

Practical Risk Assessment.
An essay in common sense
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Foreword: The Essence of Business is Risk

Recently we have been hearing how businesses can change their culture or performance standards by using risk and or safety management as a driver to achieve higher and more profitable performance levels. This concept no matter how academically plausible and attractive has an underlying flaw which is that simply expressed "essence of business is risk for profit". What is however an unassailable assumption is that efficient professional management will have as outcomes, improved productivity profitability and safety. Simply put this means the chicken comes after the egg or the cart come after the horse. You need good management to have good safety.

As the essence of business is, the management of risk for profit, we have to understand the professional management of risk is therefore the key to improved productivity safety and profitability.

If we wish to find a magic wand to improve our safety performance we will be well advised to examine the way we manage and recognize that all decisions in business have multiple outcomes, it is unrealistic to expect a decision will only effect one aspect or outcome. Every decision made effects to a greater or lesser extent all the possible outcomes of the business.

- Productivity
- Safety
- Profitably
- Employee relations
- Costs
- Image etc.

As outcomes are historical consequences poor performance in any of the above is an indication that we either failed to;

- take into consideration all possible outcomes and therefore the consequences or
- we were prepared to live with the outcome and subsequent consequence

Change to the structure, methodology and process must include changes to the systems that are in place to manage the pure risks of business. (Prof G Head)

(Pure risk in this context is defined as those risks that can only result in loss)

The foreword to this paper was chosen deliberately. Nothing is having a greater impact on safety at present than our ability or lack of ability to change our safety management systems effectively in harmonious concert with the consistent reorganisation of the business unit driven by harsh realities of the market place.

Too many of our systems designed and implemented during the last decade of Pyramid Management based on compliance driven quality systems requiring vertical loops of control have not been changed or modified to be practically functional in today's flat team based management approach. To many systems are reporting to layers of management that no longer exist, the answer is not a control failure as the control is as necessary now as when the system was designed but rather a failure to redesign the system from vertical to horizontal. (Horizontal reporting is common practice not only in advanced industry but has been practiced by both leading sports teams and crack military units for many years.)

This failure can often be attributed to, or simply summarized as a failure to evaluate the practical aspects of change resulting from a lack of understanding of the practical application of the

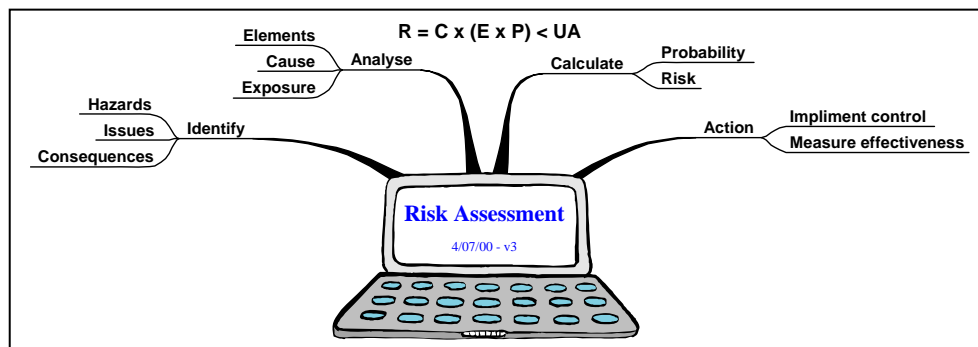
fundamental principles of Risk Management.

The Assessment of Risk

The key fundamental principle of risk management is that we should identify all potential loss (in this case OH&S) and establish the potential consequences. Assess what likelihood that the events that can cause the loss events to take place, will take place, consider that acceptability thereby establishing the level of risk and then attending to each identified issue in a defensible order of practical priority. (Quote, Prof G Head. Past Life President of The International Risk Management Institute)

The formula for risk is therefore
(Consequence or Severity of Loss) X (Likelihood of the Occurrence) expressed a fraction of unacceptable risk.

The Consequence or Severity of loss is relatively simple to perceive with a high degree of relative accuracy however the likelihood is more difficult to compute accurately. What we have found in the field is that the results of risk assessments are viewed with scepticism, in some cases, as a result of a lack of understanding of the elements of risk especially, likelihood and unacceptable risk. In this presentation we will attempt to address those issues which we have found in the field cause the most confusion.



Objective of the Paper

To review the practical application of the basic principles of risk assessment in terms of

- The primary decision
 - * Treat
 - * Transfer
 - * Terminate or
 - * Tolerate risk
- The analysis of cause of risk in terms of
 - * Elements of hazardous conditions or activities
 - * Elements of unsafe behaviour
- Avoiding damaging behavioral syndromes
 - * The GP syndrome
 - * The TTP syndrome
 - * The SS syndrome
- The assessment of probability in terms of
 - * Singular
 - * Alternate or
 - * Joint probability.
- The control of risk in terms of
 - * Mathematical approach to the hierarchy of control

- * The application of risk finance techniques

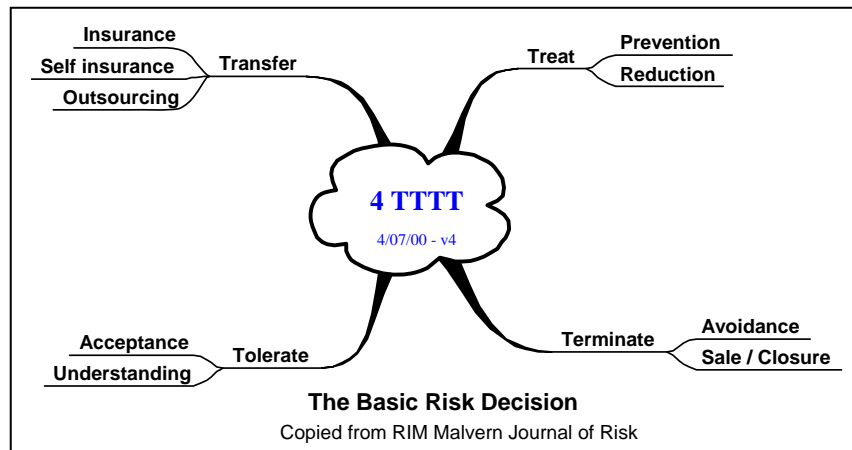
To have safety without risk control, competency without practice and good results without effort is as impossible as it is to turn back the clock of time. M Curie

The Primary Risk Decision

One of the finest teachers of safety considered by many as the father of “Loss Control” Frank Bird embedded in my mind a short quotation

*As we wander down life’s twisted paths
It is prudent to ask
What will happen if we take this path
And not
Go blindly into the dark.*

From a practical Risk Management view point when faced with any decision there is a simple primary set of questions we must ask.



- What consequence can result from the actions caused by the decision.
 - Can that consequence result in loss
 - And if so what should we do about it!
- * This question is answered by evaluating this qualitative risk against the following four criteria
 - ⇒ Can we **tolerate** the risk? If anything goes wrong can we live with the results?
 - ⇒ Can we **terminate** the risk? Can we afford not to be involved or close that portion of the business down? (This is always the most expensive option.)
 - ⇒ Can or do we want to **transfer** the risk? Simply put can we insure against it happening and would that be cost effective?
 - ⇒ Can we effectively **treat** the risk by eliminating or reducing the risk to acceptable levels?

The Analysis of Cause of Risk in Terms of the Elements of Danger.

Managing Hazards.

Few of us realise how many times a day we manage risk in an orderly controlled manner. For example how many of us drive motor vehicles daily and in the process negotiate sharp bends and many other similarly hazardous conditions. How do we do this? Simply analysed we do the following:

1. Our senses (sight) inform us there is a hazard (sharp bend)
2. Our mind determines the consequence (the potential the car will turn over)
3. It determines what we should do to reduce the potential to a manageable level
4. We therefore reduce our speed to a level where the car can safely negotiate the bend

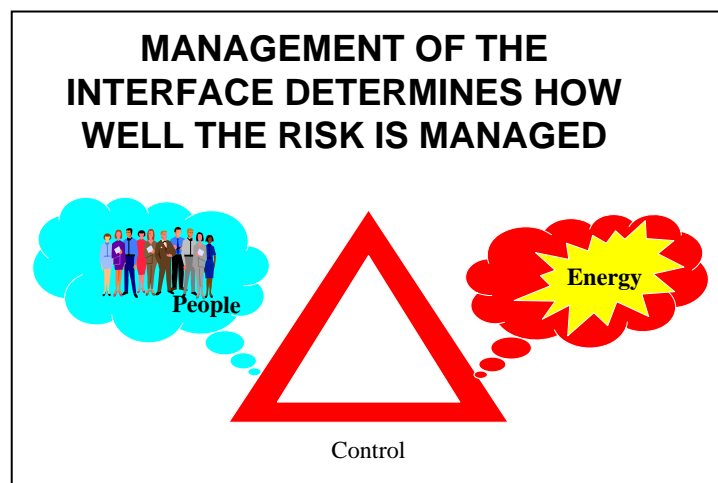
What we have done in fact is manage risk. We managed the co-ordination of the elements of danger and reduced the risk — in fact we treated the risk with a dose of common sense.

What we need to understand is there can be no danger if one of the following two elements is adequately controlled.

- People or persons who could be injured.
- Damaging energy that can cause damage

Common examples where we do this and therefore manage risk every day on the mines are

- When we blast we remove the people
- When we have moving machinery we place a barrier (guard) between the machinery and persons to prevent contact
- When we have bad roof, we either support it to prevent it falling or cause it to fall in a controlled manner
- We insulate copper wire used to conduct electricity
- And where we cannot physically or practically engineer the risk out we create rules to ensure the risk can be managed by appropriately trained persons.



Why then if the management of risk is this simple do accidents still occur. Regrettably there are other factors in these equations.

- The potential we have as humans to make mistakes. (Human error)
- Circumstances created by others outside the control of those interfacing with or controlling the danger. (Damaging behavioural syndromes)

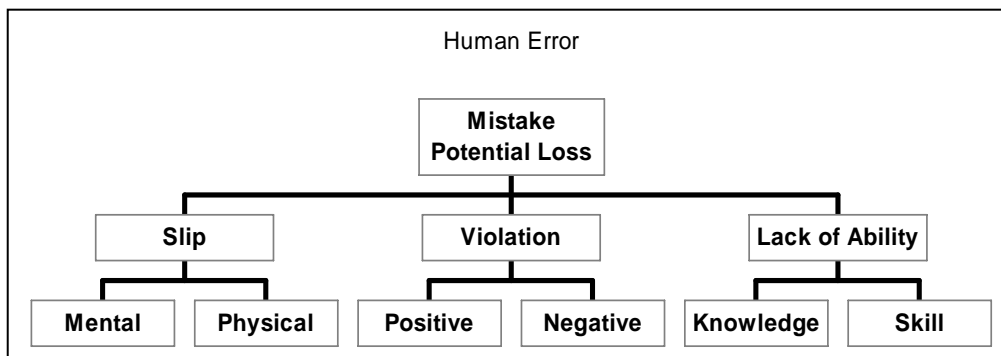
(both of these are dealt with in-depth in the following section of this paper)

However please remember

*To get profit without risk!
Experience without danger!
and reward without work!
is as impossible as to live without being born*

Understanding Human Error. (Acknowledgment: To Prof G Simpson for his superb analysis of underground locomotive accidents in coal mines which forms the foundation of the following assumptions)

What is Human Error? Simply stated, it those mistakes made people or persons that have resulted in loss. (There is no person in this audience and or at this conference who has not made some mistake at some time that either caused loss or had the potential to cause loss. A common example is which of us has never gone through a red traffic light. We may have been lucky and not been involved in an accident — but the potential was there, the mistake was made.) Understanding the basic mechanisms that often cause mistakes is important if we are to manage behavioral safety with any degree of success.



In the diagram above any of these elements or combination of these elements can lead to a mistake (Human Error) lets examine them individually.

- Slip. (When something occurs because of a lack of awareness, when we fail to notice a potential hazard and therefore fail to take action to manage the risk and when under normal circumstances we would never have done what we did.) Slips can result from either mental or physical conditions or both
 - * Mental as in boredom
 - * Physical as in tiredness.
- Violations. (Where there was a definite decision resulting in a action that had the potential to cause loss.) There are two definite categories that must be reviewed they are; Positive Violations and Negative Violations. A interesting study published based on one thousand industrial accidents where failure to carry out instruction and or failed to work to standard had been identified as a primary cause showed 90% of these occurrences were on further investigation found to be as result of persons doing what they did because they thought it was in the organisations interest. Positive Violation.
 - * Positive done for reasons other than personal gain
 - * Negative done for malicious reasons or for personal gain.
- Lack of Ability. (When due to lack of training or experience or a physical condition such as age we do not have the ability to always function without making a mistake.) This also has two main categories namely a Lack of Knowledge and or a lack of Skill.
 - * Lack of Knowledge — insufficient training and or experience.
 - * Lack of Skill — insufficient agility, co-ordination or mental ability.

Understanding (DMS) Damaging Behavioural Syndromes (Acknowledgment: To Dr A Greensburg UACL, Prof T Heller Oxford University and Prof A Cohen NY State University. The assumptions in this section are based on my perception of their concerns about certain behavioural cultures evident that can damage an organisation and lead to loss occurrences.)

It is noted in all the publications that syndromes can be a menace in that they can start with single individuals behaviour but can however spread rapidly throughout an organisation contaminating culture. Although traditionally they have fed on greed and ambition more recently they have been fueled by the markets demand for better profit — which as it is not subject to any risk other than financial and is therefore ruthless in its demands.

There are three virulent strains of this syndrome that greatly increase chance of loss that have been identified as present in a number of recent catastrophic events:

- **TTP or Try To Please Syndrome.** (I cannot give you the formula for certain success, however I can give the formula for failure, which is try to please everybody.)
 - * Loss events normally associated with this syndrome normally have the following type of cause identified during investigation.
 - ⇒ Operating equipment that should be in for repair because there is no available spare.
 - ⇒ Working excessive hours because of staff shortages.
 - ⇒ Carrying out tasks with insufficient knowledge and experience.



- **SS or System Says Syndrome.** (The belief if we comply with written script it will cater for all eventualities, protect us from accidents and let us get on with our core business)
 - * Loss events normally associated with this syndrome normally have the following symptoms identified during investigation.
 - ⇒ It was previously identified and due for discussion at the next meeting.
 - ⇒ We wrote a Safe Work Procedure to prevent it happening.
 - ⇒ We are a Five Star mine it can't happen to us.
- **GP or Grand Prix Syndrome.** (This is probably the most virulent strain of them all — Those Affected are driven by ambition and greed and have used the economic and or political environment as drivers to bend their "Duty of Care". The Grand Prix label has been attached because of their tendency to want to win no matter the costs).

- * Loss events normally associated with this syndrome normally have the following symptoms identified during investigation.
- ⇒ Fear, the constant threat of job loss.
- ⇒ Drainage, resources drained and strained to support expansion.
- ⇒ Safety is isolated from the core business.

The Assessment of Probability in terms of

There is an almost an oversupply of information in the industry about risk however its singularly most important element **Probability** (what chance is there that it will happen) has a singular lack of published information.

The problem is no risk assessment where the probability is not reasonably accurate has any validity. (Therefore gut feel is not an option) Probability is the sum of a mathematical formula and although you may use qualitative information if quantitative information is not available the process must be done to eliminate the emotive element.

Probability defined: (USA Bureau Standards definition, this is the definition recommended by RIMS for use in the risk profession)

Probability is the chance an adverse occurrence will take place. It is calculated by counting the number of adverse occurrences where loss has occurred due to a specific hazard or type of hazard and then expressing that number as a fraction of the number of the total exposures to the same specific hazard or type of hazard in a given time frame. Probability must take into consideration whether the chance is **singular, alternate or joint** and be calculated accordingly.

Singular Probability is that chance a single hazard will cause loss. Example: A single missing guard on a large high speed conveyor in a area where persons are required to work.

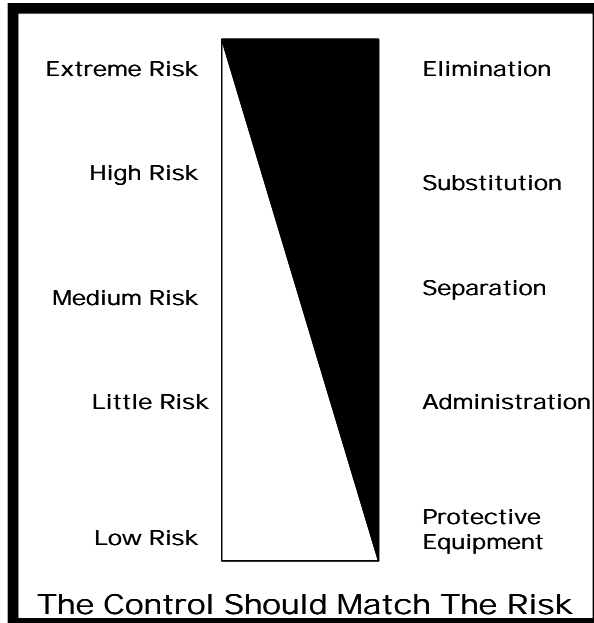
Alternate Probability is that chance any one of a number of singular hazards will cause a loss. Example: Where there is a missing guard on a walkway at height with an exposed electrical connection. (Increase in Probability)

Joint Probability is that chance a loss will occur as the result of a sequence of occurrences taking place. Example: Where a truck is damaged when driven on a road not normally used where the shoulder was weakened as the result of unseasonable rain. (Decrease in Probability)

Understanding Risk Control (Acknowledgment: Prof Haddon's paper "The Escape of Tigers" forms the basis of this section.)

The "Hierarchy of Control" did not just happen nor was it in original copy the work of a single person it was in fact an analysis of control measures required by insurance assessors from people and or organisations which were required to have been put in place after certain loss events had occurred to obtain reinsurance. It therefore has in its foundation in practical financial management and it is based on a simple principle to often overlooked in our search for absolute safety and or a simple way out:

The control should match the severity of the risk, it may be more but should never be less.



- Simply put the top of the scale means high risk = strong action required, it means engineer the risk out or put in place engineering controls that will reduce the risk to acceptable levels.
 - It means eliminate or terminate a condition or activity
 - Or substitute or modify the process, material or equipment.
- Simply put the middle of the scale means medium risk = it requires we separate persons from the risk by
 - Means of a physical barrier
 - Means of administrative controls such as time and space
- Simply put the lower section of the scale means low risk = may be catered for by administrative controls or protecting the person and not the hazard
 - Rules, procedures and standards
 - The placement of warning signs to ensure awareness
 - It means protect with protective clothing

In practical terms we must therefore assess risk in a way that will allow the “Hierarchy of Control” to be used as a practical measurement tool to assess if the controls we have put in place are adequate.

Conclusion

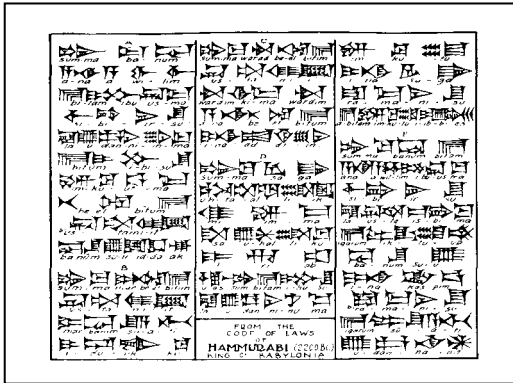
Two published legal findings written 4000 years apart define with great similarity our “Duty of Care” They require we identify the results of our acts and omissions and their potential consequences.

They require we assess the chance of those consequences caused by our acts and omissions occurring.

They require we put reasonable controls in place to either eliminate the danger or reduce the risk to acceptable manageable levels.

They hold that failure to do this is a breach of our “Duty of Care” and hold us liable in both

criminal and civil context.



“You must take reasonable care to avoid acts or omissions which you can reasonably foresee would be likely to injure your neighbour. Who, then, in law is my neighbour? The answer seems to be - persons who are so closely and directly affected by my act that I ought reasonably to have them in contemplation as being so affected when I am directing my mind to the acts or omissions which are called in question.”

Donoghue v. Stephenson
1932 AC 562 (per Lord Atkin)

Practical Risk Assessment is therefore

1. Identify the Hazards
2. Establish the Consequence
3. Assess the Probability
4. Determine the Risk
5. Action Preventive Controls
6. Measure their Suitability

**THERE ARE RISKS AND COSTS TO A PROGRAMME OF ACTION
BUT THEY ARE FAR LESS THAN THE LONG RANGE COSTS
OF A PROGRAMME OF COMFORTABLE INACTION.**

JOHN F KENNEDEY.