

Introduction

1. This chapter discusses previous tragedies and the failure to learn from them.

New Zealand coal mine tragedies

2. New Zealand's main New Zealand main coal mine tragedies, not including the Pike River mine tragedy, are set out below.¹

DATE	WHAT HAPPENED	DEATHS	INQUIRY	MAIN PROBLEMS
21 February 1879	Explosion of methane at Kaitangata coal mine, Otago	34	Coronial inquest	Warnings about dangerous practices were not heeded. Insufficient gas record keeping and ventilation. Use of naked light (open lamp) despite previous detection of methane.
26 March 1896	Explosion of methane and coal dust at Brunner coal mine, West Coast	65	Royal commission of inquiry	The explosion was the result of ignition of coal dust from 'blown out shot' fired contrary to rules of the mine, in a part of the mine where no one should have been working. Miners believed there had been an accumulation of methane and inadequate ventilation, which was not accepted by the commission.
28 January 1900	Substantial fire at Westport-Cardiff coal mine, Mokihinui. (The mine had been closed in September 1899 due to a failure to produce marketable coal and lack of funding.)	0	Royal commission of inquiry	Presence of conditions supportive of spontaneous combustion. The mine was not adequately monitored. (During operation of the mine, there was inadequate ventilation and insufficient enforcement of statutory requirements.)

DATE	WHAT HAPPENED	DEATHS	INQUIRY	MAIN PROBLEMS
21 June 1907	Fire burning at Nightcaps colliery, Southland	3	Royal commission of inquiry	The management of the mine was poor, there was inadequate ventilation during the shift and inadequate daily examinations. Naked lights were used instead of safety lamps and workers were not withdrawn when conditions were dangerous. There was also lax enforcement by the inspector.
12 September 1914	Explosion of methane and coal dust at Ralph's colliery, Huntly	43	Royal commission of inquiry	Inadequate examinations for gas in old workings and inadequate ventilation. Naked lights were used instead of safety lamps. Failure to report injury caused by a previous explosion. Shot-firing in dusty mine. The inspector failed to ensure strict and immediate compliance with recommendations, failed to require use of safety lamps and did not properly examine old workings.
3 December 1926	Explosion of coal dust at Dobson colliery, Dobson	9	Royal commission of inquiry	Laxity in issue of oil safety lamps. Lamps were left unattended in the mine. There was inadequate stone dusting despite the requirement by the inspector to stone dust all roads.
15 November 1929	Explosion of methane and coal dust at Linton coal mine, Ohai	3	Royal commission of inquiry	Inadequate ventilation, stone dusting, supervision of shot-firing (which was non-compliant) and detection of contraband (matches taken underground).
24 September 1939	Fire at Glen Afton No. 1 coal mine, Huntly	11	Royal commission of inquiry	Fire initially caused by cigarette or naked light, not completely extinguished. Inadequate reporting at mine of fire. Ventilation fan not on while men in mine.
6 November 1940	Explosion of methane at Kayes coal mine, Ten Mile Creek, Greymouth	5	Commission of inquiry	Methane ignited by worker lighting cigarette.

DATE	WHAT HAPPENED	DEATHS	INQUIRY	MAIN PROBLEMS
31 August 1955	Inrush of mud and water at Renown colliery, Huntly	1	Commission of inquiry	<p>The majority considered the tragedy was unforeseeable in light of existing knowledge and previous experience. Management was efficient and up to accepted standard.</p> <p>The minority considered the accident was foreseeable. Mine manager failed to inspect the surface following a large roof fall beneath a watercourse. The deputy and underviewer were not told of the watercourse above the pillaring operation.</p>
17 January 1958	Explosion of methane at Westhaven coal mine, Collingwood	4	Commission of inquiry	Inadequate ventilation, failure to search for contraband (matches and lighter taken underground) and failure to carry out examinations. Mine manager made untrue entries of searches and examinations and presence of fifth man working the mine concealed.
19 January 1967	Explosion of methane and coal dust at Strongman coal mine, West Coast	19	Commission of inquiry	<p>Insufficient pre-shift examinations, insufficient gas testing, failure to report occurrences of gas, non-compliant shot-firing and inadequate ventilation.</p> <p>The district and chief inspectors had failed to take action despite being aware of dangerous practices, including the non-compliant shot-firing and ventilation problems.</p>
18 September 1985	Fire caused by spontaneous combustion at New Imperial (Boatmans No. 4) coal mine, Reefton	4	Court of inquiry ²	<p>Pillaring conducted too close to return airway, failure to detect signs of spontaneous combustion due to lack of examinations, mine plans not submitted to the inspector and poor ventilation management practices – main fan not running and ventilation door connecting the intake and return was kept open.</p> <p>Inspector not able to make frequent inspections of mines in his area due to workload.</p>

DATE	WHAT HAPPENED	DEATHS	INQUIRY	MAIN PROBLEMS
23 September 1992	Explosion of methane caused by spontaneous combustion at Huntly West coal mine, Waikato	0	Investigation by mines inspector	Insufficient reporting to mines inspector and mines rescue service, failure to adequately extinguish fire and failure to immediately withdraw workers when smoke encountered.
4 June 1998	Outburst of coal, mudstone and methane at Mount Davy coal mine, West Coast	2	Coronial inquest	Unforeseeable and unavoidable event in light of industry knowledge at the time.
8 March 2006	Inrush of water at Black Reef (Tiller) coal mine, Greymouth	1	Coronial inquest	No effective health and safety system in place, no risk assessment undertaken, inadequate information, inaccurate mine plans, the knowledge and experience of the underground manager was insufficient and no training plan was established for him, and failure to plan for possibility of inundation.
8 September 2006	Unplanned goaf fall at Roa coal mine, Blackball	1	Coronial inquest	Manager's support rules not followed, no strata management plan and no review of pillaring operations.

Figure 20.1: New Zealand coal mine tragedies

3. Recurring themes include:
- an insufficient regulatory framework;
 - the health and safety regulator not properly conducting inspections nor ensuring legislative compliance;
 - operators not identifying and managing hazards, including inadequate ventilation and gas management systems;
 - operators not providing miners with proper training, equipment and oversight; and
 - miners not following safe practices.

Overseas tragedies

4. Similar themes are apparent in overseas coal mining tragedies, some of which are outlined below.

Westray

5. On 9 May 1992 a methane and coal dust explosion in the Westray mine, Pictou County, Nova Scotia, Canada killed all 26 miners underground. The mine had been open for nine months. Sparks from the cutting parts of a continuous miner provided the source of the ignition. There was inadequate ventilation, treatment of coal dust and training. Westray was a 'stark example of an operation where production demands resulted in the violation of the basic and fundamental tenets of safe mining practice'.³ Management failed to instil a safety mentality in its workforce. It ignored or encouraged a series of hazardous or illegal practices. The body responsible for the mine planning

approval process did not perform its duties properly. The body most responsible for regulating the safety of the mine failed to enforce the law.

Moura No. 2

6. On 7 August 1994 a methane explosion at Moura No. 2 mine, Queensland, Australia, killed 11 miners. Ten survived. A second explosion two days later led to the mine being sealed. The bodies of the miners have never been recovered. The investigation found that the ignition was caused by spontaneous combustion in a sealed panel.⁴ Factors contributing to the first explosion included failing to prevent heating in the panel, failing to capture and evaluate signs of heating over an extended period, failing to identify that sealing the panel could result in accumulation of methane within it and failing to withdraw people from the mine when there was potential for an explosion. Management did not ensure that all miners underground were aware the panel had been sealed. It did not inform miners that they could choose not to go underground.
7. In 1996 the Moura No. 2 investigation report was reviewed by a New Zealand task force led by the Ministry of Commerce, which was then responsible for health and safety in underground coal mines.⁵ It made recommendations directed at managing spontaneous combustion, training, the need for underground coal mines to have ventilation officers, gas monitoring, sealing and emergency facilities.

Sago

8. On 2 January 2006 an explosion at the Sago coal mine in West Virginia, United States, killed 12 miners. Sixteen miners survived. The Mine Safety and Health Administration (MSHA) report dated 9 May 2007 identified the likely immediate cause of the explosion as a lightning strike, which transferred energy to an abandoned pump cable within a sealed area of the mine, igniting accumulated methane. The explosion destroyed the seals and filled parts of the mine with carbon monoxide. Failings included not building the seals in accordance with the approved plan and not immediately notifying the MSHA and mines rescue of the accident. Even so, rescue teams would not have been allowed underground immediately because of the high levels of toxic gases and the risk of a further explosion. An internal review into the MSHA's actions identified weaknesses in its performance, including a failure to follow established inspection procedures, poor and uncorrected performance of the inspectors, weaknesses in enforcement actions, a failure to recognise a deficiency in the approved emergency plan and outdated and unclear procedural instructions.

Upper Big Branch

9. On 5 April 2010 a coal dust explosion that resulted from a methane ignition at the Upper Big Branch coal mine, West Virginia, United States, killed 29 workers and injured two others. The MSHA found that the operator 'promoted and enforced a workplace culture that valued production over safety, including practices calculated to allow it to conduct mining operations in violation of the law'.⁶ In the four years before the explosion, miners did not make health and safety complaints to the MSHA because they were intimidated by management and told that raising safety concerns would jeopardise their employment. Because health and safety inspectors had given prior notice of visits, violations could be hidden. The operator had two sets of health and safety hazard records. One was required by law and available to miners and inspectors. The other, not available to miners or inspectors, contained internal production and maintenance reports. It included hazards not noted in the first set.
10. Basic safety measures could have prevented the explosion. The longwall shearer was not maintained safely and was, therefore, an ignition source. The methane monitoring, ventilation and stone dusting were inadequate and ventilation and roof control plans were not followed. Mine examinations were not properly performed and obvious hazards were not identified. Workers were not adequately trained and refreshed about their tasks, health and safety, and hazard recognition. The MSHA inspectors failed to follow established policies and procedures, compromising enforcement efforts. In the 18 months before the explosion, the Upper Big Branch mine received 684 citations for violations, yet the MSHA failed to use other enforcement mechanisms. The inspectors did not identify many of the mine's failings. There was inadequate review of the operator's record books.

11. International coal mining tragedies have received significant media coverage, including the Upper Big Branch mine tragedy, which occurred only six months before the Pike River tragedy. Domestic and international mining tragedies provided a strong warning about the need for strict management of underground coal mine hazards and effective regulation. Non-coal mining tragedies also provided relevant lessons.

Non-coal mining tragedies

Erebus Flight 901

12. On 28 November 1979 Air New Zealand flight TE901 crashed into Mount Erebus in Antarctica, resulting in the death of all on board. A royal commission of inquiry analysed the organisational factors that contributed to the accident by allowing human error or failing to negate it. It led to the creation of a specialist New Zealand Civil Aviation Authority (CAA). The CAA establishes standards, monitors adherence to standards, and investigates accidents and incidents. A scientific approach is used. It collects data on error and violation producing conditions, supervisory and organisational issues and reports on these formally on a quarterly basis.⁷ That data underlies safety initiatives, including education campaigns, monitoring and compliance action. This scientific approach has still not been fully reflected in the Department of Labour's regulatory approach.

BP Texas City oil refinery

13. On 23 March 2005 an explosion at the BP Texas City oil refinery, United States, killed 15 people and injured more than 170 others. The BP US Refineries Independent Safety Review Panel (the Baker panel, as it was known) identified it as a process safety accident. BP had neither effective safety leadership nor adequate safety systems to address the risk of catastrophe. Process safety was not established as a core value across its US refineries nor effectively incorporated into management decision-making. The Texas City refinery had 'not established a positive, trusting, and open environment with effective lines of communication between management and the workforce',⁸ a required part of a good process safety culture. The process safety education and training at BP was inadequate. The Baker panel found 'significant deficiencies existed in BP's site and corporate systems for measuring process safety performance, investigating incidents and near misses, auditing system performance, addressing previously identified process safety-related action items, and ensuring sufficient management and board oversight'.⁹ Many of the deficiencies were identifiable in lessons from previous process safety incidents. The issue of process safety had been highlighted as long ago as the Piper Alpha oil rig tragedy in 1998, when 167 people lost their lives.

Cave Creek

14. On 3 July 1995 a viewing platform collapsed at Cave Creek, on New Zealand's West Coast. Fourteen people died. There had been significant failings by the relevant regulatory agency, the Department of Conservation. The commission of inquiry recommended that the government institute a combined regional disaster and trauma plan for the West Coast, to provide for unambiguous overall leadership of emergency responses, the prior resolution of all likely conflicts and the co-ordination of all services involved. Following Cave Creek, the co-ordinated incident management system (CIMS), described in Chapter 16, 'Search, rescue and recovery' was developed. The 2005 West Coast regional plan provided for the control of mine emergencies (by the police). But underground coal mine emergencies were not included in CIMS training and the 2010 West Coast regional plan did not state who would control them.
15. The Cave Creek commission also recommended that a family liaison officer be appointed immediately after a tragedy to make all appropriate information available to those with an interest greater than that of the general public. The aim was to allay as much as possible the fear and anxiety of the victims' friends and family.

Conclusions

16. As its inquiry proceeded the commission noted the extent to which the themes identified by inquiries into previous tragedies were repeated at Pike River. History demonstrates that lessons learnt from past tragedies do not automatically translate into better health and safety practice for the future. Institutional memory dims over time. This confirms that good health and safety performance is only achievable with the effective, continued involvement of the three key participants: employers, employees and the government regulator.

ENDNOTES

¹ For a history of coal mine tragedies see W.P. Brazil, *A Summary of the Evolution of Coal Mining Safety Legislation Together with a Traditional Viewpoint*, May 1995, DOL0010010001. There are other tragedies not listed that resulted in coronial inquiries. See CAC0177.

² Under s 181 of the Coal Mines Act 1979, the minister of energy could direct a formal investigation be held into accidents resulting in death or injury where a mines inspector believed the accident was caused by the owner, mine manager, engine driver or any other person employed at the coal mine. The investigation would be held before a court of inquiry, consisting of a magistrate appointed by the minister.

³ K. Peter Richard, 'Prelude to the Tragedy: History, Development, and Operation', in *The Westray Story: A Predictable Path to Disaster: Report of the Westray Mine Public Inquiry*, November 1997, <http://www.gov.ns.ca/lae/pubs/westray/summary.asp#prelude>

⁴ Queensland Warden's Court, *Wardens Inquiry: Report on an Accident at Moura No 2 Underground Mine on Sunday, 7 August 1994, 1996*, CAC0152.

⁵ Ministry of Commerce, Mining Inspection Group, *Review of the Recommendations from the Wardens Inquiry into the Accident at Moura No 2 Mine, Queensland on Sunday August 7 1994, 1996*, EXH0003.

⁶ United States Department of Labor, Mine Safety and Health Administration, *Coal Mine Safety and Health, Report of Investigation: Fatal Underground Mine Explosion April 5, 2010 – Upper Big Branch Mine-South, Performance Coal Company*, 12 November 2011, p. 2, <http://www.msha.gov/Fatals/2010/UBB/FTL10c0331noappx.pdf>

⁷ Kathleen Callaghan, witness statement, 31 October 2011, FAM00042/19, para. 69.

⁸ BP U.S. Refineries Independent Safety Review Panel, *The Report of the BP U.S. Refineries Independent Safety Review Panel*, 2007, p. xii, http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/SP/STAGING/local_assets/assets/pdfs/Baker_panel_report.pdf

⁹ *Ibid.*, p. xiv.