



Why do organizations not learn from incidents? Bottlenecks, causes and conditions for a failure to effectively learn



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ABSTRACT

If organizations would be able to learn more effectively from incidents that occurred in the past, future incidents and consequential injury or damage can be prevented. To improve learning from incidents, this study aimed to identify limiting factors, i.e. the causes of the failure to effectively learn. In seven organizations focus groups were held to discuss factors that according to employees contributed to the failure to learn. By use of a model of the learning from incidents process, the steps, where difficulties for learning arose, became visible, and the causes for these difficulties could be studied.

Difficulties were identified in multiple steps of the learning process, but most difficulties became visible when *planning actions*, which is the phase that bridges the gap from incident investigation to actions for improvement. The main causes for learning difficulties, which were identified by the participants in this study, were tightly related to the learning process, but some indirect causes – or conditions – such as lack of ownership and limitations in expertise were also mentioned.

The results illustrate that there are two types of causes for the failure to effectively learn: *direct causes* and *indirect causes*, here called *conditions*. By actively and systematically studying learning, more conditions might be identified and indicators for a successful learning process may be determined. Studying the learning process does, however, require a shift from learning from incidents to learning to learn.

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1. Introduction

"Every day, 6300 people die as a result of occupational accidents or work-related diseases" states the International Labour Organization ILO on their website (ILO, 2013). They also state that this means that "every 15 seconds, somewhere around the world a worker dies from a work-related accident or disease" (ILO, 2013). Employers have a legislative responsibility to look after the health of workers and many employers also want to prevent injury or loss. Therefore employers put effort into the prevention of accidents and incidents (such as near-misses). Besides the prevention of personal injury, employers also aim to prevent material damage and process disturbances. In recent years, both researchers and practitioners have become increasingly interested in "learning from incidents" as a strategy to prevent incidents and accidents. Learning from

incidents involves both the analysis of incidents and a follow-up on this analysis (Drupsteen and Guldenmund, 2014).

In the analysis of incidents, causes that led to the incident are identified. A well-known distinction in the causes of incidents is the distinction between active failures—or direct causes—and latent conditions (Reason, 1990; Groeneweg, 2002). Active failures are the activities that directly contribute to the emergence of an incident, such as human errors. Latent conditions are the weaknesses in the organization that contribute to the situation in which an accident could occur. For the prevention of accidents, both active failures and latent conditions in the organization need to be addressed. Many ways to identify these failures and conditions are described in the safety literature (e.g. by Kontogiannis et al., 2000; Reinach and Viale, 2006; Sklet, 2004; Le Coze, 2008).

For successful learning, the analysis of an incident should be followed by remedial actions that address the identified causes. This follow-up is necessary for the prevention of future incidents (Lindberg et al., 2010; Jacobsson et al., 2011), because if the causes are addressed effectively, they cannot lead to repetition of similar incidents. Effective learning from incidents is therefore also part of the safety management system. Despite the attention for

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learning from incidents as a strategy to prevent incidents and accidents, many organizations fail to effectively learn from incidents (Drupsteen et al., 2013).

Some reasons why organizations fail to learn effectively from incidents are considered in earlier studies (e.g. Pidgeon and O'Leary, 2000; Choularton, 2001; Lampel et al., 2009; Hovden et al., 2011). According to these studies, causes why organizations don't learn are for instance: too little incidents are reported (Mancini, 1998; Sanne, 2008; Rasmussen et al., 2013), too little information about the incident is given (Sanne, 2008), latent conditions are not identified (Jacobsson et al., 2009; Körvers and Sonnemans, 2008) or the implementation of remedial actions was impeded (Cedergren, 2013). These causes directly contribute to a failure to effectively learn, just like active failures directly contribute to the emergence of an incident. Conditions that hinder learning from incidents have also been studied, such as a lack of trust (Pidgeon and O'Leary, 2000; Chevreau et al., 2006), a blame culture (Dekker, 2009), a limitation in the competences of the people involved (Hovden et al., 2011) or resistance to change (Lundberg et al., 2012). Especially trust and openness are considered to be necessary values within an organization. Without these values, incidents will be kept secret, investigations will focus only on a selection of factors, and learning opportunities will remain unused.

Although these studies highlighted several causes for a failure to effectively learn from incidents from a theoretical perspective, there are not many studies that systematically investigated why organizations fail to learn in practice. In this study we aim to identify causes for the 'failure to learn' in seven organizations. The objective of this paper is to determine what causes and conditions need to be addressed to improve learning from incidents and so to contribute to the prevention of incidents.

2. Theory

The aim of this study is to identify causes and conditions that contribute to problems in the learning from incidents process. An incident is in this study defined as any unwanted event, irrespective of its consequences. This definition encompasses accidents, near-misses, operational disturbances, errors etc. The main difference between these events is whether they led to damage or injury, or not. In our opinion, all those events are preceded by similar causes and conditions. Therefore, although these events require different responses after they occur, they all provide similar lessons to learn from.

Before explaining how we studied the learning from incidents process, we will briefly discuss the theories that are used in the development of this study. As was pointed out in the introduction to this paper we use the concepts of direct factors and indirect factors to study the failure to effectively learn. This concept is known from accident causation theory where Reason (1990, 1997) introduced the active failures and latent failures as factors that contribute to an accident. Latent failures create sub-optimal conditions in an organization and are the real target for improvement in order to control the environment (Groeneweg, 2002). Other commonly used terms that describe the causes that are not directly linked to the accident, are indirect causes, root causes or underlying causes. The systemic latent failures may lie dormant for years before they align with the active failures, meaning the operational 'direct' failures, and contribute to an incident (Reason, 1997). In this study we use the term causes to describe the factors that directly contribute to negative events, and the term conditions to describe the factors and issues that indirectly contribute to negative events.

Some theorists argue that traditional models of accident causation, such as that of Reason, are not able to capture the dynamics of the real world (Hollnagel et al., 2006; Leveson, 2004;

Rasmussen, 1997). They have presented systemic models that focus on the complexity and interactions that may lead to accidents. Two well-known systemic modeling approaches are Rasmussen's hierarchical sociotechnical framework (1997) and Leveson's (2004) Systems-Theoretic Accident Model and Processes model: STAMP. Despite the differences, these models also emphasize that the weaknesses in the organization or system allow actions (causes) on an operational level to result in an accident. These weaknesses (conditions) are the issues that we aim to identify through studying incidents, and in this case through studying learning from incidents.

The distinction between causes and conditions relates to the concept of single and double loop learning as developed by Argyris and Schön (1979). Addressing the conditions that contributed to an incident, is important for so-called double loop learning. If an organization exhibits single loop learning, only the specific situation or processes are improved. However, when an organization exhibits double loop learning, improvements are not limited to the specific situation but the values, assumptions and policies that led to actions in the first place, are questioned (Argyris and Schön, 1979). If only the direct cause of an incident is addressed, this relates to single loop learning. In practice, this would mean that recurrence of a specific situation is prevented, whereas if the conditions that contributed to an incident are addressed, this is likely to increase safety in general, and so to prevent multiple future incidents.

In this study, we applied the distinction between direct and indirect factors to explain difficulties in the learning from incidents process itself. This means that instead of identifying causes and conditions that contributed to an incident, this study focuses on the learning process itself. By identifying and addressing conditions for learning from incidents, the learning capability of the organization can be improved. This learning to learn process (called Deutero learning by Argyris and Schön, 1996) enables an organization to continually improve (Senge, 1990). Building on Argyris and Schön (1979), learning from incidents therefore encompasses both the study of incidents to identify weaknesses, and addressing those weaknesses (single loop learning), and in a similar way, learning to learn from incidents encompasses both studying the learning process to identify weaknesses, and addressing these weaknesses. Addressing weaknesses that are identified through studying incidents is likely to prevent future incidents and so contribute to safety, and addressing weaknesses that are identified through studying the learning process, is likely to prevent failure to learn, i.e. it will contribute to safety, through increased learning capability.

To study the causes and conditions that contribute to a failure to learn from incidents, we used a simplified model of a learning from incidents process, that is described in an earlier study (Drupsteen et al., 2012). In the model of the learning from incidents process, learning is represented as a process with five phases (Drupsteen et al., 2012): acquiring information, investigation and analysis, planning interventions, intervening and evaluating. The first phase, *acquiring information*, consists of reporting and registration of incidents. In some organizations this includes only the registration of accidents, in others also near-misses, dangerous situations or process deviations are registered to learn from. In the second phase of the learning process, *investigation and analysis*, lessons are identified. In this phase, a first prioritization of incidents is made, because some are investigated and others are not. This phase also includes choices on the method of investigation and the people to involve in the investigation process. In the third phase, *planning*, identified lessons are translated into actions. In this phase choices are made on what causes to address, how to address them, which resources to allocate and when to perform actions. The fourth phase, *intervening*, consists of performing and monitoring actions, to see if they are performed as planned. In the fifth phase, *evaluating*, both the effect of the actions, and the learning process itself are evaluated. In each phase, the learning

from incidents process can be affected, if an activity is not performed or not performed well. This activity or step in the process is called a bottleneck, meaning “a step at which the learning process is hindered or impeded” (Drupsteen et al., 2013). If the step is hindered or impeded this does not necessarily mean that there is a full stop to learning, the learning process can continue despite limitations in a certain step. The quality and success of the learning process will however be limited through the bottleneck (Drupsteen et al., 2013). In this study, the effectiveness of learning is determined according to the learning from incidents process. If one or more of the phases are not effectively performed, learning will be ineffective, meaning that there was a ‘failure to learn’.

3. Methods

In focus groups in seven organizations we studied learning from incidents and causes and conditions for ineffective (or effective) learning. We used the model of the learning from incidents process in the analysis of the focus group results to answer the following questions:

- In what steps are difficulties to learning identified (bottlenecks)?
- What are the causes and conditions for the difficulties in learning from incidents?

The use of focus groups allows for multiple perspectives in one session and the group interaction serves as a mechanism to help people generate ideas and discuss more causes for ineffective learning. Therefore focus groups were held in seven organizations to get a shared understanding of the causes for ineffective learning from incidents. In addition, in three of these organizations the focus group also discussed how they had learned from specific incidents (Company E, F, G).

The participating companies were: four chemical companies (one with more than 1000 employees, one with approximately 350 employees, two with approximately 250 employees), a manufacturing company (approximately 800 employees), a service provider company on a chemical plant, and a construction company. The service provider and construction company had varying numbers of people working for them, since they work with many subcontractors.

In each organization a focus group session was held with about 10 participants. The Health and Safety manager invited the participants for each focus group. The composition of the focus groups was agreed between the Health and Safety manager and the researchers. The point of departure was to invite operators from a single department and a first line manager. Having both a first line manager and the operators in the same group may have influenced the willingness to be critical. However, it was the clear impression that all participants quite openly expressed their view, and as seen in the results later, none of the participants tried to paint a particularly favorable picture of learning from incidents in the organization. The exception was Company E where the Health and Safety managers considered it necessary to split the focus group in two with operators and managers, respectively.

Before the focus group a list of incidents of the past year was retrieved to gain an overview of the type and number of incidents and the amount of background information for each incident. In the focus groups, first the general learning from incidents process was discussed by asking: how well does your organization learn? And why? In which step do main problems arise? What are the main reasons that a phase is well performed or not? How do you think learning from incidents in this organization can be improved? A topic list was used by the researchers to check whether human, technical and organizational aspects were all addressed. If specific

factors or conditions were mentioned, it was verified whether these were related to specific phases in the learning process or not. In three companies (E, F and G), this discussion was followed by a brief presentation of a specific incident. The incidents were selected beforehand by the researchers, together with the Health and Safety manager. Three criteria were used for the selection: the incident should be recent, non-threatening, and recognizable. The questions to the focus group for each case were semi-structured, with as main questions: “Did the organization learn from this incident?” “Could a similar incident happen again?” “Who or what solved the situation and why?” “What can be improved even more?” The same topic list was used as for the general learning questions.

The notes from each focus group were summarized in a report that was checked by the Health and Safety manager. The reports are used for the analysis in this study. These reports were analyzed to assess for each company what the bottlenecks were, i.e. the step in which difficulties arose, and what the causes and conditions were for ineffective learning, according to the participants in the focus groups.

4. Results

4.1. Company A

This company is a production company in the chemical industry, which employs about 1500 people. In the focus group, thirteen participants were present: eleven employees from two teams, the HSE manager and the site manager. According to the participants, the organization learned well from incidents, because employees received many newsletters and reports about incidents and lessons learned. They indicated, however, also that improvements were possible in the third phase of the learning process, specifically in ‘planning good actions’, meaning the translation from identified causes to recommendations. Although the participants only mentioned the third phase of the learning process as a bottleneck, difficulties that were related to other phases (phases two and four) were also mentioned. Factors that contributed to the difficulties in learning according to the participants were: time limitations, a technical focus, a lack of ownership and perceived control over actions to be taken.

The participants indicated that the motivation and the time to take up actions were limited in this organization. When generating actions, the employees felt that some good solutions were not thought of, because there was too limited time to think it through and there was no systematic approach for the decision on what actions to take or not. There were not many serious incidents, therefore the sense of urgency to learn from incidents had decreased over the past years and so did the motivation to perform actions. Another condition that became clear from the discussion was that most employees in the organization had a technical background, which resulted in a focus on technical issues in the incident analysis and in a focus on technical actions for improvement. Human and organizational issues were rarely addressed.

Many of the recommendations formulated after incidents were seen as uncontrollable, because action should be taken on a site level or even on a global company level. This is related to a similar finding: it was not clear for the focus group who should take the actions that resulted from the recommendations. Employees considered the management to be responsible for taking actions. At the same time they considered the managers as outsiders with too limited involvement and knowledge on the core processes, and therefore too limited knowledge to determine the right actions. At the same time, the employees did not feel inclined to raise ideas for improvement, because they felt they would be made

responsible for such actions and the responsibility for the actions would involve much extra work.

4.2. *Company B*

This company is an industrial service provider that works as a contractor in the oil and gas industry. Ten people were present in the focus group: the HSE manager, a safety representative, two foreman, five workers and one (sub)contractor. According to the participants, the organization insufficiently learned from incidents. The main bottleneck was located in the first phase of the learning process, because there was a limitation in the number of incident reports. There were very few reports, and the participants agreed that the incidents that were reported, did not give a good overview of the risks on site.

There were practical and cultural reasons for the limited number of reports. Reporting cost a lot of time and the employees did not know how to justify that time to their client. They felt that every minute counted, and any delay would be used against them. For a similar reason they didn't want to ruin the current low accident rate, because it was part of their image as good contractor. Other reasons not to report were related to the group culture. The employees felt that only losers reported and that there was no need to report: you could just fix most situations yourself and they didn't feel that anything else was done with the reports.

4.3. *Company C*

This chemical manufacturing company has approximately 800 employees. Five employees from the HSE department participated in the focus group. The HSE department was considered to be the key stakeholder with respect to learning from incidents. According to the participants, the main difficulties in learning from incidents in their organization were located in the first and in the third phase of the learning process: in 'reporting incidents' and in 'planning actions', specifically in the generation of recommendations.

Difficulties in reporting were for instance caused by the fact that it wasn't always clear whether a situation was dangerous or not and that this interpretation differed between function groups such as engineers or operators. Another reason for the limited number of incident reports, was the fact that there were many successful 'recovery mechanisms', meaning that operators were often able to correct errors or dangerous situations, so that negative consequences were prevented. These successful mechanisms could provide valuable lessons to learn from, if they would have been reported.

There were also difficulties identified when planning actions for improvement, after an incident occurred. There was often not time for a thorough analysis and for a structural follow-up of the recommendations, because already a couple of days after the event, a report for the management should be ready, including recommendations and possible actions. When the HSE formulated actions, they often focused on technical and mitigating actions because they had a blind spot for human and cultural issues. In combination with the time pressure this meant that although actions were often performed fast, structural measures for prevention were not taken.

4.4. *Company D*

This construction company was hired as the contractor for a long-term utility building project. Since the amount of work activities and the needed number of people, it is difficult to estimate the number of employees, which could range from 75 to 500. The holding company employs more than 1500 people. This focus group was performed with a group of nine people as a representation of the specific project: one HSE manager and the project HSE expert, a site

manager, a project planner, the project director and four contractors. According to the participants, the main difficulties for learning in their organization were found in the second and third phase of the learning from incident process: 'incident investigation' and in 'planning actions'. Some difficulties related to the first phase were also mentioned. An important factor in creating these difficulties was the fact that every incident was considered to be unique and unpreventable and therefore many incidents were not recognized as incidents to learn from. There were no objective selection criteria to distinguish between accidents that should be or should not be investigated in depth, and all incidents were perceived similarly: as consequences of human error. In the incident investigation there was a strong focus on direct causes and on the human error, and not on the context in which an error occurred and on the reasons for certain behavior. As a result, structural measures for improvement were not taken and follow-up actions mainly consisted of reminders of existing rules and procedures. If a new action was planned, there was limited integration with other actions and the actions were not performed, because employees didn't feel it would have changed the situation: 'it was stupid behavior'.

4.5. *Company E*

Organization E is an oil and gas company with about 350 employees in The Netherlands. The Health and Safety manager explained that due to recent incidents, the organization realized the need to learn. There was a recurrence of incidents that could potentially have had large consequences. Because openness was considered to be an issue in this organization, two separate sequential focus groups were held: one group with the operators (five participants) and one group with nine representatives of the management departments: quality, health, safety and environment (5), site management (2) and engineering (2). Both groups agreed that the organization insufficiently learned from incidents. According to the participants in both groups, the main issues in learning were related to the third phase in the learning process: 'planning actions', specifically in determining what were the right actions for improvement. The group with managers and engineers indicated that there was also a bottleneck in the first phase, because 'getting an overview of incidents' was an issue that hindered learning. Issues related to the fourth phase were also mentioned in both focus groups.

There were multiple factors mentioned that created the difficulties in the learning process. The difficulty in gaining an overview was for instance caused by the multitude of systems from which information could be retrieved. Environmental safety, personal safety and process safety were each registered separately and this caused a lot of work when aiming to get an overview of safety incidents. To get this overview, and to read the reports, more time was needed than was available. Another cause was that, according to the group of managers and engineers, the operators were reluctant to report. The reports that were received were of limited quality, because insufficient time and effort was put into writing the report.

Difficulties in generating the right actions for improvement were partly caused by the lack of overview of incidents. Both groups mentioned the difficulties in the follow-up of incidents as the main cause for insufficient learning. The difficulties were for instance caused by: too many causes to address, too many recommendations, and there was not enough time to perform the actions. After an incident there was often an immediate solution, the 'quick fix'. After the quick fix, people got back to normal day to day work, and as one participant stated 'the quick fix often turns out to be the permanent solution'. Issues were therefore not systematically and structurally addressed.

Another issue for the follow-up was that people in this organization often transferred – or pushed off – tasks to colleagues. One

task that was often transferred to the next shift, was the reporting of incidents. Reporting incidents takes time and did not get any priority, because employees did not receive feedback after reporting. Employees felt that they didn't have time to register reports, take up extra work, or to read new procedures. Solutions that were proposed by the management after incidents were by employees considered as a burden, that even further limited their effective working time. In their view, actions were often implemented top down, without taking into account consequences for the work processes.

The incident case that was discussed in this focus group illustrated difficulties in planning actions. The incident was the result of a well-known risk, because similar incidents (with limited consequences) were reported weekly. The risk was inherent to the current work process (it had to do with pressure in the conduits), and the risk could only be avoided with a different technical design or with a different work approach. However, the trade-off between operations and safety and maintenance was a topic of ongoing discussion. In this case, the costs for change of work processes were considered too high by the management and therefore actions were limited to mitigation of the consequences with a quick fix. The employees had little understanding for this fix; they considered it to be a decision of a manager without knowledge of the work process, since they felt many other possible solutions were available.

4.6. Company F

Organization F is a chemical company with a production site in the Netherlands with approximately 250 employees and about 50 contractors a day. The focus group consisted of seven persons: an environmental engineer, a process operator, a coordinator process safety management, a shift leader, a senior operator, a team leader operations and a coordinator QHSE. This organization learned quite well according to the participants in the focus groups, but there was also room for improvement. The main bottlenecks pointed out to be located in phases two and three, due to difficulties in 'selecting what incidents to investigate' and in 'determining what actions to take'.

There were many reports in this organization, because accidents, incidents, near misses and dangerous situations were often reported. Reporting was sometimes used by employees if they wanted things changed or to get attention for a specific issue. Because there were large numbers of reports, difficulties arose in the selection of events that should be investigated. There was not sufficient time to read and investigate all reports and a systematic investigation of incidents was seldom performed. The focus group stated that steps from analysis to planning of actions were neglected, meaning that the investigation was often stopped too early to have identified all causes, and the selection of recommendations was done based on 'expert opinion' of the investigator. This resulted in a strong focus on technical actions. Moreover, resulting actions were not always performed, due to time pressure and difficulties in prioritization of tasks.

The first incident case that was discussed in this organization illustrated the difficulties that arose due to the large number of reports. The incident report was not recognized as relevant to investigate in further detail. As a result of a successful campaign to increase the number of reports there were so many reports that the QHSE manager was not able to read all reports on a short notice. Moreover, there were no criteria to select relevant reports, so he made a quick scan of the reports based on the title of the report, which was given by the employee who reported the incident. Since this specific incident had a very common title, it was not recognized as an event that required further attention, meaning that it was not investigated and there were no lessons learned.

The second case illustrated difficulties that were not discussed in the general part of the focus group. The incident was reported, analyzed and actions for improvement were determined, but the actions were not performed in time. A similar incident happened, that could have been prevented if the planned actions would have been performed in time. However, the causes for the delay were similar to those that were mentioned in the general part of the focus group: there were too many actions and too little budget, and there was no prioritization in actions. Another cause that was mentioned was that there was no ownership, meaning that nobody felt responsible for performing the actions.

4.7. Company G

Company G is an organization with approximately 350 employees that produces chemicals. Six persons participated in the focus group: two operational managers of different departments, a maintenance coordinator, a team coach, an assistant team coach and a HSE engineer. According to the participants in the focus group, bottlenecks for learning in this organization were located in phases one, two, three and four. The main reasons for a failure to learn effectively were 'insufficient reports', 'quality of the accident investigation' and 'performance of actions'.

Multiple factors that created these difficulties in the learning process were mentioned. Employees were for instance reluctant to report incidents, because they felt that by reporting they were saddling themselves up with extra tasks. The reporting employee was often asked to follow-up on the report. The employees carefully considered the doubts and benefits related to reporting: what can it do for me and for the team, what does the organization want me to report and what are the consequences of reporting? Some employees found it confusing that the organization wanted as much reports as possible, but at the same time, the incident frequency was supposed to be zero. The reluctance to report was strengthened because there was no feedback on given reports.

The quality of accident investigation was considered to be insufficient, because the investigators did not have the knowledge and experience to carry out root cause analyses. The quality was also limited because the investigators were afraid to include human factors, for a fear to blame colleagues. The lack of knowledge and fear to include all factors resulted in investigations in which underlying issues were not addressed.

In the focus group also multiple causes were discussed that hindered a successful performance of follow up actions. Most actions were focused on the short term, to cover liability and mitigate consequences. These actions were not evaluated for their effect and no additional actions to address underlying issues were performed. The employees indicated that they were not motivated to perform additional actions, because there were no clear drivers to perform them, as it was not clear what their added value was. Most workers already had a lot on their plate and there was in general no time to perform actions, let alone to monitor or evaluate them. The actions would increase the workload, but there was no additional time or funding available to perform them. According to this focus group, the workload was a result of limited attention by senior managers for the consequence of implementation of actions and policy in practice.

The two incident cases that were discussed in this focus group, both illustrated difficulties in performing actions. The first incident was analyzed and lessons were learned, but due to financial and technical objections, the actions were not pursued. According to the employees, actions were seldom implemented, which meant that the risks remained. After the second incident, risks also remained, however some actions were taken that aimed to reduce the consequences. Although the risks were identified and could be addressed,

Table 1
overview of bottlenecks per company.

Phase	Company							Bottleneck
	A	B	C	D	E	F	G	
Acquiring information		x	x	x	x		x	Reporting (B, C, D, E, G)
Investigation and analysis	x			x		x	x	Selection (D,F); Investigation (A, D, F, G)
Planning interventions	x		x	x	x	x	x	Plan actions (A, C, D, E, F, G)
Intervening	x				x		x	Perform action (A, F, G)
Evaluating								

the organization chose to focus on remedial measures for financial reasons, and to let the risks exist.

4.8. Causes and conditions for failure to effectively learn

For each of the organizations one – or more – bottleneck is identified, meaning the step in which the learning process is hindered. The overview of the results in Table 1 shows bottlenecks in reporting, selection, investigation, planning actions and performing actions. Table 2 summarizes for each phase the causes and conditions, which were identified in relation to the bottlenecks.

Table 1 shows that five organizations identified difficulties with acquiring information (i.e. reporting incidents). In Table 2, it is shown that this was either because reporting was associated with negative consequences – such as blame, image problems or an extra workload – and people were unwilling to report, or because employees didn't know when and what to report, because there were no serious consequences, there was no feedback if an incident was reported and the signals from the management seemed contradictory (a low incident frequency rate versus a high number of incident reports).

There were four out of seven organizations where the investigation and analysis formed a bottleneck for learning from incidents, including choices on what incidents to investigate and how to carry out the investigation itself. Two organizations perceived difficulties in the selection of incidents to investigate, because there were no selection criteria, there was no time for a thorough review, and the way incidents were reported made selection difficult. In four organizations systematic causes for the incidents were not identified and addressed (which is tightly related to the next phases of the learning from incidents process, planning actions). The main reasons were limitations in competences or in the mental models, resulting in a focus on either technical, human or mitigating actions.

Table 2
Causes and conditions for the bottlenecks.

Phase	Causes for bottlenecks	Conditions
Acquiring information	Not knowing how and what to report (C, D, G)	Recognition of situation, successful recovery mechanisms, contradicting signals on incident report vs frequencies, belief that every incident is unique
	Not willing to report (B, E, G)	Fear of ruining incident rate, fear of client, fear of colleagues/image, fear of extra work and no sense of urgency, due to lack of feedback
	Limited quality of reports (E)	Time and effort
	No overview of risks (E)	Multitude of systems
Investigation and analysis	Systematic causes not identified (A, D, F, G)	Limitation to direct causes i.e. human or technical causes, limitation to mitigating actions, time pressure on completion analysis
	No selection of incidents to investigate (D, F)	No criteria, too many reports as result of successful campaign and use of reports as action trigger
Planning interventions	No selection of actions (A, D)	No sense of urgency, due to the belief that incidents are unique, no systematic approach and limited integration with other actions
	Quality of the actions (A, C, E, F, G)	Limited employee involvement, i.e. top down, focus on quick fix, focus on technical actions (no systemic causes)
Intervening	Not able to perform actions (A, E)	Time limitations
	Actions are not performed (A)	No sense of ownership to perform actions, large scale organization and no formal action holder
	Sense of urgency to perform actions (A, G)	No drivers and fear of extra work, little serious incidents

In six organizations difficulties became visible when planning actions. There was a tendency to focus on technical causes and actions for improvement, which meant that structural improvements were not performed. Other conditions that hindered a successful planning of actions were: a lack of overview of causes to address, lack of time, limited sense of urgency and a lack of ownership.

In three organizations, the performance of actions (intervening) was considered a bottleneck to learning from incidents. In one case this was the result of planning difficulties; there were too many actions, no prioritization and no ownership to perform the actions. In other companies the actions were not performed, because there was no sense of urgency: the benefit of reducing the risk was not considered to outweigh the costs of implementing changes.

The evaluation phase was not discussed in any of the focus groups. Since this is the last phase of the learning process, and many bottlenecks have been identified in earlier steps, difficulties in evaluation are, however, likely to exist.

Some commonalities were identified in the conditions for difficulties in learning. For instance, aspects related to *time* were often mentioned by the participants as an important factor to hinder learning from incidents. There was too little time to read all the reports, too little time for a thorough investigation of the incident and too little time to perform the planned actions. It was also often mentioned that there were too many actions, too many causes to address or too many ideas for improvement, all meaning that there was not enough time to do all the things that one would like to do.

Other commonalities were found in relation to: *fear of negative consequences* – such as extra work or a negative image – *beliefs or mental models* – such as the idea that all incidents are unique – *knowledge or competences* and *sense of urgency*. *Knowledge or competences* were mainly related to incident investigation and analysis. The investigation did often not address organizational causes, because there was a blind spot for organizational and cultural

issues and technical factors were more easily identified. As a result, recommendations and actions were often mainly aimed at mitigation of the consequences of an incident, instead of at structural causes. The final commonality was the *sense of urgency*. This sense of urgency was low in two organizations as a result of earlier successes, meaning the low incident frequency in organization A and the successful recovery mechanisms in organization C. However, a lack of feedback on reports, lack of visible actions and contradicting signals on lowering the incident frequency versus increasing the number of reports for improvement, also affect the sense of urgency.

5. Discussion

Most of the case companies indicated that immediate actions were taken to remedy incidents. The consequence is that even though the risk of repetition of the specific incidents is mitigated, a similar incident may occur if the conditions are slightly different. Therefore learning from incidents should secure a more generic prevention of repetition.

The findings clearly illustrate that bottlenecks appear in all steps of the learning process. The steps *reporting*, *selection*, *investigation*, *planning actions* and *performing actions* all formed bottlenecks for learning, but most difficulties became visible when *planning actions*. *Planning actions* is the phase in which lessons learned from incident investigation are translated into recommendations and the recommendations are prioritized and selected. It is the phase that should bridge the gap between investigation and actions for improvement. In this phase, choices for follow-up have to be made, even though this often excludes or postpones other important actions. If these choices are not made, this could result in too limited focus in the action plan and a lack of structural improvement. The consequence is that the learning process in most cases is severely hampered and that neither single loop nor double loop learning takes place.

The participants in the case companies reported a number of causes for learning difficulties, the most important ones are: employees were reluctant to report incidents, the quality of incident reports was limited, systematic causes were not addressed in the investigation and planned actions were not performed. A number of latent conditions was also mentioned. Examples are fear for extra workload, limited eye for organizational incident causes, no sense of urgency to change, or little ownership for actions, created the latent conditions in which learning was impeded. Whereas, these conditions have a negative effect on learning from incidents, they can easily be reversed to conditions for successful learning from incidents. These results illustrate that in causes for the difficulties in the learning process, direct causes and latent conditions could be distinguished. This implies that to improve learning itself, a similar approach could be used as when learning lessons from incidents or accidents, in which latent conditions are identified to address them. Here it is important to note that identification of problems, causes and conditions is in itself not sufficient, but a follow-up in which these issues are successfully addressed is necessary.

Most of the identified causes in this field study are similar to those that were described in previous theoretical studies (Pidgeon and O'Leary, 2000; Choularton, 2001; Lampel et al., 2009; Hovden et al., 2011). A lack of competence or a limitation of the expertise (technical or human behavior focus) was often mentioned by the participants in relation to incident investigation and the generation of recommendations. A blame culture was only mentioned in one organization, where it strongly influenced the reporting of incidents. A lack of trust was not explicitly mentioned by the participants as a cause for ineffective learning. Limited sense of urgency

and lack of motivation are however factors that are related to trust in the organization and its management.

An important finding is that in none of the organizations explicit management commitment was emphasized, except by the health and safety managers. According to Zwetsloot et al. (2013), a strong commitment of senior management, such as in the zero accident vision companies, could however facilitate the realization of safety improvements. An absence of such commitment may therefore be a limitation to learning from incidents and could be underlying other behavioral and cultural issues, such as the sense of urgency and motivation for learning. As most companies could be expected to have other management systems in place, for instance on quality assurance, a closer integration with such systems could be a way forward to strengthen learning from incidents.

Another interesting finding is that in most of the organizations, time was mentioned by the participants as an important factor to hinder learning from incidents. Schein (2004) mentioned in his study that lack of time – or a lack of budget – is often a result of managerial decisions. Some actions are considered to be more important than others, and therefore more time and resources are available for those actions. This means for instance, that if too much time and effort is put into the selection of incidents from databases and into investigation, this time and effort cannot be used to follow-up on the incidents, i.e. to perform action.

A limitation of this study is that the failure to learn was studied in seven organizations that differed in size, organizational structure, in core business, and the type of incidents that the company aimed to learn from. Therefore caution must be applied, as these results may not be transferable to every organization. The focus group methodology could also be a reason for caution, as the methodology only tells about the participants' experience with learning and the actual learning processes as such are not identified. However, observation of learning from incident processes would require very time consuming longitudinal studies, and the current methodology is well suited to give the first knowledge which can be used for the design of intervention projects. Another limitation may be caused by the selection of participants for the focus group. A small number of participants were invited to discuss their experiences on how the organization learned from specific incidents, but other experiences may exist within the organizations that are studied here.

Despite these limitations, this work contributes to existing knowledge on learning from incidents and accidents from an applied research perspective.

6. Conclusion

In this study, an analysis of the causes for failure to learn is performed, instead of an analysis of the causes of an incident. The findings provide insight into causes for a failure to learn in practice and they illustrate that a distinction between direct causes and latent conditions could be useful. Studying the learning process itself allows for improvement from a less emotional perspective in comparison to the analysis of specific incidents. Moreover, the analysis of the learning process is possible in any type of organization, regardless of the number or the types of incidents in the organization.

The results from this study imply that organizations should put more effort into the identification of latent conditions for learning. A different mindset (learning to learn) within organizations could aid organizations in the prevention of accidents; whereas, they now often focus on learning lessons from incidents, not learning could in itself also be seen as an event to learn lessons from and therefore as a subject to study: not learning from incidents, is an incident to be analyzed in itself. By actively and systematically studying learning, more latent conditions might be identified

and indicators for a successful learning process may be determined. A systematic analysis of the learning from incidents process, could also aid in prioritization of actions and in the (re-)allocation of time and resources to other aspects of the process and so aid to structural improvements of safety. The use of methods from accident investigation could facilitate the identification of latent learning conditions.

From a research perspective, what is now needed, are more studies that investigate direct causes and latent conditions for a failure to effectively learn. More examples of why an organization did not learn are necessary to study differences between organizations and sectors, and to identify generic failures. More information on latent conditions might help to establish a common set of indicators that need to be addressed to improve learning. This information could be used to develop and test targeted interventions to improve learning from incidents.

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