SUBMISSION TO THE PRODUCTIVITY COMMISSION INQUIRY

"National Workers' Compensation and Occupational Health and Safety Frameworks"

by

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IN A NUTSHELL

1. In 1992-3, 80.5% of the cost of damage to people from work came from permanent disability.

2. New South Wales is the only state which publicly reports permanent disabilities.

3. All other states are unaccountable to their communities for overall work health and safety.

4. From 1992-3 to 2000-1 the incidence (number per 1000 employees) of permanent disability increased from 1.7 to 3.89 – 2.3 times as many.

5. When 80.5% of a problem increases by a factor of 2.3 the problem is far worse.

6. The Government "presides" over work health and safety instead of being an "active participant" as the problem requires.

7. Government's political role is "care of the citizens" – all of them.

8. In 1992-3 there were 8 fatalities and 137 permanent disabilities per day – every day of the year from work in Australia.

9. Governments were told of this in 1995 by the Industry Commission.

10. In setting National Targets for work health and safety in May 2002, Governments totally ignored permanent disability.

11. This dishonours and disrespects the permanent disabled.

12. Since the Industry Commission Report on Work Health and Safety in 1995, around 400,000 people have been permanently disabled.

13. Governments have not acted so that we know, in adequate detail, how these people were damaged. (They don't know either).

14. While fatalities and permanent disabilities are far too common in Australia, to the individual they are rare events and majorly beyond their experience.

15. Because the National Experience has not been collected and presented, we do not know what to do.

16. Instead, between 1 million and 2 million organisations/work units are required to identify hazards and do risk assessments.

17. Because they do not have veridical information to work with, people are unable to use their “thinking” function and have to use their “feeling” function.

18. The “thinking” function uses concepts to link up ideas and integrate new ideas and is concerned with “truth”.

19. Truth is necessary when dealing with the physical energies of the world.

20. The “feeling” function uses sub-emotional feelings via values to make judgements of the form “like or dislike”, “acceptable or not acceptable”. It is essentially concerned with “goodness”.

21. People produce “good” hazard identifications and risk assessments which, because untrue, are wrong.

22. Organisations are punished for getting it wrong.

23. This is equivalent to a teacher, after not providing the students with the necessary learning material, punishing them for not answering correctly.

24. Without adequate veridical information hazard identification and risk assessment cannot be made with the thinking function – as it must be.

25. People’s tissue or function is damaged by an exchange of energy which goes outside tolerable limits.

26. Safety is a matter of energy management.

27. The energy management approach requires and promotes the use of the thinking function.

28. The current ill defined terminology, models and approaches, and absence of appropriate quality knowledge, require and promote the use of the feeling function.

29. Consignorance is the result of a group of people using consensus to combine their collective ignorance while ignoring a significant body of scientific knowledge – already existing or yet to be discovered.

30. Consignorance gives ignorance authority.

31. A Consignoramus is a person who specialises in going to meetings which produce Consignorance. Their distinguishing feature is their inability to determine what has substance.

32. Too much of what passes for safety today is the result of Consignorance and Consignoramuses.

33. The Australian Standard for "Recording and measuring work injury experience" is an unethical document.

34. An ethical document would value a life at more than 220 working days, and would similarly value a permanent disability at more than 220 working days.

35. An ethical document would value the person's normal time off work and not count only the person's lost work time.

36. The vast majority of fatalities and permanently disabilities are a by-product of modern technology.

37. Modern technology improves our standard of living.

38. If the permanently disabled and dependents of those killed are not adequately compensated, we are asking them to subsidise our standard of living.

39. Compensation is not simply a matter of money – it is ensuring, as far as possible, that the person enjoys a quality of life no less than they would have.

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AUSTRALIAN WORKPLACE HEALTH AND SAFETY

I INTRODUCTION

As a freshly graduated Bachelor of Mechanical Engineering, I commenced research into tractor fatalities and permanent disabilities in 1964 using the methodology of natural scientists such as Charles Lyall and Charles Darwin – observation, description and classification - and received a Master of Engineering for a thesis “The Involvement of Tractor Design in Accidents”. Study of available undergraduate psychology subjects gave an ability to appreciate the behavioural aspects of tractor driving and a Bachelor of Science Degree with Psychology Major.

After eleven years of tutoring and research I responded to pressure to consult to the Queensland Coal Industry and others.

Early experience led to two important articles of faith.

- What is done to overcome “accidents” must be firmly based on what actually happens in “accidents”.

- Every effort must be made to prevent a person’s emotions and feelings from distorting their perception of what has occurred and their judgement of the relevance and significance of involved factors.

The first faith article came from my astonishment at how different the detailed description of tractor “accidents” were from popular conventional wisdom.

The second came from the sharp contrast in description according to whether the deceased’s body was or was not present during the reporter’s investigation and the high emotional energy associated with people holding particular views on cause, fault and blame.

Disciplined terminology, concepts and models have been developed to give application to these articles of faith.

A consultancy formed in 1976 has taught companies how to investigate "accidents" and how to organise their past history of cases into a Taxonomy – one of the oldest and most time honoured of the scientific methods. A taxonomy is a classification system with an internal structure best exemplified by the "branching" classification of the living world into species, families, phylums etc.

This energy based classification system led to the understanding that 80% - 85% of the total damage occurring to people from work involves fatality and permanent disability. This is not "number of cases" but "quantity of damage".

Personal and collective ignorance led to becoming an expert witness in court on behalf of the permanently disabled and the dependants of those killed - to learn how. Upwards of 6,500 case histories accumulated over twenty years are seen by some as an impressive data base. It is in fact grossly inadequate when it has been accumulated over a period of time during which up to 1,000,000 may have been killed or permanently disabled.

In a tragically expensive and very steep learning curve, much has been learned about the phenomena involved in creating damage and why these phenomena have not been managed and controlled.

The consulting has continued to develop and refine terminology, concepts and models while progressively moving from the damaging occurrence ("accident") itself to the wider fields of management and information in which these occurrences are all too tragically embedded and, as best as can be judged, increasingly so.

Over the nearly 40 years fads and fashions have been observed and endured. They have in common the energetic activity of a wide variety of people who share too great an ignorance, firstly of the importance of permanent disability (80% of the total cost of personal damage at work) as a component of the personal damage problem and, secondly, of how people become permanently disabled.

The effort and resources of many, working energetically and determinedly in the field, are misdirected by a bureaucracy which is under funded and lacks the intellectual weight to understand what is required. Instead it subscribes to a self supporting web of platitudinous terminology and methodology while proudly claiming "work's best practice". At the same time they are abrogating their responsibility to do well what they are best suited to do, while demanding organisations do what, for those in the organisations, is impossible and then bullying them legally for not achieving the impossible. The approach is reminiscent of the dark ages when, if you wished to know how many teeth in a donkey's mouth, you consulted the authorities. The last thing you did was look in a donkey's mouth.

I exaggerate – but perhaps not very much!

The government, political and bureaucratic, has the responsibility of managing Health and Safety on behalf of the community whose members will be killed or permanently disabled from work - nationally 8 fatalities and 137 permanent disabilities each day.

2 POLITICS

Moore (1997) gives interesting insight into politics when he comments:

> *"The process of politics often gets in the way of its essential vision and charge: the care of citizens".*

Moore sees our current idea of politics as:

> *"bureaucracy, administration, and lawmaking where thought, judgement and heroics are central"*
>
> and then argues that politics:
>
> *"could also be imagined as work with emphasis on imagination, caretaking and depth of vision."*

He concludes that "*ultimately politics is not as much a matter of administration as much as care"* and argues for a shift of focus from the mechanics of the system to giving care to the citizens.

For work, health and safety, care of the citizens involves reducing the rate of fatality and permanent disability from work, ensuring that the permanently disabled and the dependants of those killed are appropriately cared for, ensuring that organisations operate effectively, providing goods and services, employment and wealth to the community.

3 WORK DAMAGE TO PEOPLE

The Industry Commission (1995) report on Work Health and Safety costed damage to people from work. In this author's terminology and concepts, Class I personal damage occurs when a person's life is permanently altered, Class II when it is temporarily altered and Class III when it is inconvenienced. A paper "Focus Don't Fiddle", McDonald (1995) **Appendix I**, demonstrated that the Industry Commission's figures showed that 82% of cost came from Class I damage and 18% from Class II. Fatality accounted for 1.5% and permanent disability for 80.5%. Health and Safety at work is fundamentally a Class I problem.

The Industry Commission cost estimates on a National Account basis also showed a cost sharing of Employer 30%, Employee 30% and Community 40%. They note that Employers carry the vast majority of the cost for temporary impairment (Class II) damage. Employers share of the cost of Class I damage is therefore less than 30%.

In relation to the report commissioned from McDonald (1995) the Industry Commission comments:

> "McDonald & Associates has questioned the current priorities in government and industry programs directed at prevention and research. Dividing outcomes into permanent incapacity (Class One), temporary impact (Class Two), and inconvenience (Class Three), they contend that:
>
> > …..occupational health and safety is fundamentally a Class 1 problem. Despite this, it is normal for governments and insurance companies not to report figures on permanent disabilities in a meaningful way. … Class 1 damage will come from a relatively few occurrences and only the very largest organisations will have previous experience and history which gives them any understanding of these occurrences. Smaller

> organisations, looking at their history, are likely to learn nothing useful to help prediction of their future Class 1 damage (1995, p.21).
>
> The Commission agrees with this assessment. Indeed, the Commission's estimates suggest that the hazards that are the focus of national standards are not those that would yield the greatest saving in costs to the community, for a given reduction in their risks. The estimates also highlight the importance of drawing on `best practice' from outside small to medium-sized enterprises because of the low frequency of workplace incidents that occur?"

As far as can be determined, this author assesses that the significance of the dominance of Class I damage in Work Health and Safety has been substantially ignored. Worthwhile effort, but still insufficient, has been directed to fatalities but the area of permanent disability has been neglected.

There has been no publicity campaign to inform or enlighten the community that 137 people are permanently disabled every day of the year from work in Australia, ie. 50,000 persons per year, 20,000 who do not work again and 30,000 who work in a lesser capacity or for fewer hours per week. Nor is there publicity about 8 people dying each day. Most people are astonished when told of these figures.

New South Wales is the only state which publishes information on permanent disabilities – 80.5% of total costs in 1992-93. Every state which does not publish such information has made itself unaccountable to the community.

On May 2002 the National Occupational Health and Safety Commission (NOHSC) set national targets of a 20% reduction in the incidence of work related fatalities over ten years and a 40% reduction in the incidence of workplace injury over ten years. They call for half the reduction over five years.

Permanent disability was not mentioned.

Anyone who is familiar with the Lost Time Injury Frequency Rate (L.T.I.F.R) knows that it is incredibly easy to manipulate the L.T.I.F.R figures without a meaningful change in health and safety of the workforce.

New South Wales figures have been compiled for the years 1991-92 to 2000-01.

TABLE I
Incidence of Work Damage

	1991-1992	1992-1993	2000-2001	% CHANGE from 1992-1993
Fatality	0.0338	0.0259	0.0177	- 32
All Injury	18.67	17.56	15.10	- 14
Permanent Disability	1.46	1.70	3.89	+ 129
Temporary Disability	17.18	15.83	11.19	- 29

Incidence is the number of injuries per 1000 wage and salary earners.

If it is assumed the average cost of each level of severity of occurrences is the same, the cost of personal damage at work in 2000-01 is approximately twice that of 1992-93, - the year for which the Industry Commission made its assessment.

TABLE II
Comparative Units of Cost

	1992 - 1993	2000 - 2001
Fatality	1.5	1.02
Permanent Disability	80.5	184
Temporary Disability	18	12.8
TOTAL	100	197.8

Over eight years the fatality incidence rate (by crude measure)[*] has decreased by 32% and all injuries incidence has decreased by 14%. However, permanent disability incidence has increased by 129%. Permanent disabilities have gone from one per 588 person years to one per 257 person years, well over twice as many.

The cost of work damage to people has doubled over the eight years.

In view of the figures published by New South Wales, NOHSC's targets are nonsense, as is the effort of those who developed the targets. Decreasing all

[*] 47 fatalities in 2000-01 68 "last year"

injuries by 14% while more than doubling permanent disabilities is going backwards – not forwards.

The permanently disabled are dishonoured and disrespected by these targets.

4. FOCUSED EFFORT

Table III gives the Industry Commission's figures, for June 1992-1993 and **Figure 1** shows a plot of these figures, while **Figure 2** shows a stylised diagram of Class I and Class II damages.

TABLE III

	Severity Of Injury Or Disease					
	<5 days	>5 days full duties	>5 days reduced duties	>5 days lower income	Permanently Incapacitated	Fatal
No. of occurrences	144053	123395	78,333	30,728	19,290	693
% of occurrences	36.33	31.12	19.75	7.74	4.86	0.17
Cumulative %	36.33	67.45	87.20	94.94	99.80	100
				Shaded Area is Class I		
Cost of occurrences ($Billions)	0.136	1.063	2.415	4.555	11.664	0.299
% of cost	0.67	5.28	11.99	22.62	57.93	1.48
Cumulative%	0.67	5.95	17.98	40.56	98.49	100

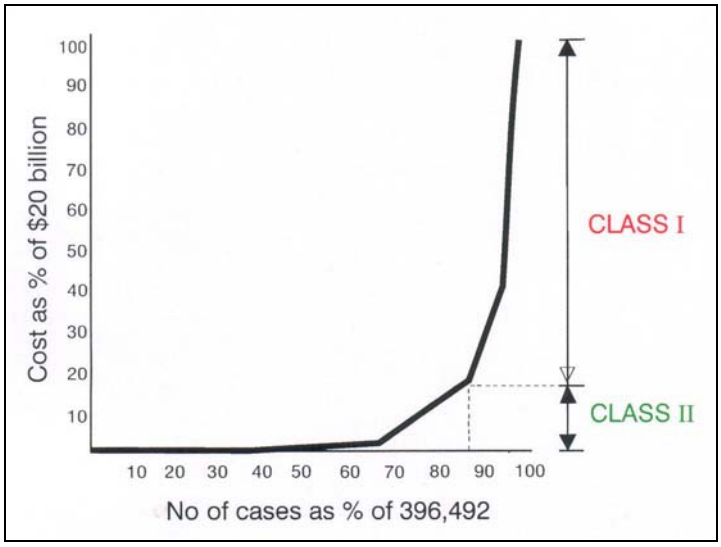

Figure 1 – Cost of damaging occurrence by severity of damage

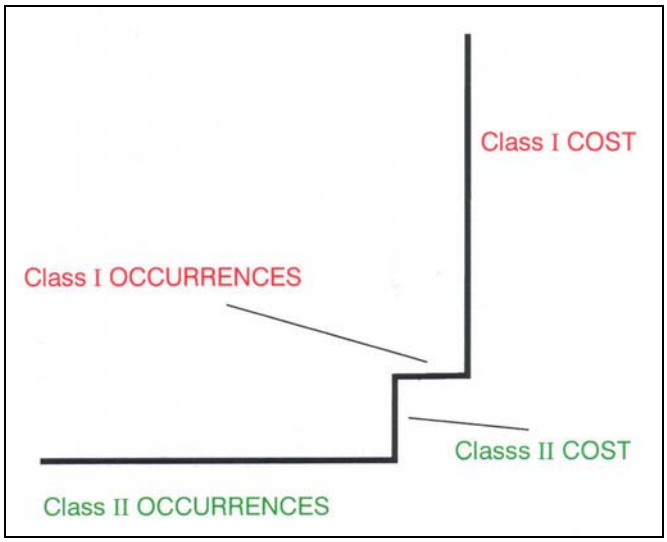

Figure 2

If Class I damage were eliminated, no one's life would be permanently altered by damage from work, and 82% of the total cost of damage would be gone. The community would be well served.

The central goal of health and safety at work should be the control of Class I damage.

If the Government managed so that every organisation and work unit knew how they were likely to kill or permanently disable members of their workforce and took effective action to eliminate these possibilities "care of the citizens" would be achieved. (Thomas Moore would be happy).

Appendix II "Off Target" gives more detail.

5. PICTURE THE PROBLEM

5.1 Rare Events

Fatalities and permanent disabilities are both rare events. In the year 2000-2001 in New South Wales, one compensable fatality occurred in 56,500 person years and one permanent disability in 257 person years. There are a

multitude of ways in which people are killed at work and a multitude of ways in which people are permanently disabled.

Fatality and permanent disability are outside the realm of experience for the majority of people involved in the workforce. Of their own knowledge and experience people are unlikely to be motivated to do anything to reduce fatality or permanent disability and, even if they were motivated to do so, would only know how to control a very limited number of occurrences.

The argument is then given that they should use Codes of Practice or Australian Standards.

How many people in Australia are required to make judgements resulting in action which effectively reduces fatality and permanent disability as required by existing law?

5.2 Risk Assessors

From the "Year Book Australia" (1996) there were in 1993-1994, 585,487 small and medium businesses operating, employing 3,244,000 people. In large businesses there were 2,432 operating businesses, with an employment of 2,057,000 people. Large businesses were defined as management units which employ 200 or more persons, or have assets worth more that $200M. Based on these figures, the number of groups who would need to be capable of having effective risk assessment done on their behalf would be well over the million, and probably more realistically of the order of 2 million. In many cases it is likely to be left to the individual themselves carrying out the task activity to make the judgement on what is to be done and inherently making a risk assessment.

It must be recognised that this is the magnitude of the number of people who need to be taught about the essential characteristics of extremely rare events. Many of these people are experience based and rely on their own experience and the communicated experience of others to determine their action. They have confidence in their own experience and that of their peer group or

associates and may be sceptical of information from outside these sources. Very often the closer to the work face the risk assessment is made, the less ability the person has to make changes other than to their own behaviour. They are also normally not competent – though lack of knowledge of damaging occurrences and broader experience – to make a valid risk assessment.

5.3 Risk Assessment

In Queensland an example of risk assessment is given in the "Code of Practice on Plant". This involves a bull-dozer which people found to be rough and involves a selection of a new seat for that bull-dozer. Had this risk assessment been carried out in practice the way it is in the Code, it is highly likely that the result would have been no better than the seat originally fitted to the machine. Practical experience has shown this to be so.

The author is familiar with the open cut coal mining industry where, repeatedly, a problem of back damage related to operating the machines has been identified. A variety of seats has then been tested; the workforce has selected the seat they consider to be most suitable; the seat is purchased and fitted to the relevant machines and the workforce is happy for about six months after which time the workforce discovers the back problems have not improved and continue. This was guaranteed to happen because there is no seat that will solve the problem of the ride on most of the earth moving machinery used in the surface coal mining industry.

The dominant frequency of most of the machines is below 4hertz. Below that frequency, suspension seats amplify vibration and will therefore increase damage.

Additionally, in another state the author had occasion to examine the ride of the seating fitted to a specialised machine which had twice undergone the process of selection of a more suitable seat. Vibration tests were conducted on this seat while the machine drove over an object on the ground. The vibration on the floor of the cab and on the pan of the seat under the seated

operator were virtually the same. In other words, a seat with no suspension and bolted to the machine frame would have given the same result.

Appendix III "Risk Assessment - Plant Advisory Standard", gives a more detailed evaluation of this process. Arguably the Division of Workplace Health and Safety set the Queensland Standard for Risk Assessment in the Plant Code. It did not draw attention to the Australian Standard "Whole Body Vibration" which sets acceptable levels for different exposure times, or to the Australian Standard outlining the testing of seats for the requirements of different classes of machines. Only the "feeling" function was used. Information to enable the "thinking" function to be used was not sought.

Evidence that an organisation of only a few people had made their risk assessment to the same standard as that set out in the Plant Code was ruled inadmissible in court. No matter how small or under resourced an organisation is, it is required to do better.

Virtually the risk assessment has to be right. Obviously if someone is permanently disabled or killed, or simply injured, the risk assessment was wrong. If a supposedly well resourced government cannot get it right in an exemplary document – how can small organisations be expected to perform well.

The next argument raised is that there are Codes of Practice or Australian Standards available to cover the necessary areas. As indicated in **Appendix III** there were Australian Standards and there was technical information to enable evaluations of ride disturbance to be made, but those preparing the Plant Code did not see fit to use this information.

In a study by Geoff McDonald & Associates attempting to produce a Taxonomy of Class I Occurrences for the surface coal mining industry, cases of 3 months off work or more were classified into a Taxonomy. 29% of occurrences and 47% of the cost involved ride disturbance of the earth moving machinery and haul trucks used in the mining operation. There are

still no suitable seats available to control the ride on these machines. The only room for reducing the risk of damage to a person is by limiting the hours of operation, which has gone in a negative direction since many people have changed from 8 hour shifts to 12 hour shifts; or better controlling the surfaces over which the machines operate. This is not wholly effective since a certain amount of the roughness of ride is produced by 'out of balance' of the wheels of the machines.

5.4 Australian Standards and Codes of Practice

There are some good Australian Standards and there are some good Codes of Practice but many of them are unsatisfactory, partly because there is inadequate knowledge of the way in which people are damaged and partly because of the lack of knowledge and intellectual ability of those compiling the documents. For example, investigation into a fireworks explosion revealed that the relevant Legislation was grossly lacking in not applying basic principles of energy management as recommended by Haddon in 1970. Further, the Australian Standard, which had been in force for less than two years, was poorly developed and similarly deficient.

A very large number of permanent disabilities and fatalities come from falls. The Australian Standards for measuring the slipperiness of pedestrian surfaces are grossly inadequate. The test in wet conditions averages the grip over 15^2 inches (75mm wide x 125mm long) rather than over an area of less than 1^2 inch involved in a heel strike slip which produces the most damaging falls. The test is carried out with a 4-S Rubber whose relationship to the material used in shoe soles is not known. The current Standard, after defining friction as being the property of two interacting surfaces, states that the Standard does not contemplate the material used in shoe soles. Immaculate friction?

A recent judgement of a District Court judge, in evaluating part of this author's evidence, made the following statement:

> *"After listing the interest groups who prepared the Australian Standard Mr McDonald pointed out that the standard contained no definition of friction. On page 6 of his report he referred to the publication of Standard Australia called the 'Australian Standard'. He quoted from the June 1997 issue indicating the 1993 standard was under revision, the article stating with respect to the co-efficient of friction '4S rubber was chosen as the slider for both test methods, and it was agreed that the floor surfaces should have COF (co-efficient of friction) of 0.4. Although many believed 0.7 to be more appropriate, 0.4 was adopted to facilitate international trade'. The article also stated high profile floor surfaces were excluded."*

Two highly competent consultants had used the Standard to evaluate a pebblecrete surface as a result of the lack of clarity of statements in the original Standard about high profile floor surfaces.

The judge continued:

> *"Mr McDonald also pointed out that the characteristics of 4S rubber when compared to materials used in shoe soles and heels is not known. He said no survey is known to have been conducted to indicate what percentage of falls would be prevented by application of the standard."*

The evidence indicates that the value of friction adopted was to protect commercial interests rather than to give the necessary level of safety required by the community. It could be looked upon as one of an example of what some people regard as a move by the "Asset Rich" to protect themselves against the poor.

Stairs are a major source of fatality, permanent disability and injury, with 5 hospital admissions a day in Queensland and 12 fatalities per year. The "Building Code of Australia" has very significant shortcomings in terms of specifying the requirements for stairs, and is also lacking in the requirements it gives for balustrades and handrails. Australian Standard 1657, while generally good, also requires improvement. It deals with access systems and stairways in the work situation.

Recently the author was called on to examine a case where a driver exiting a truck slipped on the top step and fell, sustaining permanent disability. The author had carried out a Taxonomy of Damaging Occurrences in a related fleet of trucks in 1980. Of 1,037 cases, 24 involved falls while ascending or descending to the cabin of a truck, with 20 being descending. In other words, this type of occurrence had been predicted and is, in fact, a regular occurrence which is not surprising. There are no satisfactory standards controlling the design of access systems to trucks, and on this particular model, a highly polished, curved, smooth surface on the nosing of the stairs, sits adjacent to a diesel fuel filler. A slip of a work boot off a water lubricated or diesel lubricated edge of the stair can be anticipated. This is typical of commonly occurring problems which do not receive attention because they are experienced and seen individually, or in small organisations.

5.5 Consignorance and Consignoramuses

During the author's original study of tractor fatalities and permanent disabilities, there were 100 tractor fatalities a year from 300,000 tractors. A committee was formed to develop the content for a film on tractor and rural safety. While details are not remembered 40 years on, the committee may have included 3 or 4 people with around 30 or 40 years of tractor driving experience each. From 4 people with 40 years of tractor driving experience there would be 160 years experience - woefully inadequate to give an understanding of 1 fatality, let alone the wide variety of origins of fatalities. Only when a detailed description of over 500 cases were put together did a clear picture emerge of what is involved. That 500 cases would come from about a million years of tractor driving experience. This is the magnitude of experience required to give adequate understanding of damaging occurrences enabling effective control.

One of the major tools used in the development of safety is the formation of consultative representative advisory committees who help draft Australian Standard, Codes of Practice and the like. At times there is an input of some research evidence into these committees, but frequently the content of their

product is based on the combined experience and knowledge of the committee members.

There are two important words to remember in this process. The first is "**Consignorance**". Consignorance is the product of a group of people using 'consensus' to combine their collective 'ignorance' while ignoring a significant body of knowledge, that is, of veridical (true saying) knowledge. What a person "knows" is not necessarily correct. The veridical knowledge which is ignored may already exist as a result of research or other methods of obtaining sound knowledge, but may be yet unidentified. The tragedy of consignorance is that it gives ignorance authority.

The second word is "**Consignoramus**". A consignoramus is a person who specialises in going to meetings which produces "consignorance". Their distinguishing characteristic is an inability to determine which things have substance and which things do not. Consignorance and consignoramus are seen as having played too large a part in the influence of what is done in the name of Safety.

The word "consignorance" was coined in response to the Worksafe Australia's first publication on "Manual Handling" and is well illustrated by an attempt by two groups of academic based people to have consensus support the notion that "semi-squat lifting" was an effective way of reducing back damage.

A series of seminars was run in the capital cities of Australia, with the final session in Sydney, at which one of the proponents indicated that he believed that the spine was so strong that if semi-squat lifting was used the lumbar discs would not be damaged. The strength of belief is irrelevant to a loaded lumbar disc. The objective of this seminar was to get a mass of people favouring the use of semi-squat lifting and result in wide spread training of people. If semi-squat lifting were to be effective in reducing lumbar disc damage it would have to:

(a) Reduce the load put on the lumbar disc during lifting, or
(b) Reshape the lumbar disc so that it was better able to cope with the load which was applied to it.

Both of these aspects were appropriate areas for research and enquiry but were ignored. Consensus was the goal. Getting the mass of people to support the notion put forward was not a legitimate way to establish its validity and is the type of process which leads to consignorance.

The example of risk assessment given earlier on the bull-dozer seat is, again, an exercise in consignorance.

5.6 Some Things Worthwhile

It should be made clear that there are activities with health and safety which are regarded as being effective and are to be admired and applauded. Once of these is the move by the Queensland Government on electrical safety. It should also be noted that the impetus and motivation for work in this area was at the instigation of a distraught and persistent parent rather than as an intrinsic and inherent operation of the Division paying attention to objective information available to it through the past history of damaging occurrences.

5.7 The Two Safety Mandorlas

In order to understand the other problem involved in making risk assessment, it is useful to look at the introduction to "Resizing the Safety Mandorlas". This still incomplete paper is included as **Appendix IV**.

> *"A MANDORLA (Italian for almond) is the common area of two overlapping circles.*
>
> *In safety there are two important Mandorlas. One, the Paradox Mandorla, represents the situation that there are far too many fatalities and permanent disabilities but these occurrences are so rare in an individual's experience that individuals lack both the motivation to make changes and the knowledge of what changes to make.*

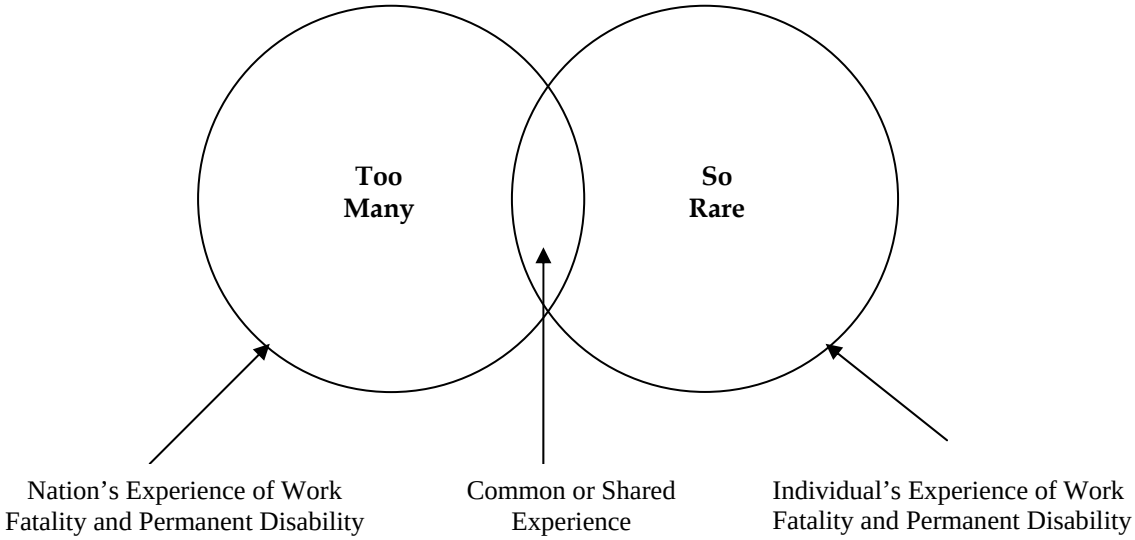

Figure 1 – Paradox Mandorla

The second, the Judgement Mandorla, represents the thinking and the feeling function, both of which are used to make judgements which lead to action. The thinking function involves the linking up of ideas by means of a concept and/or the use of concepts to integrate new ideas into an already linked up set (constellated, organised group) of ideas. Thinking is concerned with "truth" which is necessary if the physical energies of the world are to be controlled to avoid damaging people. The feeling function uses sub-emotional feelings via values to make judgements of the form "like or dislike", "acceptable or not acceptable", and is essentially concerned with "goodness".

Feeling corrupts Thinking (eg. by using value laden terms) and Thinking corrupts Feeling (eg. by attempting to rationalise how you feel). Inappropriate judgements come from corrupting one function with the other, or by using the wrong function, (eg. lack of factual information with which to think will lead to a feeling judgement).

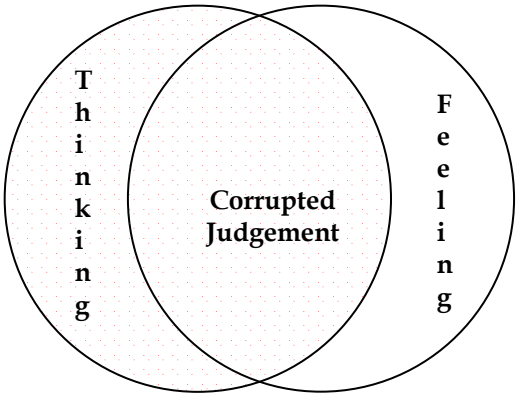

Figure 2 –Judgement Mandorla

At present the Paradox Mandorla is very thin and the Judgement Mandorla is very fat. For effective and efficient safety at work The Paradox Mandorla needs to be fat and the Judgement Mandorla needs to be thin.

Thinking Judgements (truth) and Feeling Judgements (goodness) are both necessary, each in their own domain.

The use of the wrong function or the simultaneous use of both corrupts judgement and renders it counter productive. The large Mandorla represents the large amount of corrupted judgement which exists at present."

With reference to the Paradox Mandorla, the people's experience and acquired knowledge is such that they simply do not know how people may become permanently disabled or killed. This is consistent with the view of the experience that upwards of 90% of those prosecuted by the Queensland Division were not aware that there was a hazard in the work they were undertaking.

The second aspect is that when the person comes to do a risk assessment, because there is no information available (ie. no veridical, factual information) which enables a person to use the "thinking" function to make the necessary judgements, the person is reduced to using the "feeling" function which produces a "good" result rather than a true "result". Value laden terms such as "Hazard" and "Risk" for the majority of people encourage the use of the "feeling" function.

Since it is the physical energies of the world which damage tissue or function which leads to incapacity, it is necessary to be dealing with the truth not what is "good". What is "good" may well be wrong. The "thinking" and the "feeling" functions are explained in more detail in Appendix IV.

5.8 Risk assessment by the "feeling" function – (no need for facts)

A risk assessment was observed of people making judgements about the risk of photographing the entry of people into a potentially flammable enclosed

space. They did not know what type of camera was to be used for taking the still photographs, whether it would be totally sealed from the atmosphere, or whether it had two metal plates close together in an otherwise sealed case which would take the heat out of any spark coming from within the camera. They did not know what sort of monitoring would be used to measure the gas levels and they did not know what ventilation system would be used in the space where the camera operated. Despite the fact that there were a number of competent engineers present, this lack of knowledge did not stop the process of risk assessment continuing to provide an answer which was acceptable and not founded on any factual base. In short it was a nonsense. The organisation required that risk assessments should be done.

Risk assessments have been seen where it was determined that there was a problem with materials handling. They therefore determined that people should be trained in correct lifting techniques, even though the evidence as summarised in the 1981 National Institute of Occupational Health and Safety Committee, from the United States of America, in its publication, "A Work Practices Guide to Manual Lifting" showed that training people in lifting technique had no demonstrated benefit. **Appendix V** "Risk Assessment Short Term Exposure" discusses the special case where each person is exposed for a short time.

Lack of knowledge of phenomena involved in damaging people and lack of knowledge of what is required to overcome the damage helps prevent effective action developing in health and safety at work.

6. WHAT IS TO BE MANAGED

For effective and efficient control it is important to identify what has to be managed.

6.1 Damaging Occurrences

People are damaged by an energy exchange which goes outside tolerable limits and results in damaged tissue or function. While most of the energies

are physical, they can also be biological or emotional eg. energy involved in post traumatic stress disorder.

In the sequence(s) of events leading up to the damaging energy exchange there are factors which must be there if the damaging energy exchange is to occur. These factors are termed "essential factors" and are joined by a second set of factors which, while not essential, make it more likely for the damaging energy exchange to occur by making it more likely that one or other of the essential factors is more likely to be present. These second sets of factors are termed "contributory factors" and range from 1 to 99% contributory.

Typically a thorough investigation of fatal or permanently disabling damage will lead to the identification of 30 or 40 "essential" and "contributory" factors which will always include human behaviour, machine design and environmental factors. Since essential factors are all equally important in terms of causation, there is no basis for selecting any one essential factor and giving it an increased importance of status over the others in terms of causation. There is no basis for selecting any factor and terming it a "cause" and, indeed doing so, adversely affects the appreciation of the occurrence by bringing into play "feeling" function and corrupting the "thinking" function.

The "action replay" part of the sequences of events including the damaging energy exchange can be termed a "damaging occurrence".

6.2 Rejected Terminology

In the editorial of the British Medical Journal of June 2001, there is a section entitled "BMJ Bans 'Accidents'". In the first paragraph of this slightly over one page editorial, it states:

> *"For many years safety officials and public health authorities have discouraged use of the word "accident" when it refers to injuries or the events that produce them. An accident is often understood to be unpredictable – a chance occurrence or an "act of God" – and therefore unavoidable. However, most injuries and their precipitating events are predictable and preventable. That is why the BMJ has decided to ban the word accident."*

The editorial does not recommend a term that should be used. In defining the term "accident", the Australian Concise Oxford Dictionary of 1987 uses the terms:

> *"without apparent cause, unexpected, unforeseen, misfortunes, unintentional, chance, unlucky".*

With the term "accidental" it uses the terms:

> *"happening by chance, undecidedly, or unexpectedly".*

Similarly, the Macquarie Dictionary, 2nd Revision, 1987, uses the terms:

> *"undesirable or unfortunate, mishap, anything that happens unexpectedly without design or by chance, the operation of chance".*

The key concept within the word "accident" is the unforeseen, unexpected, unplanned, fortuitous, chance aspects of the occurrence, and the outcome can be either negative or positive. Many scientific findings are said to have occurred by "accident".

There has been a tendency of organisations, including governments, to move away from the term "accident" and they have generally adopted the term "incident". Incident is an unsatisfactory word to adopt because it is relatively meaningless, in that a whole wide variety of things can be termed an incident and it does nothing to capture the distinctive characteristics of the occurrences which need to be controlled.

The dictionary definition from the Australian Concise Oxford Dictionary is as follows:

> "Incident" as a noun:
>
> *"subordinate or accessory event; event; occurrence; hostile clash of eg. groups of countries at war (frontier incident); public event causing trouble etc; detached event attracting general attention; distinct piece of action in play or poem; (Law) privilege, burden, etc. attaching to estate etc."*
>
> "Incident" as an adjective includes the definition of:
>
> *"apt or liable to happen, naturally attaching, (to); (Law) attaching to (c f.prec); (of light etc.) falling, striking, (on, upon)"*

6.3 Energy Exchange – A Central Concept

The Damaging Energy Exchanges can also be classified into three basic types - Type A, Type B, Type C, as shown in Chart I.

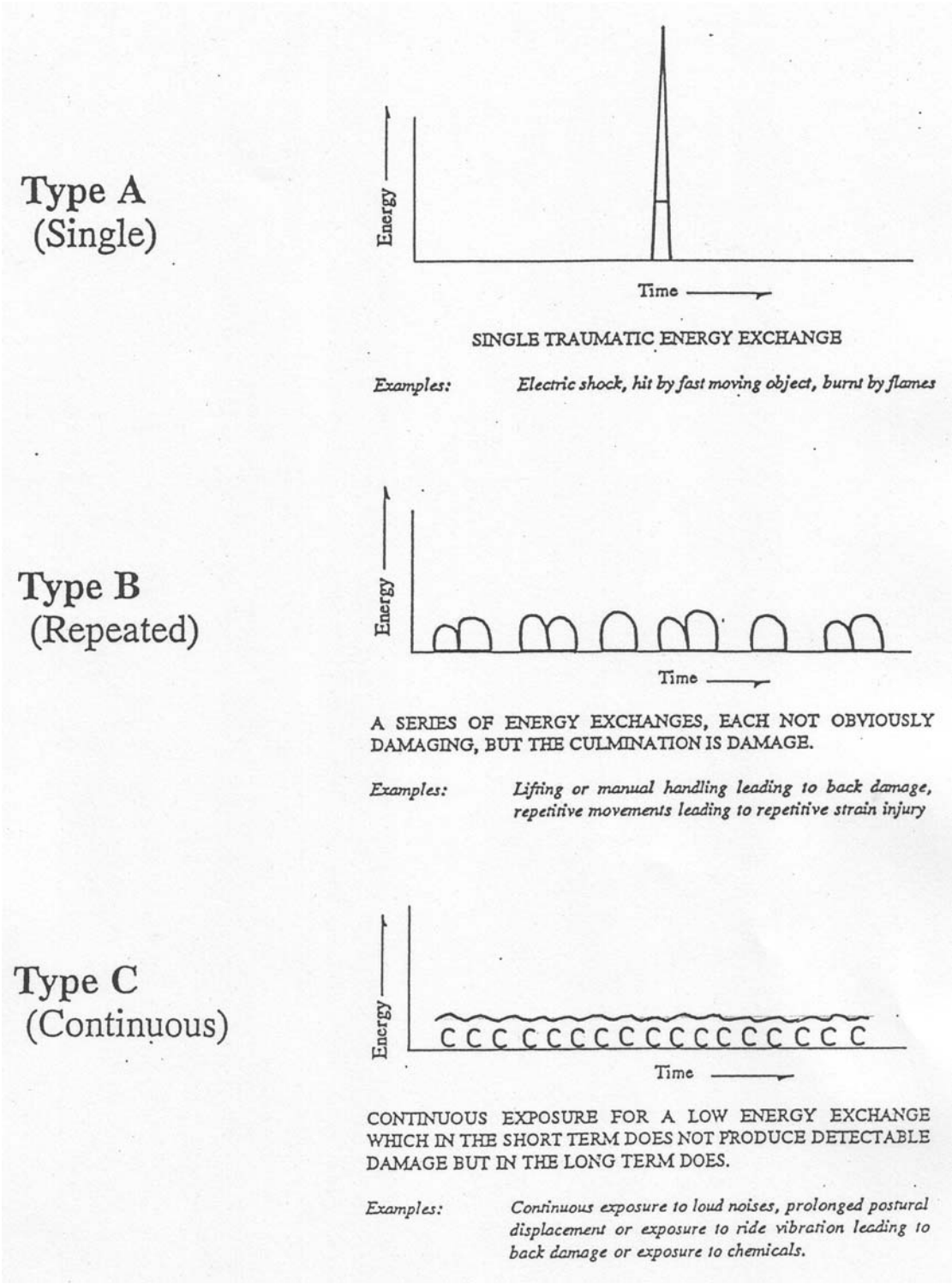

CHART I

Type B and Type C Energy Exchanges result in damage which is usually not detectable in the short term, and by the time the damage has accumulated to the level where it becomes evident, the damage is likely to be permanent. As the Type B and Type C damage increases, the level of Type A damage required to precipitate the onset of pain or dysfunction in the component of the body decreases.

A significant number of these people leave work following the onset of pain and dysfunction, with the belief that this will be a temporary absence. It is only some time later that it becomes evident that the damage is permanent. The control of this type of damage cannot be effective unless the history of creation of the damage is understood.

During the work activity, the need is to manage energy exchanges so Type A, Type B and Type C Damaging Energy Exchanges do not occur.

In a damaging occurrence there are three energy exchanges, “Communications Energy Exchange”, “Control Energy Exchange” and “Damaging Energy Exchange”.

The Communications Energy Exchange involves low levels of energy which activate the sensory system of the person, eg. a person walking along, slipping and falling over would have received visual information about the surface on which they are walking, and kinesthetic information about how their grip on the surface was functioning.

The Control Energy Exchange involves the grip between the footwear and the walking surface. If the foot goes further than intended there is insufficient energy exchange and a slip has occurred. If the foot doesn’t go as far as intended there has been a too high an exchange of energy and the person trips. If the energy exchange is uneven, the foot can twist. Secondary control energy exchange is also possible in some cases where the person can muscularly rebalance to bring their body back under control.

A Damaging Energy Exchange can occur on impact with the surface onto which the person falls or can occur as a result of components of the body getting into inappropriate orientation to other parts of the body.

The avoidance of the damaging energy exchange involves organising the communication energy and control energy functions so that the damaging energy exchange does not occur.

6.4 Management Chain and Information Chain

The essential factors mentioned earlier, while equally important in terms of causation, vary in controllability. The purpose of investigation of a damaging occurrence to avoid recurrence involves identifying as many factors as possible and assessing their contribution and controllability, ie. whether they are essential and contributory and whether the contribution is low, medium or high, and then the controllability of the factors so that effective, efficient control measures can be developed.

While this is initially done on a case by case basis, the findings can be aggregated to provide overall strategies.

Once the factors essential to and contributory to the damaging energy exchange have been identified in the action replay phase of the damaging occurrence it is possible to explore both the “Management Chain” and the “Information Chain” to identify other essential and contributory factors responsible for factors present in the “Action Replay” phase.

The Management Chain models the management of Damaging Energy Exchanges undertaken on behalf of the community at a number of stages. The activity at each stage needs to maximise the appropriate action in the next and further stages (in both directions). It is possible and undesirable for the activity at any one stage to misdirect the action at other stages, or to de-energise and de-motivate other stages by creating frustrating experiences. It can be used in two ways – as an investigative model for a particular occurrence or to shape management function.

The Management Chain helps identification of factors which are essential and contributory to the existence of the essential and contributory factors identified in the "Action Replay" stage of the damaging occurrence. The Management Chain also plays a major role in determining what is required at each level and in distributing **accountability**, **knowledge, information**, **willingness**, **skill** and **resources** throughout the organisation.

Successful management provides people who have adequate relevant knowledge and are well informed, willing, skilled and resourced at each stage so they can fulfill their accountability.

The **Information Chain** traces the flow and possible corruption of veridical[†] information from the initial understanding of the basic background phenomena involved until its integration into the Task Activity. Again this serves two functions. Essential and Contributory Factors can be identified by exploring the Information Chain, in light of the Essential and Contributory Factors identified in the "Action Replay" phase of the Damaging Occurrence. Secondly, it is a useful model for helping to seek out sources of veridical information. The model also helps identify and counteract the actual or potential corruption or blockage of the information between its source (the phenomena itself) and its application.

The representation of both the **Management Chain** and the **Information Chain** as shown in **Appendix VI** should be regarded as illustrative.

[†] Veridical comes from verus = true and dicere = to say.

MANAGEMENT CHAIN

AND

INFORMATION CHAIN

See Appendix VI

THESE ARE VERY IMPORTANT FIGURES

INFORMATION CHAIN - JOIN 2 PAGES

MANAGEMENT CHAIN – JOIN 3 PAGES

Too much of the management and the information seeking occurs to the right hand end of the Management Chain. Often the required information is not developed in the first place from the left hand end of the Information Chain.

At each level of the Management Chain there are things that people and organisations at that level can do more efficiently and more effectively than can any one or any organisation at any other level.

If each group does not do what they can do best, then somewhere else on the Management Chain, other people have to put in much larger amounts of effort and energy to achieve the same result. Consequently, it is of great importance to identify what each level of the Management Chain can do most effectively and ensure that they do it.

6.5 Current Government Management

This author's view is that the weakest link in the Management Chain is at the Government level, and that the weakness in that link cripples the effort of other levels of the chain and renders their efforts ineffective.

This author has had a number of experiences of defending organisations against Common Law Claims. Since the implementation of the current legislation, organisations are able to produce impressive paperwork to indicate that they have been taking safety seriously and making a very considerable effort. However, what is happening with the physical energies in the workplace has not changed. People involved in the organisations are flabbergasted and confused when their attention is drawn to the factors that were essential to the damage which occurred to the permanently disabled person. They had no idea of the existence of these factors.

As a result the argument is put forward that in effect the Government is managing to bureaucratize industry. As a result industry generates considerable amounts of "arse covering" paperwork without changing what

happens in the physical energies of the workplace. The Legislation requires that organisations develop these paper work systems and auditing checks that they have done so.

Anecdotal information suggests the Inspectorate in Queensland is discouraged from giving advice and maintains a regulatory inspectorial function.

The author has been involved in the defence of some prosecutions by the Division, and has also prepared reports on fatalities for the Division. The prosecutions were not encouraging as a means of improving the health and safety at work. In one case a small company of only a few people was roofing a shed and were using a specialised type of vice grip pliers attached to a rope to lift up short sections of ridge capping to the roof. The person on the ground was a qualified roofer and after he attached the vice grips to the ridge capping, the ridge capping was lifted and fell free near the top of the lift, with one section cutting the thigh of the person who had moved in under the edge of the building to be out of the way of the lift.

The Division's permanently employed expert witness incorrectly identified the tool used for the lifting, incorrectly identified the material being lifted as sheets of roofing iron and incorrectly identified how the rope was tied to the tool. The tool was available for inspection had it been requested. I wetted and oiled the steel and did up the vice grips using the little finger of one hand, squeezing against the butt of the thumb, which of course provided a very very weak closure. It took a force of seven or eight times the weight of the steel being lifted to slide the jaws of the vice grip device across the metal, and done up with that strength the metal would not have come free. It indicates the vice grip was virtually not done up at all and the closure force on the vice grip pliers would have been absolutely minimal. It is very difficult to believe that a qualified roofer would clamp the vice grips so lightly.

The magistrate found that the prosecution's report was worthless but mine was necessary and dismissed the charge against the organisation. The Government appealed on a technicality and a new trial was ordered. For the new trial the Government expert prepared a different report, again quoted a number of things incorrectly, produced a self-serving tabulation of desirable attributes and compared the lifting vice grips with a self-clamping device identified out of a catalogue. A number of relevant criteria were not in the list for comparison. It is doubtful whether the clamping device which was designed for hand carrying of objects would clamp effectively on very light pieces of steel, and it is also uncertain how the device would cope with mud and dirt and other rubbish found on construction sites. It had the appearance of being designed for handling material in factories. It was also not available in Australia.

The main part of the story is that the organisation being prosecuted had to carry the costs of its defence in the first trial and also had to carry the cost of its defence in the second trial. It is understood that in the rest of the justice system, that where there is a retrial, the cost is carried by the justice system not by the defendants. To minimise their costs the defendants pleaded guilty to the charge and paid a penalty rather than continuing the cost of fighting the action.

The second case involved a rope breaking during a tree lopping operation, with the rope being organised to guide the fall of the branch. The branch struck one of the stabiliser legs of an elevated work platform, which is mounted on a trailer towed by the truck used in the operations. The pressure pulse from the impact blew a switch out of the end of the hydraulic cylinder so that the cylinder compressed and a leg collapsed allowing the unit to tip over. There was no way the branch had any direct impact on the pressure switch which blew out. It was definitely a pressure failure which simply should not be allowed to occur in the design of such a machine.

The rope for handling the branch was a sisal rope with a breaking load of 2.84tonnes while the weight of the branch being handled was 170kg. The rope was selected from a specification sheet supplied by the manufacturer. The rope users were unaware that when a rope is looped back on itself or knotted, a factor of just under 2 is used to reduce the allowable load, and that in arduous work, as they were doing, a factor of 9 applied. The anticipated working strength of the rope was therefore approximately 1/18th of the failure load given in the specification sheet. The tree lopper believed he had bought a rope very much stronger than required when it was at best, marginally adequate. People do not normally think of factors of safety of 18 being necessary. It would have been simple for the manufacturer to include on their specification sheet a section from the Australian Standard quoting the effects of knots and what factors of safety needed to be used, which would then have enabled the person selecting the rope to realise that he was working the rope up to its limit.

The model used by the Division's expert in evaluating the loads assumed a vertical drop of the centre of gravity of the branch from above to below the attachment point of the rope on the inboard section of the branch, even though the branch sloped out at an angle. That is one way the branch could not have fallen. The branch, in falling, would have swung in an arc rather than dropped vertically, and therefore the load would have been considerably less than estimated.

It is also worth noting that Ontario discourages the use of sisal rope because it has undesirable characteristics.

I would be confident that no effort has been made to control and modify the designs of the elevated work platforms so that a shock pressure wave cannot result in failure, and that no effort has been made to have manufacturers' specification sheet include the information on factors of safety. Similarly I believe nothing has been done to replace sisal ropes with ropes of better materials.

One of the good friends of the owner of the business was killed and the owner has been permanently disabled and is unable to continue operating that type of business. He was unable to afford a barrister for the hearing which extended over four days, and the defence had to be presented by a country solicitor who was unfamiliar with this type of case, and unfamiliar with technical matters. For the purpose of the trial, the rope was classified as plant, but the relevant Australian Standard was not listed in the Plant Code.

The Division has brilliance in its risk assessment with the advantage of hindsight, even though it is technically wrong to a significant amount in what they do in this regard. There are, of course, cases where the need for prosecution is clear cut, but in some of these cases it looks very much like bullying. People being interview by the Division in relation to offences have remarked on the interviewers being aggressive and offensive in their manner. There are some organisations who have put a great deal of conscientious effort into safety being upset and offended by such behaviour.

Bureaucracy directs people towards using risk assessment and the Codes of Practice and, to a lesser extent, Australian Standards. They are taught to identify hazards and make risk assessments. As indicated earlier, this is regarded as a very unsatisfactory approach to the question of safety and health.

In drafting the Legislation and Codes of Practice great effort is made to cover all possible contingencies to show that the Government and Division cannot be criticised for not covering everything. This results in a very considerable lack of focus on critical issues and encourages the blunderbuss approach by the use of the “feeling” function rather than a sharply honed rifle approach using the “thinking” function.

Governments abrogate their responsibility by not collecting detailed descriptions of fatal and permanently disabling occurrences throughout Australia and aggregating them into Taxonomies but instead have presided

over developing Australian Standard 1885 “Recording and measuring work injury experience”.

This author is a member of the Australian Standards Committee responsible for this Standard, and has been for many years. On the formation of Worksafe Australia, responsibility for this Standard was politically taken from Standards Australia and given to Worksafe who produced an extremely unfortunate document focussing attention onto Class II occurrences and away from Class I, and thwarted the efforts of the Committee to develop a standard which could be more effective by focussing on Class I occurrences. The Standard emphasised the number of occurrences rather than the amount of damage done in each occurrence, with a fatality counting for only 220 days lost and a permanent disability the same. Again the Standard dishonours and disrespects the permanently disabled.

The author took this Standard and interpreted it as representing a specific ethic derived from a general ethic, and reasoned back to the general ethic which would spawn such a specific ethic. It gave a very unflattering view of the ethics with which industry approaches safety and health at work. This paper is included as **APPENDIX VII**.

Figure 3 shows a summary sheet of an energy based Taxonomy of Damaging Occurrences developed in 1980. Many of the occurrences did not result in time off work. For example – “specialised shape alters energy exchange” involves razor blades, knives, nails etc. which concentrate the energy exchange into very small areas. 112 cases lost no days. “Susceptible parts” such as the eye are damaged by very very low levels of energy. Susceptible parts only had 6 days lost out of 135 occurrences. In total 9,919 days were lost. Fortunately this organisation was reporting to an American Standard which had a scheduled charge of 6,000 days for a fatality which in this case occurred in “heat energy” in a “fixed installation”, and 3,000 days for a paraplegic which occurred with machine energy from a vehicle. Out of the 9,919 days lost, 919 were lost by people who returned to work while 9,000 were lost by two people who did not return to work.

TAXONOMY OF PERSONAL DAMAGING OCCURRENCES

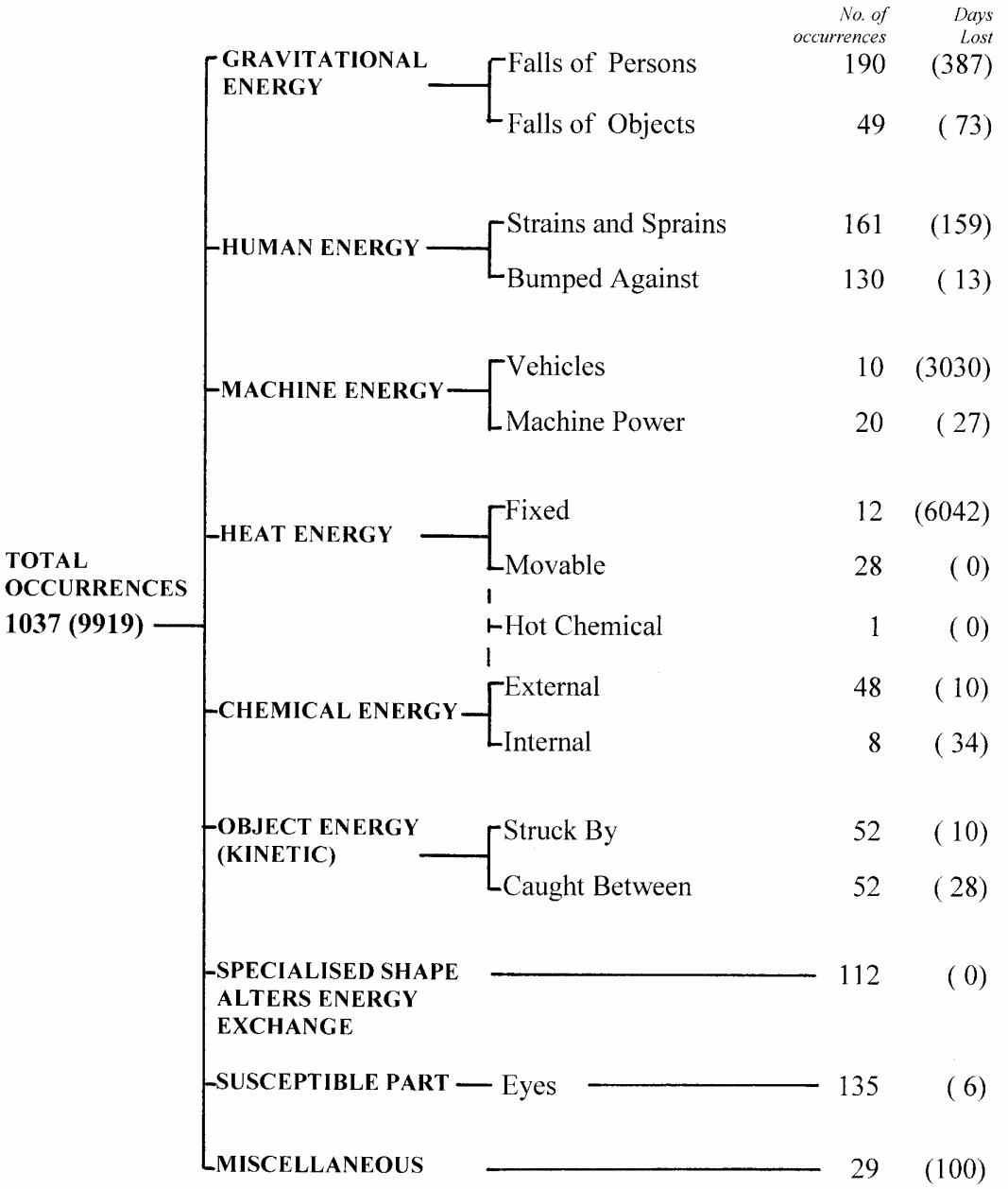

Figure 3

If those two occurrences were removed so that only 1,035 cases remained, none of those 1,035 cases would have predicted the two severe occurrences.

If the organisation had been reporting to the Australian Standard, both the severe cases would be recorded as 220 days which would have given a total of days lost as 1,359, and would have obscured the importance of the death and permanent disability. The average years of living lost from death at work is actually well in excess of 6,000 days.

A type of classification system "Nature of injuries/disease classification, type of occurrence classification system" was developed by Worksafe Australia. This classification system identifies bodily location, mechanism of injury and agency of injury, and succeeds in producing disconnected statistics which a person is unable to recombine to have an understanding of what has occurred. It does not classify the phenomena involved in producing the damage in any meaningful way, and involves preconceived categories which do not sensibly fit the phenomena which are involved and contains far too little detail to be useful.

A more useful approach would be the development of a Taxonomy based on the triple energy model of communications energy, control energy and damaging energy, and **Figure 4** gives a crude version of a Class I Taxonomy developed in a hurry for the previous Industry Commission Report on Work, Health and Safety. This illustrates the quantity and quality of information which can be produced in a small area to give a much more effective picture of the problems that need to be confronted.

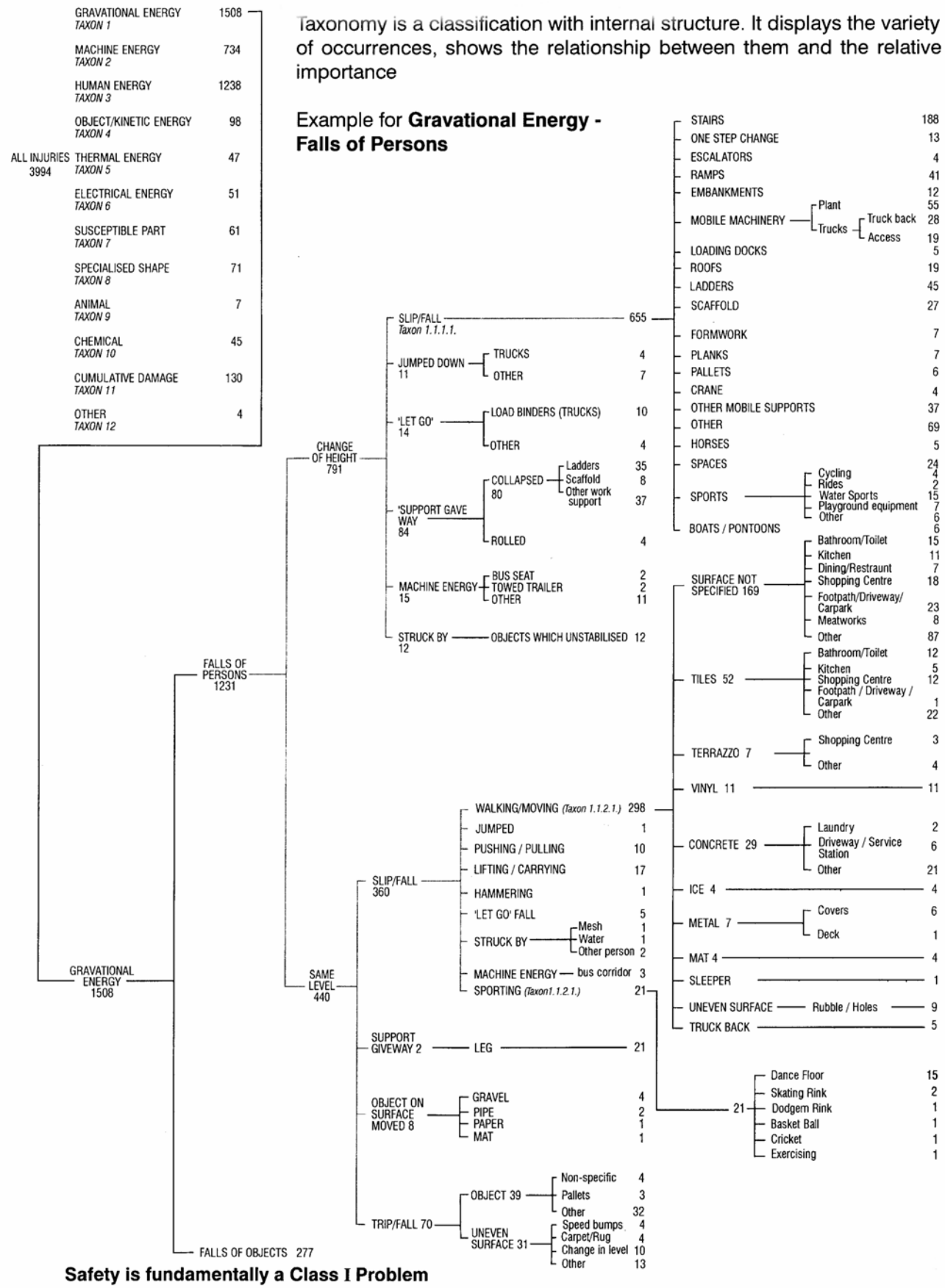
Taxonomy is a classification with internal structure. It displays the variety of occurrences, shows the relationship between them and the relative importance
Example for Gravational Energy - Falls of Persons
ALL INJURIES 3994
GRAVATIONAL ENERGY 1508 TAXON 1
MACHINE ENERGY 734 TAXON 2
HUMAN ENERGY 1238 TAXON 3
OBJECT/KINETIC ENERGY 98 TAXON 4
THERMAL ENERGY 47 TAXON 5
ELECTRICAL ENERGY 51 TAXON 6
SUSCEPTIBLE PART 61 TAXON 7
SPECIALISED SHAPE 71 TAXON 8
ANIMAL 7 TAXON 9
CHEMICAL 45 TAXON 10
CUMULATIVE DAMAGE 130 TAXON 11
OTHER 4 TAXON 12
GRAVATIONAL ENERGY 1508
FALLS OF PERSONS 1231
CHANGE OF HEIGHT 791
SLIP/FALL 655 Taxon 1.1.1.1.
JUMPED DOWN 11
TRUCKS 4
OTHER 7
'LET GO' 14
LOAD BINDERS (TRUCKS) 10
OTHER 4
'SUPPORT GAVE WAY 84
COLLAPSED 80
Ladders 35
Scaffold 8
Other work support 37
ROLLED 4
MACHINE ENERGY 15
BUS SEAT 2
TOWED TRAILER 2
OTHER 11
STRUCK BY 12
OBJECTS WHICH UNSTABILISED 12
SAME LEVEL 440
SLIP/FALL 360
WALKING/MOVING (Taxon 1.1.2.1.) 298
JUMPED 1
PUSHING / PULLING 10
LIFTING / CARRYING 17
HAMMERING 1
'LET GO' FALL 5
STRUCK BY
Mesh 1
Water 1
Other person 2
MACHINE ENERGY — bus corridor 3
SPORTING (Taxon1.1.2.1.) 21
21
Dance Floor 15
Skating Rink 2
Dodgem Rink 1
Basket Ball 1
Cricket 1
Exercising 1
SUPPORT GIVEWAY 2
LEG 21
OBJECT ON SURFACE MOVED 8
GRAVEL 4
PIPE 2
PAPER 1
MAT 1
TRIP/FALL 70
OBJECT 39
Non-specific 4
Pallets 3
Other 32
UNEVEN SURFACE 31
Speed bumps 4
Carpet/Rug 4
Change in level 10
Other 13
FALLS OF OBJECTS 277
STAIRS 188
ONE STEP CHANGE 13
ESCALATORS 4
RAMPS 41
EMBANKMENTS 12
MOBILE MACHINERY
Plant 55
Trucks
Truck back 28
Access 19
LOADING DOCKS 5
ROOFS 19
LADDERS 45
SCAFFOLD 27
FORMWORK 7
PLANKS 7
PALLETS 6
CRANE 4
OTHER MOBILE SUPPORTS 37
OTHER 69
HORSES 5
SPACES 24
SPORTS
Cycling 4
Rides 2
Water Sports 15
Playground equipment 7
Other 6
BOATS / PONTOONS 6
SURFACE NOT SPECIFIED 169
Bathroom/Toilet 15
Kitchen 11
Dining/Restraunt 7
Shopping Centre 18
Footpath/Driveway/ Carpark 23
Meatworks 8
Other 87
TILES 52
Bathroom/Toilet 12
Kitchen 5
Shopping Centre 12
Footpath / Driveway / Carpark 1
Other 22
TERRAZZO 7
Shopping Centre 3
Other 4
VINYL 11 11
CONCRETE 29
Laundry 2
Driveway / Service Station 6
Other 21
ICE 4 4
METAL 7
Covers 6
Deck 1
MAT 4 4
SLEEPER 1
UNEVEN SURFACE — Rubble / Holes — 9
TRUCK BACK 5
Safety is fundamentally a Class I Problem

Figure 4

Another area which the Government does not manage effectively is within the sub-contracting system which operates in the construction industry and aspects of operation of the trucking industry. The large entity sets the conditions, the pace and the criteria for work, and the sub-contractor either accepts them or disappears. In many cases these systems are exploitive of the sub-contractors.

In the trucking industry the exploitive nature of the industry and the result that operators drive for longer hours and use stimulants to enable them to meet the schedules required has been folklore for many years. While some attempts have been made recently, this area should have been cleaned up long ago. No doubt much more effective work is required.

A local general practitioner, in discussing the impact of work, health and safety on his practice, started with the comment “that Work Cover does not provide worker’s compensation, it provides cover for work”. He also said that he had a number of patients who had been injured at work, suffered chronic pain, were financially unable to go to a pain clinic and Work Cover would not pay for them to go to a pain clinic. He said he had another group of patients who needed counselling to overcome the psychological consequences of being damaged at work but no such counselling was provided. He also had a number of truck drivers whom he knew were taking stimulants and had managed to get them to acknowledge that that was the case. Some of them had deteriorated to such a state that he was urging them to get themselves out of the industry or face serious consequences.

7 REQUIRED ACTIVITIES

In outlining what this author believes the Government should be doing it is useful to use as an introduction, the abstract from the paper on “Veridical Ethics for Work Health and Safety” (Appendix VII). Note that in the original abstract, the employer was quoted as 40% and the Community as 30%. These were the Industry Commission’s cost figures which were based on

South Australian estimates. On the National accounts estimate the employer's contribution was 30%, the individuals 30% and the community 40%. These are regarded as the more reliable figures.

Abstract

It is believed and argued that work, health and safety has not, is not, but needs to be ethically based. Attention should be directed to how to achieve the required outcomes. Ethics requires that the community, whose members are damaged know the extent of that damage absolutely and relatively. $20 billion Australian annually (92-93), twice the Queensland Government Budget, 2½ months of Australian retail sales, greater than Mining ($18.4 billion) or Agriculture, Forestry and Fishing ($17.2 billion), 5 times the estimated cost of injury and fatal road crashes. Ethics requires that the community knows that 80.5% of this cost is from permanent disability, 50,000 people per year. Cairns in 31 months. Once a person is permanently disabled and treatment fulfilled, the cost has been created. It is only a question of how the cost is shared. Currently, Employer 30%, Individual and Family 30%, Community (via Social Security) 40%. It is ethical to focus effort on permanent disability (80.5%) and fatality (1.5%). The source of fatality is known but of permanent disability is not. Effort cannot yet be ethically directed. It is ethical to have feelings for and to value human beings. Jungians such as Johnson argue that of the four basic functions, intuition and sensation; thinking and feeling, our western community has developed logical rational, abstract thinking to a very high degree – but at the expense of the feeling/valuing function. It is ethical for people permanently disabled from work to be valued, honoured and respected by the activities of the community, the press and by the content of safety conferences. It is ethical for the community to both permit and demand that the government manage on its behalf and commit resources to produce outcomes – namely identify how people are killed and how people are permanently disabled and eliminate such occurrences. Some managers have a highly developed feeling/valuing function. How is this developed in others? It is ethical to have the feeling/valuing function energize and direct the logical, rational abstract thinking. This thinking must be based on veridical (true saying) information.

The Productivity Commission (2003) in discussing penalties under Occupational Health and Safety Acts includes the comment:

> *"In this enquiry, and in the wider debate on Occupational Health and Safety, there is considerable divergence in views on whether greater information, assistance and persuasion will be more productive than a great emphasis on penalties and enforcement."*

In quoting the Cole Royal Commission, they state:

> *"Most experts in regulatory theory now agree that the answer to the punish or persuade debate lies in a judicious mix of the two approaches. The challenges to develop enforcement strategies that punish the worst offenders, while at the same time encouraging and helping employers to comply voluntarily [attributed to "**Enforcement of Occupational Health and Safety Statutes; Issues and Future Directions. Richard Johnstone 2001**]."*"

There is another view which could be put forward. Simply that the Government should recognise its position in the Management Chain and take on the role of doing what it, by virtue of its position, can do more effectively than other levels of the Chain can. Great benefit would come if the Government were to create a vision and provide leadership towards that vision. If the vision of the massive damage to people at work was put before the people, there could be leadership towards reducing that amount of damage.

Disrespect and dishonour shown to the permanently disabled in the media and encouraged by insurance companies and some in government, emphasise the malingering and fraud which occurs. There is no question that people do malinger and commit fraud but these are criminal activities and should not adversely affect the interest of those who are genuinely permanently disabled. This publicity, not counter-balanced by publicity of people who are permanently disabled, demotivates and de-energises the whole of the safety and health effort. It is the government's responsibility to manage this issue so that the permanently disabled are valued, honoured and respected by the activities of the community, the press, the content of safety conferences and the like. This author has never seen a safety conference directed towards permanent disability.

If I were asked to audit an organisation my questions would be:

- how are you most likely to kill and permanently disable your workforce and members of the community you interact with?
- how did you come to those conclusions?

- what action have you taken to control each of these possibilities?

Most organisations have no idea of how they are likely to kill or permanently disable their people and make statements to the effect that accidents are unpredictable and how could they possible know what they are going to be.

Until organisations can answer these three questions satisfactorily, more needs to be done.

Since the Industry Commission released their report on "Work Health and Safety" in September 1995, there has been something like 400,000 people permanently disabled in Australia. Had good quality information been collected on those occurrences we would know the relative importance of different types of occurrences according to the quantity of the damage they created. We would also know the industry, occupation and equipment where those occurrences would eventuate. It would then be possible, on a sound factual basis, to advise the 587,915 operating businesses (probably more in Australia by now) of how they were most likely to kill or permanently disable their employees. This same approach needs to be extended to the community they interact with. It is the Government's responsibility to organise and act so this information is available.

The Government should also control the financial structure of industry and organisations so that high levels of safety performance are inherently advantageous for organisations. It should develop a co-operative strategy with particular industries so that where piecemeal introduction of some new safety requirement would adversely affect the initiators, legislation requiring all to introduce the new requirement is promulgated so that initiators are not disadvantaged and so that innovation is not prevented by competitive pricing.

The educational and training structures should move towards teaching and training people in models and strategies which use the "thinking" function. Safety should be developed on the basis of management of energy to avoid

damaging energy exchanges rather than continuing to support the “feeling” function which exists in the community at large.

While I have not had the opportunity to review tertiary education courses, I have lectured to the first two intakes of students at the Ballarat College, lectured at the Queensland University of Technology, been an external examiner for a Masters thesis and an external mentor for a student from another university, and have met a number of people trained through post-graduate university courses. What I have seen and heard gives rise for concern. One post-graduate expressed astonishment at seeing reports that had been prepared in this office, and when asked how much of their course involved learning how people were killed and permanently disabled, she indicated, none, that the whole of their course had been devoted to management techniques. There is only one area of knowledge which can distinguish a safety professional from other areas and that is knowledge of how people are killed and permanently disabled. This is a very complex and demanding area. One person in charge of one university health and safety course indicated that they did not handle stuff like that, with the inference being, very clearly, that this was sub-academic material when in fact it is not. Interview of an “about to graduate student” indicated his knowledge was grossly inadequate. If a course deals only in management techniques, it is a management course not a safety course.

Currently the Government requires organisations to undertake prescribed activities so that they are compliant. Organisations are far more interested in being compliant than they are in working out how people are likely to be killed or permanently disabled from the organisations work activities and taking effective control action. Currently complying and taking effective action cannot be seen as the same activity.

Much more can be said but I think, in the material in this report, and its Appendices, there is a reasonable indication of what I believe is wrong with the current system and some of the changes that are required. There would,

of course, need to be an enormous amount of discussion, development and refinement to help make the changes.

G L McDonald November 2003

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APPENDIX I

"FOCUS DON'T FIDDLE"

FOCUS - DON'T FIDDLE
(The Obscenity of the L.T.F.R.)

G.L. McDonald, M.E. B.Sc
Geoff McDonald & Associates Pty Ltd

Where did we come from?

When a person asks about pursuing a career in safety, the first question must be "What is your frustration tolerance?" Safety is an extremely demanding career. The problems to be handled are often diffuse and hard to come to grips with. The rewards are few and far between and often unconvincing. Nobody tells you what the next accidents are going to be. The importance and significance of safety in an organisation are vastly under recognised. The real results and rewards are in people not being damaged. It is often very difficult to know whether or not the overall likelihood of damage to people at work has been reduced.

Over the last thirty years, safety has been struggling to emerge as a profession. Whilst a core of professional safety knowledge is steadily developing, a series of "fads or fashions" has flowed through safety practice in those years. The ideas are presented at conferences or introduced commercially, are tried diligently and subsequently discarded. Elements of those practices may remain.

"Safety" started with concern for the physical damage people suffered at work. "Loss Control" argued that what led to accidents and damage to people also led to damage to property. The umbrella was extended further under "Total Loss Control" which claimed the territory of all loss events. Imagine the job of being responsible for all things negative in an organisation! Realisation that all events could not be controlled, and that it was necessary to insure against uncontrollable events, led to the broader umbrella of Risk Management which effectively placed safety as part of the insurance arm of an organisation. This completed the expansion of safety from physical damage to people to all the downsides of an organisation's operation. It was debatable in the end as to who was in control and what was the real objective of the functions, e.g. minimising cost or loss to the organisation? Certainly it was not minimising damage to people.

In more recent times has come Total Quality Management (TQM) and its many variants, and a quest for Best Practice and Bench Marking. A paper presented recently to a Construction Industry Seminar in Sydney described TQM for that industry. It gave the same ideas as had been presented in the 1970's and 1980's albeit in a different frame work.

People have travelled far and wide in search of Best Practice and Bench Marks. How do these people know what they are looking at - or is Best Practice a deceptive facade that deceives even those who create it? "Bench Mark" suggests some type of measurement or a reference point for measurement and offers a means of comparing safety. Are we looking at something real and beneficial or at a cruel web of deceit?

Fiddling and its results

Despite the skill and dedication of many within the safety profession, safety has not delivered enough. Betts (1995)[i] states *"It is the Safety Institute's belief that the current institutional arrangements must carry much of the responsibility for our nation's poor performance"*.

Much of what has been done in the name of safety over recent years has been based in tripartite activity when the employer, employee and government combine to produce documents and action. Much of the output has been sad as exemplified by National Standard for Manual Handling and National Code of Practice for Manual Handling, published by Worksafe Australia in February 1990.

This Code led directly to the coining of a new word - 'consignorance'. Consignorance occurs when a group of people achieve consensus by combining their collective ignorance whilst ignoring a significant body of scientific knowledge. Consignorance involves intellectual laziness, lack of commitment and lack of resources.

Does our nation perform poorly? By comparison with which other nation, or what standard?

This raises the question of how performance can be measured?

To be free of such wasteful influence, safety has to recognise what it should be doing, and do it better. This will not come from gazing or grazing around the world. In the dark ages it was known that all wisdom existed in the authorities on each topic. To find out how many teeth a donkey had you would consult the authorities. You would not look in the donkey's mouth. The dark ages ended when people began to observe afresh and the Renaissance was born.

It's time safety came out of the dark ages, observed at least the obvious, established clear goals and energetically pursued them. Facts and information should determine professional action - not fads, fashions, legal requirements, tripartism or consignorance.

Clear terminology, reflecting clear concepts is necessary to give clear thinking.

Personal Damage

As a result of work, people become damaged (injury or illness). The damage falls naturally into one of three groups. The person's life is permanently altered (Class I), temporarily altered (Class II) or inconvenienced (Class III).

Until this terminology is adopted, the clarity of thinking which comes with it will not be available.

Go ➔ Class I

The Industry Commission (1995) reported the number of damaging occurrences (my words) and the cost of these. **Table I** presents these numbers and costs for six severity categories and gives percentage and cumulative percentage. These figures apply to Australia in 1992-93.

TABLE I. Number of Cases and Cost of Damage (Australia 1992-93)

	Severity Of Injury Or Disease					
	< 5 days	*> 5 days, full duties*	*> 5 days, reduced duties*	*> 5 days, lower income*	*Permanently Incapacitated*	*Fatal*
No. of occurrences	144053	123395	78,333	30,728	19,290	693
% of occurrences	36.33	31.12	19.75	7.74	4.86	0.17
Cumulative %	36.33	67.45	87.20	94.94	99.8	100
Cost of occurrences ($Billions)	0.136	1.063	2.415	4.555	11.664	0.299
% of cost	0.67	5.28	11.99	22.62	57.93	1.48
Cumulative %	0.67	5.95	17.98	40.56	98.49	100

SHADED AREA IS CLASS I

These cumulative percentages are plotted in **Figure I**. By the Industry Commission's definitions, the first three categories are Class II damage and the last three are Class I damage. What does this graph tell us?

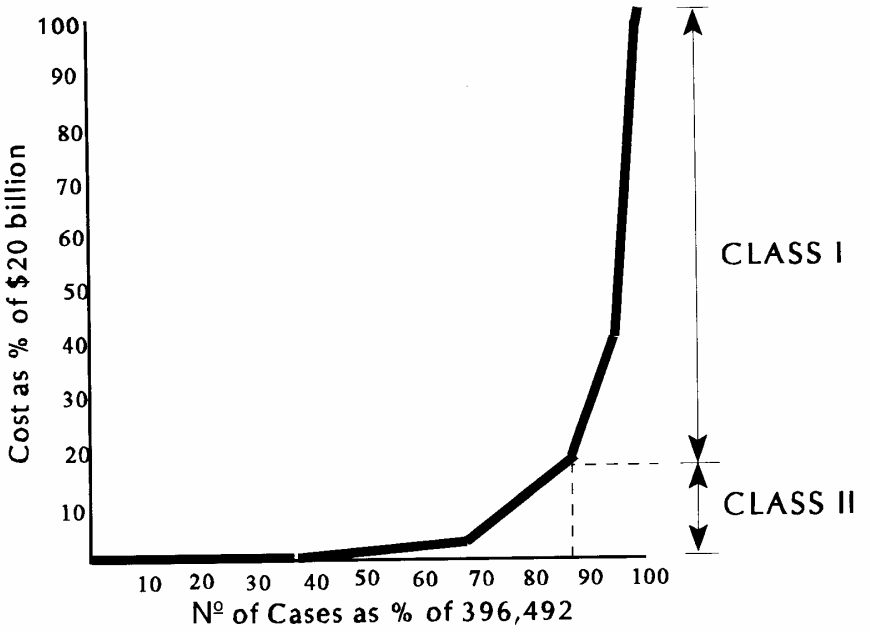

Figure I. Cost of damaging occurrence by severity of damage

Figure II gives a clearer message:-

87% of occurrences were Class II and gave 18% of costs
13% of occurrences were Class I and gave 82% of costs

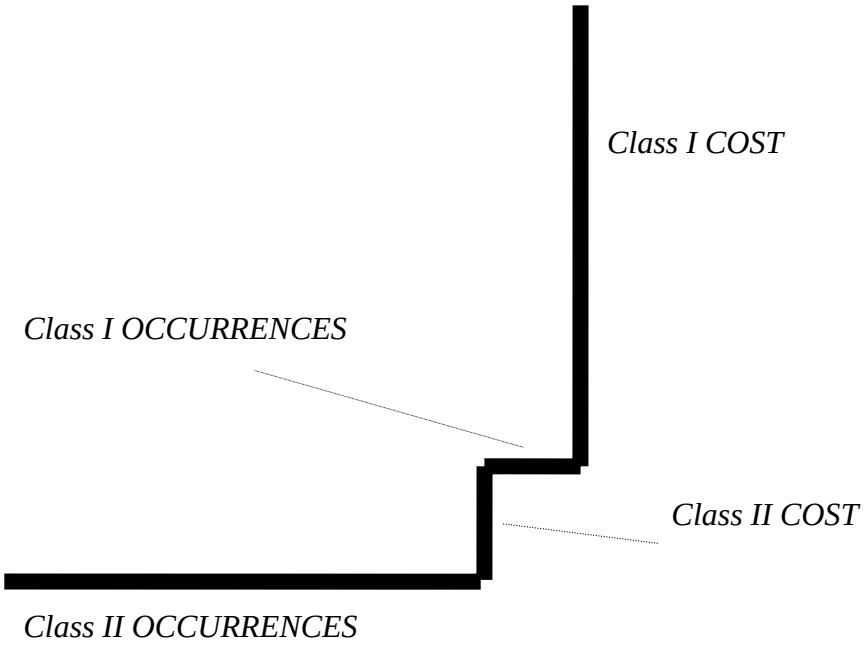

Figure II. Class I - Line Motif

Class I damage occurs rarely, yet the cost is enormous - $16.4 billion of the $20 billion annually.

According to the Industry Commission (1995) figures, Class I damage comprises:

Fatal -	700		
Non-Fatal -	50,000	never work again	20,000
		lower paid job	30,000

What were the damaging occurrences which produced this Class I damage?

How much money has been spent on observing, describing and understanding these occurrences and communicating the results so that each of us may confront the major issues.

Unless these Class I occurrences are directly confronted, safety is fiddling. Safety is fundamentally a Class I problem. Class I occurrences are not chance variations of Class II or Class III. Certainly there is some overlap. Using Class III occurrences to predict Class I is like using the occurrence of the common cold to predict cancer, heart attack or strokes.

The concept that safety is basically a Class I problem is not new. It was first presented in 1981 to the Wide Bay Industrial Safety Organisation (McDonald 1981)[ii].; more widely in November 1984, at a seminar at the University of New South Wales organised to celebrate the founding of Worksafe (McDonald 1985)[iii]. It was again presented at a series of seminars throughout Queensland as part of Safety Week in 1985[iv]. The issue of Class I significance was ignored.

During the construction of Darling Harbour (a New South Wales Bi-Centenary project), a congested, fast track construction site, the video “Safety - a Matter of Management” was prepared and used to help direct site safety activities to focus on Class I. Only one minor permanent disability occurred on site. Brisbane Expo resulted in, (from memory), between 5 and 7 fatalities.

Many in the Queensland mining industry are familiar with Class I, II and III terminology. The practice has not yet developed.

Focus

To focus on Class I, there are important changes to be made in thinking and action.

Reject	Occupational illness and disease
Adopt	**Work personal damage**
Reject	Accident
Adopt	**Damaging occurrence**

Reject	Human behaviour as the focus
Adopt	**Focus on damaging energy exchanges and the management of energy**
Reject	Lost Time Frequency
Adopt	**A measure of Class I Safety Performance**
Reject	Focusing on internal experience
Adopt	**Focusing on industry, occupation, machine or process experience**
Reject	Trying to do it all yourself
Adopt	**Mobilising the efforts of others. Develop a skill to manage upwards, sideways and downwards**

In many organisations safety activities are driven by a performance measure which is most often the Lost Time Frequency Rate (LTFR). Where this affects staff performance appraisals, pay rises and awarding of contracts, effort will be focused on this number and it will decrease, even to zero.

Look again at **Table I** and **Figure I**. Over one third (36%) of cases account for one one hundred and fiftieth (0.67%) of the costs. Over two thirds of the cases (67%) account for one sixteenth of the costs (6%). Seven-eighths of the cases (87%) account for less than one in 5.5 (18%) of the cost.

The most effective way to reduce the LTFR is to concentrate on Class II occurrences, and more particularly the lower Class II. The most efficient way to reduce the LTFR is not to reduce damage to people, but to make work a more pleasant place to be *(not a bad thing to do in its own right),* and encourage and coerce people to not take time off work, or simply to not recognise the damage as work related. There is no need to spell out the strategies used. Most of you will have heard of many of them. The ingenuity is impressive.

LTFR is an invalid measure of safety performance. It is a poor measure of Class II damage and does not reflect Potential Class I damage. It is an unreliable measure since both sides of the fence cheat like hell. Why is LTFR used so widely? Because of ignorance or a hidden agenda? The answer is not known. The continued use of the LTFR cannot be tolerated by a community seriously interested in controlling work damage to people. Its use is obscene.

‘obscene’

- highly offensive to decency
- indecent, esp. grossly or repulsively so
- tending to corrupt
- morally repugnant
- loathsome

(taken from Oxford Concise & Macquarie dictionaries)

Do not trot out the Iceberg Theory. It presents a valid statistical description but an invalid inference or prediction. Most mishaps can never become major damage events - just as the common cold cannot become a heart attack or cancer.

For Class I damaging occurrences to be controlled, they must be predicted. The control of "accidents" is inherently difficult - by popular definition they are unforeseen, unexpected, capricious, chance events.

The control of "damaging occurrences" is quite straight forward. A damaging occurrence is the logical outcome of the system of work, the energy stored or utilised within that system and the characteristics of the participants interacting within that system.

Accidents and damaging occurrences are the same events viewed from either a self defeating or a controlling viewpoint.

The feature which distinguishes a damaging occurrence from all other occurrences is an exchange of energy which goes outside tolerable limits for the human and produces damage. The exchange of energy occurs as the climax to one or more sequences of events. In the sequence(s) are a number of essential factors which must be there for the damaging energy exchange to occur.

Class I Prediction

The prediction of Class I damage potential is the prediction of Class I Damaging Energy Exchange Potentials (**D.E.E.P.S**).

Class I Prediction requires:

- Damaging Occurrence Investigation
- External Class I Taxonomy
- Internal Taxonomy (Class II and III)
- Workforce Information (e.g. Critical Incident Recall)
- Relevant Body of Knowledge of Science

Once these have been collected it is possible to do:

- Physical Inspections
- Mental Reviews of Work Procedures
- Behaviour Observations

On the basis of these eight sources of information, it is possible to make an informed prediction of Class I damage and establish priorities.

This paper is necessarily an overview paper rather than a “how to” paper, and so it is not possible to detail what is required in each of the eight. Each requires much more than a paper to understand.

The most urgently needed information is an external Class I Taxonomy. What type of occurrences produced the 50,000 Class I occurrences in Australia, and what are the Class I occurrences in mining around the world? What are the Class I occurrences for draglines, front-end loaders, haul trucks, conveyors, continuous mixers, long wall machines? What are the Class I occurrences for underground pillar and bord and for longwall? What are the Class I occurrences for electric welding, word processing, detonator assembly, mechanical hoisting? Until these questions can be answered confidently, safety will remain diffuse and hit and miss, ie. fiddling.

In 1981, when the author first realised safety was a Class I problem, he was unable to find published information describing how people received Class I damage. The advice he was giving organisations centred on a taxonomy of their past experiences. It predicted their Class II damage, not their Class I. The direction of Geoff McDonald and Associates was changed to concentrate on providing evidence in litigation cases. Their files now contain over 5000 cases of Class I damage to people killed or permanently disabled. Four thousand of these cases are work related. It is an expensive data base in terms of human suffering.

Whilst it is not known how this data base relates to the 50,000 Class I cases each year in Australia, a taxonomy of these cases was included in a report to the Industry Commission (McDonald 1995). It is instructive to examine elements of the taxonomy shown in **Figure III.** The first three energy categories - Gravitational, Machine and Human - account for 87% of cases - 90% if cumulative damage is included in human energy.

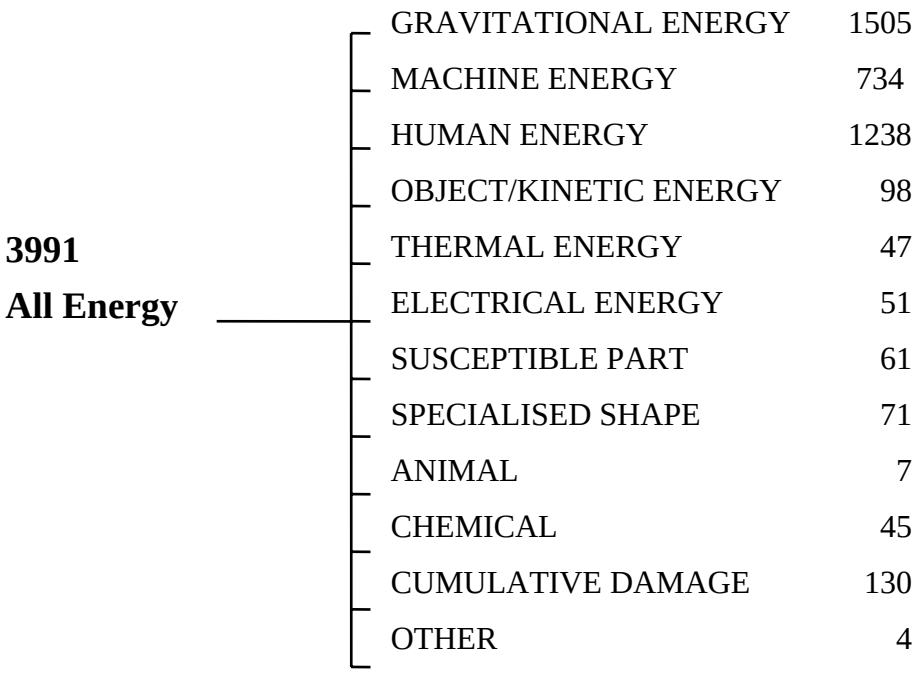

Figure III.

The most common Class I occurrences include:

GRAVITATIONAL ENERGY		1505
	Slip & Fall to the same level	306
	Stairs	201
	Access to mobile machinery (including trucks)	70
MACHINE ENERGY		734
Vehicles 312	Crashes	164
	Pedestrians	63
Fixed Plant 322	Pulled in (conveyors, rollers, winches...)	121
	Crushed by (presses...)	82
	Strike/Cut by (saws...)	119
HUMAN ENERGY		1238
	Lifting	759
	Pushing	56
	Pulling	33
	Using Tools	101

Control of the occurrences listed above would control 56% of cases in the taxonomy. The design requirements of shoe heel/floor surface combinations, stairways, access to mobile equipment, ladders and their usage are known. The control of people on the ground near vehicles and guarding of fixed plant can be addressed. The loads (bending moments) which will damage various joints in the body have been quantified.

By focusing on specific problems, effective, efficient changes can be made.

How to get there

To achieve safety at the task activity it is necessary to provide the appropriate combination of **Information**, **Willingness** to use that information, **Skill** to be able to use the information and **Resources** to enable the information to be used. (Inform, Will, Skill and Resource).

First, the information needs to be known. The first information needed is a quantitative and qualitative description of Class I occurrences.

The greatest changes required to implement safety are not from the workforce. They are from:

- Government
- Industry Associations
- Boards of Directors

PRIORITY ACTION

All

- Utterly destroy and eliminate the use of the Lost Time Frequency Rate.

Government

- Ensure that a quality taxonomy of Class I occurrences in Australia is developed in the shortest possible time.
- Ensure that the framework for measuring safety performance is developed and reflects the contribution to reducing future Class I damage.
- Ensure that the Industry Associations do what is required of them.
- Ensure that the Boards of Directors do what is required of them.

Industry Associations

- Ensure that the government does what is required of it.
- Ensure that the first 5 steps of prediction are taken on an industry basis.
- Make the best possible prediction of Class I potential for their industry (both quality and quantity), machines, occupations and processes.
- Ensure that the Boards of Directors do what is required of them.

Boards of Directors

- Ensure that their Industry Association does what is required of it.
- Ensure that the government does what is required of it.
- Ensure that their organisation takes the predictive work of the Industry Association and applies it to the final three steps of prediction at each work site.
- Ensure that every level of management in their organisation is appropriately informed, willed, skilled and resourced.

Final Comment

The Management Chain (McDonald, 1994[v], 1995[vi]) outlines what is required from management at all levels, from the community through to government, industry associations and unions, through the organisational structure to the final management - management of the task activity.

Much of our recent safety approach has been based on consensus, a fine thing as it produces co-operation. This co-operation may produce correctness - again, fine. Often it produces consignorance and, in so doing, condemns tens of thousands of Australians to Class I damage.

Where has current consensus produced:

- acceptable floor surface/shoe heel grip,
- stairs with adequate geometrical, visual and grip characteristics,
- acceptable ladder design and usage,
- adequate vehicle/pedestrian control,
- adequate guarding of plant and equipment,
- loads (bending moments) which will not damage the musculoskeletal system?

It is unfair to expect the consensus parties to know such things unless the appropriate knowledge is given to them. Use consensus to combine expertise and experience - but only if the consensus members are strongly agreed on reducing Class I damage. The consensus group must be informed, willed, skilled and resourced.

Do not follow fads and fashions. Do the hard work. Observe and describe Class I damaging occurrences and base actions on those observations. Remember consensus carelessly used produces consignorance and utilises intellectual laziness.

Safety is a matter of managing energy to avoid damaging energy exchanges. Develop a long way past the notion inherent in most of the current safety activity, that it is a matter of getting people to behave better.

The 360 people who slipped when walking normally, as well as 200 on stairs and 70 accessing equipment, and the 949 people lifting, pushing, pulling and using tools were doing what was expected of them. We must leave the dark ages, understand Class I damage by observing how it happens, predict and develop effective ways of managing energy within a system of work in view of the characteristics of the participant operating within that system.

Safety requires first class work

30th June, 1995

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APPENDIX II

“OFF TARGET”

OFF TARGET

by
G.L. McDonald M.E. B.Sc.

INTRODUCTION

By continuing to publicly disregard Permanent Disability, the National Occupational Health and Safety Commission (NOHSC) is ignoring the Industry Commission's 1995 report and, on the basis of the only available information, is presiding over a worsening of damage to people from work.

One hundred and thirty seven people are permanently disabled every day of the year from work in Australia and account for 80% of the total cost of damage to people from work. Employers carry below 30% of this cost, with the community at large, and the permanently disabled carrying the remainder of the cost.

Just over eight people die each day as a result of work, the majority from disease. Approximately 50% of the traumatic work deaths occur on the road.

Despite the 1995 Industry Commission report on "Work Health and Safety", which drew attention to permanent disability, recent National Targets confirm that by far the largest quantity of work damage to people, permanent disability, continues to be widely ignored.

To its credit, New South Wales is the only state in Australia to make itself accountable by reporting annual figures for permanent disability. By considering the quantity of damage (via the Industry Commission's cost estimates) rather than the number of cases, the figures show that there has been a major increase in damage to people from work rather than a modest improvement over the past eight years. The figures also show that the National Targets could be met while increasing the damage to people from work.

The standard response to permanent disability is to revert to comment about fraud and malingering. "If there is an increase in permanent disabilities it must come from increased fraud and malingering". This is extremely dangerous and destructive thinking. It disrespects and further worsens the lives of tens of thousands of people and demotivates efforts to reduce permanent disabilities.

Sound business principles need to be applied. Not only the number of goods should be considered. The value of each needs also to be considered. A life is rightfully given the highest value. Permanent Disability has a much higher value than Temporary Disability and should be treated accordingly.

COSTS

In 1995 the Industry Commission, part of the Commonwealth Treasury Department, produced a report "Work Health and Safety". They estimated the cost of injury from work in Australia for the year 1992-93. In summary, in 1992-93:

Total cost of Damage to People from Work	$20 Billion
Total cost of Fatalities	$0.3 Billion
Total cost of Permanent Disabilities	$16.1 Billion
Total cost of Temporary Disabilities	$3.6 Billion

These figures were based on –

693 traumatic deaths to employees	(1.9 per day)
50.018 permanent disabilities	(137 per day)
345,781 temporary disabilities	(947 per day)

The report showed, on the National Account basis, that costs were shared –

Employer	30%
Worker	30%
Community	40%

They note –

(i) "The share of the costs borne by the community increases with the severity of the incident"

(ii) "…..for more severe workplace incidents workers bear up to 50% of the costs."

(iii) "As workplace incidents become more severe, the proportion of costs borne by the employer, progressively decline. Hence financial incentives for employers to prevent injuries are inadequate particularly for serious incidents. However, employers bear most of the costs of less severe workplace incidents indicating that they have stronger incentives to prevent these incidents."

FATALITIES

(1.5% of the Costs - Immense Personal Tragedies)

The National Occupational Health and Safety Commission (NOHSC) published in 1998 "Work-related traumatic fatalities in Australia, 1989-92. The diagram below is derived from their report and gives the average annual fatalities for one year.

Total annual work-related fatalities	791		
While working	440	At workplace	305
		On road	135
Commuting	157		
Bystander	194	Workplace	75
		Road*	134

*(some Road also classified as Workplace)

Annual traumatic fatalities at 791 (2.2 per day) are higher than estimated by the Industry Commission.

Larger numbers of fatalities occur from disease, predominantly cancers and the Industry Commission reports Worksafe Australia's best estimate was 2,200 disease related deaths annually. Add to this the 791 traumatic deaths given above and a rounded figure of 3,000 work-related deaths per year or 8.2 per day can be taken.

The cost of 3,000 deaths would obviously be well above that of the 693 used by the Industry Commission for its cost estimates.

The trauma, separation, abandonment and dislocation resulting from death cannot be adequately factored into cost estimates but must play a major role in determining the effort dedicated to preventing such deaths.

PERMANENT DISABILITIES

(80.5% of Cost – Immense Personal Tragedies)

The Industry Commission estimated that 30,728 people were injured in 1992-93 resulting in permanently reduced income – fewer hours of work or lesser skill. 19,290 other people did not return to work. Approximately 50,000 people were permanently disabled. These estimates were based on an Australian Bureau of Statistics survey in New South Wales for the year 1992-93.

New South Wales is the only state which reports the number of permanent disabilities for each year. The rate of permanently disabling wage and salary earners in that state from 1991-92 to 2000-01 is graphed below in **Figure 1**. Over ten years the incidence has increased from 1.46 per 1000 workers to 3.89 per 1000 workers, an increase to 266% of the 1991-92 rate, ie. an increase from 1 in 685 person years to 1 in 257 person years for each permanent disability.

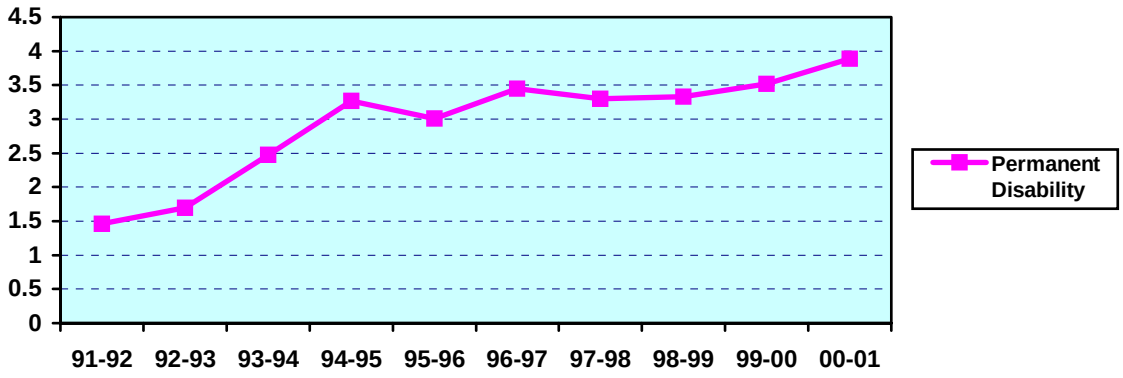

Figure 1 - Incidence of Permanent Disability in New South Wales.
(Incidence is the number of injuries per 1000 wage and salary earners).

NATIONAL OCCUPATIONAL HEALTH AND SAFETY STRATEGY

In May 2002 NOHSC promulgated the "National OHS Strategy" which set the following targets –

"• sustain a significant, continual reduction in the incidence of work-related fatalities with a reduction of at least 20 percent by 30 June 2012. (and with a reduction of 10 percent being achieved by 30 June 2007); and

• reduce the incidence of workplace injury by at least 40 percent by 30 June 2012 (with a reduction of 20 percent being achieved by 30 June 2007)."

NOHSC expects the first of five national priorities, "reduce high incidence/severity risk to contribute immediately to achieving the national target." They explain that an industry sector which has a relatively high incidence of work-related injuries or a high proportion of deaths compared to other industry sectors would require priority attention nationally. Permanent disability is not mentioned.

How would effort to achieve the above targets affect damage to people from work?

New South Wales is the only state in Australia which has made itself accountable by annually reporting the number of permanent disabilities.

NEW SOUTH WALES AS AN ILLUSTRATIVE EXAMPLE

Table I shows the incidence of different levels of severity of damage to people from work in NSW for ten years. **Figure 2** shows a combined individual plot of each of these levels of severity, scaled to show the changes over that time.

Table I
Table of Incidence of Work Damage 91-92 to 99-01

Year	Fatality	Permanent disability	Temporary > 6 mths	Temporary < 6 mths	Total
91-92	0.0338	1.46	1.08	16.10	18.67
92-93	0.0259	1.70	1.03	14.80	17.56
93-94	0.0290	2.47	1.20	15.30	19.00
94-95	0.0318	3.27	1.51	14.50	19.31
95-96	0.0241	3.01	1.83	13.80	18.66
96-97	0.0256	3.34	1.90	14.00	19.27
97-98	0.0305	3.30	2.05	13.50	18.88
98-99	0.0254	3.33	1.95	12.10	17.41
99-00	0.0256	3.52	1.58	10.67	15.79
00-01	0.0177	3.89	1.25	9.94	15.1

Incidence is the number of injuries per 1000 wage and salary earners

While lines of regression and associated confidence limits should be plotted for the best comparison, a simplistic comparison is given below.

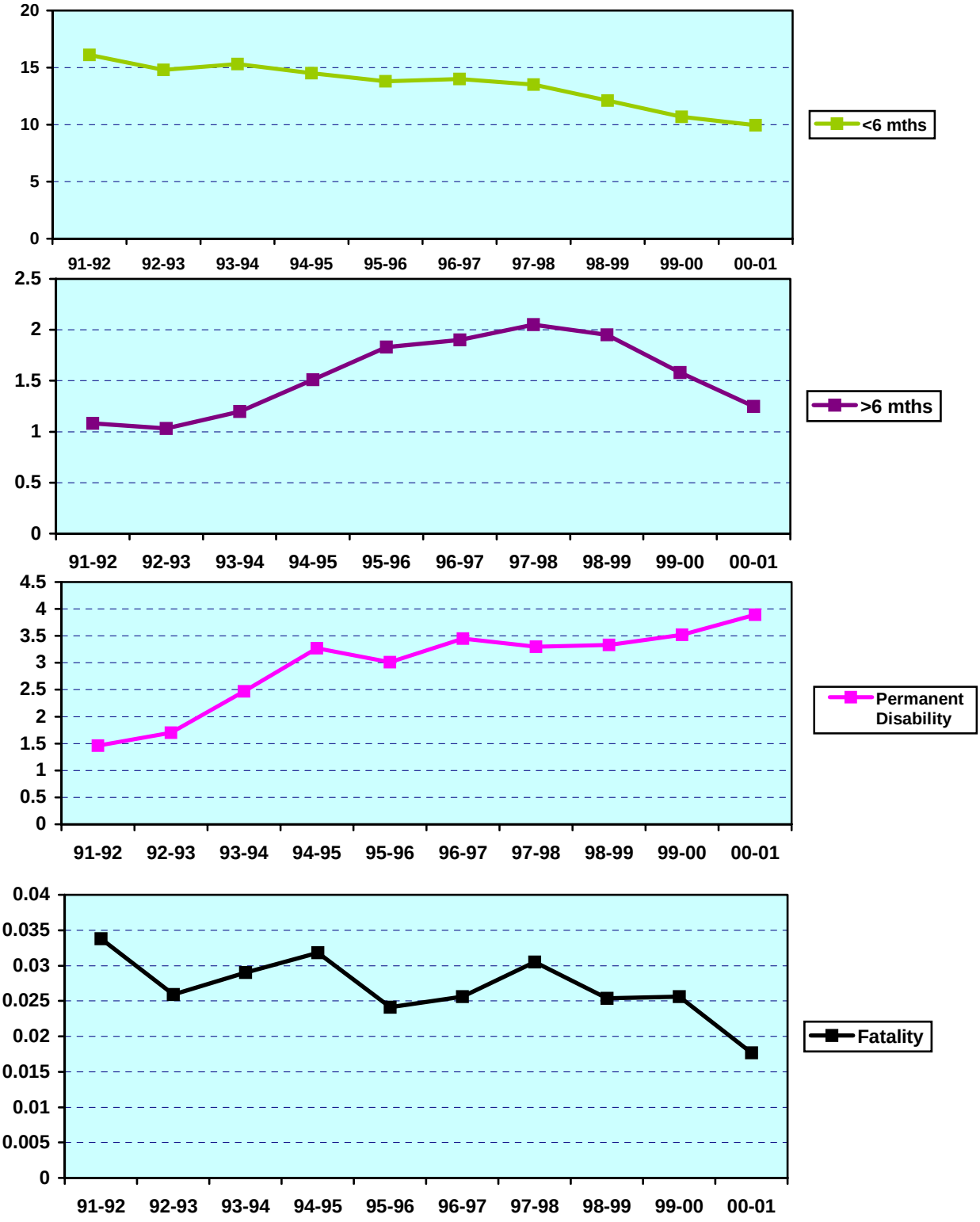

Figure 2 - Incidence of different severity of Injury – New South Wales
(Incidence is the number of injuries per 1000 wage and salary earners)

Temporary disability rate with less than 6 months off work has generally declined steadily until the latest rate of 9.94 is a 38.3% reduction of the initial 16.10.

Temporary disability rate with 6 months or more off work has climbed to a peak in 97-98 and declined since. The peak was 90% above the starting rate. The final incidence rate of 1.25 is still 16% above the initial rate but 39% below the peak.

The permanent disability rate has steadily increased. The final rate is 166% above the initial rate, i.e. 2.66 times the original rate.

The fatality rate at the end of the period is 48% below the initial rate and 37% below the previous lowest (95-96) rate. Only a line of regression would make sense here as the number of annual occurrences is too low in relation to its variability to enable easy comparisons. Next year's figure will be necessary to help indicate the relative influence of chance variation and of meaningful change.

How would NSW have fared if the National Target had been set to start from the 1991-92 year?

Figure 3 shows the incidence of Temporary Disability, Permanent disability and Fatality, with the incidence of fatality too low to register on this graph. See the Fatal section of Figure 2 to see how the fatality incidence varied over the ten years.

Temporary disability both over and under six months have been combined for Figure 3.

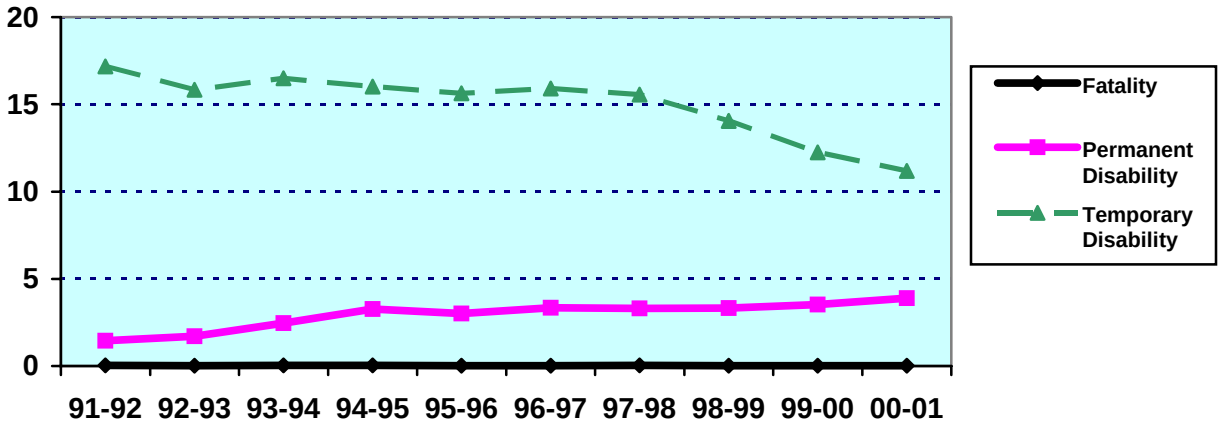

Figure 3 - Incidence of Fatality, Permanent Disability and Temporary Disability – NSW
(Incidence is the number of injuries per 1000 wage and salary earners)

While the incidence of temporary disability has steadily declined, the incidence of permanent disability has steadily increased. The total incidence rate (Table I) has declined from 18.67 to 15.1, a drop of 19% over the ten years.

The incidence of fatality was shown earlier to be 48% lower in the 10th year than in the 1st year. This does not support the contention that industry has reduced fatalities by 48% – the year to year variation is too high. As argued earlier, lines of regression and confidence limits need to be calculated. If the year 1991-92 is ignored, it is difficult to argue for a downwards trend in fatalities over the next years, until the year 2000-01.

At this stage it is important to note that the NOHSC "Work-related traumatic fatalities in Australia, 1989 to 1992" reported that working deaths were not covered by –

- Compensation Agencies 43%
- Occupational Health and Safety Agencies 64%
- By either 33%

Bystander and Commuter deaths were probably not covered by either. The fatality figures given above for NSW are based on compensation figures.

PERMANENT DISABILITY

The Industry Commission estimated in 1995 that 80.5% of the Total Cost of Damage to People from Work came from Permanent Disability for the year 1992-93.

The National OHS Strategy makes no mention of Permanent Disability. What are the ramifications of not paying specific attention to 80% of the costs or, more cynically 80% of the production of the "Damage to People at Work" industry.

Some bold assumptions give some insight. Accept the Industry Commission's estimates of costs for 1992-93:

1.48% for fatalities
80.54% for permanent disabilities
17.98% for temporary disability

Assume that the composition of permanent disabilities in other years is the same as in 1992-93. Determine the multiplication factors for 92-93 to convert the incidence rate to the appropriate percentage of costs. Apply these factors to the other years. The result is given in **Figure 4** (page 8) which is a replot of Figure 3. Figure 4 depicts the relative estimated cost of damage to people from work. **Table II** gives the figures used to plot Figure 4, derived from the incidence rate and the relative costs of the different classes of severity in 1992-93.

Table II
Relative Personal Damage Cost Rate

Year	Fatality	Permanent Disability	Temporary Disability	Total
91-92	**1.93**	**69.18**	**19.52**	**90.62**
92-93	**1.48**	**80.55**	**17.98**	**100.01**
93-94	**1.66**	**117.03**	**18.74**	**137.43**
94-95	**1.82**	**154.93**	**18.19**	**174.94**
95-96	**1.38**	**142.61**	**17.76**	**161.75**
96-97	**1.46**	**158.25**	**18.06**	**177.78**
97-98	**1.74**	**156.35**	**17.67**	**175.76**
98-99	**1.45**	**157.78**	**15.96**	**175.19**
99-00	**1.46**	**166.78**	**13.92**	**182.16**
00-01	**1.01**	**184.3**	**14.1**	**199.23**

(See text for derivation of figures)

Fatalities again do not show, but permanent disability is now much higher than temporary disability. The overall trend is now upwards rather than downwards.

Whereas Figure 3 depicts a decrease of 19% in the overall incidence rate, Figure 4 depicts a 120% increase in relative cost. Bear in mind that the Employer pays a relatively low (30) percentage of the overall costs and a much lower percentage of the costs of permanent disability.

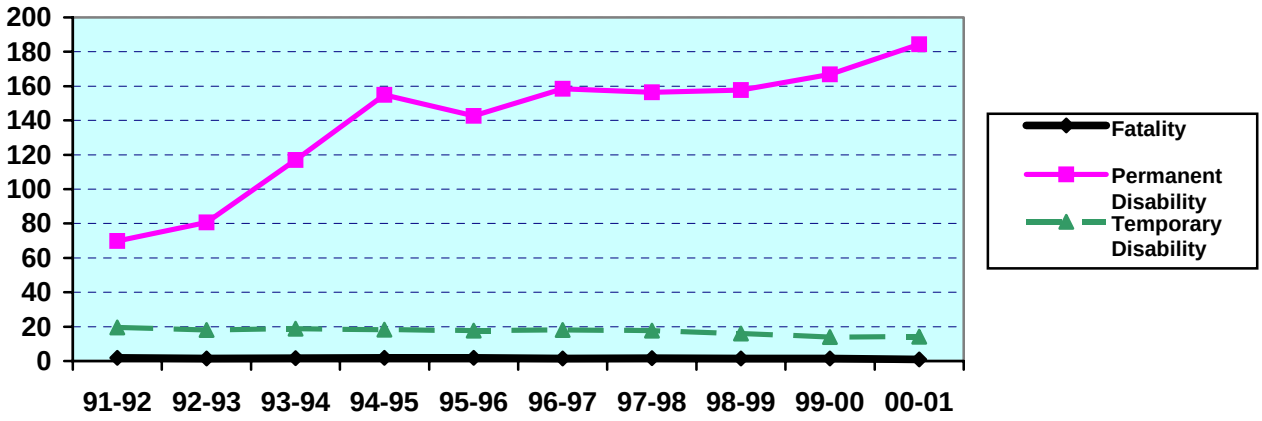

Figure 4 - Relative cost of Fatality, Permanent Disability and Temporary Disability – NSW.
Based on Industry Commission's assessment of Australia's 1992-1993 experience (see text).

A comparison of 1992-93 (Industry Commission Year) and 2000-01 is summarised in **Figure 5** which shows the change in the quantity of damage based on the Industry Commission's costing.

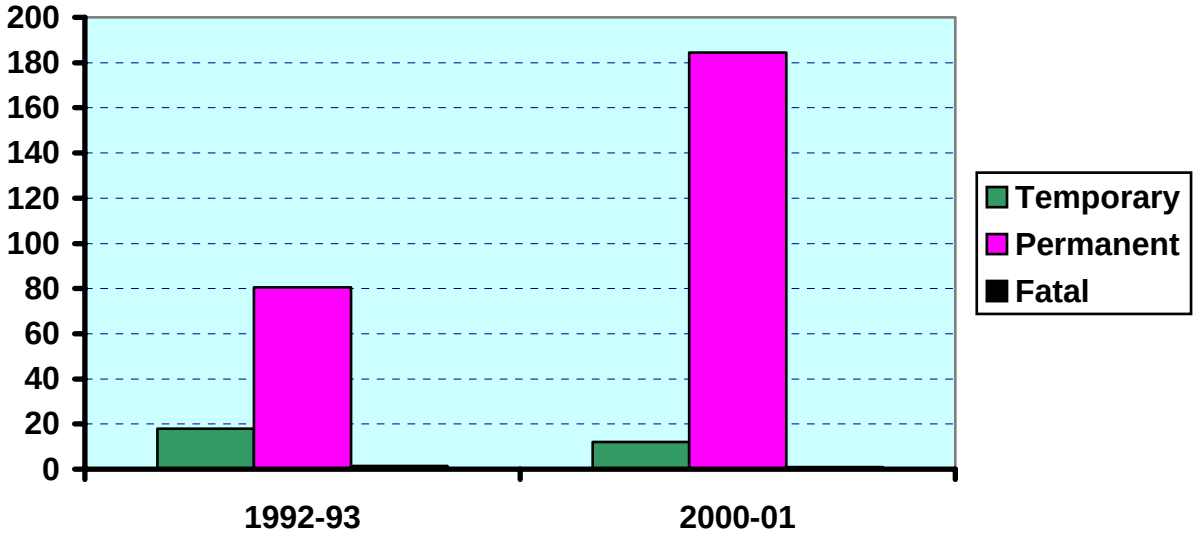

Figure 5 – Relative Costs of Temporary Disability, Permanent Disability and Fatality
This diagram is based on Incident Rate and therefore effectively compares the costs for equal sized workforces

OVERALL VIEW

Figure 3, Figure 4 and Figure 5 show clearly that incidence rate and estimated cost are not a sufficient indication of need for control effort. If they were, fatalities would be ignored.

Attention and effort is rightly being focused on fatalities because of the tragedy – the loss, the departure, the abandonment, the emotional trauma and the dislocation. Fatalities have a number of dimensions which do not exist with a temporary disability. These dimensions mean the fatalities have to be elevated above their mere numbers or costs.

Similarly, permanent disabilities also have dimensions which do not exist with a temporary disability. Again this means the permanent disabilities need to be elevated above their mere numbers or costs.

The targets set by the National OHS Strategy take no account of permanent disabilities and, as shown above, it would be possible to reach the targets while increasing permanent disabilities and increasing the total amount of damage to people.

Unless there are severe aberrations in the NSW statistical information, or the assumptions made above are not true, Health and Safety in 2000-01 was well over twice as bad as it was in 1991-92.

This poses two questions:

Why has Work Health and Safety shown worse rather than better performance?

Why has Permanent Disability been so long ignored when the Industry Commission brought it to the fore eight years and at least 400,000 permanent disabilities ago?

In quoting this author, the Industry Commission stated :

> "McDonald & Associates has questioned the current priorities in government and industry programs directed at prevention and research. Dividing outcomes into permanent incapacity (Class One), temporary impact (Class Two), and inconvenience (Class Three), they contend that:
>
> > …..occupational health and safety is fundamentally a Class 1 problem. Despite this, it is normal for governments and insurance companies not to report figures on permanent disabilities in a meaningful way. … Class 1 damage will come from a relatively few occurrences and only the very largest organisations will have previous experience and history which gives them any understanding of these occurrences. Smaller organisations, looking at their history, are likely to learn nothing useful to help prediction of their future Class 1 damage (1995, p.21).
>
> The Commission agrees with this assessment. Indeed, the Commission's estimates suggest that the hazards that are the focus of national standards are not those that would yield the greatest saving in costs to the community, for a given reduction in their risks. The estimates also highlight the importance of drawing on `best practice' from outside small to medium-sized enterprises because of the low frequency of workplace incidents that occur?"

This author's view has changed. While there are far too many fatalities and permanent disabilities, they are far too rare and far too varied for the majority of individuals or organisations to be motivated by their own experience to try to control them. Similarly their miniscule experience of Class I occurrences (fatality and permanent disability) ill equips them to know what to do.

The Government needs to manage workplace health and safety so that Class I experience is harvested and communicated. Knowledge of how Class I damage is created needs to become part of individual and collective wisdom. Advice needs to be targeted to relevant specific issues. Unless the Government takes the lead, meaningful targets will not be made, strived for and met. NOHSC has made a commendable start on harvesting fatal experience but negligible effort on permanent disability – 80.5% of the personal damage in 1992-93.

The first step must be to communicate to the public the enormity of the problem.

In 1992-93:

- 3000 deaths - 8.2 deaths per day
- 50,000 permanent disabilities – 137 cases per day
- 53,000 Class I damaging occurrences

Picture a community of 53,000 people or calculate how long to permanently alter the life of the members of a community. In Queensland – Bundaberg in twelve months.

The tragedy of Australian work is that one of the largest industries is damaging people – 82% of which is Class I damage.

Health and Safety is a Class I problem. NSW have made themselves accountable by reporting permanent disability. The other states remain unaccountable for 80% of the quantity of damage to people from work. Any business which does not pay specific attention to activities which account for 80% of their costs cannot expect to be successful.

We live in an economy and community which subscribes to the philosophy of user pays. To a large degree, industry does not pay for the damage to the workers it uses. Industry is heavily subsidised by the community and, worse still, by the permanently disabled and by the dependants of people killed.

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APPENDIX III

“RISK ASSESSMENT - PLANT ADVISORY STANDARDS”

RISK ASSESSMENT – PLANT ADVISORY STANDARD

The subject of risk assessment was raised earlier and Part 12 – Risk Assessment of the Plant Advisory Standard has been included as **Appendix 3**. This advocates the use of a basic approach which has been quoted on page 29, item 12.3.1. Its central elements were-

- Give careful thought to the situation.
- Determine the hazards and risks and who is likely to be affected. This could involve consulting with workers.
- Decide whether existing preventive measures reduce the risk to an acceptable level and whether anything more needs to be done. This could also involve consulting with workers.

A more complex approach is said to be required when –

- an employer recognises a basic approach would not be adequate, or
- where a basic approach indicates there are risks the employer cannot assess in this manner.

The steps for the more complex risk management process as given in Section 12.4 of The Plant Advisory Standard (Reproduced in Appendix 3) include –

Step 1 - Identify the hazards
- Identify the form the hazard takes, or the way it is manifested

Methods for identifying hazards are then given and includes –

- Walk–through survey (use checklist)
- Workplace evaluation
  - Hazard and Operability Studies
  - Hazard Analysis
  - Fault Tree Analysis
  - Management Oversight Risk Tree
- Consult with workers
  - easy and effective
  - workers usually aware of what can go wrong
- Near miss, incident, accident, injury, disease data
  - relating to plant at a workplace
- Manufacturers instructions
  - important source of information

- usually state about proper use of plant

• Specialist practitioners and representatives
  - industry associations
  - unions
  - government bodies

Step 2 - Assess the risks

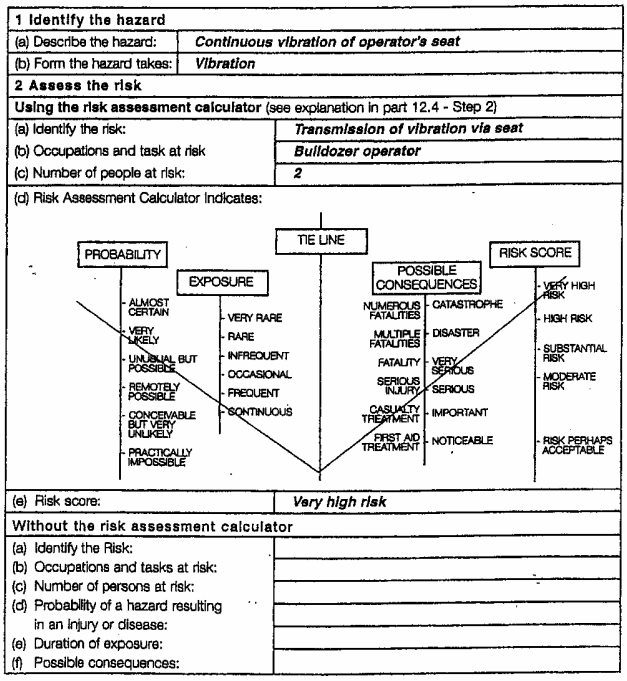
Step 3 - Decide on Control Measures

Step 4 - Implement Control Measures

Step 5 - Monitor and Review

Details of recommendations for these steps can be seen in **Appendix 3**.

An example of a completed risk management form is given in Part 13 and is reproduced below.



1 Identify the hazard	
(a) Describe the hazard:	***Continuous vibration of operator's seat***
(b) Form the hazard takes:	***Vibration***
2 Assess the risk	
Using the risk assessment calculator (see explanation in part 12.4 - Step 2)	
(a) Identify the risk:	***Transmission of vibration via seat***
(b) Occupations and task at risk	***Bulldozer operator***
(c) Number of people at risk:	***2***
(d) Risk Assessment Calculator Indicates:	
(e) Risk score:	***Very high risk***
Without the risk assessment calculator	
(a) Identify the Risk:	
(b) Occupations and tasks at risk:	
(c) Number of persons at risk:	
(d) Probability of a hazard resulting in an injury or disease:	
(e) Duration of exposure:	
(f) Possible consequences:	

3 Decide on what control measures to take	
(a) Short term/immediate control measures:	*Reduce the number of hours each operator operates the bulldozer per day*
(b) Long term control measures:	*Replace seat with one that has a vibration damping effect*

4 Implement control measures	
Short term control measure	
(a) Work procedures developed	**Reduce number of hours each worker operates bulldozer per day**
(b) Communication to workers and others	**Workers informed of change in shift hours**
(c) Supervision provided	**Check that workers keep to revised shift hours**
Long term control measure	
(a) Long term control measure applied	**Vibration damping seat installed on bulldozer**
(b) Work procedures developed	**Work procedures amended to include instructions on how to use seat**
(c) Communication to workers and others	**Workers informed about seat and why it was installed**
(d) Supervision provided	**Workers supervised after seat installed**
(e) Maintenance undertaken	**Maintenance procedures amended to include maintenance requirements for seat**

5 Monitor and Review	
(a) Are chosen control measures in place and being used correctly? If yes, continue. If no, re-do step 4.	☑ Yes ☐ No
(b) Has exposure to the assessed risk been eliminated or adequately reduced? If yes, continue. If no, re-do step 3.	☑ Yes ☐ No
(c) Have implemented control measures resulted in the worsening of any existing problems or the introduction of any new problems? If yes, describe and re-do step 3 **Introduction of a new problem: seat does not have a lumbar support and so may introduce other hazards** **As a result of re-doing step 3, another vibration damping seat with lumbar support is selected** If no, continue.	☑ Yes ☐ No
(d) Date of review of entire risk management process	1 / 11 / 00

Employer Details	
Employer name:	*Jones Earthmoving*
Workplace:	*Bruce Highway Extension*
Prepared by:	*Pat Jones*
Employer's Signature:	Pat Jones.
Date:	*1/11/99*

Firstly it should be recognised that ride disturbance in a wide range of vehicles is a significant safety problem.

E.L. McDonald (1997) developed a Taxonomy of Class I damaging occurrences in the Queensland and New South Wales Coal Mining Industry and discovered that 29% of Class I damaging occurrences, and 47% of the Class I damage costs involved ride disturbance.

Over many years this author has had contact with the Coal Mining industry and has been aware of regular cases of the suspension seats being changed in response to complaints. Such changes also occur in plant in other industries. Some months after the change it has often been realised that there has been no subjective improvement from the operator's experience. Back discomfort and damage continues.

Recently the author tested a machine after it had been fitted with a suspension seat, generally held in high regard. Accelerometers were fitted to the seat and the floor of the machine. The accelerometers were fed through a small signal conditioning system into a laptop computer which recorded the information for later processing. The tests showed that the accelerations experienced by the operator in the seat were as high as those on the floor.

In the case of the ropes it was necessary to find detailed description and technical evaluation of the phenomena involved in their performance to enable the thinking function to make judgements, as discussed in Section 10 - Ropes.

The same applies in this case. Three sets of data are relevant. One set of data describes acceptable levels of ride vibration for seated operators. The second set of information shows the intensity of vibration at different frequencies developed by types of machines. The third set of data shows how different seats will either increase or decrease the vibration at particular frequencies.

AS2670.1-1990 “Evaluation of human exposure to whole-body vibration – Part 1 – General Requirement” gives diagrams which enable the likelihood of a ride vibration to adversely affect the operator. Figure 15 (page 59) taken from the Standard shows the “fatigue-decreased proficiency boundary”. The vertical scale gives the intensity of the vibration, the horizontal scale gives the frequency. The dark lines over the body of the figure shows the hours for which a person can be exposed to the vibration before vibration induced fatigue will decrease their proficiency. The lines can be adjusted upwards to give an exposure limit, or down to give a reduced comfort boundary.

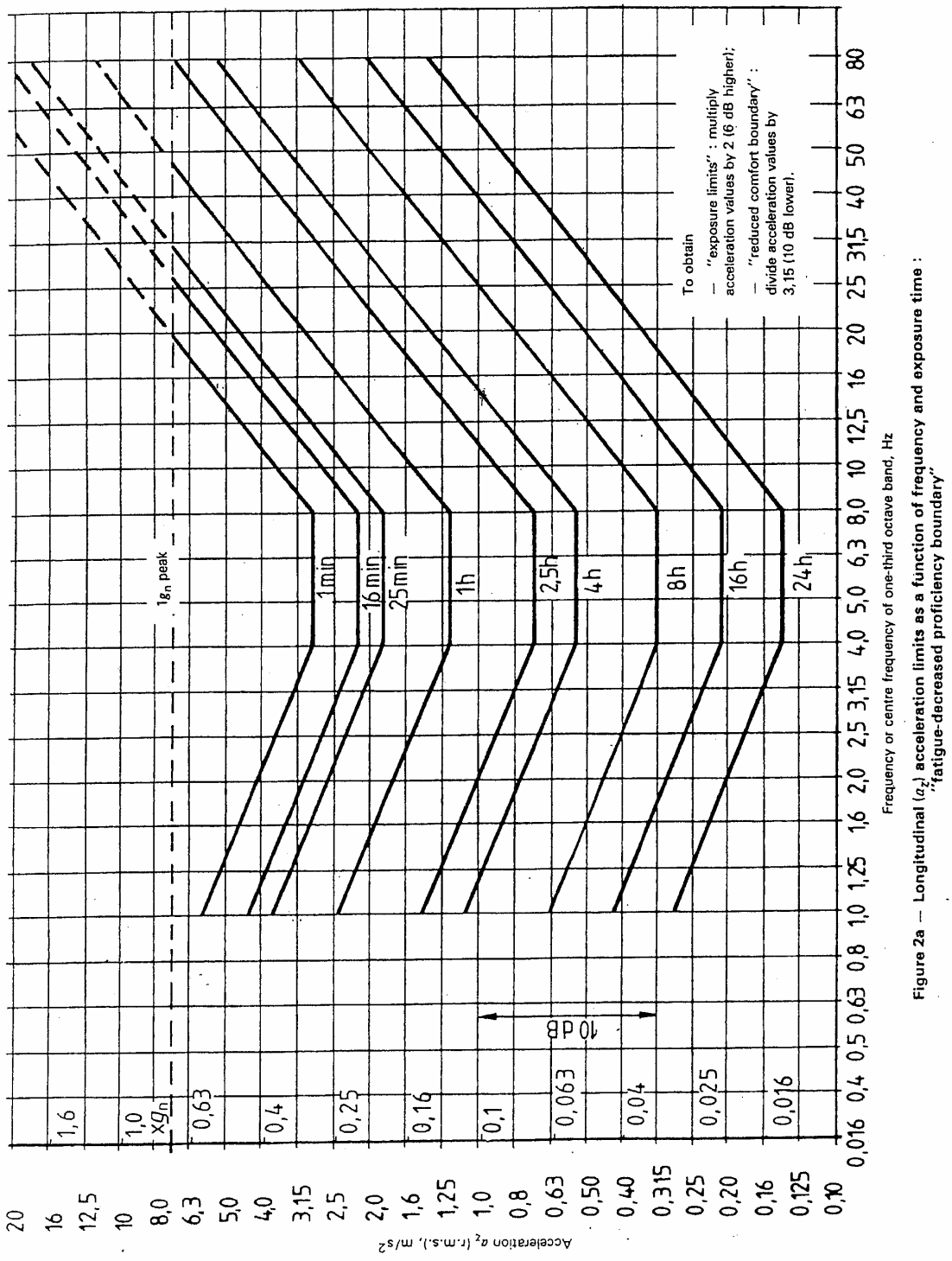


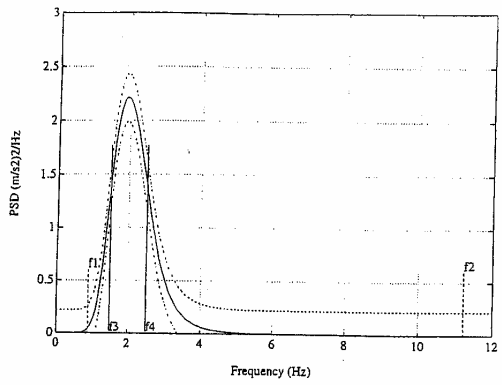
Figure 2a — Longitudinal (a_z) acceleration limits as a function of frequency and exposure time : "fatigue-decreased proficiency boundary"

Figure 15 Fatigued-decreased proficiency boundary

The ride on a machine can be measured and a plot of the intensity at each frequency can be placed on the diagram.

The relevant time is determined by which darker line is reached. The shape of the lines show that the human body is most sensitive to vibration in the range 4 to 8 Hertz which corresponds to the natural frequency of sections of the spine.

ISO Earth Moving Machinery – "Laboratory Evaluation of Operation Seat Vibration" (Revision of second edition (ISO 7096:1994) gives a method of testing seat suspensions by inputting vibration representative of various classes of machines. For each class of machine, a plot of intensity of vibration on the vertical axis, and vibration frequency on the horizontal axis is given. These figures are presented in the next three pages.



Vibration input from
machine to seat base
PSD = Power Spectral Density

Figure 2. PSD for input spectral class EM1 [Articulated or Rigid Frame Dumper]

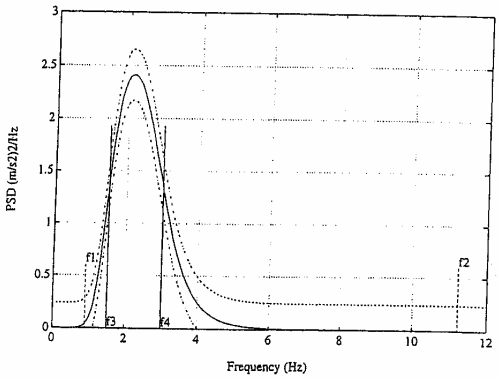


Figure 3. PSD for input spectral class EM2 [Scraper without axle or frame suspension]

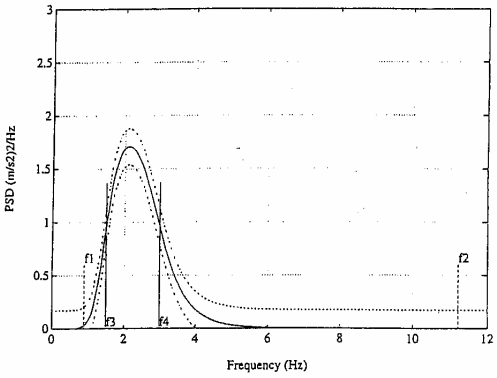


Figure 4. PSD for input spectral class EM3 [Wheel Loader > 4500 kg]

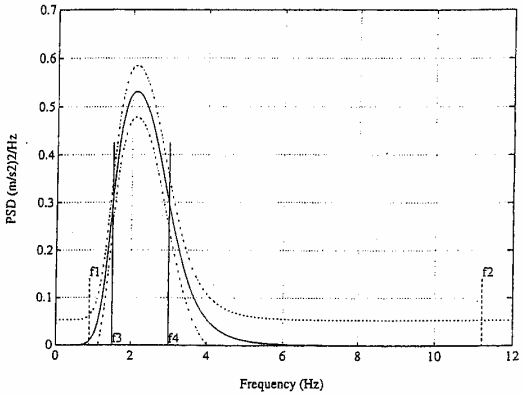


Figure 5. PSD for input spectral class EM4 [Grader]

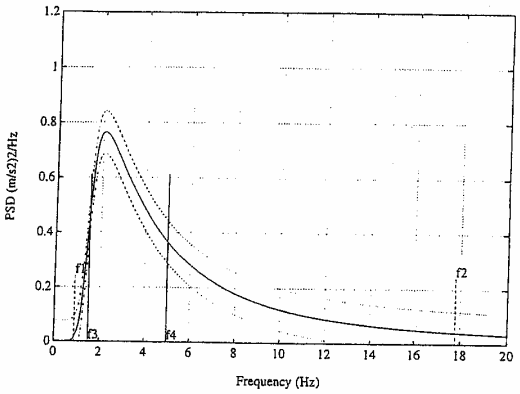


Figure 6. PSD for input spectral class EM5 [Wheel Dozer, Soil Compactor (wheel type), Backhoe Loader]

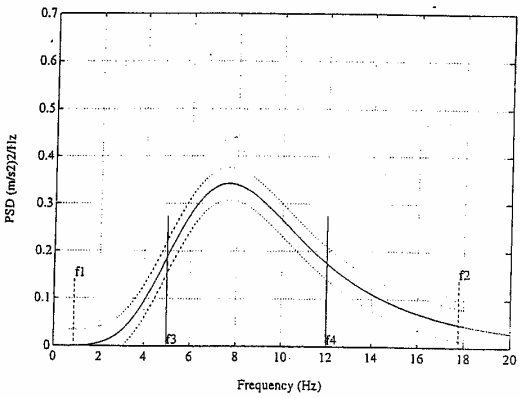


Figure 7. PSD for input spectral class EM6 [Crawler Loader, Crawler Dozer < 50000 kg]

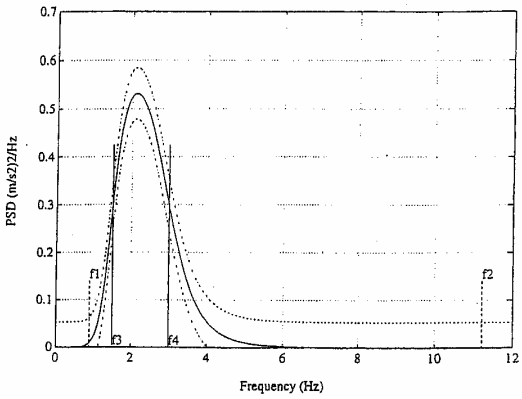


Figure 5. PSD for input spectral class EM4 [Grader]

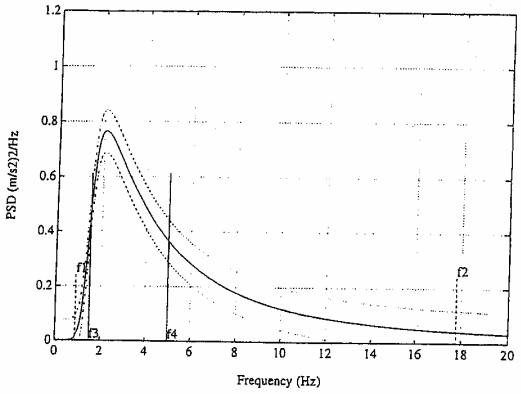


Figure 6. PSD for input spectral class EM5 [Wheel Dozer, Soil Compactor (wheel type), Backhoe Loader]

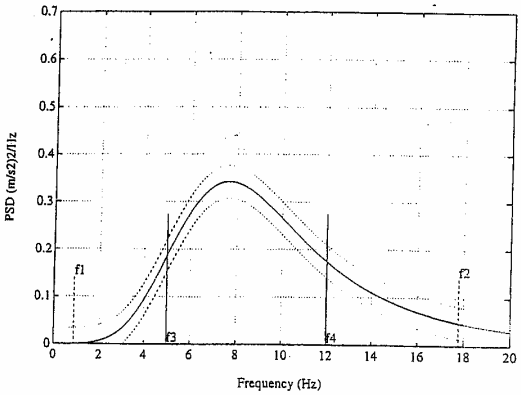


Figure 7. PSD for input spectral class EM6 [Crawler Loader, Crawler Dozer < 50000 kg]

For Figures 3, 4 and 5 the dominant frequency is near $2H_z$ and little of the vibration energy is above $4H_z$.

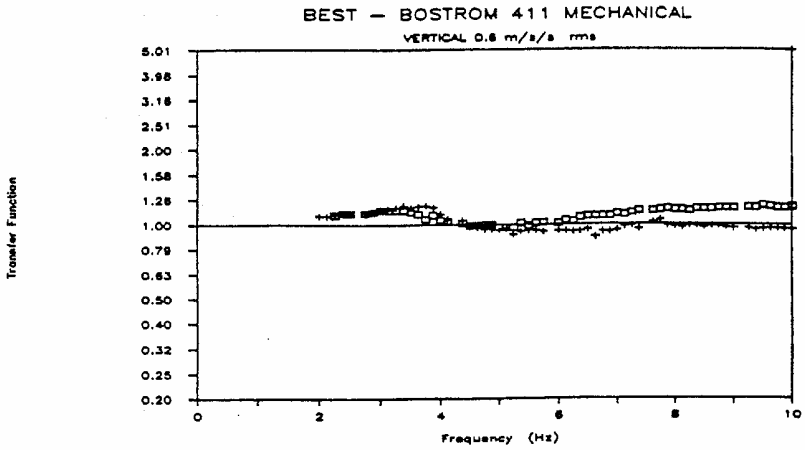
For Figure 8 the dominant frequency is around $3H_z$, and for 9 and 10A is around $4H_z$.

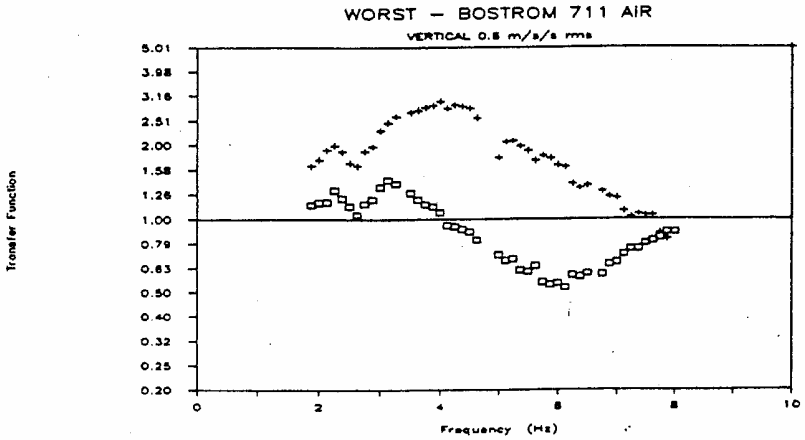
Figure 7, for Crawler Loaders and Crawler Dozers, shows the broadest and least peaky spectrum extending above 0.1 from $4H_z$ to $14H_z$.

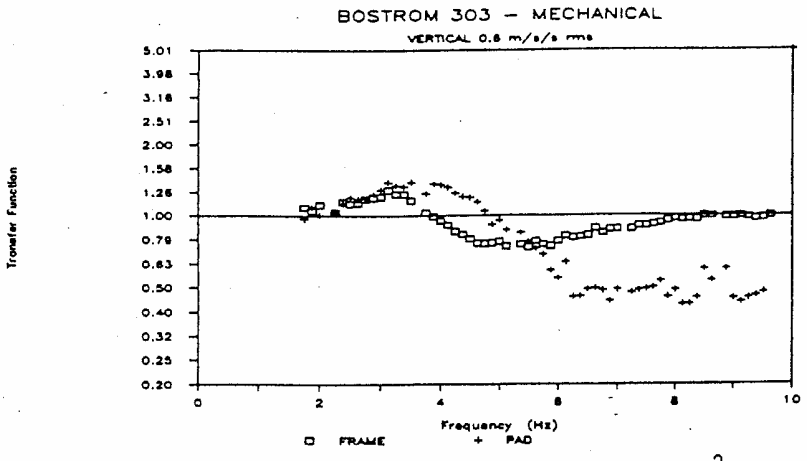
In 1991 Vipac completed a project on Seating for Open Cut Mobile Equipment Operators. Among other tests they placed commercially available seats on a laboratory shaker facility. This enabled determination of the seat transfer function which compares the intensity of vibration on the seat compared to that of the seat base. The transfer function was plotted for the top of the seat frame (shown by rectangles) and on top of the seat cushion (shown by pluses). A Transfer Function of 1 indicates that the seat vibration was the same as the seat base. A Transfer Function of greater than one indicates that the seat vibration was more intense than that of the seat base, while a value less than 1 indicates that seat vibration is less intense than the input to the base. The next two pages (Pages 65 and 66) reproduce Figure 3.4, "Selected Shaker Test Results at 0.6 m/s²" and Figure 3.5, "Selected Shaker Test Results at 0.8 m/s²" from the Vipac Report.

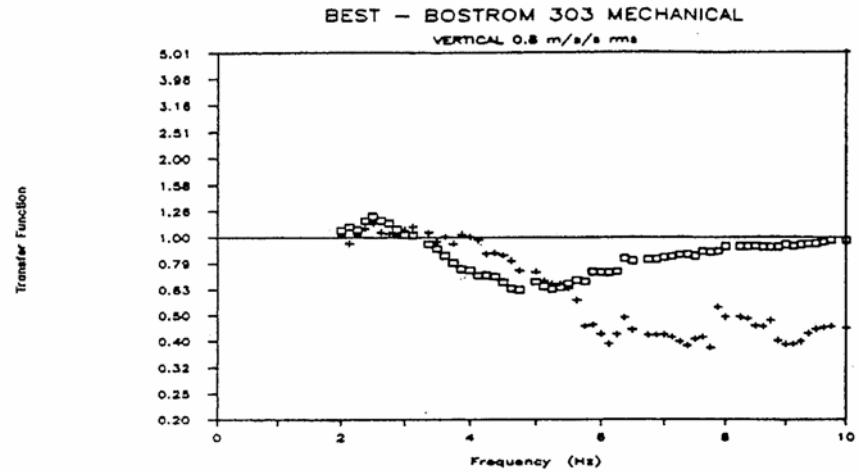
The best vibration isolating seat, in Figure 3.4, gives negligible reduction but only very little increase in vibration intensity on the seat as compared the base. The worst seat, at around $4H_z$ has a Transfer Function approaching 3, meaning the acceleration on the seat is approaching three times the intensity of that on the seat base at that frequency.

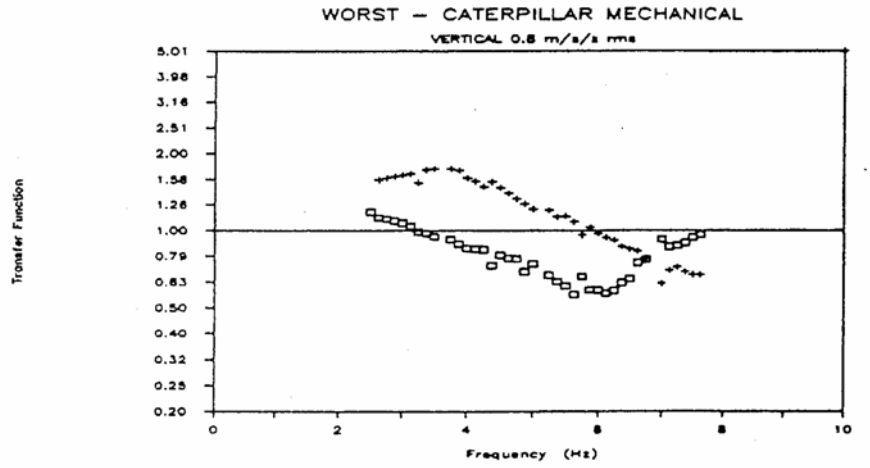
Consider the pluses since that represents the top of the seat cushion where the person sits. Of the six figures none shows any reduction in vibration below 4Hz, ie. all Transfer Functions below 4Hz are greater than 1.

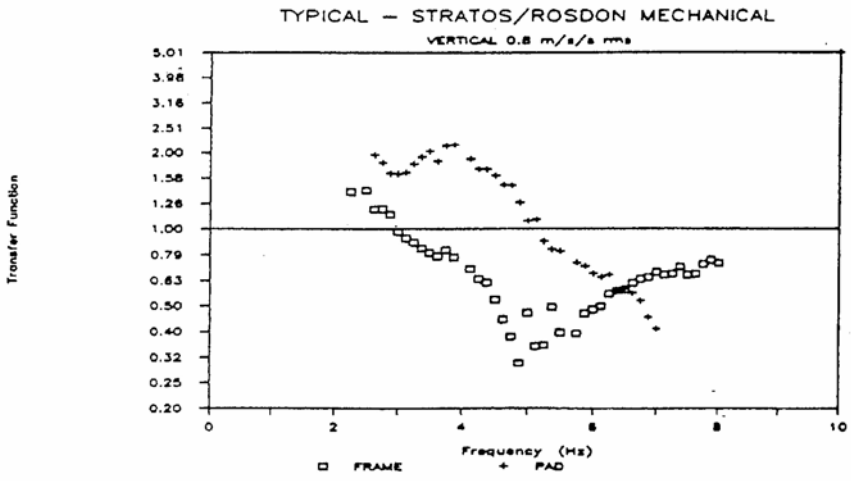

BEST – BOSTROM 411 MECHANICAL
VERTICAL 0.6 m/s/s rms
Transfer Function
5.01
3.98
3.16
2.51
2.00
1.58
1.26
1.00
0.79
0.63
0.50
0.40
0.32
0.25
0.20
0
2
4
6
8
10
Frequency (Hz)


WORST – BOSTROM 711 AIR
VERTICAL 0.6 m/s/s rms
Transfer Function
5.01
3.98
3.16
2.51
2.00
1.58
1.26
1.00
0.79
0.63
0.50
0.40
0.32
0.25
0.20
0
2
4
6
8
10
Frequency (Hz)


BOSTROM 303 – MECHANICAL
VERTICAL 0.6 m/s/s rms
Transfer Function
5.01
3.98
3.16
2.51
2.00
1.58
1.26
1.00
0.79
0.63
0.50
0.40
0.32
0.25
0.20
0
2
4
6
8
10
Frequency (Hz)
□ FRAME
+ PAD


BEST – BOSTROM 303 MECHANICAL
VERTICAL 0.8 m/s/s rms
Transfer Function
5.01
3.98
3.16
2.51
2.00
1.58
1.26
1.00
0.79
0.63
0.50
0.40
0.32
0.25
0.20
0
2
4
6
8
10
Frequency (Hz)


WORST – CATERPILLAR MECHANICAL
VERTICAL 0.8 m/s/s rms
Transfer Function
5.01
3.98
3.16
2.51
2.00
1.58
1.26
1.00
0.79
0.63
0.50
0.40
0.32
0.25
0.20
0
2
4
6
8
10
Frequency (Hz)


TYPICAL – STRATOS/ROSDON MECHANICAL
VERTICAL 0.8 m/s/s rms
Transfer Function
5.01
3.98
3.16
2.51
2.00
1.58
1.26
1.00
0.79
0.63
0.50
0.40
0.32
0.25
0.20
0
2
4
6
8
10
Frequency (Hz)
FRAME
PAD

Consider the Bulldozer given as the Risk Management example in the Plant Advisory Standard. Take Figure 7 from the ISO Standard showing the vibration spectrum for Dozers. Fit to it the Bostron 711 AIR – an air suspension seat which would be regarded as quite advanced. From 2 to 7 Hz the vibration will increase – 4 to 8 Hz is the sensitive range for people.

What result will the organisation achieve, and how will they feel about their efforts in putting in a "better" seat which gives a worse result?

Once again it is argued that the Risk Management Example, given in the Plant Advisory Standard, encourages the use of the Feeling/Valuing function. People can feel good about the effort, the consultation, the consideration and the expenditure put into the project. The Example does not promote the use of the thinking function.

Nowhere does the Example draw attention to the Australian Standard on Evaluation of human exposure to whole body vibration.

Nowhere does the Example draw attention to AS2955.6-1988 "Earth Moving Machinery – Tests and Measurements. Part 6 – Operator Seat – Transmitted Vibration" - the precursor to the draft ISO Standard included in this report.

Nowhere does the Example draw attention to the fact that seat transfer functions can be determined and are available to help selection of a seat with the most suitable vibration characteristics for the machine under consideration.

The above only provides a rough guide. Vibration measurements need to be taken from the machine in its application to determine the transfer function required for a vibration reducing seat. Measurement needs to be taken after the seat is fitted to confirm the performance.

Nowhere does the Example draw attention to the need to measure ride vibration.

The situation is still more complex since, while the Standards deal with continuous vibration, the method of assessing single shocks is in need of further development.

The origin and development of Standards, be they within Standards Australia, or within the Division of Workplace Health and Safety, and its associated committee, is of considerable interest. This author has been on Standards Australia Committees since the 1960s and has also had experience with the Division of Workplace Health and Safety. **Appendix 8** presents "Comments on Standards and Their Use" which gives some of this author's thoughts on the topic.

The publication in 1990 by Worksafe Australia of "The National Standard for Manual Handling and National Code of Practice for Manual Handling" led to the development of the word "Consignorance".

Consignorance is developed when a group of people use consensus to combine their collective ignorance while ignoring a significant body of scientific knowledge. The tragedy of consignorance is that it gives ignorance authority. The problem of the Worksafe document is discussed in **Appendix 4**, and is used to illustrate the Information Chain.

Unfortunately, as being advocated, promoted and used, Risk Assessment can be related to consignorance.

The author's over-riding experience is that there is a very great shortage of veridical knowledge of how people are killed and how they are permanently disabled. This results in a lack of knowledge of what to pay attention to and of what changes need to be made. It is critical that their knowledge issues be addressed. This is part of the "So Rare" discussed in Section 4 – Page 7.

This lack of knowledge is in no small part due to the lack of collective action of the State and Commonwealth Governments of making themselves accountable by accurate

recording of fatalities and permanent disabilities. Observation and description of these occurrences would go a long way towards developing veridical knowledge which would enable the thinking function to be used more.

On the 11th September, 1995 the Industry Commission submitted their report No. 47 Work, Health and Safety to the Assistant Treasurer, Parliament House, Canberra.

On Page 27, Volume I they state:

> "(Geoff) McDonald & Associates has questioned the current priorities in government and industry programs directed at prevention and research. Dividing outcomes into permanent incapacity (Class One), temporary impact (Class Two) and inconvenience (Class Three), they contend that:
>
> …..occupational health and safety is fundamentally a Class I problem. Despite this, it is normal for governments and insurance companies not to report figures on permanent disabilities in a meaningful way….Class I damage will come from a relatively few occurrences and only the very largest organisations will have previous experience and history which gives them any understanding of these occurrences. Smaller organisations, looking at their history, are likely to learn nothing useful to help prediction of their future Class I damage (1995, p.21).
>
> The Commission agrees with this assessment. Indeed, the Commission's estimates suggest that the hazards that are the focus of national standards are not those that would yield the greatest saving in costs to the community, for a given reduction in their risks."

The report was intended to influence governments to better health and safety activity. No evidence of activity to overcome the problems indicated in this statement has been seen.

G.L. McDonald M.E. B.Sc.

APPENDIX IV

“RESIZING THE SAFETY MANDORLAS”

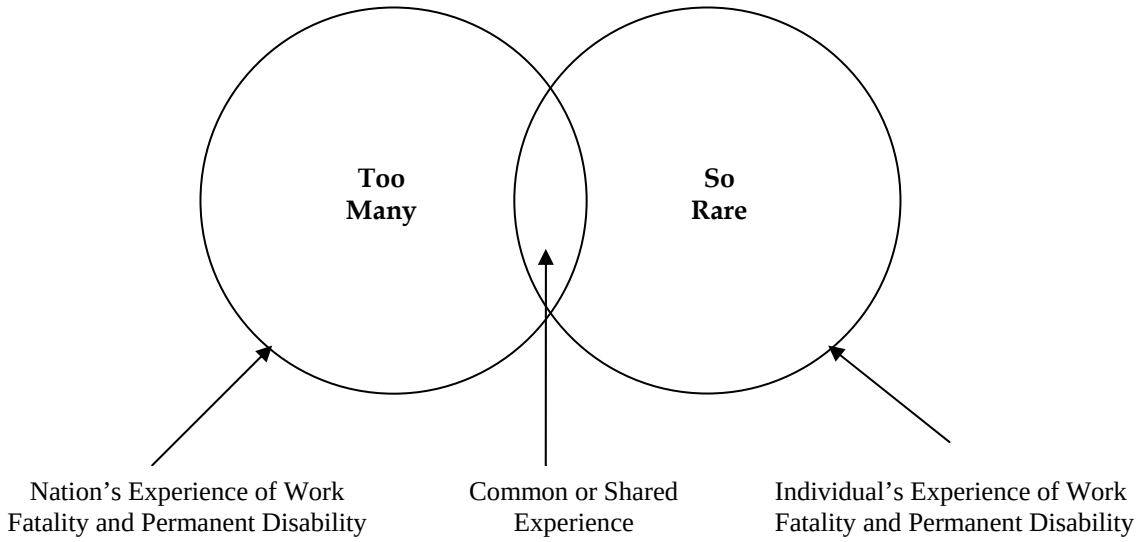
RESIZING THE SAFETY MANDORLAS

I. INTRODUCTION

A MANDORLA (Italian for almond) is the common area of two overlapping circles.

In safety there are two important Mandorlas. One, the Paradox Mandorla, represents the situation that there are far too many fatalities and permanent disabilities but these occurrences are so rare in an individual's experience that individuals lack both the motivation to make changes and the knowledge of what changes to make.

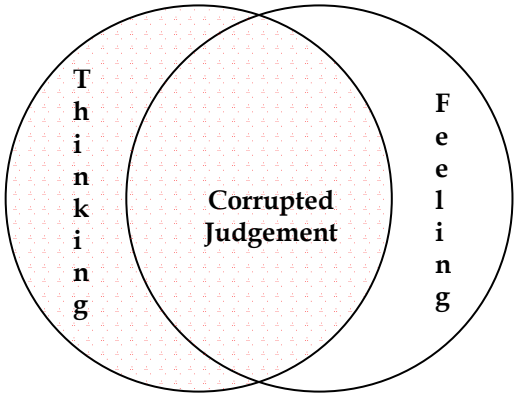
Figure 1 – Paradox Mandorla



The second, the Judgement Mandorla, represents the thinking and the feeling function, both of which are used to make judgements which lead to action. The thinking function involves the linking up of ideas by means of a concept and/or the use of concepts to integrate new ideas into an already linked up set (constellated, organised group) of ideas. Thinking is concerned with "truth" which is necessary if the physical energies of the world are to be controlled to avoid damaging people. The feeling function uses sub-emotional feelings via values to make judgements of the form "like or dislike", "acceptable or not acceptable", and is essentially concerned with "goodness".

Feeling corrupts Thinking (eg. by using value laden terms) and Thinking corrupts Feeling (eg. by attempting to rationalise how you feel). Inappropriate judgements come from corrupting one function with the other, or by using the wrong function, (eg. lack of factual information with which to think will lead to a feeling judgement).

Figure 2 – Judgement Mandorla



At present the Paradox Mandorla is very thin and the Judgement Mandorla is very fat. For effective and efficient safety at work The Paradox Mandorla needs to be fat and the Judgement Mandorla needs to be thin.

Thinking Judgements (truth) and Feeling Judgements (goodness) are both necessary, each in their own domain.

The use of the wrong function or the simultaneous use of both corrupts judgement and renders it counter productive. The large Mandorla represents the large amount of corrupted judgement which exists at present.

2. THE CIRCLES

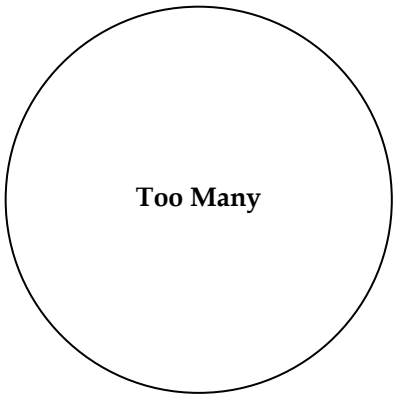
In order to understand a Mandorla it is necessary to first understand each of the circles which overlap to create the Mandorla. In considering the circles it is important to consider the content of that circle only and not allow aspects of the other circle to intrude into the consideration. The intrusion of one circle into the other is the territory of the Mandorla and will be discussed in Section 3.

2.1 The Safety Paradox Circles

The paradox is the apparent conflict between there being collectively far too much damage to people from work and there being individually far too little to provide motivation and knowledge for effective action to be taken. Consider the component parts.

2.1.1 National Experience Circle (Left)

Figure 3 – Left Paradox Circle



Nation's Experience of Work
Fatality and Permanent Disability

The left circle, helping create the Paradox Mandorla, is the Quantity of Damage to people from work.

The Industry Commission (1995) has provided the fullest description in its report to all Australian Governments on Work, Health and Safety. Its overall conclusions have been quoted but its detail has been ignored.

The cost of damage to people from work was greater than the contribution to gross domestic produce of the Mining Industry or the combined Agricultural, Forestry and Fishery industries, five times the cost of injurious and fatal car crashes, twice Defence expenditure, more than any State Government Budget and twice that of Queensland's. 82% of the total cost came from 13% of occurrences. 80.5% of the cost came from permanent disability and 1.5% from traumatic fatality.

Each day 137 people are permanently disabled from work in Australia, seven days a week, fifty two weeks of the year. Of the 50,000 people permanently disabled each year – 20,000 do not work again and 30,000 work reduced hours or with reduced skill. Identify a community, find out its population and calculate how long to permanently disable that population.

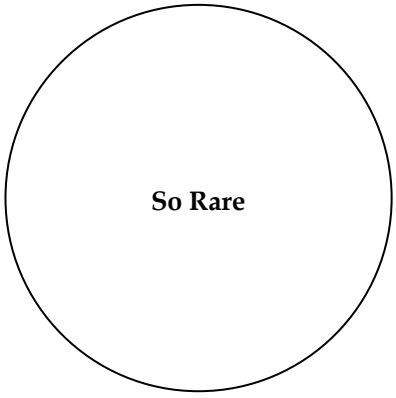
Fatalities are more difficult to estimate because of the effects of chemicals, asbestos and the like. The range is from 4.2 to 8.5 deaths per day or 1,550 to 3,100 per year.

Both deaths and permanent disabilities come from single traumatic energy exchanges, repeated damaging energy exchanges or continuous damaging energy exchanges. With the latter two, the personal damage develops progressively and is often relatively irreparable when identified.

The personal damage comes from a wide variety of energies and an even larger variety of mechanisms of damage.

2.1.2 Individual Experience Circle (Right)

Figure 4 – Right Paradox Circle



Individual's Experience of Work Fatality and Permanent Disability

The right circle, helping create the Paradox Mandorla, is the individual experience of damage to people from work. The number of person years for a fatality or for a permanent disability gives some idea of the majority experience.

The Australian National Institute of Occupational Health and Safety estimates a traumatic fatality rate of 5.5 persons per 100,000 person work years. This is one death every 18,200 person years. The people who die from progressive damage have often left work and lost work contact before they die. Their death is often only vaguely known to the workplace.

New South Wales is the only state in Australia which publishes figures for permanent disabilities. In 1998-99 fatalities occurred once in 39,400 person years according to NSW compensation figures. In 1992-93, the year for which the Industry Commission made its estimates, NSW compensation recorded one permanent disability per 588 person years. By 1998-99 it was one per 300 person years.
Work fatalities are rare events and permanent disabilities are relatively rare events. The majority of people at work will have minimal experience of either fatality or permanent disability. The majority of individuals will not be motivated by their own experience to expend a significant effort to reduce work fatality and permanent disability. Those who are motivated by their own experience to expend effort will have a limited knowledge of what needs to be controlled and how to do so.

2.2 Judgement Circles

This section is based on the author's experience which he recently found was consistent with Carl Jung's (1971) assessment of Personality Types. Jung identified two attitudes, Extraversion and Introversion and four functions set in two opposing pairs, Thinking and

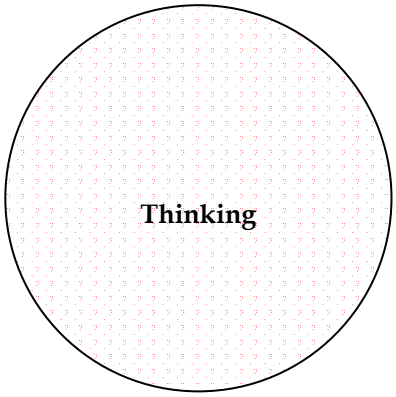
Feeling and Sensation and Intuition. In crude terms Extraversion and Introversion are whether the person's focus is generally turned outwards or inwards.

One pair of opposites, Sensation and Intuition, label the functions we use to perceive the world. Sensation involves the perception of the conscious world, Intuition the perception of the unconscious world.

We are here concerned with the Thinking and Feeling functions which we use to make judgements. All four functions are of importance and ability to use all four is desirable.

2.2.1 Thinking Circle (Left) - Description

Figure 5 – Left Judgement Circle



The following is heavily based on Jung's (1971) one page definition of "thinking" and his thirteen line definition of "apperception".

Thinking

Thinking is the psychological function which uses concepts to connect ideas in accordance with the laws of reason and of logic. Thinking is an activity which joins new ideas with similar already existing ideas so that they are grasped, understood and become clearer.

Active thinking is an act of will where a person, of their own accord and from their own motives, consciously applies their mind to understand a new idea and to actively absorb that idea into a group of ideas already formed together.

Passive thinking is an occurrence where new ideas force themselves on consciousness either from without (through the senses) or from within (from the unconscious). The new ideas compel the application of the mind and thereby lead to understanding.

In active thinking, also known as "directed thinking", ideas are submitted to a voluntary act of judgement.

In passive thinking, also known as “undirected thinking”, or “intuitive thinking”, concepts which link ideas together establish themselves of their own accord.

The distinguishing feature of thinking is the linking up of ideas by a concept. This requires an act of judgement. It does not matter whether that act was intentional or not.

The capacity for active thinking is called “intellect”.

The capacity for passive thinking is called “intellectual intuition”.

Active thinking is a rational process because it arranges ideas under concepts with a rational pattern of which the person is conscious.

[A concept is an abstract idea or an idea or mental picture of a group or class of objects formed by combining all their aspects.]

Passive thinking is an irrational process because it arranges and judges ideas by patterns of which the person is not conscious. The person therefore is unable to see that the thought is consistent with reason. Later the person may recognise that the intuitive act of judgement is consistent with reason although it first arose by a process that appeared irrational.

Thinking governed by feeling is not intuitive thinking but is thinking which depends on feeling. The thinking does not follow its own logical principle but is subordinated to the principle of feeling. The laws of logic and of reason are only apparently present. They are actually suspended in favour of the aims of feeling.

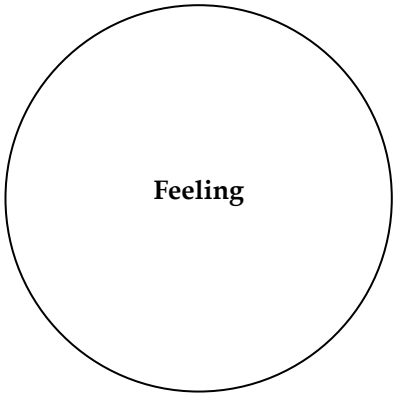
According to Jolande Jacobi (1968), who worked with Jung, thinking operates on the “true - false” continuum.

Briggs and Briggs (1980) state

> *“Thinking is essentially impersonal. Its goal is objective truth, independent of the personality and wishes of the thinker or any one else. ……. so long as the problems are impersonal like those involved in building a bridge or interpreting a statute, proposed solutions can and should be judged from the standpoint ‘true - false’ and thinking is the better instrument”.*

2.2.2 Feeling Circle (Right) – Description

Figure 6 – Right Judgement Circle



The following is heavily based on Jung's (1971) three page definition of "feeling" and his almost one page definition of "affect".
Feeling is the psychological process that takes place between the ego and a given content of the conscious mind which imparts to that part of the mind's content a definite value in the sense of acceptance or rejection ("like" or "dislike").

Feeling is an entirely subjective process which can be completely independent of external stimuli, even though it combines (allies itself) with every sensation.

Feeling is a type of judgement, differing from intellectual judgement. Its aim is not to establish conceptual relations as thinking does, but to set up subjective criteria of acceptance or rejection. These value judgements by feeling cover all of the content of consciousness, regardless of what it may be.

When the intensity of feeling increases, it turns to emotion. Emotion involves marked physical sensations from nerve activity and also a peculiar disturbance of the formation of ideas.

Even though the dividing line between emotion and feeling is very fluid there is an important difference. Every feeling can become an emotion by gaining in strength and releasing physical sensations. Emotion is clearly distinguished from feeling by these physical sensations from nerve activity. Feeling for the most part lacks this nerve activity, or the nerve firing is at a low level which can only be detected by delicate instruments. The important practical significance of the difference is that feeling can be a voluntary disposable function while emotion is usually not.

Feeling produces neither more nor less physical sensations from nerve activity than does thinking.

Abstract feeling is different from "simple" concrete feeling. Concrete or "simple" feeling relates to a simple unaggregated content of the conscious mind (a thing). Abstract thinking uses concepts which disregard individual differences between things and uses their "common pattern" to bring them together to give abstract understanding. Abstract feeling eliminates differences between particular contents of the conscious mind it is evaluating and produces a mood or feeling-state which relates to the abstracted commonness of those particular contents. This mood absorbs all the individual evaluations which are thus subordinated to the abstraction.

The more concrete a feeling is, the more subjective and personal is the value bestowed on it. The more abstract a feeling is, the more universal and objective the value will be.

Feeling is a rational function since values are generally assigned by use of the laws of reason, just as in thinking, concepts are generally formed in accordance with the laws of reason.

Thinking organises contents of consciousness under concepts.

Feeling arranges contents of consciousness according to their values.

Passive (undirected) feeling allows itself to be attracted to, or excited by, a particular content of the conscious mind. This content then forces the person's feeling to participate. Passive (undirected) feeling is feeling intuition which can give values to content without the participation of the person or even against their intention.

Active (directed) feeling involves a transfer of value from the person to a particular content of the conscious mind. The transfer entails an intentional valuation of the content in accordance with feeling – not in accordance with intellect.

Naturally the above definitions do not give the essence of feeling and only describe it from the outside. The intellect is incapable of formulating the real notion of feeling in conceptual terms. Thinking belongs to a category having no common factor (incommensurable) with feeling.

Jolande Jacobi (1968) indicates that feeling is concerned with the "agreeable – disagreeable" continuum. Briggs and Briggs (1980) argue that *"'Agreeable' is too pale a word for the rich personal worth of a feeling evaluation"*. In discussing the feeling function they state:

> *"But the moment the subject is people instead of things or ideas – and some voluntary cooperation from those people is needed – the impersonal approach is less successful. People (even thinkers) do not like to be viewed impersonally and relegated to the status of 'objects'. Human motives are notably personal. Therefore, in the sympathetic handling of people where personal values are important, feeling is the more effective instrument"*.

2.2.3 Thinking Circle (Left) – Application

A person suffers damage to tissue or function, and becomes impaired, as a result of an energy exchange which goes outside tolerable limits.

As a result of this damage, the person's life may be permanently altered (Class I damage), temporarily altered (Class II damage), or inconvenienced (Class III damage).

The damaged tissue or function can result in impairment to the person physically, mentally or emotionally. The person may be impaired in their personal functions as well as their work, family, community, recreational and other functions.

A Damaging Energy Exchange occurs as the climax of one or more sequences of events, which contain factors without whose presence the sequence cannot continue to the damaging climax (Essential Factors). Other factors (Contributory Factors) which, while not essential, make the damaging energy exchange more likely, by making it more likely that one or more of the essential factors will be present. All essential factors are equally important in terms of causation. There is no basis for selecting out any one essential factor and giving it increased importance over other essential factors by nominating it as the 'cause'.

Essential Factors nearly always include Behaviour, Design and Environment factors. The Thinking summary is that Behaviour Factors make an essential contribution to 100% of cases,

Design makes an essential contribution to 100% of cases and Environment makes an essential contribution to 100% of cases.

Contributory Factors vary from 1 to 99% contribution. Both Essential and Contributory Factors vary in their controllability. Controllability needs to be considered for short / long term and for specific / widespread application. Controllability includes such considerations as feasibility, implementability, reliability and durability.

The interest of safety is served by identifying as many as possible essential and contributory factors and selecting for action those with the highest controllability.

The sequence(s) of events and the damaging energy exchange are collectively called a Damaging Occurrence.

A Damaging Occurrence is the logical outcome of –

- the system of work
- the energy used or stored within the system of work, and
- the characteristics of the human (behaviour), machine (design) and environment

interacting within that system.

The damage to tissue or function can be the result of a single energy exchange (Type A), repeated energy exchanges (Type B), or continuous energy exchanges (Type C). With both Type B and Type C damaging energy exchanges no damage is manifest in the short term. By the time the damage is apparent, damage to tissue or function may be permanent.

The damaging energy exchange occurs during or as a result of a Task Activity.

What happens in the task activity depends on the Management Chain and the Information Chain.

The Management Chain extends from the community whose members can be damaged from work to –

- The Government, political and bureaucratic, whose role is to manage on behalf of the community to
- Industry Associations and Unions who represent the interests of their members (and interest in reducing Class I damage) to
- Boards of Directors / Owners to
- Chief Executive Officers and through the company structure to
- The person in charge of the task activity to
- The person performing the task.

Each level of the Management Chain is better able (efficiently and economically) to do some things than are other levels of the Chain. To the extent that any level of the Chain does not do what it is best able to do, safety will be adversely affected unless some other levels of the Chain undertake more activity (less efficiently and economically) to compensate for the shortfall at the other level.

Identification of essential and contributory factors in the ‘action replay’ part of the damaging occurrence predominantly identifies factors operating during the task activity. The

Management Chain can then be searched for essential and contributory factors which lead to the existence and presence of the 'action replay' factors.

Both the 'action replay' factors and the Management Chain factors can then be used to explore the Information Chain for essential and contributory factors leading to the presence of the factors previously identified.

The Information Chain extends from phenomena involved in damaging occurrences to

- an individual's veridical (true saying) understanding of the phenomena, to
- a wider understanding of the phenomena, to
- responsible outsiders (academic, professional, governmental) understanding, to
- responsible insiders (within organisational structure), to
- understanding by those involved in the task activity.

The Triple Energy Model shows how the above is predominantly concerned with the energies of the world i.e.

Communication Energy (low levels of energy) interacting with the sensory system, and involving

- information detection
- information processing, and
- decision making

by the human, machine or environment.

Control Energy, generally larger but still modest amounts of energy, which maintains the potential damaging energy under control e.g. grip of footwear on a walking surface, movement of a steering wheel, and grip of tyres on a road.

Damaging Energy can manifest itself through Type A, type B and Type C exchanges with the most common Class I damaging energy sources being gravitational, human (muscular), and machine energy (including vehicles).

The above is a brief summary of a system which can be used to provide a 'thinking' understanding of how people become damaged from work. The system in full requires clearly defined terminology, concepts and models which seek truth in accordance with the laws of nature so that

- energies can be managed to give effective communication and control
- the potential damaging energy exchange is avoided or modified
- only acceptable levels of personal damage occur to an individual.

A damaging occurrence can be identified and described in terms of essential and contributory factors. The identification of these factors should not be dependant on the personality or wishes of the thinker or anyone else, but will depend on their veridical knowledge of phenomena involved in damaging occurrences and on the organisational ecology within which they work.

2.2.4 Feeling Circle (Right) - Application

3. THE MANDORLAS

The Mandorla is the overlapping portion of two intersecting circles. It contains content of both circles. Each circle also has content it does not share with the other circle. Some of the stored material is intrinsically shared since it is naturally common to both circles. Other material may be shared, not because of its inherent properties but as a result of some other factors or activities which places the material in both circles.

3.2 The Present Safety Paradox Mandorla

There is one National Experience Circle. There are as many Individual Experience Circles as there are individuals. These individuals could be organised into groups according to their common patterns and individual differences.

The individual experience may be direct (they were damaged), as an observer (witness), second hand (told by someone else) or they may have learned or been taught either formally from institutions and professions or informally from the community's general knowledge.

3.3 The Present Judgement Mandorla – Present

3.4 The Effective Safety Paradox Mandorla

3.5 The Effective Judgement Mandorla

3.6 Resizing the Safety Paradox Mandorla

3.7 Resizing the Judgement Mandorla

4. WHO DOES WHAT

To be fitted in Consigning Consignorance and Consignoramuses to ?

APPENDIX V

“RISK ASSESSMENT – SHORT TERM EXPOSURE”

RISK ASSESSMENT – SHORT TERM EXPOSURE

While the principle of risk assessment is sound there are numerous problems in its use. These problems revolve around lack of knowledge, ignorance of available information, and lack of information which combine to cripple the thinking function. With its penchant for using its value to determine "acceptance" or "rejection" the feeling function takes over. The outcome of the risk assessment must then suit the values of the risk assessor or those the assessor reports to. The use of models on prescribed methods of making the risk assessment provide a façade to enable the feeling/valuing function to vitiate (corrupt or debase) thinking. And remember, Jung said that feeling is an entirely subjective process which in every respect may be independent of external stimuli and sets up subjective criteria of acceptance and rejection.

Two examples illustrate. Both show ignorance of the mechanisms of injury and therefore the potential for fatality and permanent disability. Both also show shallow thinking on exposure and use numbers to give a misleading impression. Start by thinking in terms of goals of fewer than one fatality in 100,000 designated years and fewer than one permanent disability in 30,000 designated years. Designated may refer to person, machine, (eg. tractor), or work role, eg. "welder". In the 1960s and 1970s there was one death per 3000 tractor years – 33 times the target figure.

In the first case, 1,200,000 vehicles had unloaded waste into a surge pit at a transfer station. An estimated 2,000,000 people had been involved in unloading these vehicles. Ten had fallen into the pit and two of these were treated at a hospital casualty unit. The assessment indicated that there had been a fall at the rate of 1 in 200,000, a casualty rate of 1 in 1,000,000 and a fatality rate of fewer than 1 in 2,000,000. The probability of an occurrence was seen as less than "conceivable (but very unlikely)" and more than "Practically Impossible". For users the probability was "conceivable (but very unlikely)". For both, the possible consequence was seen as "Casualty Treatment".

The second case involves a high speed water slide. The risk assessment was less involved. The number of rides down the slide and the number of "Incident Reports" completed were used to calculate the risk of injury. Figures varied between .0000189% and .0001158%. The figures were actually ratios and not percentages and gave the probability of an "Incident Report" being filled out. The figures looked very low, are relatively unintelligible and mean more if quoted as once in 52,825 rides to once in 8631 rides.

While there was slight differentiation of severity in the first case (no injury or casualty treatment) there was none in the second. Both confined there assessment to the installation history. In the first case there were 18 unloading bays (9 on each side) in use for 3.5 years giving 63 bay years. The fall is over a 2.5 m vertical concrete wall onto rubbish or concrete and potentially into the path of a bull-dozer operating in the 5 m wide pit.

The probability of a fatality, quadriplegia, paraplegia or brain damage from a fall (sometimes going over backwards) in 100,000 bay years (over 1500 times the sample size) would be exceedingly high as 15,000 falls could be expected.

The water slide involved entry into water at around 60 k/ph. It could result in penetration and rupture of body cavities and cases where one leg was torn back and the function of the pelvic girdle was severely disrupted were reported. The number of cases of actual or potential permanent disability reported from 26 water slide years leads to the conclusion that the potential for damage over 100,000 slide years was horrendous.

In both cases the number of cases, with each use being for a very short time, was used to generate numbers which indicated a low probability of an occurrence. Ignorance of or ignoring the mechanisms of damage avoided recognition of a high potential for fatality or permanent disability. These combined to give an unrealistic assessment and resulted in relative acceptance of the situations.

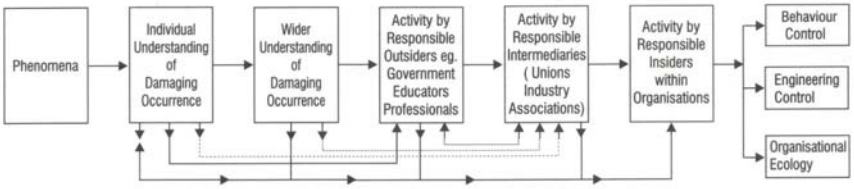
These examples are not intended to be critical of those involved but are presented as a combination of a process foisted on the community and industry without the development and communication of the content (knowledge and information) which is necessary to enable the process to work. There are many other ways in which the feeling/valuing function vitiates the thinking function in risk assessment. Even when risk assessment, formed or informed, determines action should be taken, lack of veridical knowledge results in ineffective action – eg. training in lifting techniques (straight back, bent knees) instead of limiting the bending moment on the spine.

APPENDIX VI

"INFORMATION CHAIN"
and
"MANAGEMENT CHAIN"

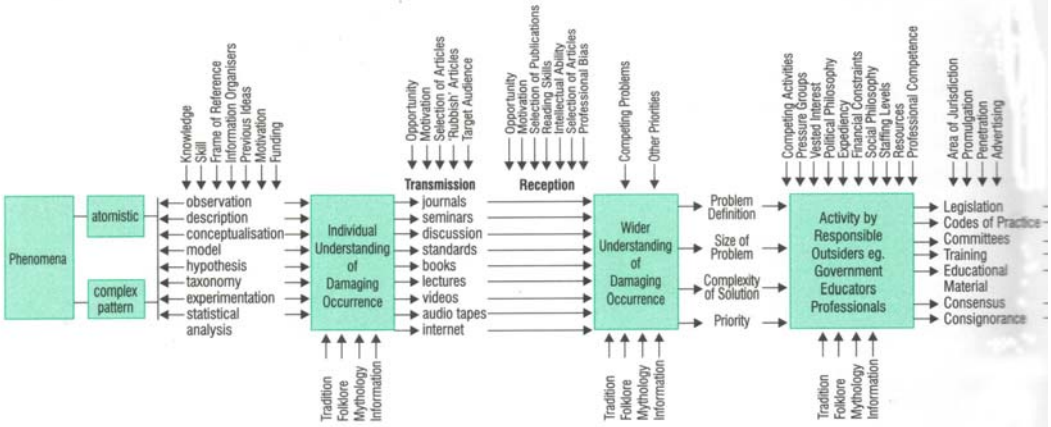
Information Chain – to be viewed with 2 pages joined together

Management Chain – to be viewed with 3 pages joined together.



Information Chain Summary

Information from phenomena needs to feed through to give change.
This information is the signal.
It is often weakened as it is transmitted.
Noise is introduced at every level.
The result is often a very low Signal / Noise ratio.



Information Chain

Only Veridical Information should influence the Task Activity (verus = true; dicere = to say)

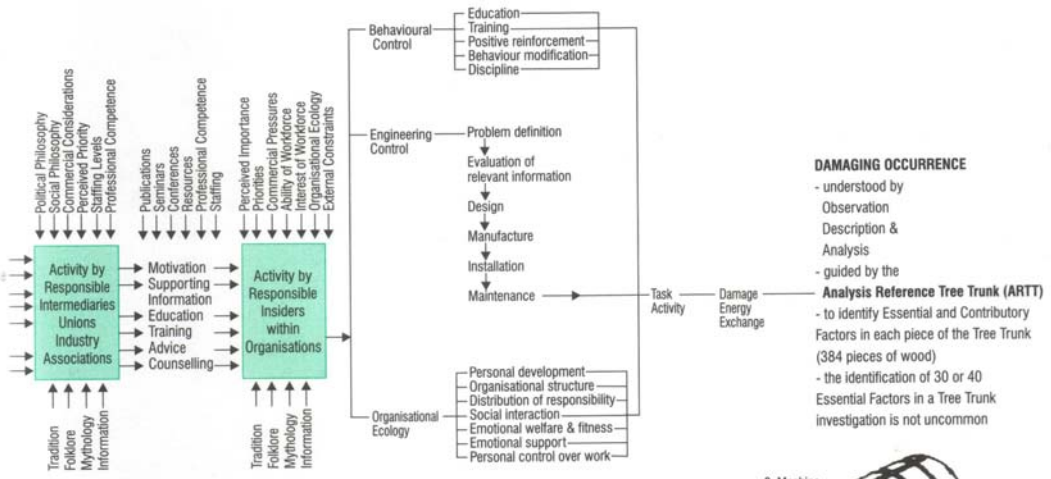
The processes by which information is transferred from one box to the next need to be identified as do the things which will act positively or negatively on the transfer. The information signal can be strengthened or weakened. Competing ideas need to be identified, so that they can be evaluated and, where appropriate, negated as they can introduce 'noise' which will reduce final signal / noise ratio.

If the information coming across the page is of poor quality (low signal / noise ratio), or spurious (wrong), forcing attention to it may be counter productive since it can cut out direct input of better quality and more relevant information.

Safety is fundamentally a Class I Problem

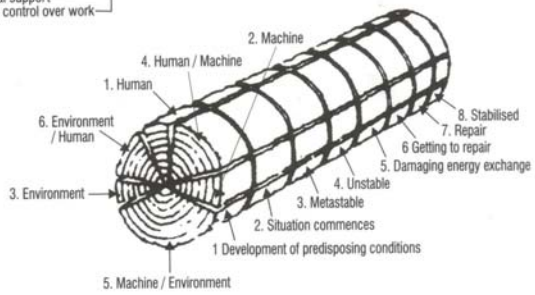
Use veridical information to predict and control

For further information contact Geoff McDonald & Associates Pty Ltd



DAMAGING OCCURRENCE

- understood by
  Observation
  Description &
  Analysis
- guided by the **Analysis Reference Tree Trunk (ARTT)**
- to identify Essential and Contributory Factors in each piece of the Tree Trunk (384 pieces of wood)
- the identification of 30 or 40 Essential Factors in a Tree Trunk investigation is not uncommon



Annular Rings :- 1. Metrological
2. Information Detection
3. Information Processing
4. Decision Making
5. Energy Giving
6. Energy Receiving
7. Social
8. General Adaptive

Class I damage - Permanently alters a person's life

Class II damage - Temporarily alters a person's life

Class III damage - Provides minor inconvenience

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Second Part of

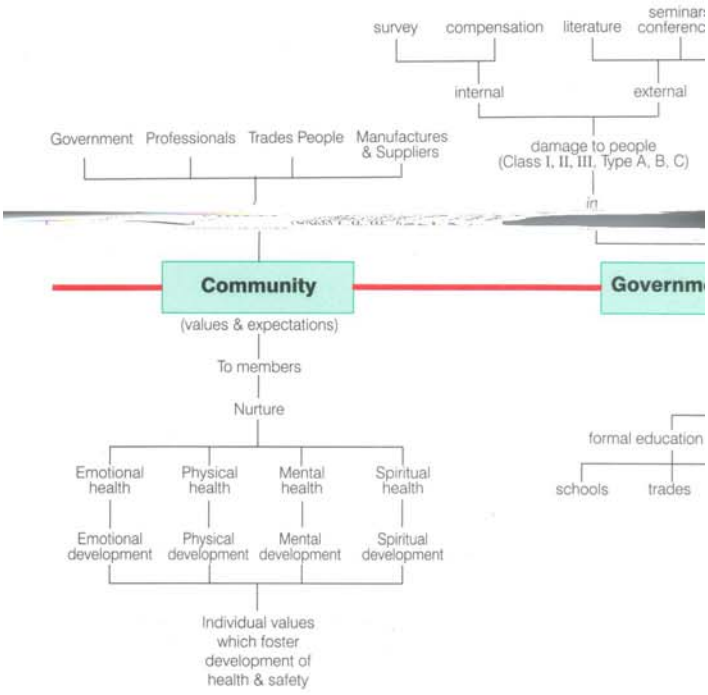
APPENDIX VI

MANAGEMENT CHAIN

Community Values & Expectations — Government & Quasi Government Bodies — Industry Association & Unions — Board of Directors — Management of Organisation

Management Chain Summary

Management of the Damaging Energy Exchange Potentials is und
activity at each stage needs to help maximise the appropriate acti
activity at any one stage to misdirect the activities at the next sta
creating frustrating experiences.

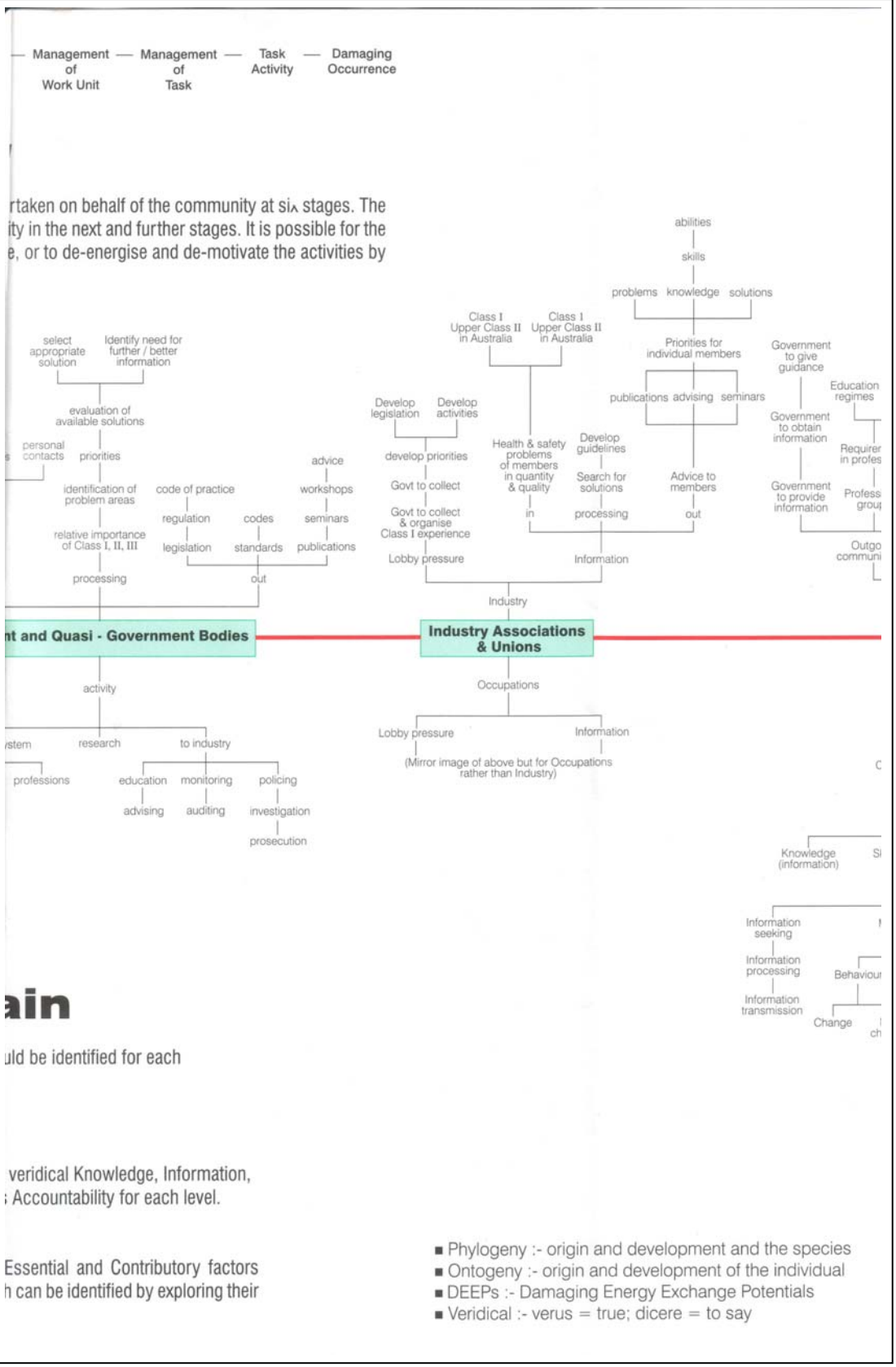


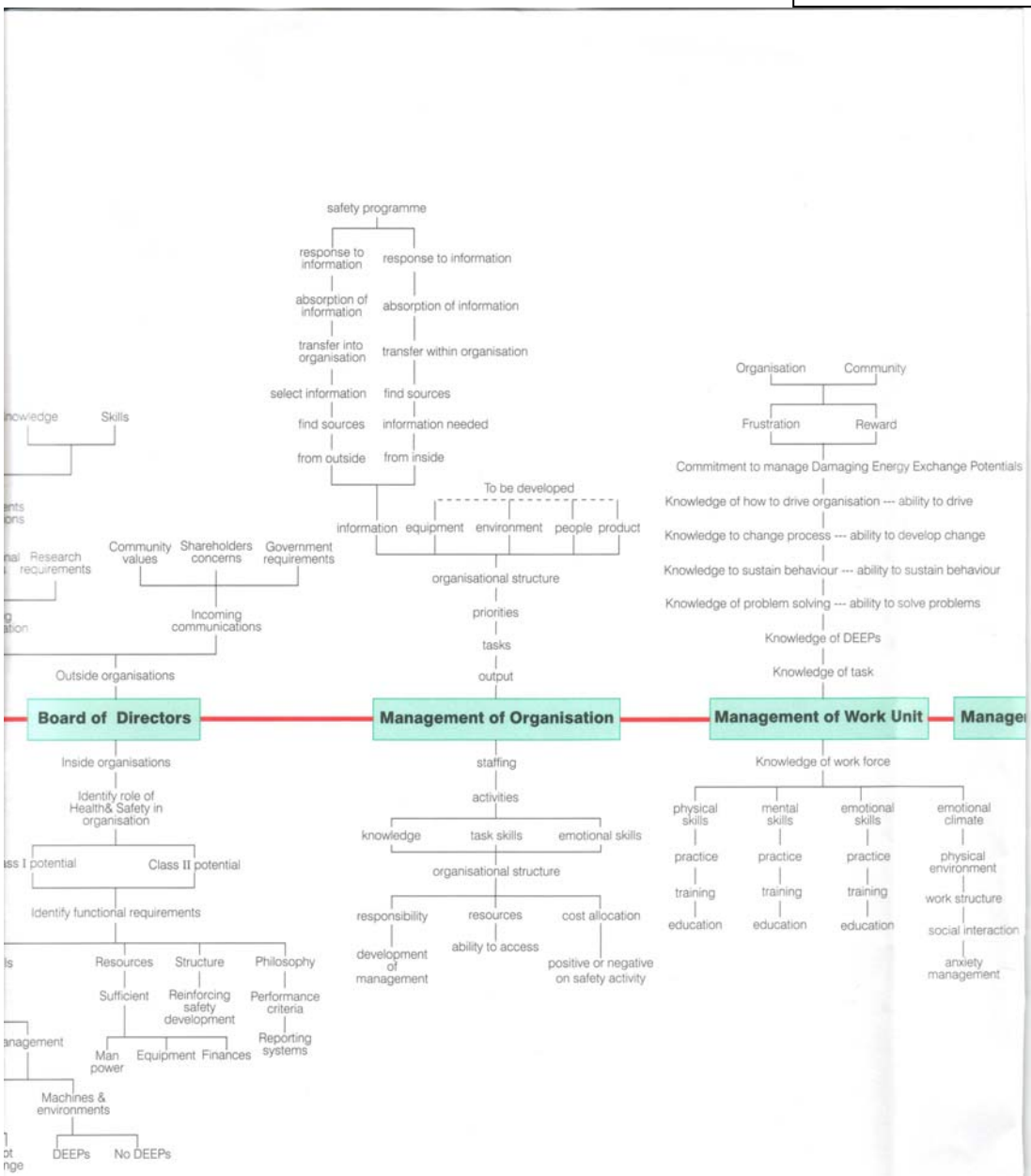
Management Cha

The Management Chain is illustrative and the specific chains sh
application.
The Management Chain can be used in one of two ways:-

1. Shaping Management Function
For identifying the required activity at each level and therefore th
Willingness, Skill and Resources necessary. This in turn identifie

2. Investigative Model
For complementing the Analysis Reference Tree Trunk Model.
identified with the ARTT Model exist because of other factors whi
origins in the Management Chain.

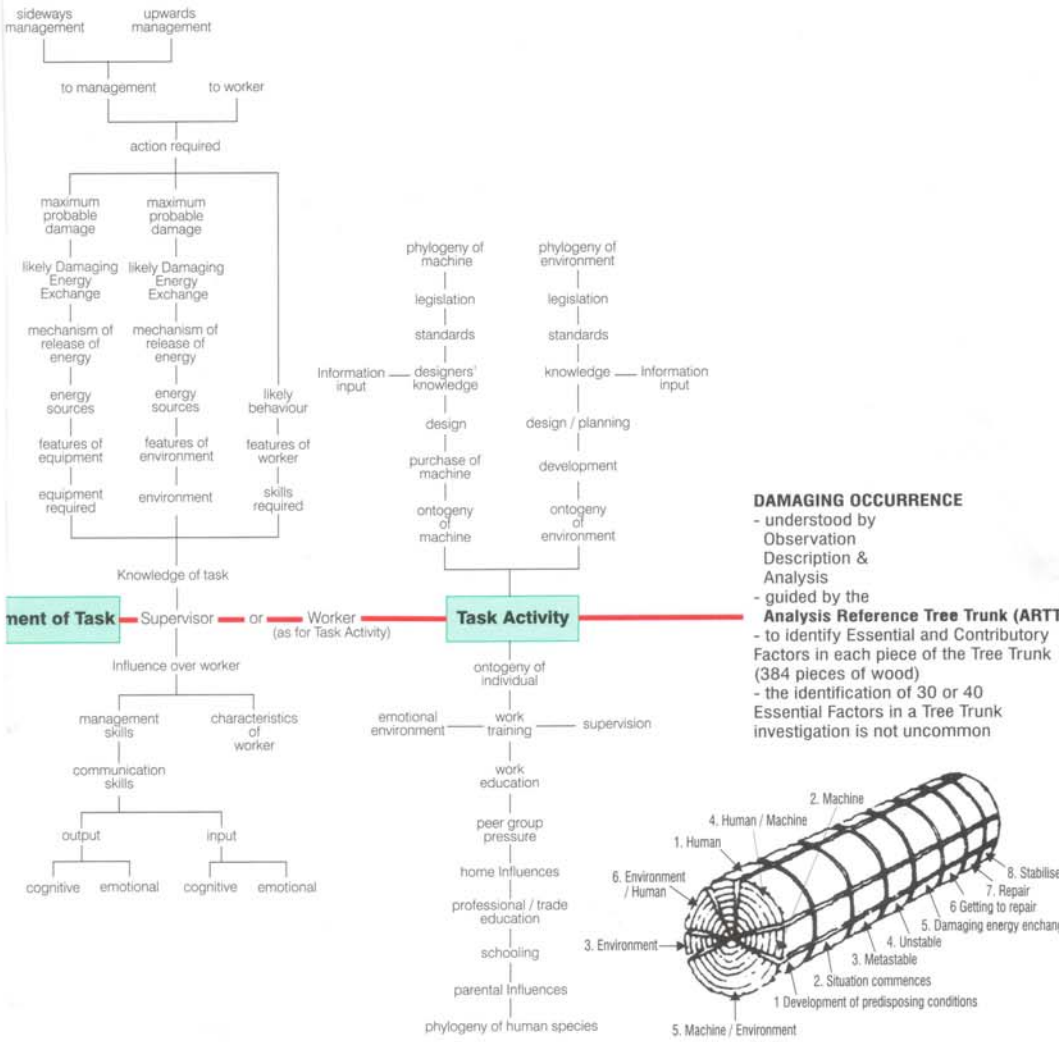

Management of Work Unit
Management of Task
Task Activity
Damaging Occurrence
rtaken on behalf of the community at six stages. The
ity in the next and further stages. It is possible for the
e, or to de-energise and de-motivate the activities by
abilities
skills
problems knowledge solutions
Class I Upper Class II in Australia
Class I Upper Class II in Australia
Priorities for individual members
Government to give guidance
Education regimes
publications advising seminars
Develop legislation
Develop activities
Government to obtain information
select appropriate solution
Identify need for further / better information
evaluation of available solutions
personal contacts
priorities
develop priorities
Health & safety problems of members in quantity & quality
Develop guidelines
Requirer in profes
advice
identification of problem areas
code of practice
Govt to collect
Search for solutions
Advice to members
Profess group
workshops
regulation
codes
seminars
Govt to collect & organise Class I experience
in
processing
out
Government to provide information
relative importance of Class I, II, III
legislation
standards
publications
Lobby pressure
Information
Outgo communi
processing
out
Industry
nt and Quasi - Government Bodies
Industry Associations & Unions
activity
Occupations
stem
research
to industry
Lobby pressure
Information
professions
education
monitoring
policing
(Mirror image of above but for Occupations rather than Industry)
advising
auditing
investigation
prosecution
Knowledge (information)
Information seeking
Information processing
Information transmission
Change
ain
uld be identified for each
veridical Knowledge, Information,
Accountability for each level.
Essential and Contributory factors
h can be identified by exploring their
Phylogeny :- origin and development and the species
Ontogeny :- origin and development of the individual
DEEPs :- Damaging Energy Exchange Potentials
Veridical :- verus = true; dicere = to say



Class I damage - Permanently alters a person's life
Class II damage - Temporarily alters a person's life
Class III damage - Provides minor inconvenience

Safety is

For further informat



Annular Rings :- 1. Metrological
2. Information Detection
3. Information Processin
4. Decision Making
5. Energy Giving
6. Energy Receiving
7. Social
8. General Adaptive

; **fundamentally a Class I Problem**

Predict and Manage

ion contact Geoff McDonald & Associates Pty Ltd

APPENDIX VII

“VERIDICAL ETHICS FOR WORK HEALTH AND SAFETY”

VERIDICAL ETHICS FOR WORK HEALTH AND SAFETY

Geoff McDonald M.E., B.Sc.
Principal Geoff McDonald & Associates

ABSTRACT

It is believed and argued that work, health and safety has not, is not, but needs to be ethically based. Attention should be directed to how to achieve the required outcomes. Ethics requires that the community, whose members are damaged know the extent of that damage absolutely and relatively. $20 billion Australian annually (92-93), twice the Queensland Government Budget, 2½ months of Australian retail sales, greater than Mining ($18.4 billion) or Agriculture, Forestry and Fishing ($17.2 billion), 5 times the estimated cost of injury and fatal road crashes. Ethics requires that the community know that 80.5% of this cost is from permanent disability, 50,000 people per year. Cairns in 31 months. Once a person is permanently disabled and treatment fulfilled, the cost has been created. It is only a question of how the cost is shared. Currently, Employer 30%, Individual and Family 30%, Community (via Social Security) 40%. It is ethical to focus effort on permanent disability (80.5%) and fatality (1.5%). The source of fatality is known but of permanent disability is not. Effort cannot yet be ethically directed. It is ethical to have feelings for and to value human beings. Jungians such as Johnson argue that of the four basic functions, intuition and sensation; thinking and feeling, our western community has developed logical rational, abstract thinking to a very high degree – but at the expense of the feeling/valuing function. It is ethical for people permanently disabled from work to be valued, honoured and respected by the activities of the community, the press and by the content of safety conferences. It is ethical for the community to both permit and demand that the government manage on its behalf and commit resources to produce outcomes – namely identify how people are killed and how people are permanently disabled and eliminates such occurrences. Some managers have a highly developed feeling/valuing function. How is this developed in others? It is ethical to have the feeling/valuing function energize and direct the logical, rational abstract thinking. This thinking must be based on veridical (true saying) information.

1 ETHICS

It has been argued that work health and safety has not, is not, but needs to be ethically based. The Oxford Dictionary and Thesaurus has the following entry under ethical

"Ethical. 1. *Relating to morals, esp. as concerning human conduct* ***2*.*** *Morally correct, honourable.* ***3.*** *(of a medicine or drug) not advertised to the general public, and usu. Available only on a doctor's prescription.* ***Ethical investment*** *investment in companies that meet ethical and moral criteria specified by the investor.*

Synonyms 2. Moral, correct, right, proper, just, righteous: honourable, decent, upright, principled, fair honest, good, virtuous, noble.*

Within the above definition and synonyms is a range of meaning and understanding of "ethical". On the one hand it is possible to define what is required for the conduct to be ethical. The conduct may be of an individual, a group, an organisation or a whole society. On the other hand there is a more general, abstract, pervading and absolute requirement for conduct to be ethical.

Both "hands" should be kept in mind as we explore what would constitute ethical conduct. Each "hand" should know what the other is doing. This requires that conduct and its outcomes are consistent with a set of values.

2. THINKING-FEELING FUNCTIONS

A framework helps clarify thinking about complexities and is needed here. But that I could so clearly write something to help us connect with and express our feelings in relation to complexities.

Carl Jung argued that the human personality has four aspects or functions, set in two opposing pairs. The first pair is thinking and feeling; the second pair is intuition and sensation. Jung, as quoted by Johnson (1987) described the four functions as follows:

"The essential function of sensation is to establish that something exists, thinking tells us what it means, feeling what its value is, and intuition surmises whence it comes and goes. Sensation and intuition I call irrational functions, because they are both concerned simply with what happens and with actual or potential realities. Thinking and feeling, being discriminatory functions, are rational. Sensation… rules out simultaneous intuitive activity, since the latter is not concerned with the present but is rather a sixth sense of hidden possibilities, and therefore should not allow itself to be unduly influenced by existing reality. In the same way, thinking is opposed to feeling, because thinking should not be influenced or deflected from its purpose by feeling values, just as feeling is vitiated by too much reflection".

If work health and safety is to achieve what is required, the thinking function will have to be used effectively. Establishing what is required and legitimising the necessary action is much more to do with the feeling/valuing function.

3. THE THINKING FUNCTION

Damage to people from work and other income earning enterprises could be seen as a problem requiring solution. Many models of problem solving have similar components including, identify the problem, identify the component parts and work out what to do with each of these parts.

Effective thinking must be logical and rational and, if dealing with complexity, abstract. Thinking should deal with "information". "Information" is fast coming to mean anything available on the internet – much of which is not true and therefore not helpful to think about. "Fact" has similar difficulties. A number of true facts can be combined to give a logical inference which is untrue. The incorrect inference is seen as true as a result of other true facts being omitted. Veridical information is required. "Veridical" comes from verus (true) + dicere (say) i.e.: "true saying" and is defined as (1) truthful (2) Psychol (of visions etc) coinciding with reality.

How work creates damage to people and the total extent of that damage needs to be known veridically, as do the type and origins of the damage.

3.1 Damage to People –Creation

Remove the feeling/valuing influences from thinking about how people are damaged. The terms, carelessness, accident, cause, blame, error etc must be removed because they have emotive and feeling/value laden components that distort thinking.
Logical, rational, abstract thinking leads to the following:

People are damaged as a result of one or more exchanges of energy which go outside tolerable limits.

1. The damaging energy exchange may be single, repeated or continuous. **2.** The damage is to tissue or function. **3.** Impairment can result from the damage. **4.** Impairment can give rise to disability. **5.** Impairment may permanently alter, temporarily alter, or inconvenience the person's life. **6.** The damaging energy exchange occurs as the climax to one or more sequences of events, collectively termed a Damaging Occurrence. **7.** In the events leading up to the climax are essential and contributory factors. **8.** An essential factor must be present to enable the sequence of events to continue to the damaging climactic energy exchange. **9.** All essential factors are equally important in terms of causation. **10.** No essential factors can be given increased status and importance over any other essential factors. **11.** Essential factors nearly always include Design, Environment, and Behaviour factors in any one Damaging Occurrence. **12.** Essential factors very in their controllability. **13.** Contributory factors do not need to be present but make the occurrence more likely by making it more likely that one or other of the essential factors will be present. **14.** Contribution can very from1 to 99 per cent. **15.** Contributory factors nearly always include Design, Environment and Behaviour factors in any one Damaging Occurrence. **16.** Contributory factors vary in their controllability. **17.** A Damaging Occurrence is the logical outcome of the system of work, the energy stored or utilised within that system, and the characteristics of the participants (design, environment, human), interacting within that system.

As such, the damage to people is a logical outcome, is predictable and is controllable.

This is the skeleton of logical rational thinking unaffected by distorting feelings and backed by abstract principles such as damage, energy exchange, control and communication. It provides the knowledge and working tools to enable damage to people to be reduced. It aids veridical appreciation.

3.1 Damage To People – Extent

A damaged person's life can be Permanently altered (Class I), Temporarily altered (Class II) or Inconvenienced (Class III). To the best of the author's knowledge the following is veridical.

Dr Jukka Takala (1999), Chief of ILO's Health and Safety Programme pointed out that the workplace hecatomb of[*] 1.1 million deaths exceeds the average annual deaths from road accidents (999,000) war (502,000) violence (563,000) and HIV/AIDS (312,000). He did not quote the figures for Class I - non fatal occurrences. They are not available.

Australia's Industry Commission (1995) estimated the cost associated with work damage to people in 1992-93 at $20 Billion dollars. 82% of the cost comes from Class I damage and 18% from Class II damage. Class I fatal cost 1.5% - less than one fiftieth of the cost of Class I - non fatal damage. To

[*] Hecatomb 1. (in ancient Greece or Rome) a great public sacrifice oig. of 100 oxen. 2. Any extensive sacrifice.

predict coarsely the total cost of Class I damage world wide is to think of over fifty times the hecatomb figure given above.

To give some logical rational meaning to such huge figures, comparisons are needed. $20 Billion dollars is approximately 5% of Australia's Gross Domestic Product, twice the Queensland Government Budget for that year, and five times the cost estimated by the Bureau of Transportation and Communication Economics (1995) of road crashes involving injury or death in the calendar year 1993. This comparison to road crashes may not be veridical since the road estimates did not separately cost Class I non-fatal crashes and may therefore have severely underestimated the total cost. $20 Billion dollars is greater than the gross product of two of our larger industries, Mining - $18.4 Billion and Agriculture, Forestry and Fishery combined - $17.2 Billion and 2.5 times Retail Sales which included dining out. Damaging people at work can be seen as one of Australia's largest industries.

The Industry Commission report put traumatic fatalities at around 600 per year, and between 650 – 2200 per year from cancer as a result of work exposure. The Class I - non fatal involves 39,728 who now work either with reduced skill or reduced hours per week, and 19,290 who did not work again. This means that 50,000 people per year suffer Class I - non fatal damage and that represents permanently disabling the population of Cairns in 31 months, or Bundaberg each year.

Once a person is damaged, only the quality of the repair and rehabilitation processes can alter the ultimate cost of the outcome. A variety of actions can be taken to alter the distribution of the cost of the outcome. The Industry Commission estimated that of the total cost associated with damage to people at work, 40% was carried by the employer, 30% by the individual and 30% by the general population through the Commonwealth Social Security.

3.3. Damage to People - Kind

In order to logically and rationally deal with the reduction of damage to people at work, it is necessary to know the kind of damage which occurs and the sources and mechanisms of that damage. Currently, information is collected nationwide, and compiled into a National Data Set, (Foley et al 1996), which classifies the occurrences and presents the information in a form consistent with those used throughout the world and with the International Labour Organisation. The types of occurrences are described by Nature of Injury or Disease – Bodily Location, Mechanisms, Breakdown agency. Figures 1 and 2 show mechanisms for 1994-95, Fatalities (Figure 1) and Injury/Disease (Figure 2)

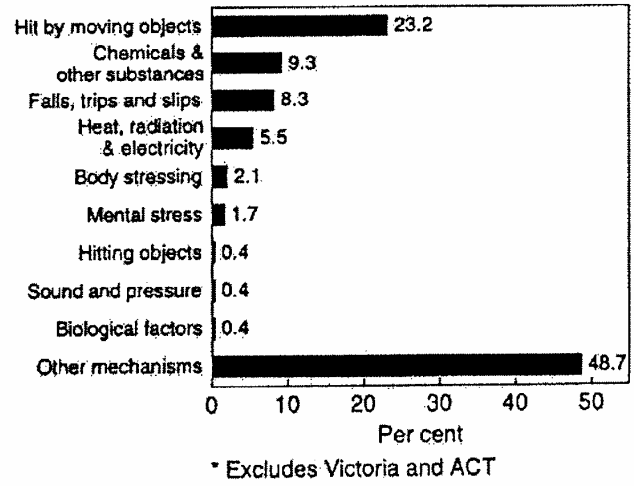


Figure 1 – Fatalities by Mechanism, 1994-95

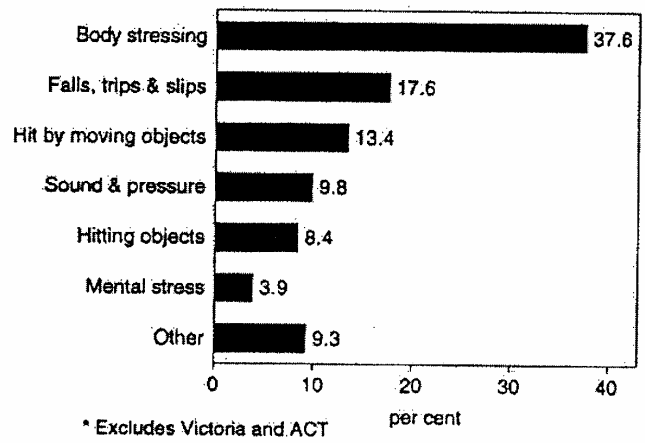


Figure 2 – Mechanism of Injury/Disease, 1994-95, Persons.

As a result of a recent study by NOHSC (1998), there is now available a very useful description of fatalities, that is the Class I - fatal occurrences. No overall description of the Class I-non - fatal occurrences, which make up 80.5% of the total cost of damage, exists.

There are difficulties in the use of the National Data Set. The origins of this system would be well worth investigating. Some of the classifications such as "falls to the same level" and "falls from height" are useful. However, being wounded by a knife during a robbery, amputating an arm with a portable circular saw and being injured while driving a spike into a railway track are all classified in the same group as "hit by moving objects". Grouping these into the one category does not help logical, rational thinking. It is an absurd abstraction. What happened to the railway fettler?

Any classification system needs to be developed out of the phenomena that are being classified. The classification system being used at the moment is, in logical, rational terms inconsistent with grouping on sound abstract principles. Any collection and classification of data needs to organise the data into a form to enable people to make helpful and useful decisions about action to be taken. Taxonomy, the method used to classify the living world including bacteria and viruses into species, family, phylum etc, provides a valid method for producing a veridical data collection system.

A taxonomic classification is based on observation and description, and recognition of common patterns and individual differences and gives considerable understanding of occurrences. Compilation of data into preconceived and disconnected tabulations is far less helpful.

4. THE FEELINGN/VALUING FUNCTION

Having been heavily disciplined to logical, rational, abstract thinking, by virtue of engineering and scientific training aiding and abetting a natural tendency, I am ill-equipped to champion the feeling/valuing function. It is probably not legitimate to attempt to explain the feeling/valuing function in logical, rational, or even worse, abstract terms. Since that is where I am grounded, I must inevitably start from there and attempt to move on. It is tempting to ask the audience or the reader to think carefully about what I am saying and describing in this following section. It is also wrong. What I should ask is that you feel and value, not think.

What is the feeling we have for people? In what way do we value people? How do we feel for and value an employee, a family member, a parent, a sibling, a child, a person in the community, as a member of a social group or club, a citizen of a nation or one six billionth of the human population on earth. Only aspects and roles of persons are considered. To feel for and value a person requires feeling for the individual with all their imperfections and their wholeness. To understand and predict behaviour of a person it is necessary to describe them physically, mentally, emotionally and spiritually. It would therefore seem logical to say that in valuing a person we should value the reality of the person, their physical being, their mental strengths, emotional complexity and depth of spirit. To do this is to invite people to make judgements, (is the person physically strong or physically weak?), which are probably irrelevant to the feeling/valuing function of the person as a whole. The judgements have relevance for the person in a particular role.

The feelings we have for and values we place on a person, family, group etc can vary from weak to strong and can be positive or negative.

4.1 Feeling/Valuing-Examples

Another way of approaching the feeling/valuing function is to observe, as best we can through our own biases and filters, the feeling and valuing which people exhibit towards others in our community. It is likely that often feeling/valuing is much more about the person doing the feeling and valuing than about the person supposedly creating the feeling or valuing. This brings us into the difficult world of what we project onto other people and how our feelings and values for one another are influenced by what we project onto them. It is much easier to feel for and value a person positively who helps us move towards and achieve our goals than it is to feel for and value positively a person who either impedes our progress towards our chosen goals or distracts us away from them. As a person progresses towards wholeness, this need for projection decreases and feeling and valuing takes a purer and more positive form.

There are many cases of parents whose lives have been very dramatically altered by the presence of a severely disabled child, with the disability sometimes being present from birth or inflicted by trauma or disease later in life. Under these circumstances a very strong feeling/valuing function can develop in the parent towards the child. The child may be physically significantly disabled, mentally well below the average function, and emotionally difficult, but the parents look beyond these disabilities and see some internal, indomitable spirit which they learn to appreciate and which leads to very strong feeling and valuing. This in large measure reflects the growth of the parent. This growth is nourished by the child.

Step back and contrast that type of feeling/valuing function with what is typically seen in industry.

The majority of managers I have met during over one third of a century in safety, have been polite to safety, a few have been disparaging, a few have been functional and a very few have been passionately effective. Passionately effective managers have usually had close experience with death or severe trauma early in their careers. . The feeling/valuing function is strong. Safety has been “sold” because it improves productivity or because it saves money. Safety action is also justified by a need to avoid being penalised or sued. Rare is the manager who says ‘I will take this action so no one’s body or life is mutilated’.

When a person suffers Class I - non fatal damage (permanent disability) devaluing occurs and negative feelings are generated. Typically a damaged person changes and adopts a different role. Their feeling of self worth and the value in which they hold themselves decreases. The strength of feeling for and value from their partner also apparently decreases

as the partner frequently leaves. The damaged person suffering chronic pain or suffering loss of emotional control after brain damage can challenge the feeling/valuing function strongly.

A significant influence in the devaluing and denigration is the emphasis on malingering and fraud. While these occur, they are a small minority and should not be allowed to detract from the lot of the permanently disabled. What does communication from the press reflect? Is it the problem of injury and fraud or our values?

5. THINKING-FEELING/VALUING – MUDDLED IN SAFETY

When the thinking – feeling/valuing model is applied to safety, interesting insights emerge. Historically the commonest and most popular model has seen "accidents" as being caused by carelessness, unsafe acts, or human error. Thinking has been distorted and confused by the use of words and models that create feelings. A negative feeling/valuing function has been applied where logical, rational, abstract thinking is required, 33 3.1 Damage to People – Creation.

"Improving productivity", "reducing costs", "a positive cost-benefit ratio" have all been used to sell and motivate safety. Here we see logical, rational, abstract thinking being applied to an area that properly belongs to the feeling function.

Negative feelings and values are often applied following an "accident". A person having been involved in an accident is typically found to be at fault and is devalued. If dead, they are often posthumously denigrated, if alive, employment prosects or promotional prospects are often severely reduced. These views have come out of the author's close contact and dealing with what are popularly believed to be "accidents", and which veridically are damaging occurrences. The feeling function is directed to devaluing the person (carelessness, unsafe act, error) and away from valuing the worth of the person: a worth inherent in each of us at birth.

Geoff McDonald & Associates have investigated over 6000 case histories of Class I damage, in significant detail. The vast majority of this personal damage is the by product of modern technology. Modern technology by and large improves our standard of living. Those people suffering Class I damage have been disadvantaged and disabled by the same technology. If these people and their dependants are not adequately compensated so that their life can continue as well as possible, these disabled people subsidise the standard of living of the rest of the community.

An initial Class I physical insult is followed by psychological, social and economic insult. I am not here arguing for any change in the 40:30:30 sharing of costs of damaging occurrences, but simply observe that this is a logical, rational, abstract measure of our feeling/valuing function in one aspect.

6. GENERAL ETHIC (FEELING/VALUING). SPECIFIC ETHIC (THINKING)

In the introduction following the definition and synonyms, it was observed that there was a general ethic and a specific ethic. This fits well with the thinking – feeling/valuing functions. The general ethic derives out of and is strongly associated with the feeling/valuing function. The specific ethic can be looked at logically, rationally, and abstractly, and measured according to a set of criteria. This specific ethic must be derived out of the general ethic. An ethical requirement is to identify and

appreciate the feeling/valuing function in general terms, so that specific ethical requirements can be developed. The specific ethic can then utilise the thinking function.

It is veridical to observe what has been done, to determine the feeling/valuing represented by that action and to identify the specific ethic manifested therein.

For many years safety performance has been measured by the Lost Time Injury Frequency Rate. How was this measure derived? The measure does not correlate with and is not predictive of fatality and permanent disability. The measure takes no account of the personal loss of the individual, the loss of the function to themselves, the loss of the function to their family or the loss of their function to the community. It regards and measures only their loss of function to the employing organisation. The measure reflects purely a person's value to the organisation. The dishonesty in the application of the lost time injury frequency rate means that the measure does not even do this reliably. Seen in this light the measure is devaluing. The L.T.I.F.R. devalues the person and devalues the organisation. The agreed standard measuring method, Standards Australia (1990), also devalues a life or permanent disability to the working days of one year – 220 days. Does this reflect or measure our feeling/valuing function. The mean age of traumatic deaths, 1989-1992, was 37.5 years. The average days of living lost for a death would be in excess of 13,000 days. Had the general ethic been used to derive a specific ethic, a veridical measuring system could have been derived which better reflected our feeling/valuing function and guided our thinking function. This is still needed.

7. UNTO CAESAR WHAT IS CAESAR'S

Logical, rational, abstract thinking would reason that such thinking should be applied to the areas appropriate to it, and that the valuing/feeling functions should attend to areas appropriate to them. The thinking function should be applied to such areas as Damage to People – Creation (3.1) where the terminology and concepts need to be devoid of feeling and valuing, so thinking remains undistorted. Damage to People – Kind (3.3) can also be dealt with in a logical, rational, thinking framework, of observation, description and classification (Taxonomy) and not in the disconnected absurd method of preconceived categories currently used. Damage to People – Extent (3.2) calls in strongly, the feeling valuing functions. It is with great skill and feeling that Takala has used "hecatomb". This is a symbolic and ritualistic word and therefore has power far beyond that of logical rational words. Let the word "hecatomb" – a great public sacrifice", sink deep into your spirit.

Most of us are unaware of the significance of symbolic and ritual terminologies such as hecatomb. We live in a Western society where we have been heavily influenced by science, and where those with a much fuller understanding of the feeling/valuing function than I, argue we have become relatively disconnected from the feeling/valuing function. These functions have to do with the depth of spirit within a person. In drawing attention to this I am not speaking in a religious context but in a context of a deep inner part of our lives which, if not respected and honoured, will eventually demand our attention. We are confused between our thinking and feeling/valuing functions in safety. Historically we have applied the functions wrongly. This and the excessive use of negative feeling functions and inadequate use of positive feeling functions treat our inner being with disrespect, and devalue ourselves as well as our fellow humans.

If we are to positively value and feel for ourselves and for others we must surely respect and honour those affected by Class I damage. The community must know the meaning of Class I damage in the lives of individuals and our communities. In knowing, the community will surely both permit and demand far greater action so that managers are respected and honoured for saying, this action will be taken so that no-one will have their body, or their life mutilated. Veridical information will need to be sought and applied so that the expenditure of monies and effort is not directed by non-veridical ideas.

Veridical ethics for work health and safety can only be established by getting into intimate contact with our feeling/valuing function to identify our general ethic' and by using our thinking function to develop a specific ethic. Action can then be taken within this ethical frame work.

Lack of R.O.P.S. and access platforms on tractors, absence of guards on machines, use of slippery flooring surfaces, inadequate access to mobile equipment, manual handling of excessive loads, and a host of other safety deficiencies do not exist because of cost or technical difficulty. They exist because the collective and individual feeling/valuing function is not strong enough, and in part, because we have muddled the function.

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