) worksite conditions (e.g. equipment, materials and environment that workers interact with).

In most cases the action taken by the worker is likely to be repeated unless the underlying root causes are addressed, including:

- i) management and organizational factors, e.g. shortfalls in the organization's OH&S policy, resources and arrangements, resulting in ineffective management of risk;
- job factors, e.g. unsuitable working environment, plant, equipment, substances, precautions, procedures and systems of work; and
- iii) personal factors, e.g. lack of appropriate decision making, behaviour, underlying health conditions, skill, knowledge, experience and aptitude to carry out duties safely.

Where personal factors are identified as causes of the incident, it is important to explore how job and management factors that might have contributed to those personal factors arose.

The team should look for immediate causes and any contributory factors by trying to reconstruct what happened just before the incident. In determining such causes, simple checklists can be used to prompt thought and examination of previously unconsidered areas.

For effective investigations of critical incidents, or those with severe potential consequences, it might be appropriate to use one or more techniques such as Fault Tree Analysis (FTA), the why approach, and process mapping, which might require training and experience for effective application.

Maintain and secure evidence and investigation documentation 8.6

Incident investigation documentation and related records should be maintained in an agreed secure location. Any components, equipment, plant or materials which might be needed for further evaluation or use as evidence should also be stored in an agreed location until the investigation team leader, or authorities, decide that it is no longer required and can be returned to service or disposed of.

8.7 **Investigation report**

The investigation report is the document which contains all the collated information. It should be fully and diligently completed and demonstrate that the organization took the required steps to prevent a recurrence of the incident. The report should contain sufficient information to give a clear picture of events, and as a minimum include:

- identifying information names, dates, times;
- b) criticality evaluation severity and frequency;
- incident category (e.g. near miss, high-potential near miss/accident, low, serious, major);
- full description of events, including drawings, maps, sketches and photographs; d)
- full causal analysis; e)
- immediate actions taken: f)
- recommendations for corrective action and opportunities; and g)
- copies of witness and expert statements.

If the report makes reference to, or bases conclusions on, presumed events or conditions, i.e. those not supported by evidence, the investigator(s) should justify inclusion.

The report should be distributed to:

- 1) the appropriate managerial level;
 - For example, major and high potential incidents need to be reported to top management.
- 2) those impacted by the incident;
- those allocated actions; and 3)
- other interested parties (e.g. employee representatives, regulator).

Performance evaluation

9.1 Monitoring, measurement, analysis and performance evaluation

9.1.1 Investigations

Periodically (e.g. monthly or as defined within the management system), a summary of past incidents which have occurred since the last report should be prepared by a designated worker and reviewed by any relevant management and health and safety committees. The report should include information associated with each incident, including:

- a) severity rating (e.g. minor, serious, major, catastrophic);
- b) incident category;
- reporting promptness [e.g. how well it met any reporting time criteria in the occupational health and safety management system (OHSMS]; and
- status of recommendations/actions raised.

Outstanding items should be expedited.

9.1.2 Trend analysis

Incident analysis involves the methodical examination of the causes and actual or potential consequences of past incidents. By structuring the information on incidents and their causes, trends can be identified which bring to light repeated OH&S exposures, incorrectly evaluated risks and inadequate controls. Incident reports over a pre-defined rolling period should be analysed to monitor for trends such as:

- a) types and categories of incidents by, for example:
 - 1) actual and potential severity;
 - 2) type of injury or ill-health condition;
 - 3) body part injured;
 - 4) location of incident; and
 - 5) time of day incident occurred;
- b) consequence frequency rates. Reports should include the most recent rates and previous rates, for example:
 - 1) personal injury and ill-health;
 - 2) lost time;
 - 3) property damage; and
 - 4) near miss:
- c) immediate and root causes, for example:
 - 1) sub-standard conditions; and
 - 2) sub-standard acts;
- d) root causes, for example:
 - 1) personal factors; and
 - 2) organizational factors; and
- e) completion of remedial and preventative actions.

The trends should be reviewed by relevant management and health and safety committees, and occupational health professionals if appropriate, as defined by their terms of reference.

9.2 Internal audit

The effectiveness of the incident investigation and reporting process should be reviewed on a periodic basis as part of the organization's internal audit programme, with the aim of:

- a) identifying improvements in the reporting/investigation process;
- b) identifying training needs; and
- c) assessing compliance with the process.

Audit reports should be circulated to senior managers and discussed as part of the management review meetings as a minimum.

9.3 Management review

Top management should include in their management review meeting a review of incidents which includes:

- progress of overdue actions;
- progress of major investigations;
- review of major incidents since last management review;
- d) trend analysis; and
- audit reports on the incident investigation reporting process.

10 **Improvement**

10.1 **Implementing recommendations**

All recommendations should be specific, measurable, achievable, realistic and time-based (SMART).

It is up to the line management of the area or activity affected to plan and implement the agreed remedial actions within the set timescales. These actions should be monitored and tracked to ensure successful and timely completion.

In order to achieve effective implementation, workers and their representatives, where they exist, should be consulted to ensure their commitment and cooperation. The reasons for any changes should be explained to those who could be affected and who might need retraining. Implementation of changes arising from investigations should be included in subsequent monitoring and review.

10.2 Learning lessons

If the investigated incident or a similar one has the potential to recur, the lessons learned should be shared, whilst preserving individual confidentiality, throughout the site, organization and, where relevant, peer group industries.

The communication of brief facts and causes surrounding the incident could be sufficient for others to learn and act upon.

Annex A (informative) Example of investigation contacts and participants for complex organizations

COMMENTARY ON Annex A

See also 6.5.

A.1 A.1 Responsibilities and management participation

The investigation team for the initial investigation of all incidents includes:

- a) the first line supervisor (foreman, supervisor or manager);
- b) a representative from the area;
- the shift supervisor; c)
- the injured party, if available (for personal injury accidents);
- an environmental health and safety (EHS) specialist, as applicable (subject to severity);
- the relevant manager (subject to severity); and
- other senior managers (subject to severity).

The department manager is responsible for ensuring events reported are investigated and acted upon in a prompt and correct manner. Their representative participates in the investigation as shown in Table A.1.

The shift supervisor initially coordinates activities and leads the investigation with the first line supervisor and a representative from the area.

Table A.1 — Example of investigation contacts and participants matrix

	Notification								Participate in investigation/revie					
	M	S	L	N		HPI			M	S	L	I	HPI	
General Manager	√					$\sqrt{}$		Ī						
Site Manager	√					$\sqrt{}$		Ī	$\sqrt{}$					
Shift Supervisor	√	√	√	√				Ī	$\sqrt{}$	√	√	√		
Department	√	√	0					Ī	√					
Manager														
Process Safety	√							Ī	√	√	√	√	√	
Coordinator														
Environmental	√							Ī						
Advisor														
Employee from									$\sqrt{}$	√	√			
area														
Team Leader/Line	√	√	0	0		$\sqrt{}$			$\sqrt{}$		√			
Supervisor														
EHS Manager		√		√	$\sqrt{}$				$\sqrt{}$				√ _	
Engineering	√	engineering related only						Ī	as determined at time					
Services Manager														
Human Resources	√						Ī	as determined at time						
Manager														

L = low type accident/incident; N = near miss accident/incident; S = serious type accident/incident; M = major type accident/incident; HPI = High-potential incident. For serious (S) and major (M) type accident/incidents, senior managers should be involved from the outset.

 $\sqrt{\ }$ = all areas, 0 = own area

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Further reading

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