

Trials and Tribulations: The Building of a Resilient Organization

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Abstract. Resilience engineering has emerged as a new approach to safety and risk management emphasizing the importance of proactive, anticipative and adaptive organizational behavior thereby distinguishing itself from the traditional approaches of PSA and accident analysis. In contrast to the traditional approaches that frequently artificially separate topics, the approach provides a theoretical synergy of safety and risk management principles that reflect the practitioner's everyday goals and challenges. This paper sets out to present a case study of the intricacies of building a resilient organization. Focus is on the challenges that may interfere with the creation of a resilient organization, e.g. power struggles, incompatible goals, competence, censorship, business culture, management fads, academic discussions, compromises, campaigns, failure to learn from near-misses and accidents, short term economical versus long term safety goals, and poor corrective actions. The challenges will be discussed and illustrated with examples. Based on the author's experience building a resilient organization is not easy despite the best intentions.

1 INTRODUCTION

Building a resilient organization is easier said than done. Safety goals frequently become entangled with other organizational goals and safety is gradually downgraded over time in a continual battle for supremacy. Why safety originally was seen as important and needing prioritization is soon forgotten amongst the need to earn money and desire to reach production targets. Even the experience of recent incidents and accidents can rapidly be forgotten. This is despite the prevalence of organizational visions of safety first or zero incidents and accidents.

A significant role is played by the organization's business culture. The organization's business culture provides the goals and boundaries to work within but is affected by external influences such as industry regulators, political decisions and particularly when it comes to safety, media interests and attention stirring popular opinion. This is often seen in the aftermath of large-scale incidents and accidents in which regular witch-hunts can result from the media's need to 'define and assign' responsibility and to identify scapegoats. Engineering resilience in such situations requires a systematic approach that emphasizes organizational foresight and adaptability (Hollnagel et al., 2006), which may be difficult when the consequences of the past loom in the background.

This paper presents the trials and tribulations of a practitioner attempting to engineer resilience in an organization in the aftermath of two large-scale accidents. It discusses issues that are inherent in almost every organization and which cannot be dismissed. No attempt has been made to refer to specific resilience engineering models rather to em-

phasis the challenges associated with applications in the practical environment. The list of challenges is far from exhaustive but reflect those of central relevance to the case in focus.

2 THE CHALLENGES

In the first quarter of 2000 a Scandinavian railway operator experienced two large-scale accidents: a collision between two passenger trains resulting in 19 fatalities, and a collision between two freight trains resulting in a long lasting gas fire and the risk of a BLEVE (Boiling Liquid Expanding Vapor Explosion). (This explosion could have potentially destroyed everything within a 500 meter radius, and occurred at the railway station of a town with a population of approximately 50 000.)

Despite having experience two large-scale accidents within a short time period, building a resilient organization soon became submerged under everyday preoccupations. This next section will describe some challenges the organization faced as it attempted to bounce back after the accidents as seen from the author's perspective.

2.1 Power Struggles

Despite what could be expected, experiencing large-scale accidents is unfortunately not always enough for organizations to show a willingness to lay aside existing internal conflicts (even at an individual level). In the aftermath of accidents, organizational changes are often one of the first steps to be taken to rectify the perceived causes. Frequently the CEO and her nearest colleagues will resign (voluntary or involuntary), leaving a void waiting to be filled. This unfortunately leads to a change of focus from correcting the causes of the accident and improving safety in the organization to individuals positioning themselves for managerial roles in the new hierarchy. Corrective actions become a task for lower and middle management, often in safety related positions, whereas top management change focus to the upcoming power struggles. Consequentially safety receives less attention than deserved and becomes less of a priority.

Power struggles can also take a different form. The strength of some trade unions can be of such dimensions that safety initiatives end up as compromises so that the balance between different trade unions and management remains the same. For example, following the train accidents, the railway operator decided to make changes to the departure procedure. The departure procedure had previously been changed to reflect the introduction of ATC (Automatic Train Control) on the lines. The conductor's role as a second barrier therefore became obsolete. Since ATC was only installed on the main lines, non-ATC lines relied on only one barrier for preventing accidents - the driver.

The organization conducted a risk analysis in which three alternatives were evaluated. The best solution was chosen and presented for the two trade unions (drivers and conductors). However, one problem arose. The suggested change to the procedure involved a change of power from the driver to the conductor. This was seen as unacceptable by the drivers union and in the end a compromise was reached, which involved selecting

the third safest procedure that maintained the prevailing power distribution. The procedure was still an improvement from the then present situation but power struggles clearly came in the way of safety.

2.2 Incompatible Goals

Incompatible goals exist in all organizations. Railways are customer-centered organizations and customer needs often take priority. Arriving and departing on time is central to a successful railway organization and reliability statistics are often presented at stations and on web pages as the first contact point between the customer and the organization.

The importance of time becomes an important signal the organization sends to both customers and personnel. Safety is rarely visible and is only mentioned in connection with accidents or incidents. For the driver this presents a problem, as delays are unwanted and create external (through traffic control centers communication) and internal (through a desire to run on time) pressures that ultimately create stress and increase the potential for SPAD (Signal Passed At Danger) incidents.

How priorities are communicated and followed-up in organizations is paramount. Communicating a safety first message will have limited success if managers and personnel are assessed on productivity. This requires awareness and attention from top management but is seldom understood or acted upon.

2.3 Competence

In many large organizations, safety departments consist of personnel who have worked their way up through the system. Their knowledge and skills are often unique but they frequently lack the safety science knowledge and skills required to work systematically with safety in order to build a strong and reliable organization. Hiring academically trained safety personnel is therefore often necessary to ensure that safety is managed systematically.

In the example referred to here, the organization improved the competence level of its safety organization and its place in the organization in the aftermath of the accidents. This was partly due to an internal awareness that improvements were required, but also externally by demands made by the regulator. The new safety department reported directly to the CEO and led to the safety department becoming a strong force in the organization. In the next two years the level of safety was improved significantly. However, internally many held the opinion that the safety department had become too dominant a force, which in turn created power struggles. Not everyone considered the increased competence and strength of the safety department as positive.

It took less than two years for the organization to forget the reasoning behind the need for a strong safety department. Internal disputes began to take priority over competence needs. The bigger picture was blurred and after two years (and two reorganizations later), the safety department was relegated in the hierarchy as a result of internal power struggles. Many of the higher qualified safety personnel employed after the accidents

left the organization, taking with them the competencies required to engineer a resilient organization.

2.4 Censorship

Censorship takes many shapes both voluntary and involuntary. Sometimes organizations do not wish to see the results of accident investigations because they point the finger at the higher echelons. At other times organizations seek scapegoats and wish to ignore the influence or failings of the system as a whole. Censorship may also be driven by the knowledge that the information will become available externally in the public domain.

Making the result of accident investigations public puts pressure on the organization both at individual (the people involved) and managerial levels (the people ultimately responsible). Willingness to learn is suddenly confronted by mass media criticism and its translation of events.

In 2002 the national Accident Investigation Board (AIB) was enlarged to include the railways. Operators and the infrastructure owner had to report and make their investigations accessible to the AIB to which the public had unlimited access. The result was that the operator decided to change the format of its accident reports so that these consisted primarily of a sequence of events description. Deeper analysis was kept as internal notes, however, it did not take long before the internal notes were perceived as superfluous by the management, as the criticisms included were seen as undesirable. Thus, a good accident investigation system faltered because the culture of the organization with respect to openness and willingness to face the facts did not match the good intention of the AIB to learn from accidents.

2.5 Business Culture

Organizations have cultures that reflect the primary goals to be attained whether financial, safety, environmental or quality. The business culture defines what is important in the organization and consequently how safety is prioritized. Separating safety from production is theoretically possible but practically impossible, as all decisions made in an organization in some way will reflect on safety. Working to improve safety must therefore be done in the light of the many internal and external influences affecting the organization. These are often not safety related and a first step to improve safety within a business culture is to make management understand that organizations work as complex systems where each decision impacts far beyond its direct target.

Selling the systemic perspective in an organization is not easy. Managers frequently see their roles as unique and independent of other functions in the organization and have problems accepting their direct or indirect influence on safety matters. If their decisions lead to success in the organization as a whole they happily take responsibility but if the decisions lead to failures or accidents they are less willing to accept responsibility.

In the aftermath of the accidents described, the safety department attempted to introduce a systemic perspective but found little acceptance in the organization. Not because of unwillingness amongst management to accept a systemic perspective but because of power struggles and territoriality. The resilience to change in the organization was far greater than the need for improved safety performance.

2.6 Management Fads

Campaigns, in particular poster campaigns are seen in most high reliability organizations as a tool to keep personnel informed and attentive to safety issues. As with most attitudinal campaigns the effects are short lived and rarely make a mark on behavior. In fact some organizations use too many poster campaigns and create a negative effect, as personnel do not see the point since the campaigns are rarely supported by any actions.

Behavioral intervention campaigns are stronger and will if supported over a longer time have an impact, e.g. Statoil's *Safe Behaviour Programme* (Statoil, 2007). This program was commenced in 2003 and has had to date more than 29.000 participants from the Statoil Group. Unfortunately many behavioral intervention programs are one offs and effects remain short term.

Other management fads e.g. organizational models, customer focus etc., can also impact on the organization in a negative way. In the last decade safety management theory has placed safety as part of the responsibility of line management. Whether this is right or wrong is difficult to say but the result has often been that line managers have been given increased responsibility but not adequate resources to take on this responsibility. At the same time safety departments have been reduced in size since there no longer is a need for the specialist in the organization, e.g. NASA (Rollenhagen, 2005). The drive to improve safety may also be used as a form of efficiency drive.

In the aftermath of the accidents the railway operator started a traffic safety campaign to improve understanding of behavioral issues. The campaign consisted of a single day's training and was to be available for the entire organization. The campaign was considered successful, however, the main group of personnel, the train drivers, only participated in limited numbers, as they could not be removed from other duties. The organizations priority was demonstrated very clearly through management's decision, which was observed and commented upon by many.

Following the employment of the new CEO the company was reorganized. This reorganization took place two and a half years after the accidents and a conscious decision was made to break up the safety department and delegate safety responsibility to line managers. The organization decided that specialists no longer were needed and the outcome was a 30% reduction of safety personnel including some of the most senior staff. The changes made to the safety organization were a reflection of the power struggles that had taken place and the consequences were never risk assessed by independent means. For management, a belief in modern safety management theory drove these changes, despite being based on limited scientific support.

2.7 Academic Discussions

Building a resilient organization often requires external input in the form of investigations, surveys or suggestions and suitable solutions to action. Organizations rarely want academic discussions about terms and vague or ambivalent definitions that make concepts difficult, if not impossible to apply.

The distance between academia and high reliability organizations frequently appears immense and the high level of abstraction used in academia is of limited or no use to an organization. For example, the culture/climate debate may be of high relevance to academics distinguishing between deeper and shallower characteristics of an organization but for most organizations this distinction has little value. What matters is a solution or solutions, to the problems encountered. Whether this is called safety culture or safety climate is irrelevant.

Following the accidents several surveys (culture/climate) were conducted. Statistical analysis identified a high number of interdependent characteristics, which were perceived to constitute the organization's safety culture. Complex models were presented to illustrate the significant result of the analysis but no concrete suggestions to corrective actions were made. The analyses also failed to link behavioral/attitudinal factors to structural aspects.

On the whole the safety culture focus disappeared in a statistical significance fog, which did not support the organization in developing suitable corrective measures. In the end the organization developed its own Simple Model of Safety Culture (Skriver, 2004) on which its corrective action plan was based. The model, containing three interdependent factors (risk control, attitudes and behavior), was utilized for developing and managing corrective actions both at concrete and more abstract levels in the organization from a systemic perspective and has since been applied successfully in other industries such as the nuclear and oil. For the practitioner keeping it simple is often the key to success.

2.8 Failure to Learn

In high reliability organizations accident investigations have a specific goal – to identify corrective actions that reduce the probability of the accident being repeated. Unfortunately most accident investigation methods pay little attention to this fact. Writing an accident investigation report often becomes an end rather than a means to an end and little consideration is given to how it shall be used. Poor corrective actions result and in the end the accident investigation fails to prevent further accidents as the organization fails to learn.

Systematic accident investigation is essential if an organization is to learn from what happened. However it is important that the focus is on accident prevention not on presenting a detailed description of an accident sequence, root causes, non-conformity or variability. This may be relevant for Accident Investigation Boards but for most organizations, where time limits may impact on the investigation it is important to keep the goal in mind.

When the accidents described occurred, it was apparent that the railway operator did not have an accident investigation method. One of the first actions was to develop an investigation method suited specifically to the needs of the railway. Essentially a railway operator employs two occupations that are most likely to be involved in accidents at the sharp end: train drivers and conductors, thus the method focused on their roles and potential actions in a systemic perspective. The method derived its structure from the STEP method (Hendrick & Benner, 1986) combined with the checklists of the Human Performance Investigation Method (Paradies *et al.*, 1993). Due to its tight coupling train accidents are often predictable (design based) and it was therefore possible to include an element on generic corrective actions in the method thereby simplifying the task of seeking solutions for the line managers responsible.

The method was developed to account for the majority of accidents so that investigations could be conducted and documented in less than 10 working days. This was to satisfy management requirements and to ensure that media pressure did not interfere with the investigation process. The method was applied with success during the following years proving its value and also supported the improvement of an existing incident registration database. However, all investigation results are not always welcome (see 2.4) and the method died a slow death due to increased regulator attention and internal accident reports becoming accessible for the public.

2.9 Short-Term vs. Long-Term Goals

One of the biggest problems encountered in connection with engineering a resilient organization relates to the need for long term planning. This stands in strong contrast to most organization's short-term financial goals and managers' requirement to show instant results. Behavioral intervention programs in connection with changes to procedures or rules take time to have an impact. If, e.g. procedure violation has been the norm, it is insufficient to change the procedure and expect behavioral changes to follow. Organizations must work systematically with the changes as well as with behavior and attitudes to succeed. However, this type of work takes time, especially if many procedures have to be changed. Over time safety behavior will improve as a result of well-developed behavioral intervention programs.

Unfortunately the pressure put upon most managers to show results counteracts such a systematic approach. To show management abilities, campaigns and other changes are introduced often in rapid succession without further thought to the impact on safety as a whole. The end result is often poor despite high costs. It is important for organizations to understand that improving safety takes time and effort. A five-year plan provides the time span within which safety can be expected to improve.

3 CONCLUSIONS

Resilience engineering has been proposed as an approach that provides a theoretical synergy of safety and risk management principles that reflect the practitioner's everyday goals and challenges. This paper has outlined a number of the challenges associated

with the building of a resilient organization using examples from a practitioner's perspective. It is critical that the field takes such factors into account when new theories and models are produced. For the practitioner there is a need to keep things simple and to focus on solutions. If resilience engineering is to be an approach supporting the practitioner's goals and challenges it must reflect the goals and challenges of the practitioner and be aware that the needs often are different from the academic environment.

The difference between a resilient and a less resilient organization lies in how safety is managed on the whole. A resilient organization will focus on proactive safety management. Less resilient organizations will practice reactive safety management where savings from preventing accidents are rarely balanced with the costs of accidents. Essentially building a resilient organization is a question of systematic application of safety management principles, which in reality are always mediated by cost, prioritization and culture. Despite the best intentions engineering a resilient organization is not easy. Self-interest by managers and workers will often prevail and building a resilient organization may ultimately stand on the organization's resilience with respect to change.

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