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The bureaucratization of safety



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ABSTRACT

This paper examines the bureaucratization of safety, and the increase in safety as measurable bureaucratic accountability. The bureaucratization of safety—which has accelerated since the 1970s—revolves around hierarchy, specialization and division of labor, and formalized rules. Bureaucratic accountability refers to the activities expected of organization members to account for the safety performance of those they are responsible for (e.g. unit, team, site). Bureaucratization of safety has brought benefits, including a reduction of harm, standardization, transparency and control. It has been driven by regulation, liability and insurance arrangements, outsourcing and contracting, and technologies for surveillance and data storage. However, bureaucratization generates secondary effects that run counter to its original goals. These include a reduced marginal yield of safety initiatives, bureaucratic entrepreneurship and pettiness, an inability to predict unexpected events, structural secrecy, “numbers games,” the creation of new safety problems, and constraints on organization members’ personal freedom, diversity and creativity, as well as a hampering of innovation. This paper concludes with possible ideas for addressing such problems.

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1. Introduction

“Businesses are in the stranglehold of health and safety red tape... We are waging war against this excessive health and safety culture that has become an albatross around the neck of businesses”.

David Cameron, UK Prime Minister, in meeting business owners (Anon, 2012)

1.1. Capturing the bureaucratization of safety

In 1981, more than three decades before David Cameron’s remark, Mendelhoff noted how the Reagan administration in the US believed that health and safety regulation had gone too far. Terms and standards had been set so strictly that costs easily outweighed benefits (Mendelhoff, 1981). Yet ten years on, Zimmerman observed in the *Journal of Energy Engineering* that “institutions... have continued to be created and refined and new bureaucracies and a professional workforce to deal with these problems have continued to be formed as well” (1991, p. 97). He noted a 13% increase in projected funding for safety regulation from 1990 to 1993, which has since accelerated. Between 1974 and 2008, Townsend (2013)

showed a ‘mere’ doubling of the number of applicable statutes, but a hundred-fold increase in regulations interpreting and applying them, with a concomitant proliferation of “service industries” for safety auditing, researching, pre-qualification, enforcement, publishing, recruitment, training, accreditation and consultancy (p. 51). Such growth shows no sign of slowing: the number of occupational health and safety-certified companies in 116 countries more than doubled from 26,222 in 2006 to 56,251 in 2009 (Hasle and Zwetsloot, 2011). Today, some cite “health and safety lunacies” (Townsend, 2013, p. 59) and “petty bureaucracy” (Hale et al., 2013). Some have, in the words of Amalberti (2013, p. 114) begun “to realize the irony of the tremendous efforts that are being devoted to safety.”

Not that such irony is on full display in our own literature, by the way. *Safety Science* features few papers that explicitly review the growing bureaucratic organization and ordering of safety work. Bureaucracy, of course, is implicated in the consumption, funding and production of safety research. It configures producers and audiences of such research in institutional webs of resource- and ideological relationships that might keep certain assumptions in place and some questions unasked. The exceptions are as follows: Hale and colleagues newly reported on a strong political consensus about how safety regulation stifles industrial innovation, feeds a culture of risk aversion and petty bureaucracy (Hale et al., 2013). A duo of extensive reviews questioned the top-down rational approach to imposing rules, which limits freedom of choice and

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sees ‘violations’ as negative behavior to be suppressed (Hale and Borys, 2013a, 2013b). This follows earlier research questioning the value of behavioral safety rules (Hale, 1990; Hale and Swuste, 1998). Antonsen and colleagues questioned a strong emphasis on standardization in the oil and gas sector for the unintended negative consequences on organizations’ crisis-handling capabilities (Antonsen et al., 2012). Jagtman and Hale (2007) criticized bureaucratic control measures in traffic safety—as expressed in standards and guidelines which designers can ‘hide’ behind, and which are incapable of dealing with unexpected events. Bieder and Bourrier (2013) have asked whether never-ending proceduralization in aviation is desirable or avoidable. More implicit critiques of safety bureaucracy are found for instance in the work of Nilsen (2008), who developed tools for empowering local risk management; or Falk et al. (2012), who identified problems with focus and prioritization in safety reviews of modifications to nuclear power plants; or Borys (2012) who exposed gaps between safe work method statements and actual work in the construction industry, and in a recent editorial examining the issues and challenges of occupational health and safety management systems (Hasle and Zwetsloot, 2011). But much related research reported in *Safety Science* seems dedicated to getting aspects of bureaucracy to work better, for example how to improve the application of occupational health and safety management systems (Makin and Winder, 2008) or get leadership involvement to increase worker rule compliance (Dahl and Olsen, 2013).

Industrialized nations have followed different trajectories in the bureaucratization of safety. A contrast study between Sweden and the US, for example, showed how that divergence became particularly visible from the 1970s onward (Fischer et al., 1994). The Swedish response was to give safety stewards (who had been around since 1942) more education and a role in monitoring work-floor rule compliance, as well as a focus on employer provision of safe workplaces. Government inspectors were expected to give advice and follow up on it. In contrast, the US concluded that “consequences of violations of the Worker Protection Act are not severe enough” (p. 402) and chose to increase its punitive responses. Surveys showed trust about compliance in Sweden, and a reliance on small groups to rationally reach agreement. In contrast, they revealed widespread mistrust of employer intentions in the US and a belief that they deliberately ignored safety standards. US inspectors were prohibited from giving advice, because if it did not succeed in correcting the problem, citation for violations could be thrown out in court. “American[s]” the study concluded, “not only start off with more pessimistic assumptions about predispositions to compliance but also ... use the legal system to regulate human interactions” (p. 388). Bureaucracy, however, is heavily implicated in both these models: the involvement of more rules and compliance, and more people who have local decision power but are not directly involved in front-line work.

Yet many experiences of bureaucratic expansion of safety are common across nations and activities—e.g. increases in rules, paperwork, costs, time drain, safety people involved, and compliance expectations that are insensitive to the demands of front-line activities (GAO, 2012; Hale, 1990; Hale and Borys, 2013b; Hale and Swuste, 1998). To be sure, increasing regulation and the kind of standardization and systematization that comes with bureaucratic governance have paid great safety dividends during the twentieth century. Bureaucratic organization has tried to introduce rationality, order and efficiency as well as eliminate favoritism (Du Gray, 2000; Merton, 1938). The safety yield of further bureaucratization, however, is declining or plateauing in many industries (Townsend, 2013). Predictability, standardization and control are by-words for this mode of organizing, which implies the suppression of surprise, diversity and deviance. It has inspired questions about secondary (negative) effects—as indeed raised by David Cameron.

1.2. Defining bureaucratization

Bureaucratization for the purposes of this paper means the administrative governing, by not necessarily representative organization members, of the relationship between the means an organization dedicates to safety and the ends it hopes to achieve with them. According to sociologist Max Weber (1864–1920), bureaucratization involves hierarchy, specialization and division of labor, and formalized rules:

- Hierarchy increases organization members’ decision authority and span of control closer to the administrative apex. Members are accountable for their actions to those “above” them (the notions of “above” and “below” in hierarchy themselves pre-date Weber by centuries. These can be traced back at least to the ideas of Rene Descartes).
- The specialization and division of labor affects safety work too. Not only has safety work become more of a specialization separate from operational labor, it also has further differentiations and divisions within (e.g. from occupational hygienists, biohazard managers, emergency response planners to process safety specialists).
- Formalized rules refer to standardized responses to known problems and fixed procedures that govern the collection, analysis and dissemination of information as well as the processes by which decisions are arrived at, and how both authority and responsibility for decisions are distributed, upheld and accounted for.
- Bureaucratic work is characteristically conducted by non-representative members of an organization. In this case, those who do such work are not necessarily chosen or elected to speak or act on behalf of a constituency (e.g. the operators doing safety-critical work).

According to the acquisitive model of bureaucracy, its activities may express a kind of “bureaucratic entrepreneurship.” This refers to undertaking an organizationally coordinated activity that, while legitimate with respect to organizational or societal goals (harm reduction, accident prevention), sustains demand for itself and creates more work to be met with additional bureaucratic means. Such a characterization of safety bureaucracy has resonated since Zimmerman, and even precedes it (Goyal, 1983; Smith et al., 1978). Members and leaders in a bureaucracy might defend their responsibilities and influence, or may seek to expand them (Mintzberg, 1979). Bureaucracy can popularly be referred to “as a composite term for the defects of large organizations ... it is a synonym for waste, inertia, excessive red tape and other dysfunctions” (Du Gray, 2000, p. 106). The monopolistic argument is that bureaucracies do not need to be parsimonious with their resources, nor show clear results, because they face no competition. With the bureaucratization of safety, that is not so obvious. Yet a seemingly moral obligation (e.g. a zero vision) or a particular regulatory demand can justify even inefficient and ineffective bureaucratic means dedicated to it (Donaldson, 2013).

The study of bureaucracy has a tradition in sociology and related fields (Du Gray, 2000; Merton, 1938; Thompson and McHugh, 2002). Weber warned long ago of the secondary effects of bureaucratization that run counter to an organization’s objectives (Weber et al., 1978). The remainder of this paper reviews the secondary effects of bureaucratization of safety as reported in the literature over the past years. It then considers the possible reasons for the increasing bureaucratization of safety and concludes with questions concerning the ‘appropriate’ role of bureaucratization in safety work.

2. Secondary effects of bureaucratization

Research over the past decades shows that unintended secondary effects of bureaucratization include a reduced marginal yield of bureaucratic safety initiatives, a difficulty in predicting unexpected events, a shift to bureaucratic accountability, quantification and “numbers games,” the occasional creation of safety problems that result from the application of fixed rules or bureaucratic safety systems, and the real and perceived constraints on organization members’ personal freedom, diversity and creativity.

2.1. Reduced marginal yield from safety initiatives

Does ever-increasing proceduralization and rule-making actually increase safety? This question was recently asked in the literature about commercial aviation (Bieder and Bourrier, 2013), and has been foreshadowed in an observation by Amalberti in 2001:

“The rate of production of new guidance materials and rules in the European Joint Aviation Regulations is significantly increasing while the global aviation safety remains for years on a plateau at 10^{-6} (over 200 new policies/guidance/rules per year). Since nobody knows really what rules/materials are really linked to the final safety level, the system is purely additive, and old rules and guidance material are never cleaned up. No surprise, regulations become inapplicable sometimes, and aviation field players exhibit more and more violations in reaction to this increasing legal pressure”.

(Amalberti, 2001, p. 111)

The experience in aviation noted by Amalberti above is not unique to that field (i.e. more rules do not create greater safety). A recent Delphi analysis of safety interventions in the construction industry showed that the interventions most associated with bureaucracy are deemed the least worthwhile (Hallowell and Gambatese, 2009). This includes the writing of safety plans and policies; record-keeping and incident analysis, and emergency response planning. These are judged by experts and practitioners in the study to not improve safety, and thus may drain organizational resources for no gain. Safety plans and policies, for example, are supposed to serve as the foundation for any effective safety program. They have difficulty capturing contextual sensitivities, however, and may miss the nuances of changes and developments in tools, insights and experiences gained in practice. The assumptions that go into the writing of plans and policies can be quite Tayloristic—implying that planners are smart and workers are dumb, suppressing diversity and working by heuristics—which are not always suited to the complexity and dynamics of organizations (Wright and McCarthy, 2003). It might assume, for instance, that there is one best method by which to achieve a particular goal safely, and that departures from, or innovations, on such methods cannot just emanate from the work floor, but need to be quality-checked and approved through bureaucratic process and protocol. This pretty much guarantees, of course, that a gap between policy and practice is left open. Safe, efficient work comes from a lot more than just practicing a policy—if that is even possible or doable in the first place (Borys, 2012; Cook and Woods, 1994; Degani and Wiener, 1990; Dekker, 2003; McDonald et al., 2006; Suchman, 1987).

Some parts of the literature suggest that safety assessments, policies and structures which are developed or enforced bureaucratically by those at a distance from operations, might not represent risk well, nor how to manage or govern it in practice. The Macondo (or Deepwater Horizon) well-blowout shows that while measurable safety successes were celebrated, the organization’s coherent understanding of engineering risk across a complex

network of contractors had apparently eroded (Dekker, 2011; Graham et al., 2011). Emergency response planning has also been critiqued in this regard (Hallowell and Gambatese, 2009), particularly for its “fantasy documents” that bear little relation to actual requirements in cases of emergency. Such documents are tested against reality only rarely, and draw from an unrealistic or idealistic view of the organization or the environment in which it operates (Clarke and Perrow, 1996). Echoing BP’s post-Macondo realization, Downer observed about the Fukushima nuclear disaster in 2011 (the largest since Chernobyl in 1986) that:

The bureaucratic infrastructure beyond the plant evinced ... shortcomings. Official announcements were often ill-considered and characterized by denial, secrecy ... The pervasive idealization of formal risk assessments, which so many narratives of Fukushima reaffirm ... perverts the processes through which it is governed.

(Downer, 2013, pp. 2–3)

The proceduralization or bureaucratization of safety assessments may in fact hamper the kind of relational thinking that is necessary to see possible correlations that become relevant or critical in a crisis (Bieder and Bourrier, 2013). This links to the next problem of bureaucratically organizing safety: the difficulty of managing uncertainty and predicting unexpected events (Grote, 2009).

2.2. An inability to predict unexpected events

Record-keeping and incident analysis is a bureaucratic initiative which involves documenting and reporting the specifics of incidents and injuries, including information such as time, location, work-site conditions and probable causes. It may also drive trend analysis of incident/injury data (Hallowell and Gambatese, 2009). In industries which show near-zero safety performance (i.e. a tiny residue of fatalities or serious injuries), the predictive value of incidents (for those fatalities or larger-consequence accidents) seems to have declined. The counting, analysis and tabulation of lower-consequence events hardly yields the insight necessary to prevent big events. As observed by Amalberti in 2001:

All this additional information does not necessarily improve the prediction of future disasters. The logic behind the accumulation of data first relied on the strong predictability quasi-accidents had on accidents; extending the scope of safety analysis to quasi-accidents seemed natural. The same logic then applied by linear extrapolation to incidents, then to quasi-incidents, and eventually in turn to precursors of quasi-incidents. The result is a bloated and costly reporting system with not necessarily better predictability, but where everything can be found; this system is chronically diverted from its true calling (safety) to serve literary or technical causes.

(p. 113)

At least two things are worth reflecting on in Amalberti’s observations above. The first is his sense of “mission creep” in reporting and documenting incidents, which now extends to precursors of precursors. This echoes doubts about zero vision commitments. These suggest, after all, that everything is preventable. If everything is preventable, then everything (even papercuts and rolled ankles) needs to be documented and investigated. This drains and perhaps misdirects investigative resources onto what Turner called “decoy phenomena” (Donaldson, 2013; Turner, 1978).

The second is that understanding incidents or near-accidents as dress rehearsals for actual accidents derives from linear defenses-in-depth (or Swiss Cheese) models of safety (Reason,

1997). The incident or near-accident is represented in this model as the breach of some, but not all, layers of defense. The whole notion of precursors relies necessarily on a linearity and similarity of pathways to incident and accident, or a common etiology between them (Wright and van der Schaaf, 2004). This does not apply, however, to complex, dynamic and already very safe systems (Amalberti, 2013). Failures in such systems seem to be preceded not by—what are seen as—incidents or breaches of defenses, but by normal work (De Carvalho et al., 2009; Dekker, 2011). Such normal work may contain daily frustrations and workarounds, as well as workers having to “finish the design” with various improvisations (Wynne, 1988). But these do not typically rise to the level of report-worthy incident, if anything because they occur too often, and successful ways of dealing with them have been developed (Starbuck and Milliken, 1988). These are, however, precisely the kinds of things that do show up in fatalities and big accidents. This ranges from ambiguous results on a negative pressure test (Graham et al., 2011), to applying a mixture of base chemicals with a brush to make scratches and gouges ‘disappear’ from the foam covering the Space Shuttle’s external fuel tank (CAIB, 2003), to an unclear procedure for how or how often to lubricate a jack screw on MD-80 airliners (NTSB, 2002), to the existence of vast networks of informal work and unofficial guidance materials to get the job done in aircraft line maintenance (McDonald et al., 2002). In hindsight, all these things turned out critical for the systems’ eventual drift into a big failure, but none of them ever were reported as incidents.

Bureaucratic mechanisms for incident analysis and reporting have great difficulty picking up these subtle signs (indeed, Amalberti (2013) covers the relative uselessness of telling organization members to look out for “weak signals”). Moreover, bureaucratic indicators of “safety,” particularly quantitative ones, may well suggest that risk is under control—more so than it actually is. Recent disasters occurred in “high-performing” organizations with—if not a strong focus on safety—a strong focus on low numbers of negatives. This includes companies such as BP, suffering disasters at their Texas Refinery in 2005 with 15 deaths, and the Macondo blowout with 11 deaths, the West Fertilizer Company in 2013 with 15 deaths, or the Montreal, Maine and Atlantic Railway company in Quebec Canada, whose rail cars derailed in Lac Megantic and killed 47. All these companies reported high levels of safety performance (as measured by the absence of injury and incident) and many people in them would seem to have had confidence in their safety systems prior to these events (Baker, 2007; Graham et al., 2011). Quantified safety data on low-consequence events may suggest, to important stakeholders inside and outside the organization, that risk is under control. They might believe they have a great safety culture, because they have the numbers to show it (Elkind and Whitford, 2011). This can encourage a collective sense of invulnerability (Janis, 1982), where a “warning of an incomprehensible and unimaginable event cannot be seen, because it cannot be believed” (Perrow, 1984, p. 23).

2.3. Quantification of safety performance and “numbers games”

Notwithstanding the realizations above (about the lack of an etiological link between precursor events and fatalities), the sheer number of reported incidents still correlates strongly with fatality risk—at least according to relatively recent data from two industries. A study of Finnish construction and manufacturing from 1977 to 1991 showed a strong negative correlation between incident rate and fatalities ($r = -.82$, $p < 0.001$). In other words, the fewer incidents a construction site reported, the higher its fatality rate was (Saloniemi and Oksanen, 1998). This replicates findings from aviation on the same negative correlation: passenger mortality risk was higher on airlines that reported fewer incidents (Barnett and Wang, 2000). An explanation that does not rely on a

substantive overlap between the etiology of incidents/injuries and accidents/fatalities is one based on “just culture” or its absence (Dekker, 2012). Low incident reporting rates might suggest workplaces where superiors are not as open to hearing bad news of any kind, which might explain why those that have fewer incidents are also more likely to suffer fatal accidents—even if these are caused by different factors.

Quantification of safety performance, combined with certain incentive structures, can lead to a suppression of evidence about incidents, injuries or other safety issues (Frederick and Lessin, 2000). Workplace signs that track the number of hours or days without a lost-time or recordable injury can sometimes encourage such suppression. Putting “bad” results into a system of bureaucratic or even professional accountability, after all, can feel akin to being pilloried for one’s “moral” failings (Bosk, 2003; Leape, 1994). One recent extreme example shows how the measurement of “safety” performance based on such data focuses on accountability *up* the hierarchy to particular stakeholders, rather than responsibility *down* and *for* people who do the safety-critical work:

A Louisiana man is spending time in prison for lying about worker injuries at a local power utility, which allowed his company to collect \$2.5 million in safety bonuses. A federal court news release says that the 55-year old was sentenced to serve 6.5 years in prison followed by two years of supervised release. He was the safety manager for a construction contractor. He was convicted in November of not reporting injuries at two different plants in Tennessee and Alabama between 2004 and 2006. At his federal trial, jurors heard evidence of more than 80 injuries that were not promptly recorded, including broken bones, torn ligaments, hernias, lacerations and injuries to shoulders, backs and knees. The construction contractor paid back double the bonuses.

(Anon., 2013)

With the commitment to a quantitative safety goal (e.g. “zero”), little might actually be known about the sorts of activities and mechanisms that lie behind the reductions in harm that committed companies have witnessed, and not much research has been conducted into this (Zwetsloot et al., 2013). A recent survey of 16,000 workers across different industries revealed wide-spread cynicism about zero vision (Donaldson, 2013). With a focus on a quantified dependent variable—*injury and incident statistics* that determine how bonuses are paid, contracts are awarded, promotions are earned—manipulation of that dependent variable (after all, a variable that literally depends on a lot of things not under one’s control) becomes a logical response. Injury discipline policies, behavior modification and safety incentive programs (Geller, 2001), post-injury drug testing, observation and prevention of ‘unsafe acts’ are the more obvious measures (Frederick and Lessin, 2000); flying the dead bodies of deceased workers from one country to another (the contractor’s home country) is an extreme one. Researchers have recently warned against the kind of regulation and rule-making (which might incentivize such numbers games) that putatively focus on such aspects of an organization’s safety culture, suggesting it might be smarter to target issues such as equipment design, leadership styles or inadequate work organization (Grote and Weichbrodt, 2013).

2.4. Bureaucratic accountability

Governing safety through a “bureaucratic infrastructure” of planning, process, records, audits and administrative rationality—all at a distance from the operation—generates bureaucratic

accountability requirements. This does not mean the accountability of bureaucracies to a democratic constituency (O’Loughlin, 1990), but accountability relationships *within* a bureaucracy—specifically related to safety. Safety as bureaucratic accountability means following rules and conforming procedurally to enable decision making and information relay up the hierarchy. It involves “agreed-upon procedures for inquiry, categories into which observations are fitted, and a technology including beliefs about cause-effect relationships and standards of practice in relation to it” (Vaughan, 1996, p. 348). Procedures for inquiry can range from audits to safe work observations, inspections, data surveillance and monitoring, and investigation. Different industries have different ways of categorizing the data gathered (and ordering it in cause-effect relationships), in for example safety management systems or loss prevention systems. Their fixed requirements for categorizing and labeling can of course limit rather than empower the actionable intelligence gleaned from such activities. Data representing negative events or their precursors (loss time injuries, medical treatment injuries) have become both a standard in such systems across industries, as well as increasingly doubted for their genuine reflection of safety (Collins, 2013; GAO, 2012).

Bureaucratic accountability not only implicitly and explicitly specifies the kind of data that counts as evidence (and may disincentivize the reporting or classification of certain data), it also determines who owns it up to where and from where on. For instance, once a safety staff member presents a management board or similar with a safety assessment, incident report or injury figures, their bureaucratic safety accountability might be seen as complete. People have relayed the information up, and others then decide what to do with it (Woods, 2006b). Structural secrecy is one consequence of bureaucratizing safety where critical information may not cross organizational boundaries, and mechanisms for constructive interplay are lacking (Vaughan, 1996). Structural secrecy is a by-product of the cultural, organizational, physical and psychological separation between operations, safety regulators and bureaucracies. Bureaucratic distribution of decision making across different units in an organization (or among contractors and sub-contractors) can exacerbate it (Rasmussen, 1997).

2.5. Limiting freedom, hampering innovation

A major set of secondary effects that run counter to an organization’s objectives concerns the limiting of individual freedom and the hampering of innovation (Besnard and Hollnagel, 2014). Summarizing the research on occupational safety and health management systems (OSHM), Hasle and Zwetsloot (2011) concluded that:

...critics have used harsh words to describe management systems, such as ‘scam’, ‘fraud’, ‘bureaucracy’ and ‘paper tigers’ and pointed out that workers lose influence. Other issues are their usefulness and cost for small and medium enterprises, and their relevance in the ‘changing world of work’, where production is increasingly outsourced, and risk can be easily shifted to partners in the supply chain, or to contingency workers. The certification regimes associated with OSHM systems have also been criticized, e.g. for increasing the cost to businesses and for becoming an aim in themselves.

(p. 961)

Systems of bureaucratic accountability may unwittingly undervalue technical expertise and operational experience (Vaughan, 1996). NASA, for instance, had greatly reduced its in-house safety-related technical expertise in the 1990s. NASA’s Apollo-era research and development culture once prized deference to the technical expertise of its working engineers (Mindell, 2008; Murray and Cox, 1989). Many engineers had been shifted to super-

visory oversight of contractors’ work rather than doing hands-on engineering work. The organization became dominated by bureaucratic accountability—with an allegiance to hierarchy, procedure, and following the chain of command (Feynman, 1988; Vaughan, 1996). People in such positions may no longer feel as able or empowered to think critically for themselves about technical questions (including those related to safety). This can stifle innovation and initiative, and erode problem ownership. Innovation that is non-compliant with protocol can be driven underground and be unlikely to see wide-spread adoption, thus hampering possible sources of future efficiency, competitiveness or resilience. Also, time and opportunity for richer communication with operational staff by supervisors and managers can get compromised by the daily demands of bureaucratic accountability. Managers might report limited opportunities for interaction with the workforce because of meetings, paperwork demands and email.

Of particular concern in such research has been the limited voice afforded to workers—whose main role in occupational health and safety *management* appeared to be the supply of information to superiors. What this does not capture is the value of discretion and tacit knowledge, as well as professional pride and responsibility, that together form how people adapt rules as they are tried and applied in context and where experience with them accumulates (Hollnagel et al., 2006). An example of the stifling of innovation and improvisation comes from recent floods in Queensland, Australia, where a...

Glen Taylor echoed the frustrations of thousands of rural Queenslanders [about] petty regulation which threatens to strangle old-fashioned bush initiative. ... Locals with practical skills were sidelined in rescue and recovery because they hadn’t done safety accreditation courses and serviceable boats were ordered out of the water to be replaced with approved inflatable vessels. ‘Someone shut down a bridge because it had a hole in it—that hole has been there since 1983,’ a clearly frustrated Mr. Taylor, who helped rescue scores of people, told the inquiry. He said that for generations locals had competently managed their own disasters. ‘This time we were just over-regulated,’ he said. ‘We used to handle it ourselves.’ Mr. Taylor said training was fine, but it should be combined with a recognition of skills and abilities which already exist. ‘Competency and common sense, that’s what we want,’ he said.

(Madigan, 2011, p. 5)

In a similar case of trying to restore common sense (but probably failing), the HSE Executive in the UK recently found it necessary to publish a clarification to manage the “misunderstandings about the application of health and safety law [which] may, in some cases, discourage schools and teachers from organising such trips. These ... may include frustrations about paperwork, fears of prosecution if the trip goes wrong, [or] that a teacher will be sued if a child is injured” (HSE, 2011, p. 1). Rules, of course, offer advantages to follower and imposer alike. They save time and effort, prevent reinvention of the wheel, offer clarity about tasks and responsibilities and create more predictability. The disadvantages, however, include supervisory demands on compliance monitoring, and a blindness to, or unpreparedness for, new situations that do not fit the rules (Hale and Swuste, 1998). They can also be experienced as a loss of freedom and a constraint on initiative which hampers improvisation, innovation and even safety: “Compliance with detailed, prescriptive regulations may build a reactive compliance, which stifles innovation in developing new products, processes, and risk control measures” (Hale et al., 2013, p. 2). An example comes from small- to medium-sized industry in the UK, whose contracting by government or other larger organizations now typ-

ically requires “pre-tender/supplier health and safety questionnaires ... of varying or increasing complexity and all requiring different information,” and the increased use of a “third party to assess a supplier’s suitability to be included on the approved list [involving] an assessment fee and annual membership fee” (Simmons, 2012, p. 20). This could discourage innovation and diversity—if not erode an organization’s willingness or ability to participate in tendering and procurement.

2.6. Harming safety

Following rules and complying with procedures and bureaucratic protocol can actually harm safety in certain circumstances (Dekker, 2001): “major accidents such as Mann Gulch and Piper Alpha have shown that it can be those who violate rules who survive such emergencies, whilst those who obey die” (Hale and Borys, 2013b, p. 214). This is of course a direct result of insensitivity of rules and compliance pressure to context (Dekker, 2003; Woods and Shattuck, 2000). A practitioner conducting environmental impact studies reported that “I am obliged to wear a hard hat (even in treeless paddocks); high-visibility clothing; long-sleeved shirts with the sleeves buttoned at the wrist; long trousers; steel-capped boots; and safety glasses. I may have to carry a Global Positioning System, an Emergency Position Indicator Radio Beacon, Ultra-High Frequency radio, first aid kit, five liters of water, sunscreen, insect repellent and, albeit rarely, a defibrillator. Recently, I was one of four field workers accompanied by up to 12 other people, most of whom didn’t leave the immediate vicinity of their vehicles and four of whom were occupational health and safety (OH&S) staff” (Reis, 2014). This presents a fairly obvious example of bureaucratic overreach and operational ignorance. By enforcing various layers of protective clothing and equipment, including a hard hat and long sleeves, the wearer may suffer dehydration and heat stroke more quickly in the climate where s/he typically works. Those tasked with compliance monitoring (who do not “leave the immediate vicinity of their vehicles” and do not do the work themselves) might have little sense of the reality of the experience of the wearer. It is not surprising, then, that a US Government Accountability Office report to Congress demanded better occupational health and safety guidance on safety incentive programs (GAO, 2012). It is perhaps surprising (and ironic, and hard on the credibility of those behind bureaucratized safety) that injury-prevention professionals are 70% more likely to suffer injuries that require medical attention than the general population (Ezzat et al., 2013).

But deference to bureaucracy plays out on a larger scale than individual compliance. The implementation of structures of bureaucratic accountability and systematic management of safety actually do it harm. Just prior to the Space Shuttle Challenger launch decision for example, “bureaucratic accountability undermined the professional accountability of the original technical culture, creating missing signals” (Vaughan, 1996, p. 363). Macondo serves as another example (Graham et al., 2011). In 2008, two years before the Macondo well blowout, BP warned that it had “too many risk processes” which had become “too complicated and cumbersome to effectively manage” (Elkind and Whitford, 2011, p. 9). The kind of intransparency created by multiple layers of administrative processes (as in the BP example) has previously been linked to “normal” accidents. Interactive complexity and coupling between many different processes and accountabilities can create situations where a seemingly recoverable scenario can escalate and become closed to effective human intervention (Perrow, 1984; Sagan, 1993; Snook, 2000). Man-made disaster theory also describes how the very processes and structures set up by an organization to contain risk are paradoxically those that can efficiently germinate and propagate failure (Pidgeon and O’Leary, 2000).

Bureaucratic organization offers opportunistic pathways for the incubation and escalation of disaster (Turner and Pidgeon, 1997), because:

...unintended consequences of errors are not propagated in purely random fashion, but may emerge as anti-tasks which make non-random use of large-scale organized systems of production. For example, consider the recent serious outbreaks of E-coli. food poisoning in Scotland: here the consequences of the original contamination of cooked meat in one location were greatly amplified as the products were then distributed, unknowingly contaminated, to many people via the normal food distribution system.

(p. 17)

3. Reasons for safety as bureaucratic accountability

A number of factors and developments, separate in origin but synergistic in their effect, have probably created a confluence of reasons for safety work to have increasingly become configured as a bureaucratic accountability. The factors discussed here are not comprehensive, but show up prominently both in lived experience and research.

3.1. Regulation

A most obvious reason for the bureaucratization of safety is its regulation (Hasle and Zwetsloot, 2011). This is a trend that predates the Second World War, but that has generally accelerated since the 1970s (see Section 1.2) (Fischer et al., 1994). The sociological backdrop here is known as authoritarian high modernism, a form of governance that came to dominate the latter part of the twentieth century and which is expressed in the acceleration of safety regulation as well. It is a form of governance where authority is vested in experts who plan (rather than execute) work, and where workers are essentially not given the option to resist the imposition of rules and behavioral expectations (wearing of hard hats on a flat, open field with no structures above, doing safety accreditation before going out in one’s own boat to rescue others). Recent change in the regulation (and “healthcare managerialism”) of general practitioners (GP’s or family doctors) in the UK, has increased “external surveillance of medical work [which] implies a clear reduction in autonomy over the content of medical work on the part of rank-and-file GPs, who may regret this situation but offer little resistance to it” (Harrison and Dowswell, 2002, p. 208). Authoritarian high modernism is driven by a belief in the superiority and efficiency of administrative ordering and external control of work. Standardization, compliance and bureaucratization are inevitable in this form of governance, with no formal room for craftsmanship, local expertise, improvisation, or other expressions of diversity (Scott, 1998).

Many industries have seen an increase in the amount and complexity of regulatory compliance, despite Reagan’s and others’ warnings more than three decades ago. There is a sense that some are, in fact, “over-regulated” (Amalberti, 2001; Hale et al., 2013; Ogun, 2004; Poole and Butler, 1999). More regulation, of course, means more to account for—bureaucratically. The increase in compliance demands and complexities has coincided with a gradual “responsibilization” back to organizations themselves (Gray, 2009) (see also Section 3.2). This might seem paradoxical, but responsibilization does not necessarily mean reduced regulation or reduced bureaucratization. Rather, it involves increasing self-regulation. Rather than regulators relying on a large force of inspectors (difficult and expensive to maintain) who know intimately the work or technology, they might have turned to

“making the customer do the work” (Ritzer, 1993). Organizations themselves need to keep track, analyze, distill and appropriately parcel up the data demanded by their (often multifarious) regulators. This in turn typically requires an internal safety bureaucracy. The rapid adoption of occupational health and safety management systems is one example. Having an OHSM is increasingly becoming a business-to-business requirement (Hasle and Zwetsloot, 2011): bureaucratic accountability expectations are baked into self-regulated commercial relationships rather than demanded by government. This is typical of the hard-to-resist effects of authoritarian high modernism and the consensus authority it exacts: everybody is doing it because everybody is doing it (Scott, 1998).

3.2. Liability, compensation and “responsibilization”

An important first reason concerns changes in systems of liability and accountability (financial, civil, criminal, even moral) for incidents and accidents since the 1970s (Green, 2003). Though different in kind and degree, these shifts involve a greater willingness to seek corporate actors behind what is seen as culpable mismanagement of risk (Bittle and Snider, 2006; Goldman and Lewis, 2009; Woolfson and Beck, 2004). This has coincided with legislative changes (some gradual, some more abrupt) in insurance arrangements and workers’ compensation practices in a number of Western countries (Ogus, 2004). Changes in worker’s compensation laws and practices, for example, as well as aging workforces in many industrialized countries, may have spurred organizations or their leaders to show that they have put into place all reasonably practicable measures to protect people from harm (Jacobs, 2007). It has sometimes also motivated the suppression of injury and incident data, as well as an inappropriate (if not unethical) use of modified duties or return-to-work programs (Frederick and Lessin, 2000; GAO, 2012).

Partly in reaction to these trends, an increasing “responsibilization” of workers has been noticed: they are assigned more responsibility for their own safety at work. One study showed that over two thirds of citations handed out by workplace safety inspectors are now directed at workers or immediate supervisors rather than employers (Gray, 2009). Even the Government Accounting Office in the US recently expressed concern about that trend (GAO, 2012). Assigning individual responsibility to workers who are “instructed to become prudent subjects who must ‘practice legal responsibility’” (Gray, 2009, p. 327) requires enticements to them to pay attention, wear protective equipment, ensure machine guarding, use a lifting device, ask questions, speak up. It also demands a managerial and bureaucratic infrastructure to provide such enticements and assure and track compliance, and bureaucratically account for it to other stakeholders in the organization, insurance provider or regulator. This is sometimes done under the banner of “safety culture” (Silbey, 2009), where states delegate safety responsibility to organizations, and organizations in turn delegate it to their workers. Moves toward better worker protection and insurance may thus, unintentionally and paradoxically, have led to a transfer of liability for the cost of harm onto the workers (Frederick and Lessin, 2000; GAO, 2012).

3.3. Contracting

Contracting work out (including safety-sensitive or safety-critical work) is another trend that has all but become institutionalized over the last few decades in almost all industries and many governments (from local to federal). Contracts specify the relationships that enable and govern the exchange, but also demand bureaucratic accountability through oversight and additional administrative structures. These need measures to compare, reward and decide on, as well as to allow procurement, selection,

accounting and auditing. Injury frequency rates, for example, are an important currency to supply the bureaucratic relationships between client and contractor (Collins, 2013).

Professional and technical accountability can get supplanted by bureaucratic accountability and an increased non-technical staff when an organization with high technical prowess starts contracting out its core work. Hierarchical reporting relationships and quantitative measures can gradually replace direct coordination and expert judgment. With the appointment of Sean O’Keefe (Deputy Director of the White House Office of Management and Budget) to lead NASA in the early 2000s, the then new Bush administration signaled that the organization’s focus should be on management and finances (CAIB, 2003), continuing a trend that had been set years before. As part of its efforts to control vast and growing webs of contractors and subcontractors. Managing, monitoring and controlling operations across an organizational network of contractors and sub-contractors tends to be vastly more complex, so bureaucratic accountability becomes the plausible means to try to do so (Graham et al., 2011; Mintzberg, 1979; Vaughan, 1996).

3.4. Technological capabilities

Technological capabilities for panoptic surveillance and behavior monitoring in workplaces have expanded over the past decades. From cockpit voice recorders that have long been around, there are now video recorders in some hospital operating theatres, intelligent vehicle monitoring systems in company cars and vast capabilities of data storage and monitoring with any computer use. All this is driven by, and requires bureaucratic accountability and an infrastructure to furnish it. It may reflect what Foucault referred to as governmentality: a complex form of power that links individual conduct and administrative practices, in this case extending responsibility for safety from the state to organizations, and from organizations to individuals, expecting self-responsibilization and self-discipline (Foucault, 1977). Through subtle and less subtle bureaucratic processes and technologies (including workers’ self-control), organizations exercise control (Frederick and Lessin, 2000; GAO, 2012), and, consistent with authoritarian high modernism, this ‘machinery’ for the surveillance and monitoring of human behavior is largely accepted and hard to resist from below (Harrison and Dowswell, 2002; O’Loughlin, 1990).

The commitment to a zero vision has both necessitated and been enabled by surveillance and measurement of incident and injury data, which in turn both requires and generates bureaucratic processes for its capture, reporting, tabulation, storage, and analysis (Hallowell and Gambatese, 2009; Zwetsloot et al., 2013). It may also contribute to the further institutionalization and legitimation of bureaucratic accountability—particularly the counting and tabulating and reporting up of negative outcomes (incidents, harm events, injuries, lost time) and the implicit and explicit incentives (including bonuses, announcements in various reports or requirements to notify government regulators) for the reduction of those numbers (Donaldson, 2013).

4. Conclusion

The bureaucratization of safety—which many sources indicate has accelerated since the 1970s—revolves around hierarchy, specialization and division of labor, and formalized rules. Bureaucratization of safety has brought the kinds of benefits envisaged by modernism, including not only a reduction of harm, but also standardization, transparency, control, predictability, and a reduction in favoritism. Bureaucratization has been driven by a complex of factors, including legislation and regulation, changes in liability and insurance arrangements, a wholesale move to outsourcing

and contracting, and increased technological capabilities for surveillance, monitoring, storage and analysis of data. But bureaucratization also generates secondary effects that run counter to its original goals. The bureaucratization of safety can be shown to have led to a reduced marginal yield of bureaucratic safety initiatives, bureaucratic entrepreneurship and pettiness, an inability to predict unexpected events, structural secrecy and a focus on bureaucratic accountability, quantification and “numbers games,” the occasional creation of new safety problems, and the real and perceived constraints on organization members’ personal freedom, diversity and creativity, as well as a hampering of innovation.

The question raised is not how to create or guarantee or manage safety—if not by bureaucratic intervention. That pretty much covers the entire safety field. Rather, the question concerns the ‘appropriate’ role of bureaucratization in safety. Greater deference to expertise is often called for in response to the pressures of bureaucratization. Such deference means engaging those who are practiced at recognizing risks and anomalies in operational processes, where workers are in direct contact with the organization’s safety-critical processes. This is known as the “core set:” the people most closely associated with complex technical systems, who are aware of the ambiguity inherent in their unruly technology. (Vaughan, 1996, p. 228). In the wake of the Columbia accident, NASA was told it needed “to restore deference to technical experts, empower engineers to get resources they need, and allow safety concerns to be freely aired” (CAIB, 2003, p. 203). This has become a well-established prescription in the literature on high-reliability organizations and resilience (Dekker and Woods, 2009; Hollnagel et al., 2008; Huber et al., 2009; Sutcliffe and Vogus, 2003; Weick and Sutcliffe, 2007; Weick et al., 1999; Woods, 2006a). Interestingly, the emergence of this appeal has coincided with unprecedented growth in generic management (MBA) programs and a simultaneous rise in corporations retaining external subject-matter expert consultants. If there is a role for expertise, it is not in-house and not in management (Khurana, 2007; Mintzberg, 2004).

Research, however, has identified limits on the extent to which inside experts have privileged knowledge of safety-critical processes and their margins (Dörner, 1989). Continued operational success, for instance, can get taken as evidence by experts that risk-free pathways have been developed (Barton and Sutcliffe, 2009; Starbuck and Milliken, 1988), and exceptional expert competence is associated with greater risk (Amalberti, 2013). Such research suggests a reversion to mere craftsmanship is inadvisable, as it would erode many of the advantages and improvements that bureaucratic systematization and standardization have brought. This has included limits on the discretion and autonomy of workers for certain decisions, a transition from a craftsmanship mindset to that of equivalent actors, and system-level (senior leadership) arbitration to optimize safety strategies (Amalberti et al., 2005). A balance between controlled safety and managed safety (Amalberti, 2013), between deference to protocol and procedure on the one hand, and practical expertise on the other (Galison, 2000), is likely the broadest, most useful prescription.

Or perhaps it is not. Such a one-dimensional characterization, after all, may hamper a fruitful approach to the problem. The notion of balance might suggest that our current problem is one of imbalance between regulation and bureaucracy on the one hand and individual skills, diversity, craftsmanship and expertise on the other. Indeed, “over-regulation” is similarly not the best way of constructing the problem. This suggests that a suitable ‘norm’ (which arbitrates what is ‘under’ and ‘over’ when it comes to regulation) can be found, and that our current problem is merely quantitative (simply too much regulation). This probably misconstrues the challenge. Instead, the challenge might be a qualitative one—are we regulating the right, or smart, way when it comes to many different kinds of safety? This question has recently received

attention in this journal. This has offered new ways to nuance the debate, for example with questions about the appropriateness of action rules versus rules at the level of goals, outcomes and risk management (Hale et al., 2013), and a differentiation of what works for safety in certain application areas (Grote, 2012) or at existing levels of safety (Amalberti, 2001), or between process safety, system safety and personal safety (Grote and Weichbrodt, 2013; Leveson, 2012). It is hoped that such research, inspired in part by the work reviewed in this paper, contributes to a “saner” or (to refer to the Queensland “Bushie” above) a more competent and common-sensical approach to managing safety.

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