



Analysis of investigation reports on occupational accidents



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ARTICLE INFO

Article history:

Received 1 June 2014

Received in revised form 15 October 2014

Accepted 17 October 2014

Available online 6 November 2014

Keywords:

Investigation

Occupational accidents

Causes

Preventive measures

Eurostat variables

ABSTRACT

The investigation of accidents is an occupational safety analytical tool aimed at discovering the causes of an accident. Conducting these investigations properly is essential to obtain useful information that helps avoid these accidents in the future.

To prepare this study we analysed 567 investigations, conducted by OHS technical advisors, on occupational accidents occurring in Spain from 2009 to 2012 in industries such as construction, manufacturing, agriculture and services, in order to obtain information to improve the use of this technique. In this study we analysed how accident investigation reports are made identifying main flaws and omissions. Accident investigations lack details as they often do not consider the variables in the ESAW (European Statistics on Accidents at Work) Project. Likewise, they lack depth in determining the causes associated to active faults, preferably to latent faults, and to the company management and organisation systems. Similarly, they do not comply with the standards recommended by experts.

Finally, in the conclusions we recommend two priorities: having a harmonised European model to conduct occupational accident investigations, as well as being able to access databases that collect accident investigation reports of this kind.

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1. Introduction

The investigation of occupational accidents is a safety technique aimed at discovering the causes that led to the accident in question. Investigations are thus an essential first step in the design and implementation of adequate preventive measures, with the objective of preventing similar accidents from occurring again (Johnson and Holloway, 2003). Therefore, the importance of a good investigation lies in being able to extract some preventive benefit from what could be defined as “a safety failure”, and for this we need to obtain information that allows us to detect the existing risks and control them sufficiently and adequately (Fraile et al., 1993).

As advance Fraile et al. (1993) and reaffirmed authors like Dien et al. (2012), it was difficult to conduct an accurate and precise assessment of the results of investigations conducted by numerous and diverse agents working for the administration, OHS technical advisors, both internal and external, direct managers of an ongoing investigation, etc. Furthermore, these same authors show how

analyses conducted by the administration confirm that the preventive efficacy of the accident investigations carried out could be, to say the least, significantly increased. The same conclusion can also be found in other studies on occupational accident investigation reports (Goldberg, 1997; Jacinto and Aspinwall, 2003; Lundberg et al., 2009; Lindberg et al., 2010; Jacinto et al., 2011) which have tried to reveal the basic quality criteria that any accident investigation report should include, either in their full formal structure or in specific aspects.

As for the definition of these quality criteria when preparing accident investigation reports, as early as 1997 Goldberg defined the accident investigation process in three very basic phases: Phase 1 (initial report), Phase 2 (data and information collection) and Phase 3 (analysis and correction). Years later, Lundberg et al. (2009) defined their investigation process classified into the following 9 phases: 1 (initiation of an investigation), 2 (planning), 3 (data collection), 4 (representation), 5 (analysis of the accident), 6 (recommendations), 7 (documentation/writing the report), 8 (implementation of actions), 9 (follow-up of activities). More recently, Lindberg et al. (2010) described six quality criteria: initial report, selection methodology, investigation methodology, dissemination of results, preventive measures and evaluation.

However, from the above approaches, we should highlight the work conducted by Jacinto and Aspinwall (2002, 2003), since they created an investigation method known as WAIT (Work Accident

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Investigation Technique) which provides a model that is systematic, structured and easy to apply, even by “non-experts”. This method is based on the theoretical model of “organisational accidents” proposed by Reason (1997) and on that of “human error” by Hollnagel (1998). A particularly important aspect of this method is that it incorporates the variables proposed by Eurostat (2001). The WAIT method is comprised of nine steps grouped into two main stages. The first stage is a simplified investigation process that covers the legal requirements for information and focuses on the analysis of the immediate causes and circumstances, that is, the most “observable” elements of what happened. The second stage is an in-depth analysis, or complete investigation, identifying and analysing other possible weaknesses and conditions within the organisation. This second stage goes not only beyond the current legal obligations, but has the purpose of providing organisations with a structured tool to identify opportunities for improvement of their safety practices and policies, regardless of whether they have a formal safety management system or not. This method later evolved towards a new accident investigation report model known as RIAAT (The Recording, Investigation and Analysis of Accidents at Work process), which was conceived to analyse the full cycle of occupational accidents in order to help improve prevention effectiveness (Jacinto et al., 2011).

Regarding the quality criteria referred to above, various authors have proposed solutions to improve results and the way investigation reports on occupational accidents are conducted. It has been found that the collection of information is highly heterogeneous and there is a need for homogeneous data in these reports. To this end, Jacinto and Aspinwall (2004a) support the suitability of including the ESAW coding for at least eight variables associated to the accident as main indicators in the collection of information, as they help better understand the causal factors and circumstances of accidents which, in turn, helps define more efficient preventive policies. On the other hand, Antao et al. (2008) indicated that, in the initial analysis, the active faults related to unsafe acts and unsafe conditions (immediate causes) should be identified, then an in-depth analysis should help to define the latent failures related to individual factors and job factors (basic causes), and finally the organisation and work management conditions should also be detected. This, therefore, coincides with the model of Reason (2000) in that the three categories of faults must be taken into account to explain the causation of accidents.

Jacinto et al. (2009) criticised the procedures for recording and investigating accidents as they did not consider them thorough enough regarding the identification of causes and they recommended that accident investigations should include a broader analysis. Likewise, Suarez-Cebador et al. (2013) showed that the need to obtain relevant information on the causal factors of accidents is evident. After an analysis of the causes detected, authors such as Jacinto and Aspinwall (2003) or Weiwei et al. (2010) agreed that the phase to determine adequate preventive measures is key in order to be able to provide feedback for risk assessments of companies affected by occupational accidents before unwanted events occur again. They also recognise that any accident investigation report should include an estimated cost analysis of the same, since the proper and thorough management of prevention in the company should provide insight on how much accidents cost. Therefore, together with details on the direct costs, which are easier to estimate, items should be included that provide the closest possible picture of indirect costs (Goldberg, 1997). Likewise, Lindberg et al. (2010) highlighted two concepts to enhance the quality of investigation reports on occupational accidents, such as a description of the accident and the number of days elapsed until the investigation report is prepared. In fact, Katsakiori et al. (2009) indicated that all accident investigation reports, after their initial phase and once the essential variables have been compiled

for analysis, should include a description of the events that took place, with a certain level of detail, and in addition, Rozentel (2002) highlighted that accident investigations should be conducted as soon as possible, as there is a risk that evidence and witnesses may be lost, distorted or even twisted.

We looked at empirical studies on the way investigation reports on occupational accidents are being carried out in an attempt to show the application of some of the accident investigation quality criteria described above, but we found few cases and with limited samples:

1. Antao et al. (2008) carried out a study on the causes of occupational accidents occurring in the fishing industry in Portugal, for which they analysed a total of 73 occupational accidents using the WAIT method.
2. Jacinto et al. (2009) conducted a study on the causes of occupational accidents in the food industry in Portugal with an analysis of 30 accident investigations using the WAIT method.
3. Rollenhagen et al. (2010), with a different approach, developed a questionnaire to analyse the organisation context in which accident investigations are done, in a study of 108 Swedish investigators in industries such as healthcare, transport, nuclear and the rescue sector.
4. Schroder-Hinrichs et al. (2011), completed a study based on 41 accident investigation reports related to explosions of maritime machinery in Sweden, using the HFACS (Human Factor Analysis and Classification System) method, in order to discover the organisation factors identified in said investigations.

This situation led us to undertake the present study, using a sample of 567 investigation reports on occupational accidents prepared by safety technicians in various settings. This study was carried out with the objective not only of analysing the types of causes or context of the investigations, but also with the idea of analysing all stages of the accident investigation process. The ultimate goal was therefore to identify the main gaps in the investigations and preparation of reports in accordance with the various criteria established by investigators on this matter. Therefore, we analysed collection of information, detection of causes, determination of preventive measures, cost analysis of the accidents, description of the accidents, investigation method and an analysis of the time used.

2. Methodology

2.1. Sample selection

In order to compile a broad sample of investigation reports on occupational accidents, from February to June 2013, we invited a total of 50 companies operating in Spain with external occupational health services (OHS) and others with internal OHS, to participate in the study. In the end, 13 entities decided to participate, of which 5 had external OHS and 8 internal OHS.

The 567 investigation reports provided, on accidents occurring from 2009 to 2012, were classified as show in Tables 1–3, accord-

Table 1
Distribution of reports analysed.

Organisation mode	No. of reports	%
Internal OHS advisors	333	58.7
External OHS advisors	234	41.3
Total	567	100

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