

CHAPTER X

ADDRESSING THE ORGANISATIONAL WEAKNESSES THAT CONTRIBUTE TO DISASTER

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1. INTRODUCTION

Major accidents occurring in hazardous industries such as petroleum, mining, and aviation are invariably rooted in organisational weaknesses. A case in point is the recent disastrous loss of two Boeing 737-800 MAXs. This has been widely attributed to a company reorganization in 2001, when Boeing replaced its engineering-focussed top management with managers whose primary concern was profit maximisation (Useem 2019). The significance of organisational factors is often recognised by the companies concerned, following a disaster. For example, in 2010 the petroleum company BP experienced a blowout in the Gulf of Mexico that killed 15 people and did massive environmental damage. Subsequently, the company entirely reorganised itself to give safety a much higher priority (Hopkins 2012).

Tailings facility (TSF) failures are likewise rooted in organisational weaknesses. The report of the Chief Inspector of Mines on the Mount Polley tailings facility failure in British Columbia in 2014 provides an illuminating example (British Columbia, Chief Inspector of Mines [BC, CIM] 2015). The Inspector conducted a root cause analysis of the accident, using an accident analysis method developed by the US National Aeronautical and Space Administration. The method postulates that root causes are organisational in nature and the analysis continues until these are identified. Among the root causes identified in the Mount Polley inquiry were: production priorities prevailing over other considerations, logistics limitations, demand for increased TSF capacity, no long-run planning, no qualified person in charge of the facility, no site integration, insufficient management oversight, and lack of any mechanism by which employees could escalate concerns (BC CIM 2015, pp.130,137,138, 141). Of these, the report found that the most fundamental was the tendency for production to over-ride all other considerations.

This tendency has been identified in numerous reports on major accidents in many industries. It follows that organisational changes must be designed to counteract these pressures (Hopkins 2019). This chapter present a series of organisational strategies aimed at achieving this outcome.

At several points the chapter refers to requirements in the new Global Industry Standard on Tailings Management ('the Standard'). However, the purpose of the Chapter is not to explain those requirements, but to make recommendations that go beyond them and which might be considered in future revisions of the Standard.

2. BOARD ACCOUNTABILITY

It is commonly asserted that the board has ultimate accountability for the management of major accident risk, including tailings facility failures. But what this means is seldom clear. Accountability only has meaning if the following three questions are answered.

- Accountable to whom?
- Accountable *for* what?
- How is the accountable person or entity *held to account*?

Holding a person or entity to account means requiring them they give an account; that is, an explanation. It also must include the possibility of imposing consequences, where the account is found to be unsatisfactory (Keay & Loughrey 2015).

In relation to the first question, in many jurisdictions boards are accountable to the courts, *for* compliance with various regulations, but rarely are they *held to account*, meaning that this is seldom an effective form of accountability. Boards are also accountable to

shareholders *for* generating acceptable shareholder returns and are *held to account*, sometimes, at shareholder meetings. If boards are held to account by their shareholders only after a major accident that affects shareholder returns, this will be a relatively ineffective form of accountability, since such accidents are rare within any one company. On the other hand, if shareholders hold their boards to account for managing major accident risks on a more regular basis, this can be a very effective form of accountability. Shareholders are increasingly looking for ways to hold boards accountable for the on-going management of major accident risks, especially in relation to tailings facilities.

A third form of accountability that is relevant in the present context is to project-affected-people, *for* project impact. However, it is difficult to see how project-affected-people could directly *hold* a board *to account*, unless they are highly politically organised. There are, however, indirect means, such as provided for in the Standard. Companies are required to 'meaningfully engage' with project-affected-people. This term is carefully defined in the Standard's glossary and is quite eye-opening for people unfamiliar with the issue. Failure to meaningfully engage could have consequences for the company, in terms of the auditing process, and it is this that renders a company and its board potentially accountable to project-affected-people.

Finally, employees can hold a board to account when they are represented on the board, as is the case in some countries. There may also be indirect means, such as when regulatory regimes are designed to give employee representatives a voice.

One way that boards can respond to the possibility of being held to account is to appoint at least one board member who has expertise in the relevant major accident risks. In the petrochemical industry, stakeholders in the United Kingdom (UK) have signed up to a set of 'process safety principles'. (Process safety is the term used in this industry to refer to major accident risks, such as the risk of gas explosions.) One of these principles reads as follows:

At least one board member should be fully conversant in process safety management in order to advise the board of the status of process safety risk management within the organisation and of the process safety implications of board decisions. (UK Health and Safety Executive [HSE] n.d.)¹.

The mining industry, too, faces catastrophic risks, such as tailings facility failures, high-wall collapses in open cut pits, and explosions in underground coal mines. These are the equivalent of process safety risks in the oil and gas industries. The developments referred to above are therefore of direct relevance to the mining industry. A board which includes one or more experts in major accident risks in the mining sector is in a good position to reach down into the organisation and ask intelligent and probing questions about how risks are being managed. In turn, such a board is better able to provide an account of how the company is managing such risks, if called upon to do so.

Furthermore, there is a widespread view that the more serious the possible consequences of a risk decision, the higher in the corporation that decision should be made. Where the potential consequences are catastrophic, threatening the survival of the corporation in its existing form, it should be the board which makes the final decision. Of course, boards will be advised by the company specialists who might otherwise be making these decisions. But boards may take a broader view than these experts. In particular., they may give greater weight to the reputational damage that a catastrophic failure could cause, even though the likelihood of such a failure might be extremely remote. A board member with specialist knowledge about the major accident risks faced by the corporation can greatly assist this process. As one investor said during the consultation process for the Standard:

We want to know that oversight and decision making for these high consequence, material risks resides at the highest level of the company, where our Board nominees can have influence / at very least be aware of status, and where decisions are less susceptible to the internal corporate influences that executives can be exposed to.

The idea that boards might be involved in such decision-making is sometimes opposed on the grounds that this inappropriately blurs the line between boards and executive managers. A board's role, according to this argument, should be to ensure that there are systems in place to manage risk and that these systems are properly audited, but to inquire too deeply into how these risks are being managed, or get involved in particular decisions, infringes the role of senior management. However, this is too rigid a view. Where risks can have material consequences, that is, can significantly affect the share value, it is ultimately the responsibility of the board to decide whether, or on what basis, to accept the risk. This

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1. See also <http://www.hse.gov.uk/comah/guidance/major-hazard-leadership-intervention-tool.pdf>

principle is well understood in the case of purely financial decisions, such as mergers and acquisitions. It should also be the case in relation to major accident risks, which can materially affect the business. There is not and cannot be a rigid line between the board and the executive in regard to this matter.

To sum up, the idea of board accountability is an important one, but boards will only be accountable for major accident risk if there are persons or entities able to hold them to account. This can most easily be done by shareholders.

3. AN ACCOUNTABLE EXECUTIVE

The Standard requires the appointment of one or more Accountable Executive(s). The use of this term is not restricted to the mining industry and its meaning varies with the context. Some of the matters that depend on that context are: who may be appointed an accountable executive, to whom the appointee is accountable, for what they are accountable, and by what mechanism they might be held to account. The Standard clarifies some but not all of these matters. For this reason, the discussion here proceeds independently of the Standard and defines from first principles an ideal role for an Accountable Executive in the mining industry.

Recall that the most fundamental of the root causes of the Mount Polley failure was the priority given to production over all other considerations. The role of the Accountable Executive must therefore be to correct this imbalance by ensuring the proper management of major of accidents risks, in particular, tailings facility risks.

There is an inevitable tension between production, on one hand, and safety, or risk control, on the other. It is important that this tension be manifested at the highest level of the corporation, with these two goals championed to varying degrees by different people. In situations where Chief Operating Officers and business unit leaders may tend to give greater emphasis to production or profit, an Accountable Executive must be able to argue unequivocally for safety. Where there are significant differences of opinion, it will be the CEO who makes the decision, but with the benefit of hearing the arguments on both sides. For this arrangement to be effective, the Accountable Executive must have the same status as

those on the other side of the debate, which means that if they report directly to the CEO, so must the Accountable Executive. Without an Accountable Executive operating in this way, the tension between production and safety is buried and resolved at lower levels of the organisation, too often in favour of production.

Furthermore, given earlier observations about boards, directors need to be able to see the tensions in the organisation and satisfy themselves that management is dealing properly with the trade-offs between these somewhat competing objectives (International Commission on Large Dams [ICOLD] 2017, pp. 55,77). This requires a direct line of communication between the Accountable Executive and the board. The Accountable Executive must be able to raise issues in a timely manner, not restricted to scheduled quarterly or annual reporting. This Executive therefore has dual reporting lines, to both the CEO and the board. Finally, to maximise the autonomy of the position, the appointment should be made or confirmed by the board².

It is clear from this discussion that the Accountable Executive cannot be anyone who has production responsibilities or targets. This should be no barrier to finding an appropriate person, as companies often have a Chief Sustainability Officer, or a Chief Risk Officer, or an Executive Manager for Health and Safety, or for Safety and Major Accident Risk. As long as such people report to the CEO, they can fulfil the role of Accountable Executive described above.

Next there is the question of what the Accountable Executive is accountable for. The easiest way to answer this question in the present context is to say that the incumbent should accountable for the implementation of the Standard. More generally, because the Accountable Executive’s role will be broader than tailings management, it can be specified as ensuring that proper attention is paid to risk management and compliance throughout the corporation. Given the breadth of this role, there will need to be a structure of positions subordinate to the Accountable Executive to which the responsibilities of the role are delegated.

Finally, since the Accountable Executive is at least confirmed by the board, this confirmation can be withdrawn, which provides one mechanism for holding this Executive accountable.

2. The Mining Association of Canada’s *Guide to the Management of Tailings Facilities* (MAC 2019) envisages that the Accountable Executive will be ‘designated’ by the board.

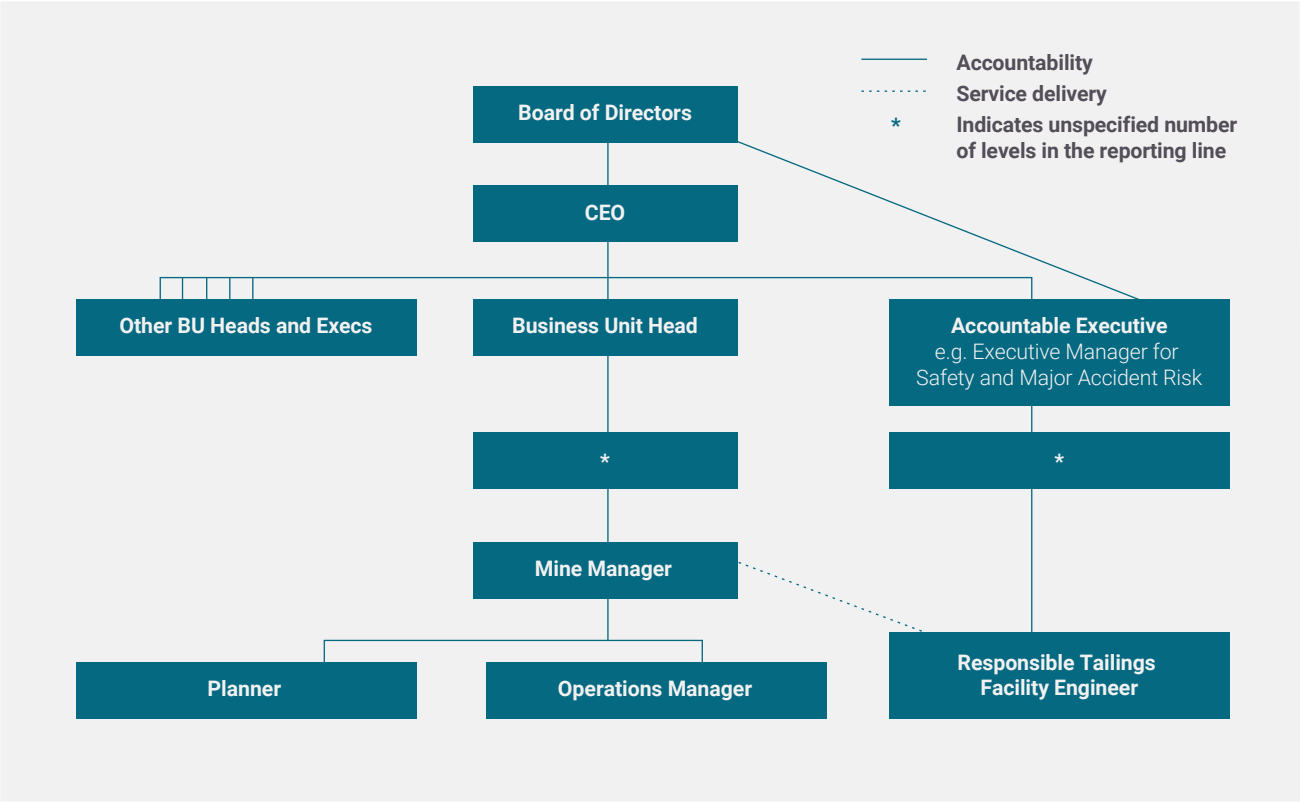


Figure 1. Skeletal Organisational Chart Showing Relationships Referred to in the Text
Updated on 12 August 2020

4. AN INDEPENDENT LINE OF ACCOUNTABILITY

The Standard requires the appointment of a responsible tailings facility engineer (RTFE) to oversee the construction of the tailings facility in a manner that complies with the requirements of the Standard. In many cases the position will also have responsibilities for managing people and budgets. In the normal course of events, therefore, the tension between production and safety is internalised in this individual. This section proposes a set of reporting arrangements to deal with this problem, drawing on insights from other industries (Hopkins 2019). Again, the proposal here goes beyond the Standard.

Specifically, it is proposed that the RTFE should have dual reporting lines: a primary line that culminates with the Accountable Executive and a secondary reporting line to the local site manager. Provided the company maintains this primary/secondary distinction this will ensure that safety and facility integrity take precedence over production. In terms of organisational charts, this can be represented as a solid reporting line that culminates with the Accountable Executive and a dotted reporting line to the site manager (see Figure 1 below). Note that this

is the reverse of the more common situation where the primary reporting line is within the business unit, with a dotted line to an external technical specialist at corporate level. The arrangement described here protects the RTFE from undue commercial pressures from mine management which might otherwise result in decisions that are undesirable from a safety point of view. Of course, there will need to be coordination between the immediate supervisor in the business unit and the supervisor in the line to the Accountable Executive, but these matters are not difficult to resolve.

The critical feature of this organisational design is that the RTFE has a performance agreement with a supervisor in the line reporting to the Accountable Executive. This agreement will naturally give priority to safety. The annual performance assessment of the RTFE will be based on this performance agreement.

There are many examples of companies in hazardous industries operating with a dual reporting structure of the type described here. An outstanding example is BP, as it was re-organised after the Gulf of Mexico blowout in 2010. BP’s engineers report primarily up an engineering line that culminates several steps above

site level in a global head (although not one answering directly to the CEO). Moreover, BP has a Safety and Operational Risk function with a head answering to the CEO and with staff embedded in local business units, both providing risk management services and ensuring compliance. This approach seems less common in the mining industry, but arguably disasters such as the Brumadinho tailings dam failure in Brazil in 2019 will drive the industry in this direction. The company responsible for the Brumadinho failure, Vale, has already implemented some of these ideas. (Nasdaq 2020)

The co-convenors of the Standard raised the following questions:

- How can company tailings experts be more 'empowered through internal governance structures...?'
- What changes should be considered to enable significant risks relating to tailings storage facilities to be elevated to senior management, e.g. Executive Committee level?

The structure proposed here responds directly to those questions.

5. APPROPRIATE FINANCIAL INCENTIVES

Many commercial organisations pay their staff bonuses (incentive payments). These bonuses are largely determined by the organisation's overall commercial success, as well as the individual's contribution to that success. This is problematic from a risk management point of view, but in different ways for different types of employee. Two types of employee are singled out here: first, employees whose primary task is risk control, particularly in relation to major accident risks; and second, employees whose major activity is production, albeit, safe production. The section concludes with some remarks about the performance bonuses paid to top executives.

Given the tension between short term profit maximisation and longer-term risk control, any system that incentivises commercial success is inappropriate for people whose primary task is risk control. This issue has been highlighted in the finance sector. Many banks now have a Chief Risk Officer (CRO) who is part of the executive team, answerable directly to the CEO. Reports into recent banking scandals demonstrate that the CRO in these cases had not carried out the responsibilities of the role effectively, because the incentive payments available to this Officer prioritised

annual profit, rather than risk control. Here is a passage from a report into one Australian bank:

[T]he CRO's remuneration mix is not materially different to that of the business unit Group Executives. Industry practice for CRO remuneration arrangements varies, with CROs at some other banks having a quite different ... remuneration mix than their executive colleagues, typically with a higher weighting on fixed remuneration aimed at safeguarding the independence of this critical function. (Australian Prudential Regulation Authority [APRA] 2018a, p.78).³

This principle extends to anyone engaged primarily in risk control. A much-quoted guidance document for the finance sector in the UK gives the following advice:

Staff engaged in financial and risk control should be compensated in a manner that is independent of the business areas they oversee and commensurate with their key role in the firm. (UK Financial Stability Forum 2009, p.7)

These ideas are equally applicable to the management of major accident risk in the mining sector. Following the Brumadinho disaster, an independent report found that bonuses of employees in the geo-technical area overseeing dam safety were linked almost exclusively to financial targets with safety goals representing a small portion of compensation metrics. Vale subsequently changed its compensation practices to give greater weight to safety, implicitly acknowledging the role incentive payments had played in the disaster (Nasdaq 2020).

The direct implication here is that neither the Accountable Executive nor the staff in that function should be incentivised in relation to production, profit or cost reduction. The simplest way to achieve this outcome is to pay them a fixed salary, augmented, if necessary, to compensate for the fact that they are not eligible for bonuses. Alternatively, if it is important to pay them bonuses, they can be incentivised on the basis of how well they perform in relation to their job specification or performance agreement. This can be based on judgements made by a supervisor at the time of a performance review. These conclusions apply also to the RTFE, whose primary reporting line culminates in the Accountable Executive.

For employees whose primary role is to contribute to production or cost reduction, albeit safely, the implications are different. Presumably, the major component of their bonuses will be based on

production and cost reduction, but there should also be a component based on safety or integrity. However, it is a mistake to base this component on quantitative metrics such as injury rates. This leads almost inevitably to attempts to manage the metric, rather than the risk. For example, the primary effect of using injury rates as a basis for safety bonuses is to suppress reporting. This problem can be overcome if bonuses are based on qualitative judgements about the employee's contribution to safety and operational integrity. It will be up to the employee to make this case during performance reviews. This will provide a strong incentive for employees to take these matters into account.

One of the most effective ways that production-oriented employees can also contribute to safety is by reporting problems that they become aware of in their normal duties. Companies should incentivise such reporting. They need not reward people each and every time they speak up, as this runs the risk of generating a large number of trivial reports. Rather, they should offer periodic rewards or awards for the best or most helpful reports at each site. That will encourage the reporting of whatever it is that the site management finds most helpful. Award winners should be publicly recognised, preferably with a material reward, and with a clear explanation of how their contribution resulted in safer facility management. (For a more extensive discussion of how this works, see Hopkins 2019, pp. 127-135.)

Most discussions of the effect of bonuses on safety ignore the issue of long-term bonuses. The top office holders of large public companies – for example, the CEO and the Chief Financial Officer – are often paid very large long-term bonuses. These are awarded provisionally and are actually paid (vest) some years later (typically three years), depending on company profit in the intervening period. They do not depend in any way on the safety performance of the company during this period (except in the unlikely event that the safety performance is so bad that it affects the share price). They therefore operate as an incentive for top office holders to focus single-mindedly on shareholder returns.

This problem is well understood in the banking industry. Nowadays it is commonplace in the UK banking sector for long term bonuses to include consideration of non-financial performance (APRA 2019, p.32). In Australia, the regulator is proposing

to limit to 50 per cent the contribution of financial metrics to such bonuses (APRA 2019, p31). The remaining 50 per cent would be made up of considerations such as: effectiveness and operation of control and compliance; customer outcomes; market integrity objectives; and reputation.

In the mining industry, the relevant non-financial considerations would include how well the company was managing catastrophic risk. It is recommended that long term bonuses in this industry be modified to take account of major accident risk. This is not a simple matter and companies will need to be innovative to implement this recommendation. It will be important that they are transparent about how they do this.

The scoping document for the development of the Standard invited the Expert Panel to address the question: 'What are the cultural, behavioural and incentive barriers within companies that block better management of TSFs?' (emphasis added). The preceding discussion is in part an answer to that question.

6. CONCLUDING OBSERVATIONS

The root causes of major accidents, in particular tailings facility failures, are to be found at the level of governance and management. Best practice requires that boards be held effectively accountable to their shareholders in these matters. This requires a company to set up an organisational structure for the management of risk that is as independent as possible from the company's business units. This risk management structure should be headed by an executive who reports to the CEO but who is also accountable to the board. Care must be taken to ensure that, where bonuses are paid, they do not undermine these arrangements.

The ideas proposed here are in principle accepted in the banking industry and increasingly in other industries. The Standard is a step in this direction, but it does not go as far as the recommendations made here. Fortunately, there is nothing to stop mining companies implementing these governance arrangements now. Some are already ahead of the Standard in this respect. Conceivably, some of these ideas will be adopted in future revisions the Standard.

3. See also APRA 2018b, p.18.

KEY MESSAGES

1. Accident analysis should always seek to identify the organisational causes of the accident.
2. Shareholders should hold boards accountable for the on-going management of major accident risks.
3. Boards should ensure that at least one of their members has expertise in the relevant major accident risks and is able to advise the board on the status of major accident risk management within the organisation and of the implications of board decisions for major accident risk.
4. Mining companies should have an executive responsible for major accident risk (an Accountable Executive) answering directly to the CEO. This executive should also have a direct reporting line to the board and should be held to account by the board.
5. Where a major part of an employee's role is to ensure compliance with standards and procedures, as is the case for the responsible tailings facility engineer, the employee should have dual reporting lines: a primary line that culminates with the Accountable Executive and a secondary line to the local site manager. Any performance review should be carried out by a supervisor in the line reporting to the Accountable Executive.
6. Neither the Accountable Executive, nor staff in lines reporting to that position should be incentivised in relation to production, profit or cost reduction. This applies, in particular, to the Responsible Tailings Facility Engineer (RTFE).
7. For employees whose primary role is to contribute to production, albeit safely, any bonuses paid should have a component for safety or facility integrity. This should not be based on quantitative metrics but on qualitative judgements about the employee's contribution to safety and operational integrity. It will be up to employees to make this case during performance reviews.
8. Companies should incentivise the reporting of issues relating to major accident risk.
9. Long term bonuses that vest after a period of years should be modified to take account of how well major accident risk is managed.

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