

PRINCIPLES FOR LEARNING LESSONS FROM INCIDENTS – A UK PERSPECTIVE

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This paper presents the findings from a project conducted by the Health and Safety Laboratory (HSL) for the Corporate Science and Analytical Services Directorate of the Health and Safety Executive (HSE). The aim of the work was to examine existing arrangements for learning lessons from incidents within UK industry and HSE, and to identify the key elements of an effective system for learning lessons from incidents. The work also identifies sound principles to be applied for the collection and dissemination of information and discusses significant weaknesses and gaps in existing arrangements. Recommendations are given for improvement within both HSE and UK industry. The study does not address the mechanisms needed to implement the policies.

One of the findings from this research was that ongoing investigations and prosecutions sometimes act (or are perceived to act) as barriers to learning by impeding the release of information on lessons learned. In response to this finding, and to related concerns from elsewhere, HSE have commissioned HSL to investigate in more detail the impact of possible legal action on the dissemination of information on lessons learned.

INTRODUCTION

Ensuring that lessons are learned from previous incidents so that identical or similar accidents arising from work activities can be prevented in the future is central to the Health and Safety Executive (HSE) mission, to protect people's health and safety by ensuring that risks arising from work activities are properly controlled.

This paper presents findings from a project conducted by the Health and Safety Laboratory (HSL) on behalf of the Corporate Science and Knowledge Unit, part of the Corporate Science and Analytical Services Directorate of HSE. The purpose of the work was to examine existing arrangements for learning lessons from incidents within UK industry and HSE, in order to enable HSE to establish a future policy for how to effectively identify and promulgate lessons learned from incidents at all levels. The project had the following aims:

- To examine existing arrangements for learning lessons from incidents within UK industry and HSE;
- To capture examples of good practice in existing arrangements;

- To establish sound principles to be applied for the collection and dissemination of information; and
- To identify significant weaknesses and gaps in existing arrangements and develop options for remedying them.

The scope of the work was extremely broad, covering all sectors of industry (both HSE and Local Authority enforced) and being concerned with lessons learned from safety and ill-health related incidents. All types of incidents (accidents, incidents and near misses) were within scope with the exception of those major accidents that have resulted in a public enquiry.

The approach adopted consisted of the following tasks:

- Literature and internet search and review focussed on material concerned with the policy and principles of learning lessons;
- Interviews with HSE staff with knowledge of how companies/organisations currently learn from incidents and HSE's involvement in the process; and
- Interviews with a small sample of representatives from industry bodies, e.g. trade associations.

KEY PRINCIPLES FOR EFFECTIVE LEARNING AND GOOD PRACTICE

A detailed review of the information collated on the existing arrangements in HSE and industry with respect to learning lessons was undertaken, and good practice guidelines on how to learn lessons and share information have been drawn out. This was informed by the discussions held with HSE staff and representatives from industry bodies.

It was found that an effective system for learning lessons from incidents would need to include the following elements:

- An incident/accident reporting system;
- A process for incident investigation that ensures that the underlying as well as immediate causes of accidents and incidents are understood, taking full account of human and organisational factors;
- A process for analysing cumulative information on accidents and incidents from both internal and external events;
- A process for ensuring that the findings of incident investigation and analysis of accident and incident data are acted upon in a timely fashion and suitable interventions put in place or modifications made to prevent a recurrence of the incident or similar incidents;
- A process for evaluating the success or otherwise of interventions and modifications;
- A process for disseminating information on accident and incident causation and suitable interventions/modifications to all relevant parties (both internal and external), as quickly as possible; and
- A system to capture the information in a format that is readily searchable and retrievable to allow ease of access, so that any lessons learned stay learned (corporate memory).

In a well managed organisation, the elements of an effective learning lessons process outlined above (with the exception of dissemination of information) should form part of a good health and safety management system. That is, it should not generally be necessary to have a separate learning lessons system. Companies with good general health and safety management were found, in general, to also be best at learning lessons and having positive health and safety cultures; this tended to be the bigger companies in major hazard/high profile industries.

It should also be noted that employee involvement is essential for the process and systems listed to be effective. The role of employees, including safety representatives, is particularly important for effective incident reporting and investigating systems.

It was found that many large companies had some formal processes (for example, systems for recognising, investigating and recording incidents) although the quality of these was variable with some being very good and some comparatively poor, while the majority of small firms do not have any, although some do have informal processes.

There is also a high degree of variability between different sectors of industry in terms of how well developed and sophisticated the learning lessons processes and systems are. For example in the aviation, offshore, nuclear and hazardous chemicals sectors companies generally have structured and established systems. In these sectors, there are specific regulatory requirements to have particular processes or elements of a learning lessons system in place. Conversely in sectors dominated by SMEs, for example the commercial and consumer services and agriculture sectors, such systems were generally either absent all together or are much less formal and sophisticated.

The following sections describe each element of an effective learning lessons system in more detail, including examples of good practice. Key findings with respect to existing arrangements within HSE and industry are also discussed.

INCIDENT/ACCIDENT REPORTING SYSTEMS

An incident/accident reporting system is a key element in any system for learning lessons. If incidents are not reported, lessons cannot be learned. Therefore, to have maximum utility, an effective reporting system would encourage reporting and there would be high levels of reporting. The content and format of the information that is captured by the reporting system is also very important. To enable effective analysis and interrogation of accident data, causal information (including both immediate and underlying causes) needs to be captured in a format that is readily searchable and retrievable.

It was found that most large companies in the UK have systems for recording incidents, although the quality of these systems is variable. High levels of reporting were observed in the UK aviation and offshore industries. In the aviation and rail sectors, where there are confidential reporting systems, in addition to the mandatory and company reporting systems, processes for learning lessons are stronger. This leads to an improved capability to learn. In the aviation industry, the presence of the confidential reporting system is seen as an essential safety net to pick up incidents not reported elsewhere.

INCIDENT INVESTIGATION

An effective process for incident investigation would have the following elements:

- A system for determining which incidents should be investigated, i.e. be able to identify those incidents where the circumstances will give rise to new lessons;
- The availability of appropriate investigation methods and techniques; and
- A system for ensuring the competence of personnel in the selection and application of appropriate techniques, which would include training in the use of suitable techniques.

Appropriate investigation techniques would include methods for the investigation of underlying as well as immediate causes, and for the investigation of human and organisational factors. The use of appropriate techniques should also ensure that all relevant people are involved in the investigation, so that important information is not missed. For example, this is likely to include any individual(s) involved in the incident, line management, safety representatives, etc.

It is also important that there is appropriate ‘ownership’ of the investigation; it needs to be owned by people within the organisation who have the power to make sure that the findings are acted upon and that appropriate changes and interventions are carried out.

Most large companies in the UK were found to have systems for investigating incidents. However, even in such companies, any learning that takes place is generally at the workplace level, occasionally at the level of risk control systems, but rarely at the organisational level or related to the underlying safety management system architecture. That is, the companies tend to be very good at investigating individual incidents, and writing full and detailed accident reports, but weak at learning the wider lessons; they deal with immediate causes but are poor at dealing with root causes or learning wider lessons and transferring them to other situations. Companies also generally find it easier to learn lessons relating to technical or hardware issues, rather than for example human factors issues.

Industry sectors that are good at reporting, investigating and analysing incidents (for example the offshore and nuclear sectors) state that a key driver for them to learn lessons so that they can reduce the number of accidents and incidents is their reputation. They recognise that accidents and incidents lead to a bad public image and can damage their reputation.

Generally, smaller companies will do less than larger companies in terms of investigation of incidents, and will not go as far as root cause analysis. In addition, the focus of the company’s investigations is often on the liabilities associated with the incident and managing their relationship with the insurer, rather than specifically on learning lessons.

Throughout HSE there is inconsistency in the approach to incident investigation and the gathering and analysis of information. In many cases there is insufficient information on the underlying causes of accidents and incidents, and inadequate consideration of human and organisational factors.

INCIDENT/ACCIDENT ANALYSIS

An essential element of an effective system for learning lessons is the analysis and interrogation of aggregate accident/incident data. Lessons may be learned from analysis of groups of accidents that would not be apparent from separate analysis of individual incidents in isolation. Only by analysing groups of accident/incident data is it possible to generate detailed accident profiles, identify some underlying causes, and identify themes and trends in accident causation. These can have an important influence on the development of intervention plans, and could also contribute to the evaluation of the impact of initiatives or interventions.

In an ideal learning lessons system, such analysis of data would be carried out for both internal and external events (that is, events occurring within a company itself, and in other companies), and the analysis of external events would include events from within and outside the sector, and both nationally and internationally.

Throughout industry there is considerable variation between sectors in terms of the amount of analysis of accident data that is carried out. Often the analysis is purely statistical, rather than looking at root causes even in those sectors that generally have the most sophisticated systems, although some firms do carry out crude root cause analysis. Some companies carry out detailed analysis of internal data, and in some sectors of industry (for example in the aviation industry) there is also wider cumulative data analysis. As with many of the other processes, the majority of the analysis that is carried out is by larger firms. Small firms generally lack both resources and inclination, and in some sectors see this as a role for others, e.g. HSE.

In some sectors (for example in the nuclear sector) there are formal mechanisms for learning from external events. A number of industries also have semi formal mechanisms for learning from external events. In many sectors, informal meetings are held between groups of health and safety managers and trade associations (and other similar industry associations) play a key role in organising such events. Participation in such events is usually dominated by large and medium sized firms, although some small firms do attend. However, some large companies think they have enough internal accidents/incidents that there is no need for them to look elsewhere for lessons.

Learning from international events only tends to occur in those sectors of industry that work internationally; it is unlikely that companies would routinely look abroad unless they are internationally linked. There is also, generally, limited awareness of other sectors or cross-sector learning or sharing of information. Companies generally see events as relevant in the same business, but not in other businesses; many industries think that issues are industry specific and not transferable. There is greater cross sector learning in relation to HSE's priority programme types of incident, for example slips and trips, and falls from height.

Throughout HSE there is inconsistency in the level of detailed analysis of accident data that is carried out in different sectors; in many cases there are good reasons for the use of inconsistent approaches. For example, in the agriculture sector, very detailed analysis of fatality data is carried out (the findings of which are used to inform the sector strategy), but similar analyses of other types of injury data is not conducted. This is because the levels of

under-reporting in the sector for other types of injury are extremely high, and therefore detailed accident analysis would not be meaningful. In the nuclear sector, HSE carry out very little detailed analysis of accident data as substantial analysis is carried out by the industry itself and it would be inefficient to duplicate effort.

ACTING ON FINDINGS

It is essential that the findings from incident investigation and accident analysis are acted upon and that action is taken to prevent a recurrence of the incident or similar incidents. An effective system for acting on the findings from incident investigation and accident analysis would have the following elements:

- A process for reviewing lessons learned from incident investigation and accident analysis, within a reasonable time of incidents/investigations having taken place;
- A process for developing appropriate intervention plans, including designated responsibilities for implementing corrective actions and timescales for implementation of any interventions or modifications; and
- A process for tracking progress against the intervention plan to ensure any actions identified are implemented, and that this occurs within reasonable timescales.

This is an area in which the current arrangements within industry are relatively weak; however, a few examples of good practice in particular elements of the process have been found. For example: in the food sector one company had a reporting system that included the allocation of corrective actions; in the pipelines sector, an action tracking system was used, against which the company is audited; and in the pipelines and utilities sectors, systems for allocation of responsibilities for corrective actions, tracking close-out procedures and reporting any outstanding actions to the board were found.

Whether company processes work or not depends to some extent on the type of event. In general, for incidents where there is a straightforward, immediate cause, things tend to work well (i.e. where the problem and solution are both clear). In less straightforward situations, for example where there are behavioural causes, the processes tend to work less well as the solutions are less obvious.

EVALUATING INTERVENTIONS AND MODIFICATIONS

In addition to developing and tracking progress against intervention plans, it is important to also evaluate whether the identified interventions and actions have been effective, i.e. to evaluate whether they have had the anticipated impact in terms of preventing a recurrence of the incident or similar incidents. This evaluation should include consideration of whether any other actions or interventions would be beneficial.

This is another area in which the current arrangements within industry are relatively weak. The importance of evaluation is recognised within the HSE agriculture sector who hold the view that it is important to check that the methods in use are successful. The sector

has an ongoing research contract to develop a practical evaluation tool to evaluate the effectiveness of methods for disseminating information.

DISSEMINATING INFORMATION

An effective process for disseminating information would include consideration of the following elements:

- The nature of the information that is to be shared (i.e. details of lessons learned);
- Identification of all relevant parties who would benefit from the information;
- Determination of appropriate communication channels;
- Identification of appropriate content and format of information to be disseminated and of appropriate dissemination methods;
- The speed with which the information can be shared with all relevant parties; and
- The roles of all stakeholders in the dissemination process.

In an effective system for learning lessons, the information that is to be shared should include details of the underlying as well as immediate causes of events so that the opportunity for learning is not limited. In addition, for the process to be effective, different approaches will be needed to disseminate information to different target audiences (for example, different approaches will probably be needed to convey messages to firms of different sizes and with different levels of understanding). The greater the diversity of the user community, the greater the range of options required to effectively disseminate lessons learned information.

In terms of dissemination of information by HSE, in a number of sectors it has been found that industry will trust and believe other industrialists (i.e. fellow workers or trade associations) more than they would HSE. The involvement of industry, in particular trade associations, is therefore a key element for the effective dissemination of information by HSE. Industry advisory committees and similar tri-partite groups (HSE, industry, trade unions) have been noted as very effective dissemination routes in many sectors. The use of exemplars and case studies (to promote good practice) has also been found to be a very effective way to get messages across in a number of sectors.

There is considerable variability in the degree of openness and willingness to share information on accidents and incidents between companies in different sectors of industry. In many cases, where there is good sharing of information between companies in a particular sector, this tends to be informal; for example there may not be formal sharing at board level, but it happens informally between people holding similar positions in different companies through trade networks.

Dissemination of accident information within the sectors is usually via trade associations and trade journals, however often only technical issues are disclosed rather than underlying causes and therefore the opportunity for learning is limited. Safety alerts are also used as effective methods for dissemination of information in a number of sectors, for example offshore, pipelines and manufacturing.

In many cases, the systems for sharing information about lessons learned from individual incidents within HSE sectors are informal, relying on networks of contacts, and the knowledge, experience and proactive behaviour of individual inspectors. Most cross-sector learning and sharing of information in HSE is also ad hoc, relying on personal contacts. The exception to this is in the HSE priority programme areas (for example construction, manufacturing and agriculture) where there are formal systems for sharing of information.

In many sectors, HSE shares information with duty holders via trade associations and industry advisory committees; these are valuable forums for discussion of accidents and dissemination of information. Additional promulgation routes used by HSE are specific publicity activities, safety awareness days, and via the HSE website.

In some areas (for example in the manufacturing, pipelines and construction sectors) it has been noted that delays in dissemination of information as a result of ongoing legal proceedings by HSE can prevent or delay the learning of lessons. Conversely in other sectors (for example offshore and agriculture) it was noted that even when larger accidents are still under investigation and subject to legal proceedings, this does not stop the immediate lessons being learned and shared very quickly where this is necessary to prevent reoccurrences elsewhere. It was considered that guidance on what information can be released, and when, in the case of ongoing legal action would be helpful.

CORPORATE MEMORY

It is essential to capture information on lessons learned within the organisational memory so that they stay learned. For such information to have utility it needs to be captured in such a way that it is accessible, and hence needs to be captured in a format that is both readily searchable and retrievable. Good knowledge (data and information) management systems will be needed in order to achieve this. In addition, it will usually be necessary to change the culture and behaviour within organisations as well as implementing appropriate knowledge management systems in order to improve corporate memory.

Organisational learning and knowledge (data and information) management within HSE need to be improved to improve the organisation's corporate memory. The structure of the organisation and the frequent re-organisation do not help information flows or knowledge management.

TRADE ASSOCIATIONS AND INDUSTRY BODIES

Trade associations and other industry bodies can play an important part in the learning lessons process. The particular roles played by trade associations and other bodies in this respect varies enormously, with some being much more proactive and effective than others. The following activities are carried out by trade associations in many sectors: analysis of accidents (although this is often only at a high level, rather than looking in detail at root causes); provision and dissemination of health and safety information (sometimes in consultation with HSE); and facilitation of sharing between companies, for example by organising informal meetings between groups of health and

safety managers. However, an important part of the process that is not carried out by trade associations (and that they (or their members) do not see as part of their role) is evaluation of the impact of corrective actions.

HEALTH VERSUS SAFETY

Within industry, the approach taken to dealing with ill-health related events is generally very different to that for safety related incidents. Safety related incidents are usually immediate, and are dealt with as such, whereas ill-health incidents are usually progressive and do not always have obvious effects or dramatic consequences; as a result they tend not to be taken as seriously. It also takes longer to establish the causes of ill-health due to the latency of the symptoms. In a number of sectors there has recently been recognition that there is a need to devote greater attention to occupational ill-health. However, industry often thinks that ill-health is much more difficult to deal with partly because of confidentiality issues that reduce the flow of information, and partly due to other problems with the quality of data on ill-health and difficulties in defining occupational ill-health.

There is also much greater analysis of accidents (safety related events) than ill-health. This is partly due to the fact that there is a significant difference in the timeframe for ill-health injuries such that they are not amenable to analysis in the same way. There is also thought to be greater under-reporting of ill-health incidents than safety related incidents.

In some sectors (for example in parts of the manufacturing sector), some companies have very good approaches to looking after staff, including occupational health schemes and well being programs as well as health surveillance schemes.

BARRIERS TO LEARNING

THE LEVEL OF UNDER-REPORTING OF ACCIDENTS/INCIDENTS

The level of under-reporting of accidents and incidents can be a barrier to learning, as the reported accidents may not illustrate the full picture. Under-reporting is a significant problem in many sectors of industry and the problem is greater for accidents to the self-employed, and in areas where there is seasonal or casual employment.

THE SCARCITY OF CAUSAL INFORMATION RECORDED

The way that incidents are recorded, and the scarcity of causal information that is usually recorded also represents a barrier to learning. It is often difficult to analyse the incidents at a later stage and extract any wider lessons.

THE PURPOSE OF AN ACCIDENT INVESTIGATION (E.G. IF THE PURPOSE IS TO APPORTION BLAME OR LIABILITY)

The purpose of an accident investigation can sometimes itself be a barrier to learning, if learning lessons (with the aim of preventing the recurrence of identical or similar

accidents) is not the primary purpose of the investigation. For example, if the purpose of the investigation is to apportion blame or liability the investigation may proceed differently than if the purpose is to understand the immediate and underlying causes so that appropriate lessons can be learned. There can also be conflict between HSE getting the necessary evidence for a prosecution and the company preparing its internal accident report. This can reduce the likely success of the learning lessons process.

THE IMPACT OF LEGAL ACTION ON THE EFFECTIVE DISSEMINATION OF INFORMATION

It has been found that in some areas there have been delays in the dissemination of information as a result of ongoing legal proceedings by HSE. However, in other areas ongoing legal action has not prevented details of immediate lessons from being shared very quickly.

INADEQUATE CONSIDERATION OF EITHER ROOT CAUSES OR HUMAN AND ORGANISATIONAL FACTORS IN ACCIDENT ANALYSIS AND INCIDENT INVESTIGATION

Often, accident analysis and incident investigation techniques used within industry do not include adequate consideration of either root causes or human and organisational factors, focussing instead on immediate causes. The opportunities for learning lessons are therefore limited as a result.

COMMUNICATION ISSUES, INCLUDING INFORMATION OVERLOAD

One of the key barriers to learning, especially in large companies is communication. Large companies often struggle to communicate to all parts of the same organisation on internal issues, let alone on issues arising externally. Related to this is information overload; if people are bombarded with alerts and information then important messages get lost. Reports of accident investigations that contain too many recommendations have a similar effect.

FOR SMALL FIRMS, LEVELS OF COMPLIANCE WITH REGULATIONS AND LACK OF AWARENESS ARE KEY BARRIERS

Key barriers to learning for small businesses are levels of compliance with regulations and lack of awareness; health and safety is generally seen as a burden on business rather than a benefit. Small firms tend to think that accidents will not happen to them, as most small companies will go through their life without ever having a major accident.

IT IS ALSO PARTICULARLY DIFFICULT TO GET MESSAGES TO SMALL FIRMS, AND TO EDUCATE THEM

It is particularly difficult to get messages to small firms. For example in the construction sector it has proved very difficult to persuade small firms to take part in safety awareness days as a result of the loss of earnings while attending such events. In addition, small firms may not be members of trade associations who play an important role in sharing and dissemination of information.

RECOMMENDATIONS FOR IMPROVEMENT WITHIN HSE AND UK INDUSTRY

One or two key recommendations relating to each element of an effective learning lessons process have been drawn out. These key recommendations are essentially suggestions for remedying some of the identified weaknesses and gaps in existing arrangements. The key recommendations can be summarised as follows:

- Ways to create the right environment to encourage reporting of incidents and accidents throughout industry should be explored. Examples of good practice have been seen in the aviation and offshore industries; it may therefore be worth exploring the feasibility of using similar methods in other sectors to improve levels of reporting;
- Industry should be encouraged to carry out all investigations with the purpose of learning lessons, and to use appropriate techniques for such investigations to ensure that there is adequate consideration of underlying as well as immediate causes and of human and organisational factors;
- The consistency of approach to incident investigation throughout HSE should be improved, and there should be improved training for inspectors on the use of appropriate accident investigation techniques that include adequate consideration of root causes and human and organisational factors;
- Collective analysis of data from individual HSE incident investigations to identify wider issues could be improved. At present, there is no easy way of collectively analysing data from individual incident investigations, however, the new HSE information system may help in this respect;
- Within HSE, the robustness of internal systems for cross-sector sharing of information should be improved. With regard to the sharing (and capturing) of the findings from incident investigation specifically, this may be improved by the development of a common template outlining the standard information from an accident investigation that would be useful to others. However, any new system should not be bureaucratic or resource intensive to use, and should not lead to information overload;
- Industry should be encouraged to implement better systems for acting on the findings of incident investigation and accident analysis including better monitoring of progress against recommendations and agreed corrective actions, as well as evaluating the success (or otherwise) of associated interventions and modifications;

- Monitoring of progress and follow up of recommendations arising from HSE investigations could also be improved;
- A more detailed examination of the issues arising in relation to ongoing legal proceedings by HSE, and the possible impact this has on the dissemination of information on lessons learned should be carried out;
- The extended use of exemplars, case studies and illustrations of good practice by HSE to convey lessons and disseminate information would be welcomed by industry, particularly by small firms. It would also greatly assist industry if HSE publications were available to the public, free, and readily accessible, for example if they could be downloaded free from the HSE website; and
- It is recommended that attempts to improve organisational learning and knowledge management within HSE be made to improve the organisation's corporate memory.

INVESTIGATION INTO THE IMPACT OF LEGAL ACTION ON THE EFFECTIVE DISSEMINATION OF INFORMATION

As stated in the previous section, one of the findings from this research was that ongoing investigations and prosecutions sometimes act (or are perceived to act) as barriers to learning by impeding the release of information on lessons learned. In response to this finding, and to related concerns from elsewhere, HSE have commissioned HSL to investigate in more detail the impact of possible legal action on the dissemination of information on lessons learned. In addition, the information and understanding gained from the work could be used to develop a brief description of the optimum/best practice process for dissemination of information throughout an investigation, taking into account proportionality. This further work is currently being undertaken with the aim of exploring whether ongoing legal action by HSE:

- **does** act as a barrier to the dissemination of information;
- **should** act as a barrier to the dissemination of information; or
- **is perceived to** act as a barrier to the dissemination of information.