

Safety Investigations: A Cost or An Opportunity For Windfall Profits

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1. AN ACCOUNTING LEDGER VIEW OF SAFETY

Few in Australia would argue that the pursuit of safety is not fiscally responsible. In point of fact there would not be one perceptive person, let alone CEO or CFO in the country who is not acutely aware that safety presents a real fiscal cost that must be borne by all of us (costs which include implementation, the on-going maintenance of existing systems, or in the most foolhardy extremis of turning a blind eye).

That said, what is not quite so immediately apparent, is that fiscal responsibility equally dictates that any such cost measures should be accountable in the ordinary sense of credits & debits, whereby safety expenses & expenditure are off-set by safety gains (for example, reduced disruption & distractions, performance impairment, compensation, retraining & recruiting, lost productivity).

Do we do this both rigorously & consistently? Probably not. And certainly not in the annual reports of many of Australia's top 200 companies that cross my desk.

Notwithstanding that, we can research the bases of these costs to the degree they have been empirically applied. Take for example the literature cited costs typically relied upon for cost benefit analyses with respect to workplace accidents:

Lost production, workers' compensation payouts, insurance premium increases, lost productivity, legal fees, reduced worker morale, emergency response fees, reduced company competitiveness, medical costs, recruitment/replacement, training of replacement workers, equipment/tool repair costs, spoiled/damaged products, administrative work.

References: "Safety and Health Add Value" Occupational Safety and Health Administration; "Job Safety and Health." OSHA Fact Sheet. Occupational Safety and Health Administration 2002; "Making Safety a Priority: Tips for Convincing Management." National Safety Council; "Lost-Worktime Injuries and Illnesses: Characteristics and Resulting Time Away From Work,2004" U.S. Department of Labour/Bureau of Labour Statistics; "Health and Safety as a Return on Investment." American Industrial Hygiene Association; "Despite 6.2% Fall in the Number of Serious Workplace Injuries, Their Financial Impact on Employers Remains Huge." Liberty Mutual Group; "Injury Facts® 2005-2006 Edition." National Safety Council; "Add Value. To Your Business. To Your Workplace. To Your Life." Job Safety & Health Quarterly. Occupational Safety & Health Administration. Fall 2002; "Personal Protective Equipment: An Investment in Your Workers' and Company's Future." International Safety Equipment Association; Behm, Michael, et al. "The Cost of Safety." Professional Safety. April 2004; Cecich, Thomas. "Where's My Return? Many Safety Investments Won't Show Financial Gain." Industrial Safety & Hygiene News. September 2005; "Reduce Future Disability Claims and Costs by Nearly 50 Percent by Improving Supervisor Response to Worker Injury and Illness." Liberty Mutual Group; "American Society of Safety Engineers' Web Poll on Aging Workforce Preparedness Finds Many Companies Are Not Ready." American Society of Safety Engineers 2005;14. "The ROI of Safety." Business Week. September 12, 2005.

Now if we approach the subject of safety accountability by way of double entry book keeping, then each of the above noted “typical” costs can appear on both sides of the ledger (either as a cost of accidents or as a saving made by preventing accidents).

“SAFETY LEDGER”	
COST of not attending to safety	SAVING by attending to safety
lost production	less lost production
workers’ compensation payouts	less workers’ compensation payouts
insurance premium increases	less insurance premium increases
lost productivity	less lost productivity
legal fees	less legal fees
reduced worker morale	improved worker morale
emergency response fees	less emergency response fees
reduced company competitiveness	company competitiveness
medical costs	less medical costs
replacement worker training	less replacement worker training
equipment/tool repair costs	less equipment/tool repair costs
spoiled/damaged products	less spoiled/damaged products
administrative work	less administrative work

Variations of this simplistic approach have been used to “prove” that safety does not cost, rather it is revenue neutral or can even produce a surplus. Unfortunately things are rarely so straight forward, particularly for very complex systems like safety in the mining industry. This is because researchers have generally only looked at one (obvious) part of the ledger, whereas a stricter (and more realistic) approach must attempt to encompass what I call the whole of safety costs. Therefore to the above noted costs we can add more abstract but far less easily definable intangible costs which may include the following:

Good will, responsibility avoidance, unnecessarily complex systems, inertia to change, rules induced confusion, repressed motivation, reputation, ambiguous documentation, fear of innovation, lost opportunity costs, realignment of strategic plans, corporate inertia, misdirected action, irrational remedies, over insurance, rescheduling, customer perceptions, compliance costs, whole of company productivity.

In the end result what really counts is income & savings over and above the real costs. Real profits in other words, not those supposedly generated by merely transferring selected items from one side of the ledger to the other. This means that for practical purposes and because intangibles have rarely been taken into account (let alone quantified in any meaningful way) we’re left with the unfortunate reality that the safety cost balance is currently in the red.

That being the case, the only option for profit reasonably available to us is to maximise each & every opportunity that our functional & functioning H & S systems throw up during the course of their operation.

If you are up for it, this is the challenge.

2. WHERE DO INVESTIGATIONS FIT?

The relevant Acts do not define what an investigation is BUT they do identify the purposes for which investigations are to be directed. The most important of which purposes is the determination of the cause(s) of accidents or incidents (HPI).

As it turns out, the determination of cause(s) is an overlooked source of serious profits, however the execution is problematic. You see, *Sir Francis Bacon (1561 to 1626; and originator of the premise that “knowledge is power”)* correctly identified that “to be ignorant of causes is to be frustrated in action”. He knew all too well that not only must the identification of factual causes be the precursor to effective decisions & actions, but also that those causes must be determined by an effective investigation. Unfortunately, what Bacon did not know, could not possibly have known, because brain function was then but an unfathomable mystery (completely unknowable) was that there are two only cerebral processes that govern thinking, including investigative thinking, as follows:

Feelings (that is, instinctive emotional thinking); and;
Reason (that is, rational cognitive thinking).

Now effective investigations must be based in reason BUT left to our own devices we’re contrarily all feelings investigators. All of us. No exceptions. We’re born that way.

We constantly do them so we can make decisions, often flawed, some plain wrong. They’re instinctive and very fast, what I call auto-investigations, hard wired into our brains to allow us to make sense of the world we inhabit.

Humanity does it without conscious awareness, and importantly, the skill with which we do it makes us who we are as individuals, defining our personalities and our careers as we continuously process sensory inputs at incredible speeds to provide information for personal judgement calls & decision making.

Its automatic, both powerful AND destructive, and unfortunately we cannot turn it off.

You now know that in any investigation there is an ever present conflict between reason based thinking & feelings’ based thinking. So if you wish to profit from investigations it will help if you understand why. Let me explain.

You see, it has been estimated that between 5,000,000 to 7,000,000 years ago our remote ancestors on the primate evolutionary tree took a detour from their fellow primates, after which time, somewhere between 2,000,000 – 2,500,000 years ago, the brain size of those same ancestors’ increased by almost 60%, then some 500,000 years ago came an even bigger 85% increase in size to a volume of 1.2 litres which is just short of today’s average human brain size of 1.4 litres [and generally accepted to have happened (that is, evolved) somewhere between 150,000 – 200,000 years ago when human kind as we know ourselves, first walked the plains of Africa].

Please consider:

It has been approximated that a mere 7,000 generations of humans have ever inhabited the earth (*Robert Fogel, University of Chicago, The Escape From Hunger and Premature Death*).

Furthermore, DNA analyses have shown that every person alive today, rapidly approaching seven (7) billion, shares a common ancestor as recently as 100,000 years ago.

In historic terms, our first cities which signalled the first tentative transition from subsistence living (but really just big towns) were built just 6,000 years ago.

Significantly, if the history of humankind at every stage of its development is shown in relation to the hands of a twelve hour clock, then the interval of the last 200 years, the modern era, would be mere 45 seconds before twelve.

The problem this presents is that feelings' thinking did not evolve for the modern era. Rather, for almost the entirety of the existence of humankind and our near-related ancestor species we have all lived as nomadic hunter-gatherers. That is, subsistence living for the (near) sole purpose of survival. Therefore it has been an exceptionally long evolutionary interval of approximately 2,500,000 years that has forged & refined our system of decision-making-based-on-feelings. A system which was & remains a brilliant attribute for survival on the veldt or in the bush because it can upload a life saving judgement in an instant, but, having evolved from and for the often hostile purposes of that era it is not well suited to the modern epoch.

Unlike our origins, the modern world is one dominated by reason but in which we still paradoxically make decisions based on feelings. We confront a globe transformed by science, where technology may be outstripping our ability to control it, where the environment may be threatened, where social pressures are growing, where like it or not we are inundated with information, and decision making has become an imperative. Decisions that can lead to irrational, damaging or dangerous outcomes because "people are not accustomed to thinking hard, and are often content to trust a plausible judgement that quickly comes to mind" (*Daniel Kahneman, American Economic Review; Kahneman and Frederick: Attribute Substitution*).

It is only in this light that we can correctly appreciate the findings of cognitive psychologists that our brains have two only thinking processes, that is, feelings (emotional gut feel), AND, reason (rational conscious thought).

It has been proposed that only ten percent (10%) of brain activity is conscious thought (*Ken Roberts; Forethought*) the rest is non-conscious and cannot be verbalized and described. This means that our reasoning (rational, conscious) side cannot access nor determine why we feel a decision should be made, therefore our "judgements are generally the products of non-conscious systems that operate quickly, on the basis of scant evidence, and in a routine manner, and then pass their hurried approximations to consciousness which slowly and deliberately adjusts them" (*Daniel Gilbert, Professor of Psychology at Harvard University*). The analogy is that of a mind consisting of two parts running out of sync, minds where our reasoning side looks second in time at an already felt conclusion, then cobbles together an explanation that is plausible in the circumstances but in doing so may fail to determine that the conclusion is quite possibly flawed, even wrong.

This means that feelings are always the precursor to rational & complex cognitive processing because we make instant emotional assessments of ALL stimuli – positive or negative, pleasure or pain, fight or flight, & so on. In other words it signifies that our non-conscious, instinctive, emotional gut response precedes our rational assessment of everything.

Importantly, it is no different for investigations even though in the modern era these are often consciously planned, that is, formalized investigations which are the ones responsible for all of our advances in modern technologies & systems, but which remain inextricably linked to and influenced by instinctive emotional thinking.

This is why the execution of safety investigations will always be problematic.

Therefore battling this problem is the permanent challenge that must be faced if safe profits are to be sought through safety.

3. USING INVESTIGATIONS TO PROFIT (SAFELY) FROM SAFETY

The cause of an accident or incident must be determined by a formal investigation. This is a minimum standard or necessary condition under the Act, but is it sufficient for business purposes? The question arises, is there profit in doing more? If you complete an investigation over & above the reasonable requirements of the Act, will this Better Safety Investigation unlock windfall profits?

Consider just three examples (but there are more).

3.1 Test the safety system by using Better Safety Investigations

The main focus of an ordinary safety investigation is the incident itself and the necessary remedial action, however, some part of that investigation will invariably be directed towards finding fault in the immediately implicated elements of the safety system that governs that accident or incident.

That is all well and good, but there is a basic scientific proposition that you can't reliably use an instrument in isolation to measure itself (and we all know that you can't calibrate a ruler against itself). The relevance of this is that any accident on a mine site will one way or another be linked to the embedded risk based management & operations systems (written, but also cultural) at that site, AND, that those same mine site systems will incorporate & control the very same sub-system(s) which will be triggered to investigate that accident.

A contradiction therefore arises because the system will try to measure itself, and will give rise to situations where "we can't solve problems by using the same kind of thinking we used when we created them" (*Albert Einstein*).

A Better Safety Investigation will not only investigate the event but also concurrently investigate the whole of the safety system in theoretical proximity to that event, even though not involved. This will be for positive purposes including currency, relevance, efficiencies & improvements, not negative and often self-defeating fault finding (nit picking) of suspect elements.

Random "preventative maintenance" in other words, which is a practical tool for complex systems because what is often overlooked is that it is natural for such systems to spontaneously progress from order to disorder.

Once acted upon, any found anomalies must translate to cost savings (of the traditional kind already recognised by researchers above) and of course safety system improvements.

3.2 Test the business by using Better Safety Investigations

As indicated, a typical (and possibly undesirable) response in an accident investigation is to criticise the immediately implicated elements of the safety system. In so doing not only is the above noted random “preventative maintenance” overlooked, but also ignored is the opportunity to independently evaluate other business & operating systems (not safety systems) whether involved or not. A random “audit” in other words, that is, the accident or incident is leveraged to a higher level of opportunity to evaluate all reasonably discernable systems, operations & processes in near or related proximity to the safety event.

A Better Safety Investigation will make the time & place of the accident/incident the focus of a separate parallel investigation of the near or proximate business operations which will piggy-back on the must-do investigation of the accident cause (or causes).

Business & operating systems are intrinsically expensive, therefore once acted upon, any found anomalies must automatically translate to real and on-going profits, and of course safety system improvements.

3.3 Detect latent faults by using Better Safety Investigations

It should not surprise you to be told that the low hanging fruit has long since been picked in the safety arena, and this of course is to everyone’s credit. That said, it is now recognised that latent faults/defects, as opposed to active failures, represent the greatest threat to the safety of complex systems (*James Reason; Human Error*) and of course this applies to the majority of mining & processing ventures.

Further, and by way of complication, current research indicates that the capacity of many large corporations to make sound decisions is being eroded and they are concurrently becoming weighed down by information overload. The usual reason being offered is the attempt to deal with the complexity of the modern world (*Marcia Blenko, Michael Mankins and Paul Rogers; Decide & Deliver Harvard Business Review*). If this is the new reality then it can only lead to more latent faults/defects winding up on our mine sites, and that means systems, products, equipment & machinery which might appear otherwise sound on the outside but harbour a “sleeper” within.

But wait. Before you can attempt to detect sleepers you must firstly come to a well founded understanding of what is the meaning of “cause”. Let me explain further. You see, in the context of a Better Safety Investigation cause is not the somewhat misleading, but now widely adopted “root cause” which has been popularized and defined by its authors (*Mark Paradies and David Busch; TapRoot Root Cause Tree*) as “the most ***basic*** cause (or causes) that can ***reasonably*** be identified that management has control to ***fix*** and, when fixed, will prevent (or significantly reduce the likelihood or consequences of) the problem’s recurrence” [their bolding & italics].

In light of this definition it is clear that “Root cause” is really but an approximation to expedite the commencement of the next step in an accident or incident assessment which is the cause-analysis process (also required under the Act). But to detect sleepers the determination of cause requires a greater degree of rigour, not just in the pursuit of it, but also and far more importantly in coming to terms with what constitutes a “cause” in the first instance. A better descriptive is therefore Principal Cause which in comparison to others now commonly encountered stands higher as follows:

Principal Cause
Proximate Cause (from the Insurance industry)
Root Cause
Causation (from Negligence Law)

In pursuit of Principal Cause(s) a Better Safety Investigation will not only investigate the event but also more deeply investigate the supposed “root cause” because it could well be a mere symptom of a deeper, more serious cause.

Any proven latent fault/defect must translate to significant, even potentially very large profits because latent faults have their origins in fundamentally expensive constructs like Design, Standards, Legislation, Manufacture, Inappropriate Use, and Inadequate Maintenance. Of course safety system improvements can be expected as well.

4. WHAT IMPEDES PROFITING SAFELY FROM INVESTIGATIONS?

At present point in time it can be very much assumed that the quality and rigour of safety investigations being conducted across the Australia mining industry are diverse and varied. Poor investigations are being completed all the time. This is quite understandable because safety derives its impetus from legislation but there are no definitions in the various Acts. Nor is there guidance, but how could there be for what is at its pinnacle of achievement (and most beneficial) a complex, reasoned & rationalized process, versus at its very worst, a cobbled together explanation (albeit plausible) of what we feel.

It is also safe to say that the Australian mining industry has no present perception that safety investigations can unlock real profits whilst concurrently improving safety. It is simply not on the agenda. Therefore the first and undoubtedly biggest impediment to profiting safely from investigations is the recognition & the acceptance that not only are Better Safety Investigations desirable but also that they’re beneficial. If you do not think of it yourselves then it’s likely it won’t happen.

That said, there are other impediments that have to be mastered before you can consistently complete investigations that are better than the ones you’re already doing. I will explain that. You see, at their heart all investigations are about information (often daunting in its sheer quantity & magnitude) AND decision making (made in the hundreds, as the information is gathered, then sorted, then tested, then analysed, then reassessed, reanalysed, and finally concluded upon). Clearly if you accept enough faulty information or make enough wrong decisions then the worth of any investigation simply evaporates.

4.1 Information

It is essential that investigations have information, either input to, or collected by the investigative process. How else can they generate new information?

But what exactly is it?

The term “information” is now so overused that its conceptual meaning is taken for granted. However like many things and particularly with respect to Better Safety Investigations it is not that simple. This is because information consists of three (3) elements, which in order of worthiness are:

Least worthy: **ROPPS**
(Recollections, Opinions, Perceptions, Predictions, and Spin)

REAL-DATA
(ROPPS that’s been “worked” so long it has become statistically relevant, tending towards FACTS)

Most worthy: **REAL-FACTS**
(Rock solid, independently verifiable concepts only, often certainties)

ROPPS is the key to avoiding information pitfalls. This is because it is pure output from the humans involved, which output is always biased by instinctive emotional thinking (because our non-conscious, gut response precedes our rational assessment of everything).

I have intentionally altered the acronym of Roll Over Protection Structure for ease of memory, its very important. Please don’t forget it.

REAL-DATA is as explained, that is, ROPPS that has withstood the rigour of targeted research, testing & and separate investigation(s) as required.

REAL-FACTS must be independently verifiable (and are not to be mistaken for the legal industry’s uncontrolled use of the term “facts”, nor for the same reasons can “truth” get a look in).

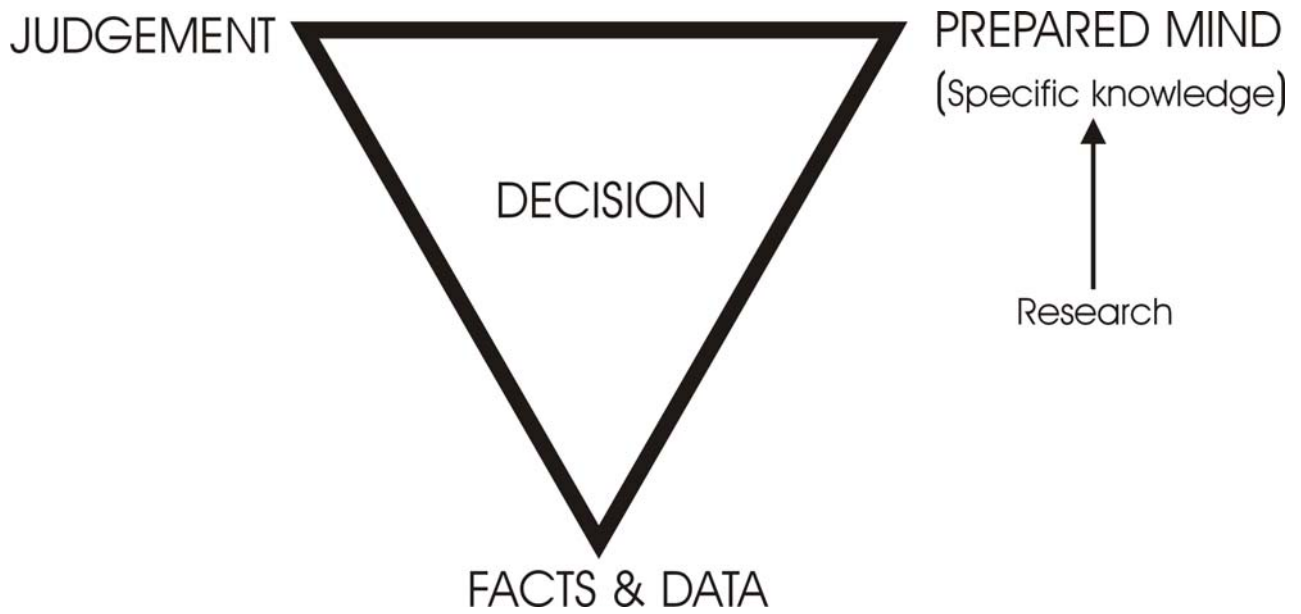
Unfortunately, the reality is that an alarming number of investigations get lost in ROPPS. This is because any investigation that is not based upon REAL-FACTS & REAL-DATA is inherently flawed.

It may sound rather trite, but it is only hard facts & hard data that can ground sound investigative conclusions because the outcome must be based in reason, whereas conclusions that rely upon ROPPS are all about feelings and therefore remain at all times potentially defective.

4.2 Decision Making

Investigators cannot generate new information unless they firstly make decisions about the information which has initially been input to the investigation, or, in regard to how further information might be collected and decided upon in turn.

Seems deceptively simple but what does it mean?
Please consider the decision triangle:



Sound decision making hinges upon Judgement derived from one's own experience. It is Judgement that will make the call on the above noted REAL-FACTS & REAL-DATA, however at all times that judgement must be augmented by what I call the Prepared Mind. [A descriptive I've adapted from *Louis Pasteur (1822 – 1895)* who was a great pioneering scientist and humbly acknowledged that "fortune favours the prepared mind".]

The prepared mind is about specific, already verified, literature based knowledge that relates to the REAL-FACTS & REAL-DATA under consideration. It is the necessary, sometimes essential background knowledge that allows Judgement to put that information into context. To put it into perspective in other words. Without a Prepared Mind everyone's ability to judge is necessarily handicapped. Now, training and/or education can be a significant element of the Prepared Mind but the unfortunate reality remains that such knowledge decays & becomes irretrievable with the passage of time, therefore the most important component is fresh knowledge acquired by a Research Investigation. This means doing an investigation within an investigation which is specifically designed to both acquire fresh knowledge, then verify it (and may or may not include the latest developments in the field).

Without a prepared mind, many an investigator fails to see what it is that's being looked at, let alone understand what it is that's been seen, nor even have the chance to act upon it. The baby gets thrown out with the bathwater!
Unpreparedness and failure often go hand in hand.

5. CONCLUSIONS

Safety costs should be accountable in the ordinary sense of credits & debits, whereby safety expenses & expenditure are off-set by safety gains.

In which respect, cost benefit analyses of workplace accidents & safety mitigation which have been completed by past researchers have generally only looked at one (obvious) part of the costs ledger and relies upon concurrent cost savings. However, a stricter (and more realistic) approach must attempt to encompass the whole of safety costs which necessarily includes more abstract but far less easily definable intangible costs.

What really counts is income & savings over and above the real costs. Real profits in other words, not those supposedly generated by merely transferring selected items from one side of the ledger to the other. This means that for practical purposes and because intangibles have rarely been taken into account (let alone quantified in any meaningful way) we're left with the unfortunate reality that the safety cost balance is currently in the red.

This signifies that the only option for profit which is reasonably available to us is to maximise each & every opportunity that our functional & functioning H & S systems randomly throw up during the course of their operation.

It is accepted that the cause of an accident or incident must be formally investigated. This is a minimum standard or necessary condition under the Act, but is it sufficient for business purposes? The question arises, is there profit in doing more? If you complete an investigation over & above the reasonable requirements of the Act, will this Better Safety Investigation unlock windfall profits?

The answer is yes, because the process of determining of the cause(s) of accidents or incidents (HPI) is an overlooked source of serious profits [which can be pursued by testing the safety system, and/or testing the business, and/or by detecting latent faults (plus there are more)].

Unfortunately the implementation of Better Safety Investigations remains problematic. This is because our brains have two only thinking processes (inclusive of investigative thinking) and now established by cognitive psychologists as follows:

Feelings (that is, instinctive, emotional, gut-feel thinking); and;
Reason (that is, rational, cognitive, as in, conscious thought).

The problem has arisen because feelings' thinking did not evolve for the modern era. Rather, it's a system which was & remains a brilliant attribute for survival on the veldt or in the bush because it can upload a life saving judgement in an instant, but, having evolved from and for the often hostile purposes of that epoch it is not well suited to a modern world dominated by reason. Yet, paradoxically a world in which we still make decisions based on feelings. Decisions that can lead to irrational, damaging or dangerous outcomes.

Feelings are always the precursor to rational & complex cognitive thinking because we make instant emotional assessments of ALL stimuli – positive or negative, pleasure or pain, fight or flight, & so on. In other words our non-conscious, instinctive, emotional gut response precedes our rational assessment of everything.

This remains the case for investigations even though in the modern era they are often consciously planned, that is, formalized investigations (which are the ones responsible for all of our advances in modern technologies & systems) but which

remain inextricably linked to and influenced by instinctive emotional thinking and explains why the execution of Better Safety Investigations is not so simple.

At present point in time it can be very much assumed that the quality and rigour of safety investigations being conducted across the Australia mining industry are diverse and varied.

Poor investigations are being completed all the time.

This is quite understandable because safety derives its impetus from legislation but there are no definitions in the various Acts. Nor is there guidance, but how could there be for what is at its pinnacle of achievement (and most beneficial) a complex, reasoned & rationalized process, versus at its very worst, a cobbled together explanation (albeit plausible) of what we feel? Furthermore, there are practical skills that have to be mastered about information & information gathering (often daunting in its sheer quantity & magnitude) AND about decision making (made in the hundreds, as the information is gathered, then sorted, then tested, then analysed, then reassessed, reanalysed, and finally concluded upon) before a party can consistently complete investigations that are better than the ones they're already doing.

It is also safe to say that the Australian mining industry has no present perception that safety investigations can unlock real profits whilst concurrently improving safety. It is simply not on the agenda. Therefore the first and undoubtedly biggest impediment to profiting safely from investigations is the recognition & the acceptance that not only are Better Safety Investigations desirable but also that they're beneficial.

Better Safety Investigations can unlock windfall profits, but the challenge is that until our industry comes to recognise the prospect, it may not be widely adopted.