



Results and lessons learned from the ESReDA's Accident Investigation Working Group Introducing article to “Safety Science” special issue on “Industrial Events Investigation”

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ABSTRACT

The European Safety Reliability and Data Association (ESReDA) established in year 2000, a Working Group on Accident Investigation (WGAI) that ended in the year 2008. With the objective of improving the quality of accident investigation and as a consequence the learning from experience process and the safety performance, the working group tasked itself at two levels: the first one, at a societal, institutional and legal level, on the public accident investigation issue; the second one, at a methodological and organisational level, on the conduct of accident investigation. The underlying process that the working group followed was firstly to establish a state of the art of accident investigation practices and secondly to foster exchanges and dissemination of best practices through issuing guidelines, reports and by organising scientific seminars.

This article summarises the working group achievements made visible in editing three reports and organising two ESReDA seminars in the area of safety investigation of accidents. The article presents a synthesis of the approach and main results, the lessons learned, some dilemmas and conflicts, several future challenges, recommendations and suggestions for action to the main stakeholders involving European and member state authorities, industrials, research centres and universities, and professionals of the rising accident investigation community.

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1. Introduction

The Learning From Experience (LFE) or operational feedback process is acknowledged as one of the pillars of the modern approaches of risk management (Dien and Llor, 2004). Thus, reg-

ulations were established to require that Investigations after Accidents (AI) or post-Event Investigation (EI) are conducted and that the LFE is properly ensured. Many industries also take into account events having minor consequences (e.g. equipment malfunctioning) in their LFE policy. In theory, an event and its learning process reveal the socio-technical system failures to which it is consequently possible to handle, for – according to the devoted expression – “not repeating the same errors”. In addition – and not least – LFE may add more generalised measures to the safety management process and thus raise the total level of safety.

This is why, the investigations and analyses of events are seen as valuable sources of information relating to safety, and through this constitute important insights towards improvement. Lessons for risk prevention and reduction of consequences (crisis manage-

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ment, stakes vulnerability reduction. . .) are generally drawn from the analyses of several types of single events (disasters, accidents, incidents, near-misses, and even weak signals. . .) and series of events (trend analyses, statistical analyses, etc).

Thus, safety information collected and produced by and for the LFE process started to accumulate before being organised through the database management. Given the size and the duplication of industrial systems with the mass production, databases and the exploitation of the LFE data developed more or less quickly depending on industrial sectors.

This is one of the safety practices that contributed to the improvement of the safety performances over these last decades. However, many accidents and even catastrophes are still occurring in every industrial sector worldwide. They illustrate the multiple organisational failures of the risk management process and among them the deficiencies of LFE process (Dien and Llory, 2004; Llory, 1996, 1999; Dechy and Dien, 2007; Dechy et al., 2008). Accidents are repeating (like the accidents of the *Challenger* and *Columbia* space shuttles), and all the possible lessons that could have been drawn from a single accident, were not fully learned. Consequently, it was (and it is always) necessary to evaluate the quality of the event investigation which fuelled the LFE and risk reduction processes.

These rationales led the ESReDA Working Group on Accident Investigation (WGAI) to focus on:

- the societal, institutional and legal conditions of the countries, industrial sectors, public and private organisations, that are supporting the quality of accident investigations;
- the methodological and organisational tools for preparing, conducting the event and accident investigations and to disseminate their lessons.

This article thus synthesises approaches followed by the ESReDA WGAI from 2000 to 2008 in collecting, analysing and formalising its work. Main deliverables of WGAI were three reports and organisation of two seminars:

- the ESReDA inquiry (Valvisto et al., 2003) on accident investigation practices in Europe (2001–2003);
- the organisation of the 24th ESReDA Seminar (ESReDA, 2003) on “Safety investigations of accidents” in 2003;
- the ESReDA book (Roed-Larsen et al., 2005) “Shaping public accident investigations in Europe” (2003–2005);
- The organisation of the 33rd ESReDA Seminar (Dechy and Cojazzi, 2007) “Future challenges of accident investigations” in 2007;
- The ESReDA “Guidelines for safety investigation of accidents” (ESReDA, 2009).

Beyond findings and lessons, these deliverables focus also on the dilemmas, remaining challenges and recommendations related to AI.

In order to illustrate some of the WGAI findings, a number of articles being prepared for the 33rd ESReDA Seminar were selected and updated in order to be published in a special issue of the *Safety Science Journal*, dealing with “industrial events investigation”.

2. Context, motives, objectives and approach of the working group

2.1. The European safety and reliability data association (www.esreda.org)

ESReDA is a European association which was established in 1992 to promote research, application and training in the reliabil-

ity field. It comes from the merger of two associations (EuReData: European Reliability Data Association and ESRRDA: European Safety and Reliability Research and Development Association). It counts today more than fifty organisation members (which are Industrialists, Administrations, Universities, Research centres, Consulting companies) originating from all over Europe. The most visible activities of ESReDA are its expert working groups and the organisation of two annual seminars. In 2008, there were seven technical working groups: ageing, structural reliability, land use planning, maintenance, uncertainties, fire risk analysis, and accident investigations. The working groups are set up with some association members and also external experts. They have, in general, 2–3 years to implement their project which results in a deliverable such as a report sent to the association’s members and which is also made available externally (www.esreda.org). The Association organise two annual seminars, most of the time in line with the activity of one of the working groups. Proceedings are accessible on request to the Joint Research Center (JRC) of the European Commission (EC) in Ispra in Italy (information on ESReDA website).

2.2. The ESReDA working group on accident investigation (WGAI): history, objectives and approach

From 1993 to 2000, the former ESReDA working group on “Accident analysis”, focused on accident databases (data collection, database management, database use. . .) and “accidentology”, and organised three seminars (1994, 1995, 1998). This working group published in 1994 a survey of the forces and weaknesses of accident databases; in 1997 it performed a benchmark of accident databases and in 2001 it published a guide for design and use of Health, Safety and Environment databases (information available at www.esreda.org). The WGAI was formed by former members of this working group and integrated new participants. In the end, more than twenty experts took part in the different work processes through the 8 years.

When initiating the WGAI, on one hand, some issues were raised as mentioned in introduction about limits of accident databases, investigations findings and accidents repetition, and on the other hand, some rising demands were observed from the legislation and the companies about AI and EI and the implementation of LFE policies. Indeed, EU integration brings on harmonisation issues by the regulatory and control lever (e.g. Seveso II Directive in the process industries). Also, in the eighties and the nineties, some countries and sectors mandated more public accident investigations, and even established accident investigation boards (e.g. the aviation sector was a precursor to this development). However, little or no comprehensive research studies have been done to map the extension of accident investigation and to measure the effectiveness of such investigation systems or procedures on a European level.

Based on these initial observations, the WGAI has initially set-up four broad objectives, with the perspective to improve safety with a scientific basis:

- to identify and describe the state of the art of the event and accident investigation in Europe (European, national, and company level);
- to identify and present general recommendations to the involved parties so as to obtain a better knowledge of accident mechanisms through the use and application of investigation methods;
- to present recommendations for involved parties with regard to the implementation of findings gained from accident investigations, with a view of improving overall safety management;

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