Organizational learning from construction fatalities
Balancing juridical, ethical, and operational processes

van Marrewijk, Alfons; van der Steen, Hans

DOI
10.1016/j.ssci.2024.106472

Publication date
2024

Document Version
Final published version

Published in
Safety Science

Safety Science 174 (2024) 106472

Contents lists available at ScienceDirect

Safety Science

journal homepage: www.elsevier.com/locate/safety

Organizational learning from construction fatalities: Balancing juridical, ethical, and operational processes

Alfons van Marrewijk [a,b,c,*], Hans van der Steen [d]

[a] Delft University of Technology, the Netherlands
[b] BI Norwegian Business School Oslo, Norway
[c] Vrije Universiteit Amsterdam, the Netherlands
[d] Former director Gebr. van der Steen, the Netherlands

ARTICLE INFO

Keywords:
Safety
Learning from incidents
Organizational processes
Construction fatality
Second victims

ABSTRACT

Construction work is associated with high risks of fatalities. Effective, deep and lasting learning from incidents is important for the safety of employees, but not well developed in the construction sector. We studied the organizational processes after a fatality through an auto-ethnographic field work study and found three distinct, but interrelated processes to normalize construction work; juridical, ethical and operational processes. Balanced attention to all three processes supports an effective, deep and lasting learning from incidents. We contribute to the learning from incidents literature with the insight that balanced attention for all three processes helps to learn from incidents and to improve the safety of workers. Furthermore, second victims can be important for the learning of incidents process. Finally, the findings throw new light on inadequate supervision of safety procedures, as the temporary characteristics of projects forces workers to deviate from safety procedures.

1. Introduction

Working in the construction industry is accompanied by a high risk of fatalities (Chan et al., 2018; Selleck et al., 2023; Swuste et al., 2012). In the United States alone, 1,003 workers died in 2019 during construction work owing to falls, contact with equipment, slipping, and electrocution. With the exception of the accidents that occurred during the construction of football stadiums for the FIFA World Cup in Qatar, these fatalities rarely make headline news present on the front pages of newspapers. However, such deaths have an enormous impact not only on the colleagues (Darshi De Saram & Tang, 2005), managers (Sinclair & Haines, 1993), and organizations of the deceased (Bell et al., 2014), but also on the victims' families and loved ones (Ngo et al., 2020). Deadly incidents can make others feel guilty or responsible, creating "second victims", which are; "practitioners who are involved in an incident that kills or injures someone else and for which they feel personally responsible" (Dekker, 2013: 1). A grotesque death at a construction site disrupts daily operations and forces organizations to understand incidents and prevent similar future events (Lindberg et al., 2010).

Research on learning from (deadly) incidents suggests that effective, deep, and lasting learning is critical for employee safety (Drupsteen et al., 2013; Drupsteen et al., 2013; Lindberg et al., 2010; Lukic et al., 2012; Zwetsloot and Bruin, 2023). Drupsteen et al. (2013) distinguished four steps in the learning process: investigating and analyzing incidents, planning interventions, intervening, and evaluating interventions. The execution of these steps is hindered by diverse bottlenecks (Drupsteen et al., 2013; Lukic et al., 2012), of which Drupsteen et al. (2013) reported the following: lack of incident reporting or registration, unsystematic implementation of lessons learned, and failure to execute an evaluation. Furthermore, Dekker (2013) points to the "intolerable paradox" in which the learning of health care professionals from their mistakes is blocked by a fear of embarrassment and of civil liability. It is therefore difficult for organizations to "exhibit reflective responses which enable them to examine the circumstances of the death, deal with legal proceedings and initiate organizational changes" (Sinclair & Haines, 1993: 130).

This study contributes to the debate on learning from deadly incidents (Dekker, 2013; Dekker, 2013; Drupsteen et al., 2013; Lindberg et al., 2010; Lukic et al., 2012; Zwetsloot and Bruin, 2023) by exploring organizational processes after a fatality. In particular, we aim to focus on taking care of second victims, an issue that has been highlighted in prior research (e.g. Dekker, 2013). Second, victims can help organizations with reflective responses to foster the promotion of safety at work (Ngo et al., 2020; Zwetsloot and Bruin, 2023). They can contribute to the

* Corresponding author at: Management of Built Environment, Delft University of Technology, The Netherlands.
E-mail address: A.H.VanMarrewijk@tudelft.nl (A. van Marrewijk).

https://doi.org/10.1016/j.ssci.2024.106472
Received 16 August 2023; Received in revised form 24 January 2024; Accepted 14 February 2024
Available online 20 February 2024

initiation, implementation, and realization of organizational processes that promote the prevention and development of a proactive safety culture (Zwetsloot and Bruin, 2023). Safety culture is understood as the social production of individual and group values, attitudes, perceptions, and behavioral patterns that influence an organization's safety management (Choudhry et al., 2007).

Based on the above discussion, the central research question of this study is as follows: *How do organizations in the construction sector organize their learning from deadly incidents?* To answer this question, we used participant observations of meetings and workshops on safety in the Dutch construction sector. Participant observation is a powerful method for understanding tensions, emotions, and unwritten rules in organizations (Pink et al., 2013). Furthermore, an autoethnographic approach was used for a longitudinal study of organizational responses to a fatal incident in a utility infrastructure project executed by Gebr. van der Steen. Gebr. van der Steen is a typical mid-sized Dutch construction company specializing in subsurface utility infrastructure work with a good safety record, reputation, and drive to improve safety practices. Autoethnography aims to systematically describe and analyze personal experiences over a long period (Ellis, 2004). We selected a utilities project because "there is a need for more construction safety research on non-building projects, particularly complex infrastructure or industrial projects" (Zhou et al., 2015: 347).

We found three distinct but interrelated organizational processes that shape learning from incidents: juridical, ethical, and operational processes. This study makes three major contributions to the learning from incidents literature. First, organizations benefit from balanced attention to all three processes, taking on both backward- and forward-looking responsibilities. Second, this case shows the importance of second victims in the learning process, as indicated by others (Dekker, 2013; Zwetsloot and Bruin, 2023). Third, the findings shed new light on the inadequate supervision of safety procedures, as the temporal pressure of projects forces workers to deviate from safety procedures (Xu & Wu, 2023).

The remainder of this paper is organized as follows. First, we discuss organizational learning from the incident literature, which allows us to understand how organizations learn through evaluations and how they deal with responsibilities. Participant observation and autoethnography methods are explained and discussed. Furthermore, we present the safety goals of the Dutch construction sector and an in-depth case study of organizational processes after electrocution in an underground infrastructure project. Electrical hazards are among the most serious causes of death in the construction industry (Dong et al., 1995). We then discuss how these three processes relate to the theoretical debate around organizational learning through incidents. Finally, we provide recommendations for organizations to stimulate reflective learning after deadly incidents.

2. Theoretical framework

Death at work is understood as an event comprising structural, organizational, and national contexts (Cox & Thompson, 2022) and a range of actors, including team support (Kessler et al., 2012), with ethical, political, and organizational complexities (Le Theule et al., 2020). For example, Willems (2017) discussed organizational responses to railroad suicides and illustrated the actual day-to-day work and organizations required to clean rail networks and restore rail services. Death at work triggers death awareness, a mental experience in which employees become conscious of their mortality, which may result in death anxiety and reflection (Grant & Wade-Benzoni, 2009). Kessler et al. (2012) analyzed responses to death at work in diverse empirical settings and found that employees experience fewer feelings of emotional disturbance when actions conform to occupational roles and organizational procedures. Therefore, roles and procedures are consequential to how employees respond to death at work (de Rond, 2017). In other words, fatality at work is not simply something episodic that can be remedied reflected upon by normalizing the emotional order in the workplace (Ashforth & Kreiner, 2002).

Deadly incidents involve "the unanticipated interaction of a multitude of often very normal events" (Dekker, 2013: 48). In the construction sector, these involve, for example, the killing of a young brick layer when a masonry wall that is not well anchored tumbles down (Van Belzen, 2018), or a construction worker accidentally falling through the roof of a nearby building while moving around (Platschorre, 2023a). An investigation is almost always started after a deadly incident, as the legal authorities responsible for monitoring safety at work intend to identify the responsible parties and the extent of their responsibility, while practitioners need to know in detail what went wrong and why (Dekker, 2013).

The concept of responsibility has been discussed extensively in the ethics literature (Coeckelbergh, 2012; Dekker, 2013; Doorn & Van de Poel, 2012; Van de Poel, 2011). According to Doorn and Van de Poel (2012) technological actions such as engineering and construction work require an ethics of responsibility, as they take place in collective settings and are complex processes with consequences that are often difficult to predict. Based upon the work of Kierkegaard, Coeckelbergh (2012) stresses the "tragic" character of engineering, which is the acknowledgment that technological action can result in accidents as we only have some, not full, control. The concepts of forward- and backward-looking responsibilities (Coeckelbergh, 2012; Van de Poel, 2011) are thus interesting in this context. Backward-looking responsibility occurs when an accident has already occurred, and includes the values of accountability and blameworthiness (Van de Poel, 2011). Organizational fear of being responsible for deadly incidents is a major topic in the learning process (Zwetsloot and Bruin, 2023). The purpose of any organizational action should be "to improve safety, not conspire to cover up or undermine the lessons that can be learned from a workplace death" (Sinclair & Haines, 1993: 135).

Forward-looking responsibility involves taking measures to create responsible technological actions for the future (Doorn & Van de Poel, 2012). Van de Poel (2011) understood forward-looking responsibility as the (moral) obligation to commit to control measures taken to prevent incidents (liability). After a deadly incident, an organizational learning process must take place in which the incident is investigated and organizational measurements are taken to prevent future incidents (Drupsteen et al., 2013; Lindberg et al., 2010; Zwetsloot and Bruin, 2023). Lindberg et al. (2010) distinguished six steps in the learning process: initial reporting, selection, investigation, dissemination of results, preventive measures, and evaluation. Based on a comprehensive review of the literature on learning from incidents, Lukic et al. (2012) developed a framework that includes learning participants (possibly shop floor workers, teams, organizations, and sectors), the learning process, the type of incidents (simple, complex, or chaotic), the type of knowledge (single versus double loop learning), and the learning context. Therefore, Lindberg et al. (2010) claim that this process should be self-reflective and include evaluation activities that lead to improvements in the process. According to the authors, all events should be reported in sufficient detail, the events selected must be those with useful information, and investigations should provide information useful for the prevention of future accidents. Furthermore, the results should be disseminated to those who can use them, and measures to prevent future accidents should be taken while the process is regularly evaluated and improved through experience feedback (Lindberg et al., 2010). This discussion demonstrates that the process of learning from incidents is complex and dynamic.

The investigation of deadly incidents is at the heart of the learning process. For second victims, being investigated is "one of the most humiliating and anxious experiences of their careers" (Dekker, 2013: 41). Accident investigations are expected to create some kind of order from messy, intense, and chaotic events (Dekker, 2013: 212). Not surprisingly, such an investigation is a multivocal process in which diverse stakeholders can generate different narratives of an incident (Dekker,

2013). For example, organizations can deny their involvement in fatalities or scapegoat vulnerable parties for fear of responsibility, legal action, and civil liability (Sinclair & Haines, 1993). Therefore, investigations must be understood as the confluence of possible conflicting psychological purposes (Dekker, 2013) that include epistemological (accurately establishing what has happened), preventive (identifying pathways to prevent recurrence), moral (maintaining and reinforcing moral and regulatory boundaries), and existential (finding explanations for the anxiety and suffering that occurred) meaning making (Dekker, 2013) purposes. For example, organizations that defend themselves through juridical responses to avoid being responsible remove the imperative to review systemic safety and implement preventative measures (Sinclair & Haines, 1993). Therefore, Dekker (2013) argues that investigation is necessary to review deadly events, but the main goal should be for the involved organizations to analyze and learn from such events. An investigation is not a performance review but a review of the event, which concerns "the system in which people work, its history, its multiple goals, its technologies and practices, its normalcy and accepted standards" (Dekker, 2013: 43).

Forward-looking responsibility is the organization's obligation to protect and care for second victims such as employees, managers, and victims' relatives. However, organizations frequently exclude second victims in the post-incident learning process (Brugmans, 2015; Ngo et al., 2020; Van der Loo & Van de Sande, 2017; Zwetsloot and Bruin, 2023). Ngo et al. (2020) demonstrate that employers tend to divert responsibility to workers to mask underlying systemic failures. Family members frequently complain that firms provide little information on both incidents and procedures (Brugmans, 2015; Ngo et al., 2020; Van der Loo & Van de Sande, 2017; Zwetsloot and Bruin, 2023). Second, victims are sometimes forbidden from discussing incidents with others (Dekker, 2013: 41). However, involving second victims in the investigation and learning process can empower both the person and the organization (Dekker, 2013; Zwetsloot and Bruin, 2023). It has been shown that family members' satisfaction is enhanced when they believe that a sense of justice has been attained, formal investigations have exposed the truth, and those responsible for the fatality have been identified (Zwetsloot and Bruin, 2023).

3. Methods

A longitudinal qualitative research approach was used to study safety meetings in the Dutch construction sector and the Gebr. van der Steen case between 2018 and 2023. Qualitative research is well suited for studying sensitive topics such as fatalities at construction sites, as it explores actors' sensemaking and interpretations (Yanow & Schwartz-Shea, 2006). Our case is not typical, as organizations tend to focus on backward-looking responsibility after an incident and fail to learn from such (deadly) incidents (Brugmans, 2015; Sinclair & Haines, 1993; Van der Loo & Van de Sande, 2017; Zwetsloot and Bruin, 2023).

3.1. Data collection

Both authors played distinct roles in collecting the research data. The first author conducted participant observations in his role as an organizational expert in the safety culture project team of the Dutch Association of Constructors. The team's goal was to suggest actions to improve the learning capabilities of the Dutch construction sector regarding safety practices. During the study period, the second author was the director of Gebr. van der Steen and acted as an expert and advisor on safety. The management of this organization was incredibly open regarding the electrocution of one of their employees and asked for permission from the victim's family to introduce the case to a larger audience. Both the organization and family were motivated to learn from this incident and to improve pipe detection methods in the Netherlands in order to make a difference (Dekker, 2013). We decided not to interview the victims' families or the involved coworkers. Combining the roles of researchers and practitioners can introduce methodological problems of subjectivity (Yanow & Schwartz-Shea, 2006) and sympathetic interpretations. Reflecting on these roles sheds light on both the theory and the practice of applied fieldwork (Yanow & Schwartz-Shea, 2006).

We first explored the topic of safety in the Dutch construction sector between September 2018 and November 2019 using participant observations (Pink et al., 2013) conducted by the first author. The first author participated in fourteen workshops and meetings (see Table 1). Data from this study were helpful in becoming acquainted to the language used concerning safety in the construction sector, learning about bottlenecks in the learning-from-incidents process, and analyzing normal organizational responses to (fatal) incidents.

We also conducted autoethnographic field studies (Ellis, 2004; Hayano, 1979; Reed-Danahay, 1997) of a specific fatality. Autoethnography brings together the "self" (*auto*), culture (*ethno*), and research process (*graphy*) (Helps, 2017; Reed-Danahay, 1997). Autoethnography aims to systematically describe and analyze personal experiences over a long period (Ellis, 2004), allowing the researcher to give meaning to the cultural phenomena under study (Reed-Danahay, 1997; Van Maanen, 1995) and present a more personal narrative and perspective (Reed-Danahay, 1997). Autoethnography provides a rich practitioner perspective that helps bridge the gap between scholars and practitioners (Van Marrewijk & Dessing, 2019). Through an autoethnographic approach, we obtained access to Gebr. van der Steen management's emails with employees, family, sector representatives, and the public prosecution service (OM) as well as safety reports, PowerPoint presentations, official reports, and letters from employees. Furthermore, desk research was conducted to collect newspaper reports, books, presentations, news articles, and radio interviews related to the case to provide data triangulation and increase the trustworthiness of the research (Yanow & Schwartz-Shea, 2006). This attempt to take an insider perspective and identify the responsibility that organizational actors take upon themselves, rather than focusing on holding them responsible, is aligned with the suggestions made by prior researchers (e.g. Davis, 1998; Provan et al., 2019).

The autoethnographic approach poses methodological risks to the reliability, criticality, and integrity of the research findings (Anderson, 2006). The double role of the researcher/practitioner (Helps, 2017) may result in self-absorption and the development of tunnel vision or "cultural nearsightedness" (Schwartz-Shea & Yanow, 2012). Various measures have been implemented to mitigate this risk. The first involves the triangulation of the research findings, which involves a comparison of diverse sources of data (Denzin, 1997). Second, researcher triangulation (Denzin, 1997) increases the trustworthiness of a study and mitigates the risk of biased observations. In our study, the first author supervised the

Table 1
Workshops and meetings in which participant observation was executed.

Date	*Subject meetings and workshops*
November 2018	Safety culture project team gathering
16 November 2018	Workshop safety at construction (80 participants)
November 2018	Program constructive safety
14 January 2019	Clients and contractors meeting
22 January 2019	Discussion with contractors on safety
12 February 2019	Workshop with CEOs of construction firms
18 April 2019	Workshop to explore the learning strategies of safety experts in the construction sector
4 March 2019	Clients and contractors meeting
2 May 2019	Clients and contractors meeting
10 July 2019	Safety culture project team gathering
23 July 2019	Safety culture project team gathering
21 August 2019	Safety culture project team gathering
2 September 2019	Workshop with public agency, clients and contractors (70 participants)

data collection by the second author through regular meetings. Furthermore, the first author visited a field meeting of the second author with 100 participants in which the new pipe detection procedure was explained (field notes, November 1, 2023). These interactions made it possible to critically discuss the field findings, question biased observations, and reflect on the second author's frame of reference (Helps, 2017; Schwartz-Shea & Yanow, 2012). The first and second authors worked together closely to analyze the data. As this is a co-authored paper, we decided not to use the first-person point of view (Van Maanen, 1995) and use the term "director" when addressing the second author.

3.2. Data analysis

To analyze the field data (Gioia & Chittipeddi, 1991), we employed a five-step interpretive method (LeCompte & Schensul, 2013). In the first step, we familiarized ourselves with the topics and themes of safety in the Dutch construction sector using participant observation data. Based on this analysis, we identified goals, procedures, and regulations concerning deadly incidents and learned about the general organizational response to fatalities. In the second step, we read all available data on fatal accidents and constructed a timeline of events, practices, and incidents using temporal bracketing (Langley, 1999). Five distinct processes were analyzed based on this timeline: (1) juridical, (2) ethical, (3) improvement, (4) communication, and (5) mourning. Third, Microsoft Visio Stream chart visualization was performed for all five processes. This helped us better understand the steps of each process and the differences and similarities between the five processes. The authors' perspectives and analyses were combined using different prisms to obtain a more in-depth, holistic, and enriched view of the social reality (Yanow & Schwartz-Shea, 2006). This type of analysis, in which data are understood within the context of the case, strengthens the claims made regarding the actors' interpretations. Based on this step, the ethical, communication, and mourning processes were combined because they overlapped in many steps. Presenting the findings for these five processes would be an inefficient use of space in this paper due to word count limitations. In the fourth step, the Visio visualizations were translated into narratives and process schemes, which were discussed and checked for factual errors and misinterpretations. Three final processes emerged from the iterations between tentative assertions and field data (Yanow & Schwartz-Shea, 2006): juridical, ethical, and operational.

4. Findings

4.1. A fatal incident during underground construction work

The fatal incident examined in this study occurred during the cold month of January 2018 in a small village in the southern Netherlands. Three workers from Gebr. van der Steen had dug a hole in the ground to find a potable water pipe. The client, the potable-water network operator, had assigned Gebr. van der Steen to relocate a water pipeline. The relocation of underground cables and pipelines for electricity, gas, water, and telecoms is an important part of construction work (Biersteker et al., 2021). Urban underground conditions are important for infrastructure projects, often causing an underestimation of risks that cannot be accurately predicted or known beforehand (Hayes & McDermott, 2018). Therefore, workers use maps to verify the exact positions of these underground networks before starting construction projects. These maps consist of drawings showing the intended locations of the pipes and cables, which are referred to as "as designed." However, their exact locations are unknown because they are located next to or on top of each other, often without formal registration on a map (Biersteker et al., 2021; Vilventhan & Kalidindi, 2016; Zou & Li, 2010). Therefore, caution is needed, as pipes and cables may have been buried at various locations, referred to as "as constructed.".

Three workers searched all morning for potable water pipes to a depth of 1.5 m. They discovered gas pipelines and telecom cables but no electricity cables for which they had an induction meter. Finally, they found a white pipe with a diameter of 25 mm, which they believed was a potable water pipe. The pipe was not easily visible because the landowner did not allow a larger hole to be made in order to prevent damage to the pavement. The three workers consulted the drawings and the pipe and came to the joint conclusion that it must be a potable water pipe due to past experience, as the pipe was white and felt like a water pipe. This is a difficult judgement to make because information regarding the ownership, age, and condition of such networks is frequently missing. Zou and Li (2010) identified twenty-seven owners of utility cables and pipelines in a single construction project. In another example, the Big Dig megaproject at the Boston City Center found utility networks that were more than 150 years old (Greiman, 2013).

After lunch, one of the three workers, 49-year-old Robert, took charge of cutting the potable water pipe. Cutting was performed using a rigid pincer, a tool typically used to cut water pipes. Unfortunately, the white pipe was an electric cable, and Robert was electrocuted when the cable was cut. His colleagues tried to pull Robert away from the cable, but it was impossible to touch him, as he was still electrocuted. They first called 112, the national alarm number, and asked the electric network operator to disconnect the cables. Robert had died by the time the ambulance arrived.

4.2. Improving the learning from incidents in the Dutch construction sector

Robert was not the only work-related victim in the Dutch construction sector. The annual average number of fatalities during the period 2009–2020 was almost eighteen (Platschorre, 2023). This motivated the Dutch Safety Board (OVV) to conclude that the sector had not really learned from previous incidents, safety risks were not professionally managed, and safety responsibilities were unclear (OVV report, 2019). In response, the sector organized a series of workshops on safety topics in 2018 and 2019. The strategic goal of these workshops was to achieve "zero fatalities in the construction sector. We must stay outside of the three most unsafe sectors. This is related to cultural changes in the construction sector" (note meeting, January 22, 2019).

However, the workshop participants concluded that they understood safety to be a "wicked problem," which is a problem that is difficult or impossible to solve because of the many interdependencies (Van Bueren et al., 2003). According to the workshop participants, improving safety is the responsibility of all partners involved in construction projects: clients, architects, constructors, and engineers. Different bottlenecks were mentioned: the fragmentation of tasks, unclear roles and responsibilities, and missing external supervision (note workshop, November 16, 2018). Furthermore, workshop participants indicated that safety should be better institutionalized in law and regulations but acknowledged that they did not comply with regulations in their daily operations (note workshop, November 16, 2018).

The workshop participants worked together seriously and felt responsible for their employees' unsafe situations. They were sincerely frustrated and ashamed at failing to improve their safety culture (note workshop, November 16, 2018). However, clients and contractors blamed each other for not taking full responsibility and not professionally managing safety risks. Furthermore, the participants' responsibilities were vague and not clearly allocated (Note workshop, January 14, 2019). To address these hindrances, the participants frequently mentioned strengthening the learning that is acquired from the incident process.

Based on discussions in workshops and meetings, improving the process of learning from incidents was selected as an important strategic goal (note meeting, October 9, 2019). Strengthening this procedure would involve the recollection of safety information, analysis of safety information, suggesting improvement measurements, redesigning

existing regulations, and implementing this measurement (note workshop, August 21, 2019). Questions related to this procedure included "what has been successful in improving the safety of construction worksites?" Further, "what can be learned from successes and failures in the learning process?" Safety instructions were also included in the training of novices and in the three-year education of construction sector employees. Finalizing the series of safety workshops and meetings, the involved organizations signed a Governance Code to make construction sites safer places for workers (Platschorre, 2022). However, Swuste et al. (2012) were not convinced of the potential of organizations to change safety work practices in the construction sector. The short-term goals of construction projects hinder effective, deep, and lasting learning from incidents (Zhou et al., 2015).

Despite the construction sector's strategic intention to increase learning from incidents, Robert became one of its annual fatalities. The foreman's call to 112, the national alarm number, triggered the incident services: an ambulance and the police arrived, and a trauma helicopter was on its way, but turned back halfway after receiving formal confirmation that Robert had passed away. The foreman then called the project leader, who informed Gebr. van der Steen's management. The organization did not use a Call Now Service to deliver messages to all persons on a designated contact list, but used a phone list for emergency cases. Later, in the evening, management informed employees by telephone with a short message regarding the incident.

This was the starting point of three different but interrelated organizational processes: (1) the juridical process, (2) the ethical process, and (3) the operational process.

4.3. *The juridical process*

The juridical process focused on backward-looking responsibility: how did the fatal incident occur and did Gebr. van der Steen's safety procedures fail? This lengthy process, which took more than three years, was characterized by formal procedures, juridical investigations, interrogations, and financial negotiations (see Fig. 1). The process started with the director informing the Labor Authority, the public agency responsible for investigating incidents in the Dutch construction sector. This situation is mandatory in cases of serious incidents. Employees of the Labor Authority began their investigations by visiting the incident location. The reporting of serious accidents is compulsory under Dutch law. However, in her research on work-related incidents in the Dutch industry, Jonkhout (2022) stressed that many serious incidents were not reported to the Labor Authority, notwithstanding possible fines.

On the following day, Gebr. van der Steen organized an internal meeting to inform employees, coworkers, and subcontractors of the tragic event and related investigations. The director did not wait for the outcomes of the investigation but, with reservation, expressed openness to the probable causes of the incident and asked employees to collaborate with the authorities and provide them with information when asked. Furthermore, a press release was prepared and sent to inform the construction sector and combat rumors, as rumors of incidents can go wild if second victims cannot provide information (Dekker, 2013). Both the Labor Authority and Telecom Agency asked for information on the project, safety procedures, drawings, and staff training. This information was combined with interviews with Gebr. van der Steen' employees and managers, the landowner, the client, and the electricity operator that

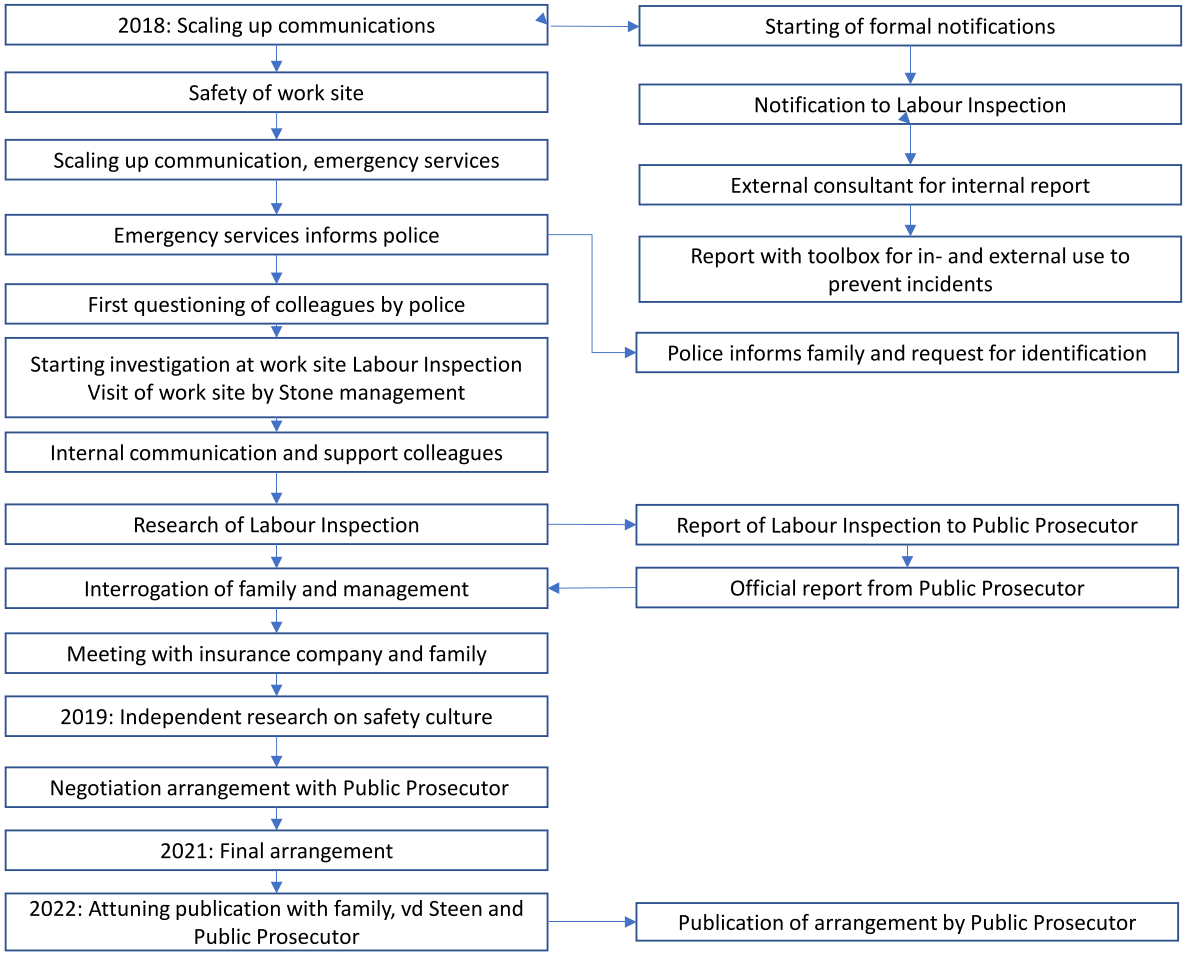

Fig. 1. Juridical process following the fatal incident (2018–2022).

repaired the electricity cables. By this stage, coworkers had already been interrogated at the police stations. Thereafter, they were supported by Gebr. van der Steen's management, as this interrogation was an emotional experience.

Insurance companies were informed and consulted with the director as it became clear that juridical support was required. In its final report, the Labor Authority accused Gebr. van der Steen of not following the correct safety procedures, such as the decoupling of all electricity networks in proximity during construction work. However, electricity shutdowns have significant technological and economic consequences for industries, citizens, and public life; therefore, they are not frequently implemented. In line with Dutch labor law, Gebr. van der Steen was officially prosecuted for failing to protect employees from severe injury and the investigation was handed over to a public prosecution office (OM). This changed the tone of the investigation, making it juridical and accusatory. OM accused the management of Gebr. van der Steen of failing to provide clear instructions regarding the identification of underground pipes (official report, July 2019). Family members were given an audience by the OM and four coworkers were interrogated for three hours, after which they signed transcriptions for their interviews. Management was also interrogated by the OM. Warned by their employees' stories, management hired a counselor for support during the interviews. Reflecting on this interrogation, the director stated that he felt, while cooperating in full transparency, that he was being treated as a criminal. Other meetings were held with the insurance company and the families to settle costs and insurance payments.

The OM asked Gebr. van der Steen to participate in an investigation conducted by an independent safety expert to study the company's safety procedures, culture, and processes. This study was an important eye opener for the director. In his presentations on these incidents, the director frequently mentioned safety experts as important actors in the learning process (Field notes, November 1, 2023). The report concluded that employees of Gebr. van der Steen followed the existing selection procedures for underground cables and pipes; however, there is no specific pipe selection procedure in the Netherlands. The color of the pipe does not indicate exactly what is being transported. This report further acknowledges the contributions of Gebr. van der Steen to changing the pipe selection procedure and informing their colleagues, clients, and the wider industry of the issue (see also section 4.5).

Consequently, in February 2021, the director proposed an arrangement with OM. This arrangement was supported by documents and reports on learning, through which OM and Gebr. van der Steen negotiated changes in tools, procedures, and financial penalties. Considering the opinions of Robert's family, the OM and Gebr. van der Steen agreed in April 2021 that without acknowledging guilt, Gebr. van der Steen would pay a fine of € 20,000 and, voluntarily, another € 10,000 to the Foundation for Work Accidents, which supports the victims of work accidents in the Netherlands. The OM announced that the agreement resulted in "an equal or even better outcome than a juridical procedure" and that "the responsibility taken by the firm [made] this agreement possible" (OM announcement, May 2021). The director was surprised to find that the fine was to be paid to the state rather than the victims' families. The family received a death benefit from their insurance company but paid an income tax on this benefit. It is difficult for families to understand why the deaths of their beloved relatives are taxed. Therefore, the Foundation of Work Accidents has been in discussion with the OM regarding the need to include considerations for second victims to improve safety cultures within organizations. This influenced the OM's perspective regarding the Gebr. van der Steen case, as they considered the measures taken in the three processes discussed and imposed a low penalty.

4.4. The ethical process

The ethical process is characterized by organizational responses to emotions and experiences of trauma, coping with feelings of guilt, and taking social responsibility for second victims (see Fig. 2). The ethical process started with the foreman calling the director, who was attending his son's school graduation ceremony at the time but immediately drove to the site of the accident. While driving to the location of the accident, many thoughts and emotions went through the director's mind; he asked himself, "what would we want to be done if something terrible like this were to happen to our beloved ones?" Once he arrived at the location and talked with coworkers who witnessed Robert's death, he discussed what should be done with the representatives of the potable water and electricity operators and observed the context in which the accident occurred. The director assumed a clear position by taking forward-looking responsibility for the ethical process. He asserted that leading an ethical process cannot be delegated to operational managers or HRM departments, which is sometimes the case. In all decisions and actions throughout the ethical process, the director was guided by the values of empathy, vulnerability, openness, and responsibility.

Empathy was observed upon contact with the victim's family. Having made a telephone appointment on the day of the accident, Gebr. van der Steen's management went to see Robert's family on the day after the incident to express their condolences. Reflecting on this, the director remarked that it "was the most demanding thing I had ever done in my life. I can recount all sentences of the conversation." Indeed, facing death makes one constantly evaluate the purpose of their work and who it serves (Reedy and Learmonth, 2011); it reframes work within the limit of time left. Other managers of Dutch construction firms had similar experiences. One stated, "we had a deadly incident last year and giving my condolences to the victim's family was the worst thing I have ever had to do" (notes meeting September 2, 2019). Two days later, the coworkers who were directly involved in the incident expressed their condolences. Expressing empathy through condolences, despite being exceedingly difficult for managers and employees, is important for the victims' families and relatives to acknowledge their grief. After consulting with Robert's family, Gebr. van der Steen's management contacted the undertaker to relieve the family of direct costs. The undertaker organized two separate spaces during the farewell ritual in the evening when everyone could pay honor to Robert in the mortuary. The family was located closest to the room in which Robert was laid out, whereas colleagues, clients, contractors, and other work relationships were welcomed in another room. In this way, the family was not directly confronted with a large audience from the construction industry and could remain among themselves. Thus, the threshold for work-related visitors was lowered, with the management supporting visitors who expressed their gratitude to Robert. Robert's coworkers who were directly involved in the incident were too emotional to participate in the farewell ritual, and the family allowed them and the management to say farewell to Robert in a quiet, respectful setting within the mortuary. The following day, he was cremated in the presence of close relatives.

This shows that *vulnerability* in the construction sector is not standard. Gebr. van der Steen's management received thirty-four supportive emails from colleagues, clients, networks and others. For example, one client wrote, "This afternoon, I received sad news regarding the accident of one of your workers today. Unbelievable!" Other emails frequently contained words such as "strength needed" and "difficult period ahead." Through these emails, the director experienced support and understanding of his position and strengthened his ability to face the many challenges that were laid ahead. Analyzing the emails, the director also felt the understanding and fear of others that this could have happened in their organization.

Informing the family and employees *openly* about the progress of investigations into the accident was an important value for Gebr. van der Steen's management during the post-cremation period. The victim's family expressed their wish to manage everything to prevent similar incidents in the future so that Robert's death was not in vain. The director felt strengthened by this support in communicating the causes of the accident openly and informing others in the sector. He asked for the family's permission to inform the employees and asked for consent over

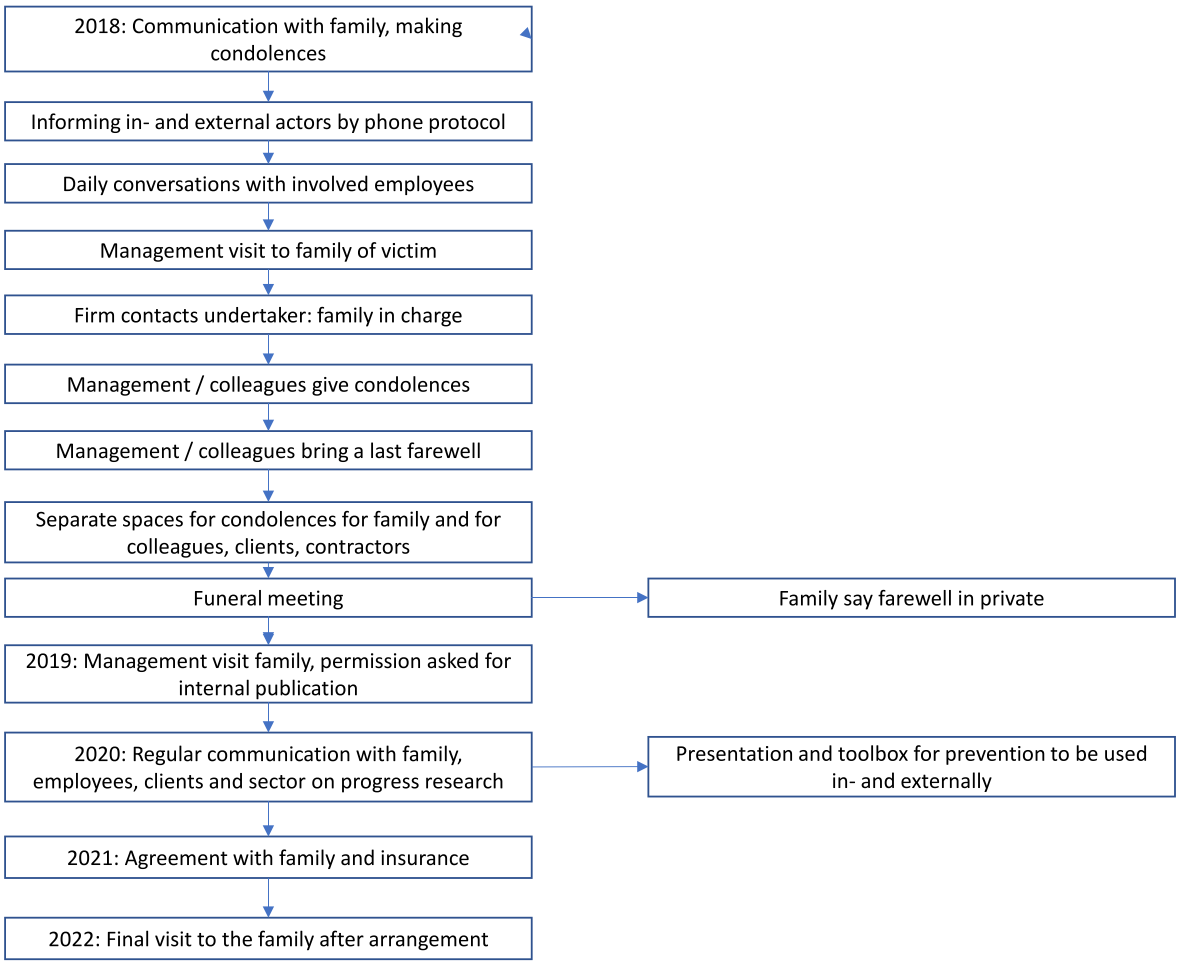

Fig. 2. The ethical process following the fatal incident (2018–2022).

text, stating that "the exact cause of the accident is being studied by Labor Authority as this is a work accident. Of course, when the research is completed, we will inform you soon after the relatives and directly involved employees have been informed" (a letter to Gebr. van der Steen, February 2018).

The social *responsibility* for the mental health of the employees involved was another value that guided the director. For the employees, as well as for the landowner who was near the scene of the accident, the impact of the incident was traumatic. "When your foreman is calling while Robert is dying and you can't help, that is the worst thing that can happen in a team that has worked together for a long time and are in contact even outside work" (letter of coworker, December 7, 2021). The coworkers directly involved were supported by Gebr. van der Steen with the help of four different professionals: a trauma expert, a trusted person, a social intermediary, and an occupational health and safety expert who had been involved with the company for a lengthy period. An immediate response through psychological help is needed to prevent negative consequences for both individuals and organizations (Dekker, 2013: 85). Notwithstanding this help, employees experienced difficulties in continuing to work; "later, the machinist broke down when an ambulance arrived at work for someone with an epileptic attack. He stayed home with burn-out related to Robert's death" (letter of coworker, December 7, 2021). Therefore, taking care of second victims is important in the ethical processes of both employees and organizations.

Since the investigation conducted by the Labor Authority and the OM took a long time, management regularly visited the family and kept the family, employees, clients, and industry partners informed of the progress. The long waiting period for the public prosecutor's report was stressful for the second victims. During this period, the director met with the Foundation for Work Accidents, which helped him understand the second victims' perspectives. Two years after the incident, Robert was memorialized with an article in the employee magazine in which Robert's widow wrote, "I cherish and save them [cards and letters]. They provided considerable support. I will also never forget that afternoon you were with me, thanks!" (December 2020). Gebr. van der Steen reached an agreement with the insurance company and Robert's family regarding compensation. The client had difficulty showing compassion: the client's director did not meet with Gebr. van der Steen's management neither informed himself about the case nor delegated this to a regional manager. Not long after settling an agreement with the public prosecutor and informing the family, the management of Gebr. van der Steen retired after a final visit to the family and handed over the ethical process to the new management.

4.5. *The operational process*

The operational process is characterized by organizational strategies to improve learning, reflect on safety procedures, come up with suggestions to improve practices, and understand the generalization of these practices (see Fig. 3). The process began with the project completion. Ironically, the regional manager of the electricity operator decoupled all electricity networks near the completion of construction work. After completing the construction work, the organization was confronted with questions about what had caused the incident, what could be learned, and how this learning could prevent future incidents.

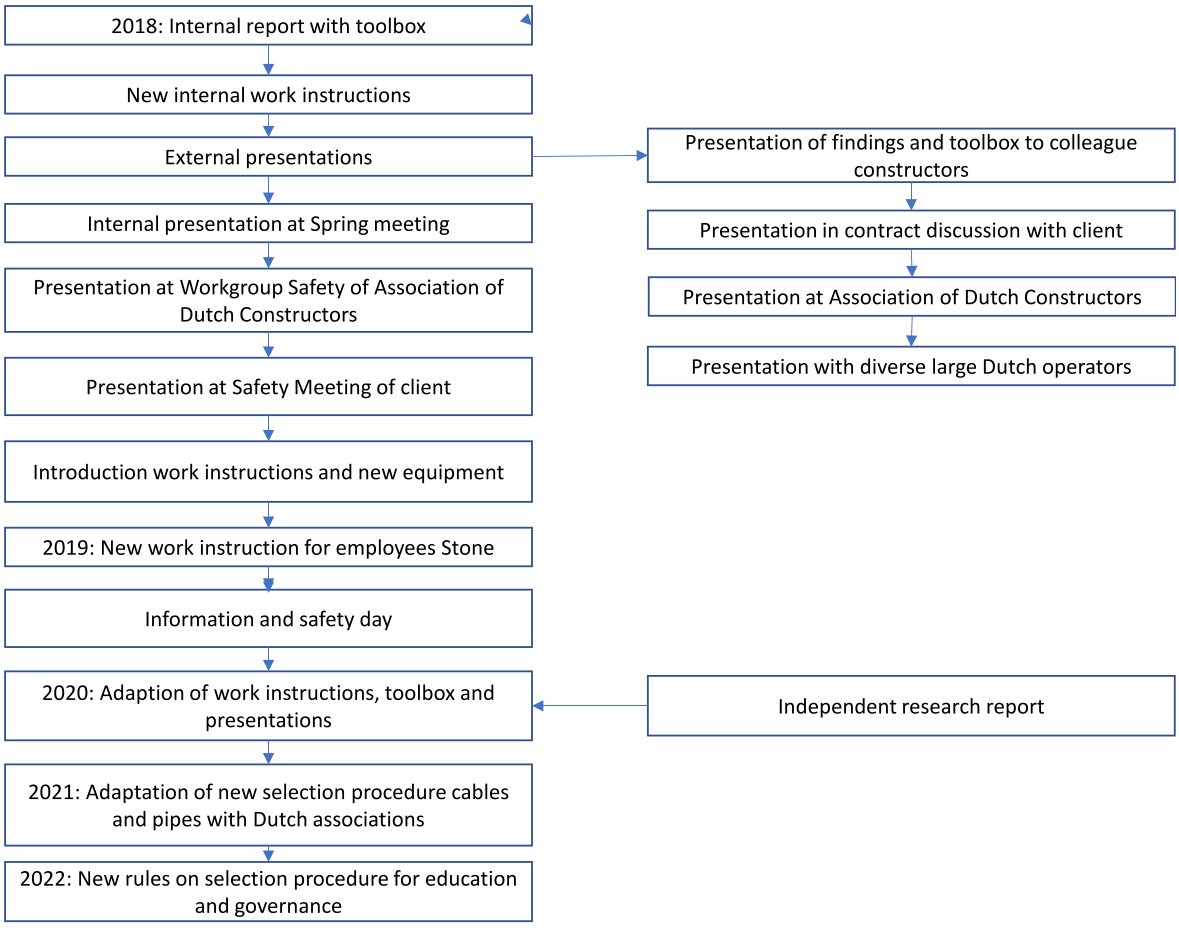

Fig. 3. the operational process following the fatal incident (2018–2022).

It was also the explicit wish of the victims' families to try to do everything to prevent future casualties. Taking forward-looking responsibility is not an automatic response, as 30 % of industry firms in the Netherlands do not take preventive action after an incident (Wimmenhove, 2015). The director hired an independent expert to conduct an internal investigation of the accident to understand exactly what had happened. The findings in this report show that pipes and cables are frequently buried in slightly different places than planned and displayed in drawings. Respondents in the construction sector mentioned the low accuracy of these drawings and that there were times when drawings were not available. Therefore, the so-called "as built" drawings, which represent the location at which cables are buried, are not reliable. Furthermore, pipes and cables, seemingly passive, "dead" materials, can change over time. For example, PVC or copper materials used in underground utilities may decay and rot, similar to the water pipes used in this case study. Based on this research, the client and involved water and electricity operators developed new isolated tools. Electricity operators also had to rethink the quality of their cables, as eighty-year-old cables could decay and were not safe to work with. However, according to the director, electricity operators prioritize net overload and interruptions over replacing old cables.

The learning process was accelerated in a study by an OM-introduced safety expert on Gebr. van der Steen's safety procedures, processes, and culture. The study concluded that there was a cable selection procedure but not a pipeline selection procedure in the Netherlands. This is dangerous because cast iron pipes can transport diverse liquids, as well as electricity: "the number of serious incidents with the selection of pipes is still too high. A procedure for the selection of pipes can be based upon the procedure of electrical cable selection" (email correspondence of safety expert, February 17, 2022). The safety expert suggested that if a selection could not be made, "the pipe should be destructed at distance, with safety measurements in case the pipe is still under pressure with water, gas or electricity" (email correspondence of safety expert, February 17, 2022). This helped the director further improve the procedure, and he presented it to his own employees, clients, colleague contractors, and wider industry partners at multiple meetings between February 2018 and November 2023. For example, in a meeting with 100 representatives of the energy, water, telecom, cable, and gas operators, the room was completely silent as the director told Robert's story (November 1, 2023). The manager of a utilities operator commented, "we have seen many near incidents and the story of Gebr. van der Steen made clear that safety could no longer be without obligations; we need real action." (Note: November 1, 2023.) Other channels were also used; "the topic 'the color can't be trusted' points at the fact that the color of a pipe or cable doesn't determine the type of energy in it" (brochure of the Contractor Collective, 2019). This resulted in a new selection procedure for cables and pipes in Construction Netherlands, the Dutch Union for Constructors and Technology Netherlands, and the Union of Installation Firms.

The efforts of Gebr. van der Steen's management to improve their safety culture and introduce a new national procedure for the selection of pipes was recognized by the OM, who acknowledged the difficulties involved in pipe and cable selection procedures and the decoupling of electricity networks. Based on the case study, a letter was sent to the network operators to label electricity networks as external risks in subsurface construction work, to take stock of these external risks, and to see if the measurements mitigate these risks sufficiently. This proactive attitude is one of the main reasons why the public prosecutors accepted arrangements with Gebr. van der Steen.

The director reflected that the event left a scar, but did not make him

feel guilty. As the organization had a good record of safety measurements, safety culture had always been his top priority. The company had given much attention to safety procedures, measurements, and equipment, resulting in a good reputation. Dekker states that "self-forgiveness entails facing up to one's wrongs while abandoning negative thoughts, feelings, and behaviors directed at the self and replacing them with compassion, generosity, and love" (Dekker, 2013: 81). As forgiveness by the victim's family is a precondition of self-forgiveness, their support in the learning process was extremely helpful.

Finally, both internal and external communication were important in this case, entangled in all three processes at three distinct levels: (a) communication with clients, construction networks, and public organizations for sharing toolboxes, safety instructions, presentations on causes of incidents, and documents when asked; and (b) communication with Gebr. van der Steen employees, suppliers, and chain partners for teaching safety instructions, sharing toolboxes and presentations, and consulting documents when asked; and (c) communication with the victim's family, clients, the Labor Authority, and OM on all relevant documents. This provides an overview of the three types of learning from incident processes (see Table 2).

5. Discussion

This study examined learning from incidents in the Dutch construction sector. The findings show that this sector aims to improve learning from past incidents in order to prevent future incidents. Through an autoethnographic research approach (Ellis, 2004), we focused on a single case of a constructor's response to the electrocution of one of their employees. Three separate but interrelated processes were identified: juridical, ethical, and operational. The juridical process is dominated by backward-looking responsibilities, in which the constructor focuses on the normalization of work by informing employees and regulatory institutions and by participating in internal and external investigations and interrogations. In the ethical process, the organization considered both its backward- and forward-looking responsibilities by expressing condolences to the victim's family, informing others about the progress of diverse investigations, and providing moral support. In the operational process, forward-looking responsibilities dominated, in which lessons learned were shared broadly with the utility construction sector and measurements were taken to prevent future fatalities. These findings contribute to the literature on learning from incidents (Dekker, 2013; Drupsteen et al., 2013; Lindberg et al., 2010; Lukic et al., 2012; Zwetsloot and Bruin, 2023) in three ways, which are discussed below.

5.1. Mutual interactions of the three processes shape the learning process

This study's first contribution is the insight that an organization's response through the juridical, ethical, and operational processes together shape the learning from incident process. This finding is consistent with that of Lukic et al. (2012) who showed that the learning process is dynamic and complex. In our case study, the ethical and operational processes influenced the juridical process, as the management transparently reflected upon the causes of electrocution with clients, the sector, and knowledge platforms. These efforts were valued by the Labor Authority and OM, which generally play no significant role in preventing incidents (Ngo et al., 2020). However, in this case, the director of the Gebr. van der Steen was an active partner in improving safety performance and took forward-looking responsibility for learning from the incident.

Although all three processes ran simultaneously, directly after the incident, the ethical process dominated, the juridical process then took over, and the operational process ultimately dominated. Kessler et al. (2012) indicate that responses to death at work are characterized by both personal emotions and bureaucratic routines. While shaping the learning process, the main goal of the three processes was to learn about and prevent future incidents, which contributed to the introduction of a new national procedure for detecting underground pipelines. Through these new organizational procedures, safety was incorporated to protect employees ethically, as this is the organization's responsibility (Kessler et al., 2012). This incorporation of the "terror of death" in organizational procedures has been observed in hospitals (Reedy & Learmonth, 2011), in end-of-life clinics (Le Theule et al., 2020), and in rail operators (Willems, 2017).

Table 2
Organizational responses to fatality in construction sector.

	Juridical process	*Ethical process*	*Operational process*
Organizational responses	• Informing institutions Informing employees Hiring juridical support Participating in investigation Negotiating financial penalty Accepting penalty	• Presence at location Value guided Expressing condolences Allocating separate spaces Informing on progress of investigation Mental support to workers	• Finishing the project Hiring an expert for internal investigation Developing a toolbox Engaging in learning process Working with isolated tools Improving safety culture

5.2. Contribution of second victims in the learning from incidents process

The second contribution of this study is the autoethnographic account of organizational processes after a fatal incident by a second victim, which is very rare and contributes to the learning from incident literature with insight into how second victims are important for both the investigation of the cause of the incident and for taking measures to prevent future incidents. Our findings show that the second victim, in our case, the first victim's family, coworkers, and management of Gebr. van der Steen, all played a role in the investigation. A credible investigation needs to be conducted as promptly as possible, be technically competent and independent, disconnected from the reputational consequences of second victims, integrate as many voices as possible, and include the second victims in providing details (Dekker, 2013: 53). For example, Gebr. van der Steen responded to the investigations and claims undertaken by the Labor Authority while simultaneously showing respect to the victim, family, relatives, and colleagues (Zwetsloot and Bruin, 2023). Furthermore, the victim's family played a role in improving the cable and pipe selection procedure by insisting that management does everything needed to prevent future casualties. This seems to contrast with the reports of scholars and bereaved families who cite a lack of transparency and information regarding the exact causes of death (Brugmans, 2015; Ngo et al., 2020; Van der Loo & Van de Sande, 2017).

Giving sincere attention to ethical processes is not easy in the construction sector, as there is underreporting of (fatal) incidents and a taboo against transparently discussing such incidents. Merrow (2011) found only thirty-one injuries and one fatal incident during twenty million working hours in the construction sector. Swuste et al. (2012) were skeptical about the potential of organizational capacity to change safe work practices in the construction sector. The short-term goals of construction projects hinder effective, deep, and lasting learning from incidents (Zhou et al., 2015). Our case shows that the difficulty in openly discussing incidents is caused by the fear of legal and financial consequences, reputational loss, and managers' personal insecurity. Fear is real, as "becoming enmeshed in legal processes is traumatic for most managers" (Sinclair & Haines, 1993 130). This taboo hinders quick and transparent learning from failures and (nearly) fatal incidents to change safety culture. Consequently, firms and the families of victims frequently end up in juridical processes.

In juridical processes, engagement with death is increasingly

mediated by a series of institutional and professional procedures (Bailey et al., 2011). For example, in our case, the management hired a counselor for support when they were interviewed by the OM. Death in the construction sector is thus sequestered, aligning with the wider social and cultural processes that tend to marginalize death (Cox & Thompson, 2022) and locate death more within the narrower professional fields of insurance, lawyers, and funeral directors. Bell et al. (2014) were struck by the silence and taboos that continue to surround death in organizational research contexts; discussing and talking about death at academic conferences was considered uncomfortable. Consequently, some authentic engagement with death has been lost; as Smith (2006: 229) put it, "when death is 'managed,' we are seen to create only an artificial, inauthentic construct.".

5.3. Project workers are forced to deviate from safety procedures

The third contribution of this study to the literature on incidents is the finding that the characteristics of temporary projects can force project workers to deviate from standard safety procedures. Our findings shed new light on the inadequate supervision of safety procedures, which is frequently mentioned as a cause of incidents (f.e. Dong et al., 1995). We agree with others (Dekker, 2013; Van der Loo & Van de Sande, 2017; Zwetsloot and Bruin, 2023) that management and regulatory bodies tend to reduce questions on safety to mere compliance with correct procedures, while safety must be understood within the system in which people work. In our case, constructors are project-based organizations in which employees work on projects characterized by temporariness, complexity, and uniqueness, involving employees of diverse organizations (Hobday, 2000). These characteristics make it difficult to follow national safety procedures when working in public spaces, which prescribe deenergizing all electricity networks at construction sites. Deenergizing a village, neighborhood, or industrial park conflicts with the economic and social interests of industry and citizens, making it difficult for workers to follow safety procedures (Zwetsloot and Bruin, 2023). For example, if a landowners refuses to allow workers to damage their driveway, workers must deviate from formal procedures to fulfill their project goals. This is in line with earlier studies showing that "skilled adaptions shape informal norms and practices that 'deviate' from written rules, but are essential to achieving performance outcomes" (Xu & Wu, 2023). Therefore, the Dutch Labor Union's Hans Crombeen was not surprised after a recent deadly incident in a tunnel construction site: "'many incidents, as this case, are commonplace at other construction projects. It is disappointing and sad that we acknowledge it 'happens the same way every time'" (Platschorre, 2023b: p.3). To create a safer workplace for underground utility network construction, citizens, industry, and end users should be patient and accept that the infrastructure needs temporary shutdowns for maintenance.

6. Conclusions

Our case study showed that notwithstanding their frequent occurrence at the sector level, fatalities are managed as disruptive events in the construction sector (Kessler et al., 2012), with a strong emphasis on backward-looking responsibility. Therefore, learning from incidents is slow and is frequently incomplete. Moreover, the construction sector is fragmented and project-based, hindering the transfer of safety experiences and improved practices to new projects. Given the relevance of fatal incidents in construction projects, we suggest new research focusing on actual learning from incident processes after a fatality and including the role of second victims in this process (Dekker, 2013). Researchers need to visit the places where such work is done not only to analyze the social stain or psychological trauma it leaves, but also to witness first-hand how normalization strategies are used in the performance of construction projects (Ashforth & Kreiner, 2002). This allows detailing the strategies of immediate normalization that managers and workers deploy in their efforts to bring the situation back to normal and restore order.

Finally, we draw attention to the construction sector to reflect on its organizational responses after a (deadly) incident. The findings of our study can be generalized to the Dutch underground utility construction sector, which is valued at 3–4 billion euro, and can be an important explanation for why the sector learns so slowly from incidents. Notwithstanding the long period of our case description (2018–2023), not all steps in Lindberg's (2010) process have been fulfilled; preventative measures have still not been implemented, and an evaluation of the learning process has not yet been discussed. We see too much backward-looking responsibility in this sector, with little openness, transparency, and focus on learning from the incident process. Being aware of and preparing for organizing and managing the three processes over a longer time, while simultaneously continuing with operations, is a very challenging task and was the main motivation for the publication of this study. We especially ask that more attention be paid to the ethical and operational normalization processes. Claims like "this will not happen with us" and "zero deadly accidents at the construction site" are, in our opinion, overly optimistic.

We believe that the ethical process should be given priority with the inclusion of family members, when open for reflection, as important stakeholders in the improvement of safety cultures (see Brugmans, 2015; Van der Loo & Van de Sande, 2017; Zwetsloot and Bruin, 2023). Constructors are frequently surprised and emotionally overwhelmed by grotesque deaths, finding themselves in juridical procedures with insurance companies and the Public Prosecution Service (OM), and opposed to the victim's family (Zwetsloot and Bruin, 2023). To make things worse, inspectors are not allowed to give information on their work as part of "the diligence that [they] practice. Witnesses sometimes give opposing statements, and we have to confront them with this in new interrogations" (Wimmenhove, 2015: 116). In our case, Gebr. van der Steen's management openly communicated with all stakeholders regarding the cause of the incident. It was important for the victim's family to know whether the incident could have happened to anyone in the organization. We believe that attention to the annual Workers' Memorial Day on April 28 could be helpful in itemizing the topic of safety. Finally, we believe that, along with others, the Labor Authority (Ngo et al., 2020; Zwetsloot and Bruin, 2023) and second victims (Dekker, 2013) can play important roles in supporting learning and improving the safety culture of organizations.

CRediT authorship contribution statement

Alfons van Marrewijk: Conceptualization, Data curation, Methodology, Writing – original draft, Writing – review & editing. **Hans van der Steen:** Data curation, Writing – original draft, Validation, Methodology.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

No financial funding was received for this study. We would first like to thank Robert's family and relatives and the employees of Gebr. van der Steen for their collaboration in this study. We also thank the reviewers and participants of the SIG project management at the EURAM 2023 conference for their helpful suggestions. Finally, we are grateful to the Safety Science reviewers for their help in guiding us in the correct direction.

References

Anderson, L., 2006. Analytic autoethnography. J. Contemp. Ethnogr. 35, 373–395. https://doi.org/10.1177/0891241605280449.

Ashforth, B.E., Kreiner, G.E., 2002. Normalizing emotion in organizations. Hum. Resour. Manag. Rev. 12, 215–235. https://doi.org/10.1016/S1053-4822(02)00047-5.

Bailey, C., Murphy, R., Porock, D., 2011. Professional tears: Developing emotional intelligence around death and dying in emergency work. J. Clin. Nurs. 20, 3364–3372. https://doi.org/10.1111/j.1365-2702.2011.03860.x.

Bell, E., Tienari, J., Hansson, M., 2014. Organizational death. Cult. Organ. 20, 1–6. https://doi.org/10.1080/14759551.2014.866779.

Biersteker, E., Koppenjan, J., Van Marrewijk, A.H., 2021. Translating the invisible: governing underground utilities in the Amsterdam airport Schiphol terminal project. Int. J. Proj. Manage. 39, 581–593. https://doi.org/10.1016/j.ijproman.2021.04.003.

Brugmans, L., 2015. En Toen Ging de Bel. De Enorme Impact van Fatale Bedrijfsongevallen. [And Then the Bell Rings. The Huge Impact of Fatal Accidents at Work]. BigBusiness Publishers, Utrecht.

Chan, A.P.C., Yang, Y., Darko, A., 2018. Construction accidents in a large-scale public infrastructure project: Severity and prevention. J. Constr. Eng. Manag. 144 https://doi.org/10.1061/(ASCE)CO.1943-7862.0001545.

Choudhry, R.M., Fang, D., Mohamed, S., 2007. The nature of safety culture: A survey of the state-of-the-art. Saf. Sci. 45, 993–1012. https://doi.org/10.1016/j.ssci.2006.09.003.

Coeckelbergh, M., 2012. Moral responsibility, technology, and experiences of the tragic: From Kierkegaard to offshore engineering. Sci. Eng. Ethics 18, 35–48.

Cox, G.R., Thompson, N., 2022. Managing Death: An International Perspective. Springer.

Darshi De Saram, D., Tang, S.L., 2005. Pain and suffering costs of persons in construction accidents: Hong Kong experience. Constr. Manage. Econ. 23, 645–658. https://doi.org/10.1080/01446190500039739.

Davis, M., 1998. Thinking like an Engineer: Studies in the Ethics of a Profession. Oxford University Press.

de Rond, M., 2017. Doctors at War: Life and Death in a Field Hospital. Cornell University Press, Ithaca, New York.

Dekker, S., 2013. Second victim: error, guilt, trauma, and resilience. CRC Press.

Denzin, N.K., 1997. Interpretive Ethnography. Ethnographic Practices for the 21st Century. Sage Publications, London.

Dong, W., Vaughan, P., Sullivan, K., Fletcher, T., 1995. Mortality study of construction workers in the UK. Int. J. Epidemiol. 24, 750–757. https://doi.org/10.1093/ije/24.4.750.

Doorn, N., Van de Poel, I., 2012. Editors' overview: Moral responsibility in technology and engineering. Sci. Eng. Ethics 18, 1–11.

Drupsteen, L., Groeneweg, J., Zwetsloot, G.I., 2013. Critical steps in learning from incidents: using learning potential in the process from reporting an incident to accident prevention. Int. J. Occupat. Saf. Ergon. 19 (1), 63–77.

Ellis, C., 2004. The Ethnographic I. Alta Mira Press, Oxford, A Methodological Novel About Autoethnography.

Gioia, D.A., Chittipeddi, K., 1991. Sensemaking and Sensegiving in strategic change initiation. Strateg. Manag. J. 12, 433–448. https://doi.org/10.1002/smj.4250120604.

Grant, A.M., Wade-Benzoni, K.A., 2009. The hot and cool of death awareness at work: Mortality cues, aging, and self-protective and prosocial motivations. Acad. Manage. Rev. 34 (4), 600–622.

Greiman, V.A., 2013. Mega Project Management. Lessons on Risk and Project Management from the Big Dig, Wiley, Hoboken/PMI.

Hayano, D.M., 1979. Auto-Ethnography; Paradigms, Problems and Prospects. Hum. Organ. 38, 99–104. https://doi.org/10.17730/humo.38.1.u761n5601t4g318v.

Hayes, J., McDermott, V., 2018. Working in the crowded underground: One call services as a boundary object. Saf. Sci. 110, 69–79. https://doi.org/10.1016/j.ssci.2017.09.019.

Helps, S., 2017. Remember who you belong to. In: Pensoneau-Conway, S.L., Adams, T.E., Bolen, D.M. (Eds.), Doing Autoethnography. Sense Publishers, Boston, Massachusetts.

Jonkhout, S., 2022. Onderzoeksrapport Slachtoffers van Arbeidsongevallen in Beeld [Research Report Victims of Corporate Accidents]. Stichting. Arbeidsongevallen.

Kessler, I., Heron, P., Dopson, S., 2012. Opening the window: managing death in the workplace. Hum. Relat. 65, 291–312. https://doi.org/10.1177/0018726711430002.

Langley, A., 1999. Strategies for theorizing from process data. Acad. Manag. Rev. 24, 691–710. https://doi.org/10.2307/259349.

Le Theule, M.-A., Lambert, C., Morales, J., 2020. Governing death: organizing end-of-life situations. Organ. Stud. 41, 523–542. https://doi.org/10.1177/0170840618800107.

LeCompte, M., Schensul, J., 2013. Analysis & Interpretation of Ethnograpic Data. Alta Mira Press, Lanham, A Mixed Method Approach.

Lindberg, A.-K., Hansson, S.O., Rollenhagen, C., 2010. Learning from accidents–what more do we need to know? Safety Science 48 (6), 714–721.

Lukic, D., Littlejohn, A., Margaryan, A., 2012. A framework for learning from incidents in the workplace. Safety Science 50 (4), 950–957.

Merrow, E.W., 2011. Industrial Megaprojects: Concepts, Strategies, and Practices for Success. John Wiley & Sons.

Ngo, M., Matthews, L.R., Quinlan, M., Bohle, P., 2020. Information needs of bereaved families following fatal work incidents. Death Stud. 44, 478–489. https://doi.org/10.1080/07481187.2019.1586792.

Pink, S., Tutt, D., Dainty, A., 2013. Ethnographic Research in the Construction Industry. Routledge, New York.

Platschorre, P., 2022. De Veiligheidsladder: waardevol instrument of papieren werkelijkheid? [The Safety ladder: valuable instrument or red tape?], Cobouw, 5 April.

Platschorre, P., 2023a. Bouwvakker overleden na val op bouwplaats Den Haag [Worker died after fall at construction site in The Hague]. Cobouw, 31 January.

Platschorre, P., 2023b. Van veiligheid tot digitaal werken: vijf goede voornemens voor de bouw in 2023. [From safety to digital work: five good intentions for the construction sector in 2023], Cobouw, 7 March.

Provan, D.J., Rae, A.J., Dekker, S.W., 2019. An ethnography of the safety professional's dilemma: Safety work or the safety of work? Saf. Sci. 117, 276–289.

Reed-Danahay, D.E., 1997. Auto/Ethnography. Berg Publishers, Rewriting the Self and the Social. Oxford/New York.

Reedy, P., Learmonth, M., 2011. Death and organization: Heidegger's thought on death and life in organizations. Organ. Stud. 32, 117–131. https://doi.org/10.1177/0170840610387242.

Schwartz-Shea, P., Yanow, D., 2012. Interpretive Research Design: Concepts and Processes. Routledge, New York.

Selleck, R., Cattani, M., Hassall, M., 2023. Proposal for and validation of novel risk-based process to reduce the risk of construction site fatalities (Major Accident Prevention (MAP) program). Saf. Sci. 158(105986 https://doi.org/10.1016/j.ssci.2022.105986.

Sinclair, A., Haines, F., 1993. Deaths in the workplace and the dynamics of response. J. Contingencies Crisis Manag. 1, 125–137. https://doi.org/10.1111/j.1468-5973.1993.tb00015.x.

Smith, W., 2006. Organizing death: Remembrance and re-collection. Organization. 13, 225–244. https://doi.org/10.1177/1350508406061675.

Swuste, P., Frijters, A., Guldenmund, F., 2012. Is it possible to influence safety in the building sector?: A. Saf. Sci. 50, 1333–1343. https://doi.org/10.1016/j.ssci.2011.12.036.

Van Belzen, T., 2018. Dit is Haiko, één van de twintig bouwdoden van 2017.[This is Haiko, one of the twenty fatalities in 2017]. Cobouw, March 25.

Van Bueren, E.M., Klijn, E.H., Koppenjan, J.F., 2003. Dealing with wicked problems in networks: Analyzing an environmental debate from a network perspective. J. Public Admin. Res. Theory 13 (2), 193–212.

Van de Poel, I., 2011. The relation between forward-looking and backward-looking responsibility. In: Moral Responsibility: beyond Free Will and Determinism. Springer, pp. 37–52.

Van der Loo, K., Van de Sande, P., 2017. Toon. De Impact van een dodelijk arbeidsongeval. Toon. the Impact of a Deadly Accident at Work. BigBusiness Publishers, Utrecht.

Van Maanen, J., 1995. Representation in ethnography. Thousands, Sage, Oaks.

Vilventhan, A., Kalidindi, S.N., 2016. Interrelationships of factors causing delays in the relocation of Utilities: a cognitive mapping approach. Eng. Constr. Constr. and Archit. Manag. 23, 349–368. https://doi.org/10.1108/ECAM-10-2014-0127.

Willems, T.A.H., 2017. 'Monsters' and "mess" on the railways: Coping with complexity in infrastructure breakdowns. Department of Organization Sciences. Vrije, Amsterdam Universiteit. Phd Thesis,.

Wimmenhove, W., 2015. Een arbeidsinspecteur aan het werk. [A labor inspector at work], in: *En toen ging de bel. [And then the bell rang]* Brugmans, L. (Ed.). Bigbusiness, Utrecht, pp. 113–116.

Xu, J., Wu, Y., 2023. Organising Occupational Health, safety, and wellbeing in construction: Working to rule or working towards wellbeing? Constr. Proj. Organ. 17–30.

Yanow, D., Schwartz-Shea, P., 2006. Interpretation and Method: Empirical Research Methods and the Interpretative Turn. ME Sharpe, Armonk, New York.

Zhou, Z., Goh, Y.M., Li, Q., 2015. Overview and analysis of safety management studies in the construction industry. Saf. Sci. 72, 337–350. https://doi.org/10.1016/j.ssci.2014.10.006.

Zou, P.X.W., Li, J., 2010. Risk identification and assessment in subway projects: Case study of Nanjing Subway Line 2. Constr. Manag. Econ. 28, 1219–1238. https://doi.org/10.1080/01446193.2010.519781 Line 2.

Zwetsloot, G., Bruin, T., 2023. Surviving relatives as stakeholders for corporate social responsibility and as leaders for meaningful safety improvement. A case study from the Netherlands. Saf. Sci. 157, 105927. https://doi.org/10.1016/j.ssci.2022.105927.