REVISITING THE KEY
MESSAGES FROM THE BRADY REVIEW

Jodi Goodall, of Brady Heywood, reviews some of the key concepts and learnings that arose out of a comprehensive review of fatal accidents in Queensland mines and quarries released in early 2020 – and why quarries should heed those learnings.

The *Review of all fatal accidents in Queensland mines and quarries from 2000 to 2019,* conducted by forensic structural engineer Dr Sean Brady, provided an independent analysis of Queensland's mining and quarrying fatalities, serious accidents and high potential incidents (HPIs) across a 20-year period.

The report, which was released in February 2020, assessed 47 of Queensland's mining and quarrying industry-related deaths between 2000 to 2019. There were six fatalities in quarrying across a 20-year period, four being employees and two being contractors. A total of 35,000 incidents were also analysed. Dr Brady calculated the frequency of the deaths, serious accidents and HPIs in terms of incidents per million hours worked.

There were numerous key messages which arose from the Brady Review.

Sean Brady, managing director at Brady Heywood.

FATALITY CYCLE

The industry is moving in a fatality cycle. Past behaviour suggests that in the order of 12 fatalities are likely to occur over any five-year period. This pattern has been evident over the past 19½ years and is characterised by periods where a significant number of fatalities occur, followed by periods where there are few to none. This suggests that the industry goes through periods of increasing and decreasing vigilance (see Figure 1).

The cycle further suggests that the periods with few to no fatalities should be viewed as simply part of the fatality cycle – they are not evidence of the industry becoming safer over the long term. Instead, further fatalities should be expected as the cycle continues.

As a standardised rate, quarrying has the most amount of fatalities by hours worked (Figure 2).

FATALITIES ARE AVOIDABLE

There are no smoking guns. A superficial examination of the causes of the 47 fatalities analysed as part of this review gives the impression that many were freak accidents, that events transpired in such a way that could never have been anticipated. This

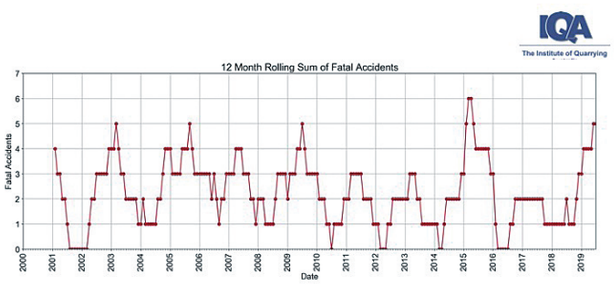

Figure 1. Periods of significant numbers of fatalities are often preceded or succeeded by periods with few to no fatalities.

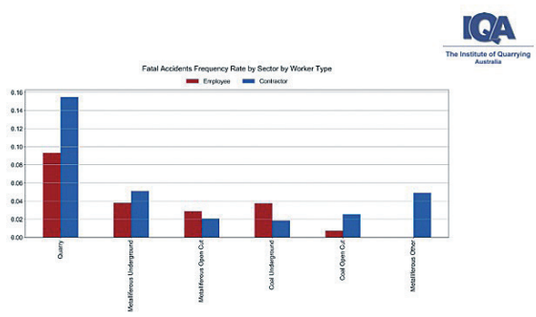

Figure 2. The frequency rate of fatal accidents by sector by worker type. As a standardised rate, quarrying has the most number of fatalities by hours worked.

impression can inspire fatalism: how can we possibly protect workers against such freak accidents? It can reinforce the notion that mining is a hazardous industry and fatalities simply cannot be avoided. However, the majority of fatalities were not freak accidents. Almost all were preventable, via hazards the industry is aware of, and there was rarely a single significant cause.

Fifteen of the 47 deaths were from vehicle accidents, 12 were machinery-related (struck by moving objects, entanglement, crushing), 10 were strata failures, four falls from height, four tyre failures, one from a fire and one irrespirable atmosphere.

INTERNAL INCIDENT INVESTIGATIONS

The causes of fatalities are typically a combination of everyday, straightforward factors, such as a failure of controls, a lack of training, and/or absent or inadequate supervision. Internal incident investigations in extractive companies must strive to capture these combinations of causal factors, and avoid simplifying them to a single cause, such as human error, bad luck or freak accidents, which has the potential to mask the underlying system failures.

At a practical level, many of the fatal incidents involved a worker being in a situation that they were inadequately trained for, with the controls meant to prevent harm being ineffective, unenforced or absent, with no or inadequate supervision to identify and remedy these shortfalls. It then took an initiating event – that is, in the form of a freak incident or bad luck – to result in a fatality.

SYSTEMIC FAILURES

Human error alone would not have caused these fatalities. They were all the result of systemic, organisational, supervision or training failures – either with or without the presence of human error. Seventeen fatalities involved no human error at all on the part of the deceased. There were 10 incidents involving known faults, where individuals were aware of them, but no action was taken. Nine fatalities had known near misses occur prior to the fatality. In some cases, prior fatalities had occurred in a similar manner.

SUITABLE TRAINING

The industry needs to focus on ensuring workers are appropriately trained for the specific tasks they are undertaking. A total of 17 of the 47 fatalities involved a lack of task-specific training and/or competencies for the tasks being undertaken. A further nine had inadequate training. These tasks were often undertaken at the direction of supervisors or others who were aware of these deficiencies. In many cases this lack of training resulted in the worker being unaware of the hazards involved in completing the task or the worker operating equipment in a manner that exposed them to hazards.

Jodi Goodall, expert in HRO, Brady Heywood.

SUPERVISION

The industry needs to focus on ensuring workers are appropriately supervised for the tasks they are undertaking. In 32 of the 47 fatalities, the worker was required to be supervised when undertaking the task – that is, the 32 did not include routine tasks, such as driving. Twenty-five of these 32 fatalities involved inadequate or absent supervision. Seventeen of these involved both inadequate or absent supervision and a lack of training for the specific task being undertaken. Not only does absent or inadequate supervision allow tasks to be approached in an unsafe manner but it greatly amplifies the consequences of a lack of training or ineffective or unenforced controls.

MANAGING HAZARDS

The industry needs to focus on ensuring the effectiveness and enforcement of controls to manage hazards. A significant number – 62 per cent – of highest level of controls put in place in the aftermath of a serious accident were administrative in nature. These types of controls do little to treat the hazard but rather treat the person interacting with the hazard. The majority of the 47 fatalities involved at least one failed or absent control that could have prevented the fatality. Administrative controls, despite having their place in the industry, are some of the least effective controls available.

HIGH RELIABILITY ORGANISATION

Businesses should follow the principles of High Reliability Organisational theory to reduce the rate of serious accidents and fatalities. At its most fundamental level, High Reliability Organisational theory focuses on identifying the incidents that are the precursors to larger failures and uses this information to prevent these failures occurring.

The concept of drift into failure, where the industry exhibits a greater acceptance of risk over time, is potentially evident in the Queensland mining industry at both macro and micro levels. While the *Mining and Quarrying Safety and Health Act 1999 (Qld)* has made significant progress in making the industry safer, despite this progress, the current approach has not been sufficient to reduce the fatality rate to zero in the long term. No single change to the mining industry will reduce this rate. What is instead required is a change in approach to how the industry identifies and controls hazards, as well as how it recognises and addresses them when these controls are eroding or ineffective.

A High Reliability Organisation, or HRO, understands that periods of success breed complacency, which can lead to failures and fatalities. Periods where there are few to no fatalities are typically periods where a drift into failure occurs. Safety is compromised for a variety of reasons, often benign, over time. These compromises typically result in a series of minor near-miss incidents. HROs actively seek out these near-miss signals, which are typically the precursors to failure. HROs believe that these signals provide an opportunity to identify and act on existing hazards in order to remove them from the workplace. This is the key step that helps prevent the drift into failure. •

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*Dr Sean Brady's report – **Review of all fatal accidents in Queensland mines and quarries from 2000 to 2019** – can be downloaded via the Brady Heywood website: bradyheywood.com.au/brady-review*

Brady Heywood also has also developed the Queensland Mining and Quarrying Podcast as part of the Brady Fatality Review. This podcast contains interviews with key industry leaders, the Regulator and union about key challenges.

Visit bradyheywood.com.au/podcasts

Sean Brady and Jodi Goodall's thoughts about serious accidents, mine safety and High Reliability Organisations can also be found at bradyheywood.com.au/articles