SUPPLEMENTARY SUBMISSION TO THE PRODUCTIVITY COMMISSION INQUIRY

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

by

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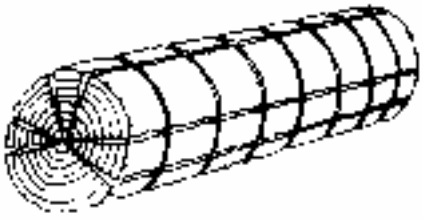

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1. ESTABLISHING A FRAMEWORK

1.1 NECESSARY RECOGNITION

For acceptable progress to be made the following must be recognised.

i). Damage to a person at work can
- permanently alter their life (Class I) - death, permanent disability
- temporarily alter their life (Class II) – lost time injury
- result in inconvenience Class III – medical treatment

ii). Work Health and Safety is fundamentally a Class I problem.

iii). Both Process and Content are necessary.

iv). What is done must be based on a thorough knowledge of what actually happens in a damaging occurrence.

v). Both the thinking function and the feeling function have important roles to play – each in its own domain without corrupting the other.

vi). It is important to maximise the role of the thinking function in understanding damaging occurrences and the options for control.

vii) It is important to maximise the role of the feeling function in understanding the effect of Class I damage on the individual, family, friends, community etc.

viii) To maximise the thinking function, the personal damage must be seen as the result of a Damaging Energy Exchange which occurs as a climax to one or more sequences of events made up of both essential and contributory factors (many of them).

ix) To maximise the feeling function, the effect on the damaged person, their family, relatives, friends and community must be seen in much more than financial terms and the life alterations which occur must be appreciated.

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x) Both (viii) and (ix) can only be achieved by competent people, equipped with appropriate veridical knowledge and appropriate models and methodologies making case by case studies to identify the phenomena involved. Epidemiological statistical studies may then follow.

xi) The combined effort of Government, Employers and Employees increased the rate of permanently disabling people by a factor of 2.3 between 1992-93 and 2000-01 when in 1992-93 Permanent Disability accounted for 80.5% of the cost of work damage to people.

xii) The major increase in permanent disability indicates a misdirection of Government resources and a misdirection of industry resources by the Government.

xiii) A widespread view of those permanently disabled from work is that they are fraudulent malingerers dishonestly trying to "rip-off" the system.

xiv) This view is strongly based on the self serving publicity and public relations efforts of insurance companies, some of which are Government owned and Government backed.

xv) The dishonouring and persecution of the permanently disabled has origins going far back in time and including the wretched history of Minnamata disease skilfully presented as a photo essay "Minnamata" by Eugene Smith.

1.2 MANAGEMENT CHAIN

The Management Chain was noted on page 26 of my original report and presented in Appendix VI.

This Management Chain presents a single line from Community through Government, Industry Associations and Unions, then through organisational structure to the management of the task activity (usually by the worker) during which, or as a result of which, Class I personal damage occurs.

The model could be elaborated by side chains to include suppliers of goods or services. This could be developed as a second stage if necessary.

A preferred option is for each organisation to manage and organise to minimise the potential for Class I damage to:

- Employees
- Customers
- Visitors and Bystanders
- Members of the Community

An organisation should not wish to kill or permanently damage anyone and should be enabled to take action to minimise the probability of such occurrences.

A brief indication of the requirements from each level of the management chain is given below.

1.2.1 Community

The community at large must know the extent of Class I damage to people from work. It should also know how this damage affects individuals in the community and the various groups (family, friends, neighbourhoods and clubs etc.) which make up the community.

The community should not require the permanently disabled and dependants of people killed as a result of work, which improves the standard of living of the community, to subsidise its (the community's) standard of living by being inadequately compensated.

Ideally the community would provide its members to work in organisations which are efficient and effective in minimising the potential for Class I damage.

The wide range of organisations employing people makes it unlikely that a sufficient number would be able to organise and co-ordinate or be self motivated to achieve acceptable minimisation of Class I personal damage.

The community will therefore have to rely on Government to manage the problem on its behalf.

The community should expect to pay for this management as part of its responsibility to its members.

1.2.2 Government and Quasi-Government Bodies.

The Government has three responsibilities:

(i) Manage Work Health and Safety on behalf of the community.

(ii) Be an active participant in the process necessary to enable other levels of the management chain to work effectively.

(iii) Minimise the likelihood of Class I damage to its own employees.

As part of its Management Function the Government should:

(i) Identify the Class I damage problem in extent and kind, and both financial and human terms. This is what needs to be managed.

(ii) Communicate the Class I damage problem in extent and kind to the community until the community broadly understands the problem in both human and financial terms.

(iii) Develop an Ultimate Measure of Safety Performance for the Nation – see Section 2.1.

(iv) Facilitate the development of Intermediate Measures to enable individual organisations or work units to measure how well they have developed towards minimising Class I damage from their operation – see Section 2.2.

(v) Develop general control actions – see Section 3.1

(vi) Develop specific control actions – see Section 3.2.

One of the specific areas which should be confronted is Manual Handling which accounts for 35% of permanent disabilities. The World Health Organisation has declared 2000-2010 to be the "Bone and Joint Decade" which should invite and encourage Nationwide activity to improve the lot of bones and joints. This should include major efforts on manual handling. I am unaware of any major efforts on manual handling under the decade banner.

For the Government's role as a participant in the Management Chain, the most obvious need is for detailed knowledge of how people become permanently disabled. More detail is given in Sections 3.1 and 3.2. The Government is in a better position than other levels of the management chain to organise the collection of such information.

There would usefully be recognition of the Management Chain with the facility for each level of the chain to transfer problems to the level which could most effectively and efficiently deal with that problem.

The priority for Government as an employer is minimising the likelihood of Class I damage to its own employees. Government Departments throughout Australia could collectively identify and quantify the potential for Class I damaging occurrences and develop methods for assessing the quality of the predictions and how effective implemented solutions are or will be.

There is also the option for the Government to innovate health and safety solutions in its own departments which are better resourced intellectually and financially than are many other organisations.

Similarly, the Government Departments could use their purchasing power to require design features necessary for safety and appropriate information for safe use of items. For example, sales literature of ropes gives the rope breaking strength but does not indicate a 40% loss in strength when knotted and a factor of safety for severe use of 9, meaning that under those conditions the rope can carry only 6.7% of the breaking load published in the manufacturer's information.

1.2.3 Industry Association and Unions

First it should be recognised that these groups act on behalf of a limited number of employers and of employees. They nevertheless have important roles to play. As both groups have other interests they must represent, it is important, as with other groups, that adequate veridical information is available to them.

Unless they also contain a research group their major role is transferring information from their group to other groups and of setting the health and safety requirements in a broader context.

Each can also play a major role in educating its members.

Additionally they can draw attention to problems which arise and are not yet identified.

The problem of employers not a member of an Industry Association is of particular importance.

The vast majority of organisations in Australia do not have the resources (financial and intellectual) to predict their potential for Class I damage and develop control strategies. It is also inefficient for a thousand or so similar organisations to all independently make predictions and develop control strategies. When and how is this best done for them?

1.2.4 Board of Directors

I'm running out of time and energy to develop this further but the Management Chain gives an illustrative outline for large organisations.

Remember the owners of small organisations functionally need to do the same thing but do not have the resources. Again it is uneconomic for many similar organisations to separately make predictions and develop solutions.

1.3 INFORMATION CHAIN – VERIDICAL

- Veridical comes from versus = true and dicere = to say.

One of the greatest short comings in Work Health and Safety is veridical knowledge and information.

Information and knowledge are not necessarily true. The individual may well believe particular information and knowledge to be true. The strength of their beliefs does not influence whether or not the belief is true. Gallegos' (1991) observed "…… *and by truth I mean the best possible alignment that words can have with the way the universe works.*" Assume that "words" includes numbers.

Assume a person's knowledge is what exists in their head and what is readily accessible to them via books and contacts they know and trust. The content will have been formed by both the "thinking" function and the "feeling" function.

Incoming information will only be admitted to and integrated into a person's knowledge if it makes "sense" to them and lines up with their experience – and then only if it is seen as relevant to them in several different ways.

The perceptual set of the majority of the community is that people are injured in accidents; accidents are caused by human error (carelessness); it is usually the person injured who erred; therefore it is their fault. The person should have behaved better and should accept the consequences of their action. Where information does not fit this model it is progressively modified until it does.

In my experience people who were killed or severely permanently disabled were at the time recognised as having been top class operators (that is when I first knew of the occurrence). Years later, back at the same organisation I'm hearing how incompetent the operator was. This is part of the "it can't happen to me" defence mechanism which also spawns specific mythologies which are based on partial truths but serve to perpetuate activities which will produce Class I damage.

It is within this complex the Information Chain must operate.

1.3.1 Phenomena

There is a wide range of phenomena which needs to be understood for effective and efficient control measures.

These range from the mechanism of damage of a lumbar disc through repeated lifting; to the area of contact of a heel strike when walking on a Pebblecrete surface and the effects of friction and hysteresis on grip; to the function of the human perceptual system which determines what is likely and what is not likely to be detected and processed; and how this may or may not lead to a decision.

Many of the phenomena involved in damage to people are poorly understood, including by those who would term themselves professionals in the field of Work Health and Safety.

The first need in this area is to identify the phenomena which are involved in damaging occurrences, eg. foot placement on stairs and on truck access pathways.

1.3.2 Individual Understanding

It is first necessary for an individual understanding. Some of this understanding will come from field work, investigating damaging occurrences (eg. that longitudinal vibration of a vehicle can result in vertebral end plate fracture in the thoracic spine as a result of the compressive load from the back muscles trying to stabilise the spine). Others will come from laboratory investigating (eg. Adams & Hutton's (1985)) observation that repeated loading of a flexed lumbar disc results in triangulation of the gelatinous disc centre. This negates the disc strength findings of all previous tests which statically loaded cadaveric discs where the gelatinous centre would have been oval, paralleling the outer shape of the disc).

1.3.3 Wider Understanding

The Information Chain Diagram lists a wide variety of factors which influence the development of understanding at the various levels. These should be regarded as illustrative rather than definitive. In developing the wider understanding it is important to ensure the significance of the phenomena is understood. Two examples illustrate.

Molten aluminium has the potential for producing devastating explosions. Many of those working in the industry did not recognise the potential. Aluminium has a strong affinity for oxygen and the chemical reaction of producing Aluminium Oxide is strongly exothermic. There are, from time to time, explosions in aluminium plants where water is enclosed by molten aluminium. The resultant rapid conversion of water to steam can give strong explosions. However, the greater potential is that the primary explosion can produce a myriad of fine droplets of aluminium so that the ratio of surface area to mass is very high. The heat generated by oxidation of the surface is much greater than the heat storage capacity of the droplet. A violent explosion results with devastating results. On a weight basis the fine droplet explosion is more powerful than many conventional explosives.

A group of engineers and industrial hygienists were considering tests to develop a procedure for people to enter and clean enclosed spaces. They decided to have no forced ventilation for the initial trials. The cleaning agent had a relatively high vapour pressure at room temperature and its flammability limits were fairly low. The agent was to be sprayed on by a hand activated spray bottle. No one had registered that a highly volatile chemical with low flammability limits would rapidly have a dangerous concentration when sprayed into a confined space with no forced ventilation. Laboratory tests showed that three to four pumps would have put the concentration into an unacceptable range in the space under consideration.

The people developing the test methods could see the numbers indicating vapour pressure and those indicating flammable region but did not translate these to mean “evaporates very easily and explodes at low concentration”. They did not see forced ventilation as the primary protection. These were competent, capable people.

There is a skill to be developed in making phenomena better understood.

In grain storage facilities there are regular cases of people being “sucked into” the grain. Stationary grain has a fairly high shear strength and can support concentrated loads – eg. feet. When grain starts to move the grain shear strength rapidly drops to close to zero and the grain cannot support concentrated loads. The person falls

through the grain as they would fall through water, but without the resurfacing potential. They are not "sucked in".

Models illustrating these phenomena would be beneficial for those working in the industry. In many cases people need to see and experience phenomena before they are meaningful.

1.3.4 Responsible Outsiders

There is a great need for a better understanding by responsible outsiders of how people come to be killed or permanently disabled.

A professional person in safety (this argument does not apply to some areas of health) should have, as the core of their knowledge, a thorough understanding of how people come to be killed or permanently disabled. It is understood that some universities, at least in Postgraduate Occupational Safety Courses, have no course material covering this area, but that the whole of their curricula is devoted to management studies. Logically their graduates are managers – not safety specialists.

Inherent in the Roben's systems, as implemented, is a strong belief that the workforce knows what is or isn't dangerous. The workforce does not.

As explained elsewhere, Class I damaging occurrences are majorly outside an individual's experience and cannot be widely or professionally known unless they are collected together and presented. Tertiary institutions and professional associations have an important role in this.

1.3.5 Intermediaries

These have a role of pumping information both ways on the Information Chain by pushing for opportunities for people to better understand phenomena involved in problems they encounter in their members' activities, and in making better quality information available to their members.

1.3.6 Insiders

In large organisations insiders can effectively use information to develop better systems, methods etc. In small organisations most of the information needs to be processed and utilised before it gets to them. They need to be "told" what they need to do. They will not have the resources to make effective use of raw information.

The development of better information leading to a fuller understanding of how people come to have Class I damage is a necessary prerequisite for developing more effective and efficient methods of minimising such damage. The information chain is a tool designed to focus attention on this area and to enable improvement to be made.

2. MEASUREMENT OF SAFETY PERFORMANCE

While an overall measure of the Work Health and Safety of the Nation will always be necessary, intermediate measures are necessary to enable organisations or work units to assess themselves or be assessed.

2.1 ULTIMATE MEASURE

The ultimate measure of health and safety performance at work must be the quantity of personal damage per unit of work.

Defining the methods of measuring quantity of personal damage and the appropriate units of work are challenges which need to be met.

The quantity of damage should be determined by the equivalent years of living destroyed.

For a fatality the quantity of damage is the life expectancy for a person of that sex at the age of death.

Detailed current actuarial tables for five year or ten year age groups are not ready to hand. For the year 2000, the male life expectancy at birth was 76.6, the female 82.0. The male life expectancy at 65 was 16.9 (total 81.9), the female expectancy was 20.4 (total 85.4).

The death of a 35 year old male would give a loss of around 33.6 years of living; a 60 year old dying would involve a loss of 21.7 years of living.

The total quantity of death damage is the sum of the individual years of living lost.

The measure of permanent disability also includes time, but arguments can be mounted for multiplying by percentage impairment (the extent to which the body does not function) or percent disability (the extent to which the interaction of the person's impairment and the structure and organisation of the community adversely affect the person's life).

There would also be a measure of the quantity of temporary disability which theoretically would be percent impairment multiplied by length of time impaired.

Overall the quantity of damage for National Consideration should be for Class I damage, ie. permanent change in life – dead or permanently disabled.

Within the Class I damage, weighting factors may usefully be developed for particular groups, eg.

- Fatality
- Quadriplegia
- Paraplegia
- Brain Damage
- Emotional Damage

This would enable consideration to be given not only to the impact on the damaged person but also the impact on the immediate family, close friends and community.

In effect the measure should reflect what the community and its members have lost from each subdivision of Class I damage.

Table 2.1 gives the number of permanent disabilities in each age group for the years for which we have the NSW WorkCover Statistical Bulletins. **Figure 2.1** compares the number of permanent disabilities in each age group in 2000-01 with 1991-92.

Figure 2.2 shows the ratio of the numbers in each age group 2000-01 compared to 1991-92.

TABLE 2.1
Age statistics for numbers of Permanent Disabilities
(NSW WorkCover)

Age	91-92	96-97	98-99	99-00	00-01
<19	154	236	243	279	315
20-24	298	671	537	690	773
25-29	362	854	869	964	1019
30-34	392	1072	939	1021	1213
35-39	390	1113	1143	1244	1401
40-44	385	1020	1153	1203	1468
45-49	322	1067	1055	1208	1386
50-54	297	893	988	1119	1413
55-59	232	677	675	663	800
60-64	135	266	308	322	405
>65	18	72	69	92	101
0ther			7	13	6

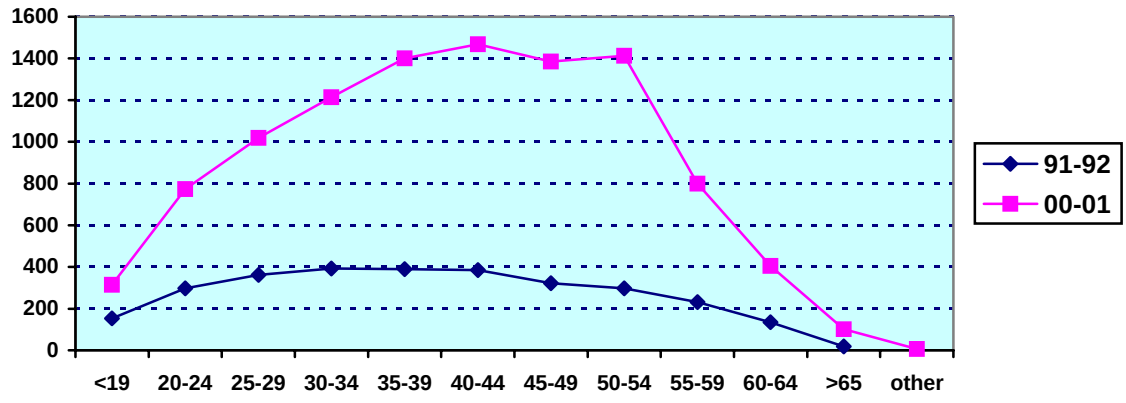

FIGURE 2.1 – Comparative Age Statistics for Workplace Permanent Disability
(New South Wales WorkCover)

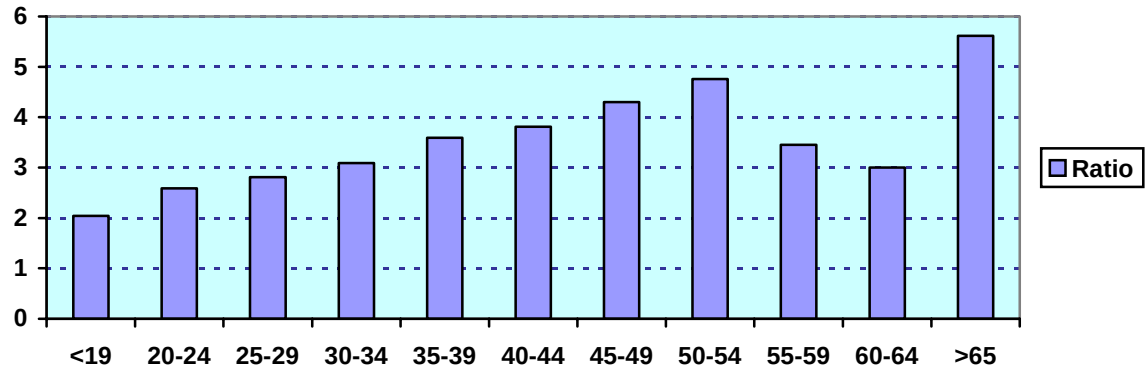

FIGURE 2.2 – Ratio of Number of Permanent Disability Occurrences in 2000-01 to 1991-92 by Age Group

TABLE 2.2

Age Group	Disabled years of living created 1991-92	2000-01
<19	?	?
20-25	16477	42740
25-30	18301	51517
30-35	17962	55654
35-40	16023	57562
40-45	13995	53364
45-50	10180	43821
50-55	7983	37984
55-60	5138	17717
60-65	2350	7051
>65	?	?

Table 2.2 takes into account the life expectancy of the person at the time they were permanently disabled. **Figure 2.3** plots the figures in Table 2.2 to compare the years of disabled living created in each age group in 1991-92 and 2000-01.

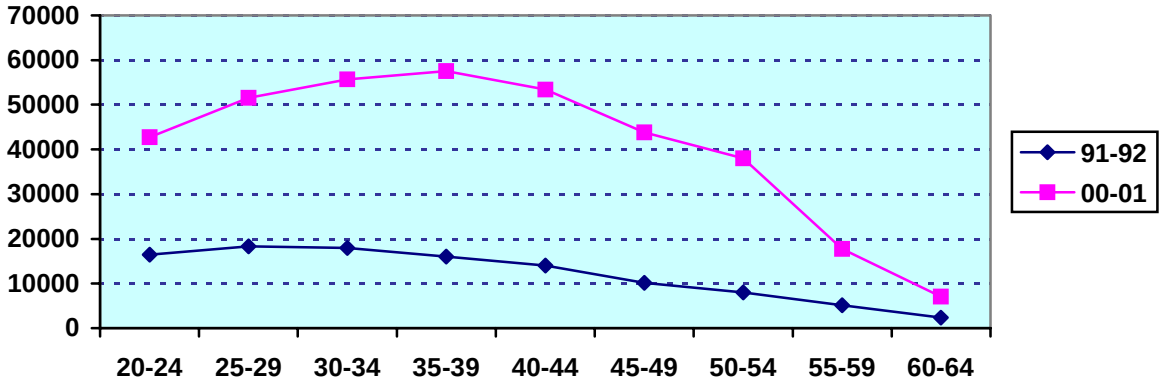

FIGURE 2.3 - Comparison of Disabled Years of Living Created 1991-92 and 2000-01

2.2 INTERMEDIATE MEASURE

A measure of the quantity of Class I damage would only be valid and reliable for very large samples such as state or nation and then only if the figures are produced honestly under a system which does not provide strong commercial, moral (immoral actually) or professional pressures to deny acknowledgement of damage occurring to people as a result of work.

For the vast majority of organisations in Australia, the ultimate measure, the quantity of Class I damage is too insensitive to be useful. Many millions of person years of work are required to provide a satisfactory measure. Only a few hundreds or thousands of person years are likely to be available for even sizable organisations. Consequently, intermediate or indirect measures are required to assess the standard of health and safety within an organisation at the time of assessment or over the time period under consideration.

Intermediate measures should indicate the potential for Class I damage.

For an organisation to minimise the likelihood of Class I damage they must first know how they are likely to kill or permanently disable people, and must then take effective action to eliminate or reduce the likelihood of Class I damaging occurrences. The intermediate measures should reflect how well these things are being done and determine the overall potential for Class I damage.

At the present time no one is in a position to do this well because veridical information has not been collected, or, if collected, has not been organised into a form which gives maximum usefulness.

Knowledge of people within each organisation would be an important measure.

3. GOVERNMENT ACTION

As indicated in Section 1.2.2, “Government and Quasi Government Bodies” it is necessary for the Government to take action which will benefit Health and Safety

generally, and to take other actions which target specific problems, starting with the largest.

In an ideal healthy and safe community, organisations would inevitably organise their individual and joint activities to maximise the benefit they brought to the community. This would include minimising the production of Class I damage.

For a wide variety of sound reasons, this will not happen. Apart from factors already raised, the financial structure within which the organisation operates may influence strongly against health and safety activities.

For these, and other reasons, it is necessary that the Government manage work health and safety on behalf of the community.

Some general actions are required, as are specific actions. Some thoughts on both these areas follow.

3.1 GENERAL ACTION

The general action required from the Government includes:

- Manage the Management Chain
- Be an active participant in the Management Chain
- Identify the Work Health and Safety problem and a system to measure it
- Organise the collection of adequate data on Class I damage
- Facilitate community honour and respect for the permanently disabled
- Organise cost structure which encourages desired activities

3.1.1 Manage the Management Chain

This requires Government to take the lead in organising an interacting set of activities so that each level of the chain is doing what they can most effectively and efficiently do. The ultimate cost is carried by the community via the cost of goods and services.

3.1.2 Participate in the Management Chain

The Government is in a better position than any other party to organise and facilitate the collection of adequate information on Class I – non-fatal (ie. permanently disabling occurrences). They are already doing this for Class I – fatal cases.

This is the first step towards developing effectively focussed activity by making such information available to the rest of the chain.

3.1.3 Develop a system for measuring work health and safety.

This is a most important action since it is most likely that the overall system will achieve what is measured. In the extent that what is measured is different from what is required, the damage to people will continue.

In 1975 Steven Kerr wrote a perceptive paper "On the folly of rewarding A while hoping for B". Inevitably A was achieved and B was not. There are innumerable examples of organisations achieving very low Lost Time Injury Frequency Rates (LTIFR) while having significant levels of permanent disability and of fatalities.

This is the reason NOHSC's (2002) targeting on all injury occurrences is so unfortunate – it will reinforce the use of the LTIFR. On the basis of the LTIFR, promotions are made or withheld, contracts awarded or lost. The LTIFR is a simple figure which, in practice, is both invalid and unreliable. It does not measure safety performance. Measurement of Safety Performance was dealt with separately in Section 2 because of its importance.

3.1.4 Honour and Respect the Permanently Disabled

Until the permanently disabled from work are honoured and respected, it is unlikely that sufficient effort will be put into prevention. At present they are frequently disparaged.

The self serving publicity by insurance companies, some of them government owned and backed, paint a picture of fraudulent malingering, is not countered by publicity examples of the vast majority of permanently disabled, honest workers, whose lives

have been strongly adversely affected. It is often the hardest worker and best performer who becomes permanently disabled.

Creative strategies are required to right this wrong perception at many levels – Government, Community, Industry and Individual.

3.1.5 Organise Cost Structure

There is a need to ensure that costing and reward systems encourage necessary activity.

One mining company enquired into why an operator's access system to reduce injury had not been installed. The cost of the modification system debited against the Maintenance Section, while the benefit (no injury) went to the Mining Section. By installing the access systems the maintenance manager would have worsened his performance and bettered that of the mining manager.

On the Industry Commission's 1995 figures for the year 1992-93, the Employer paid 30% of the cost of damage to people from work, the Worker 30% and the Community 40%. Employers pay virtually the full cost of Class II damage (lost time injuries). The major part of the workers' costs comes from Class I occurrences. This means that in the year 1992-93 approximately 52,000 Class I damaged people incurred a life time cost approximately equal to the whole of the annual cost incurred by the whole of Industry in Australia. This is a huge burden on the Class I damaged people and puts little cost pressure on the employers to control these occurrences.

When a safety innovation involves increase in cost, introduction is inhibited by the financial reward from not adopting the new safety measures. The Management Chain should be able to be managed so that, when a worthwhile safety innovation is available, organisations, by arguing their case, are able to have legislators make the use of the innovation compulsory.

There is a particular problem in industries such as transport, construction and maintenance, where the worker, frequently in the role of sub-contractor is forced to accept whatever the large organisation dictates. Special attention needs to be given to

such areas to ensure effective control of Class I damage takes place. This problem is associated with very tight pay rates and time schedules.

3.1.6 Encourage the Thinking Function and Energy Models.

One of the most important and effective ways to improve Work Health and Safety is to develop the use of the thinking function for understanding and controlling damaging occurrences. This will inevitably require the rejection of the "accident" model and the introduction of "energy exchange" based models. It also necessitates the development of veridical information so that people are able to use the thinking function, rather than the feeling function, when determining what to do. The adoption of the work "incident" instead of "accident" is not seen as a very good move as "incident" can mean almost anything that happens. The general public probably see "error" and "hazard" as similar to "unsafe act" and "unsafe condition" which were once widely used. The difficulty is that something needs to be seen as "unsafe" before it is attended to. "Risk" is an emotionally loaded and value judgement term which, of itself, encourages the use of the feeling function.

A thinking function approach would ask as follows:

- Where is energy stored?
- In what ways can that energy be released?
- In what ways can the released energy interact with people?
- What damage can occur to people?

The first task is then to determine what outcomes are possible ie. can happen.

The second task is to determine the probability of the possibility happening.

Judgements can be made without the use of words which have a strong affect (feeling, emotion) and made with words which encourage the use of the thinking function and discourage the use of the feeling function.

The Government is in a position to focus attention on these terminology, concept, model areas as well as to develop its own staff and activities in line with them.

Collection of adequate information about the 50,000+ permanent disabilities each year is crucial to progress in this area.

3.2 SPECIFIC ACTION

Control action should also be taken on the best information available at the present. Action should also be taken now to ensure the quantity and quality of the information required for more effective measurement and management will be available in the near future.

Available sources of information have not been explored fully. A few years ago an effort was made by Geoff McDonald and Associates to develop a taxonomy of permanent disability cases with WorkCover (Queensland). The descriptions of the occurrences did not enable a satisfactory taxonomy to be developed.

3.2.1 NSW WorkCover Information

Below is given an indication of the use that could be made of NSW WorkCover data.

Table 3.1 and **Table 3.2** give Mechanisms of Injury data for the years for which we hold WorkCover Statistical Bulletins. **Table 3.2** gives number of cases while **Table 3.2** gives the percentage attributable to each injury mechanism. There was a small change in the classification between 1996-97 and 1998-99. This change accounts for the increased percentage in "Other".

TABLE 3.1
Mechanism of Injury of Permanent Disability by Number of Cases

Mechanism of Injury	91-92	96-97	98-99	99-00	00-01
Manual handling	**493**	**2745**	**2921**	**3120**	**3626**
Bending, stretching, reaching	**425**	**787**	**566**	**539**	**611**
Falls to same level	**364**	**1160**	**1086**	**1145**	**1419**
Falls from height	**277**	**783**	**803**	**990**	**1108**
Falls of objects	**179**	**338**	**330**	**369**	**425**
Trapped between objects	**435**	**497**	**220**	**187**	**197**
Hit by moving objects	**281**	**454**	**431**	**449**	**538**
Hitting moving objects	**187**	**335**	**239**	**286**	**296**
Hitting stationary objects	**111**	**209**	**266**	**345**	**406**
Other	**237**	**636**	**1124**	**1388**	**1547**
Hit by person				**104**	**127**
Total	**2989**	**7944**	**7986**	**8818**	**10300**

TABLE 3.2
Mechanism of Injury of Permanent Disability by Percent of Total

Mechanism of Injury	91-92	96-97	98-99	99-00	00-01
Manual Handling	**16.49**	**34.55**	**36.58**	**35.38**	**35.20**
Bending, stretching, reaching	**14.22**	**9.90**	**7.09**	**6.11**	**5.93**
Falls to same level	**12.18**	**14.60**	**13.60**	**12.98**	**13.77**
Falls from height	**9.27**	**9.85**	**10.05**	**11.23**	**10.75**
Falls of objects	**5.99**	**4.25**	**4.13**	**4.18**	**4.12**
Trapped between objects	**14.55**	**6.25**	**2.75**	**2.12**	**1.91**
Hit by moving objects	**9.40**	**5.71**	**5.40**	**5.09**	**5.22**
Hitting moving objects	**6.25**	**4.21**	**2.99**	**3.24**	**2.88**
Hitting stationary objects	**3.71**	**2.63**	**3.33**	**3.91**	**3.94**
Other	**7.93**	**8.00**	**14.07**	**15.74**	**15.02**
Hit by person				**1.18**	**1.23**

For the last three years, “Manual Handling” accounts for 35%, “Falls to the same level” 13% and “Falls from height” 11%. “Bending, stretching and reaching” was next highest at 6%, followed by “Hit by moving object” at just over 5%. (Note that “Trapped between objects” has decreased significantly in both percentage and number of cases).

Controlling Manual Handling, Falls to the Same Level and Falls from Height could be selected for targets for immediate action.

3.2.2 Falls to Same Level

My experience indicates that falls to the same level will be predominantly heel strike slips on a surface contaminated by water, other liquid materials or granular materials on a hard surface. The vast majority of these in our records come while a person is simply walking normally across a surface. The simplest and most effective control measure would be to provide a surface which will provide an acceptable grip with the footwear available in Australia and with the surface in the contaminated condition it is likely to be encountered.

The Australian Standards for measuring the grip provided by pedestrian surfaces are most unsatisfactory documents. They specify that the test machines shall use 4S-Rubber as the slider. There is no information on how 4S-Rubber relates to the material found in the shoe soles, and, more particularly, the heels of footwear used in Australia. From Standards' own documentation, the coefficient of friction of 0.4 used as a required level was chosen to "facilitate international trade", not on the basis of any specific safety outcome. The Standards also do not "contemplate" the material used in shoe soles and heels in Australia. This follows a definition of friction as being a property of two interacting interfacing materials. In the tests one of the materials is ignored. The figures these tests produce are invalid.

There are many more difficulties with the Standard. Currently a number of people who have been permanently disabled as a result of slipping are denied compensation because the floor surface passes the Standard but does not pass tests using the footwear worn by the person at the time of the occurrence. Compliance with the Standard can still allow continuing problems in this area of falls to the same level.

A more acceptable Standard needs to be developed and requires better quality information from actual occurrences to ensure that the Standard is satisfactory. Much greater detail is required of the occurrences to be controlled.

An introductory idea is given below in **Figure 3.1** which is a Taxonomy of 440 Falls of Persons to the Same Level, being a section of a sample of 3,994 Class I Occurrences on the files of Geoff McDonald & Associates in 1995.

On which areas should attention be concentrated (bathrooms, kitchens, shopping centres) and which surfaces should receive particular attention (tiles, vinyl, terrazzo, steel trowel finished concrete).

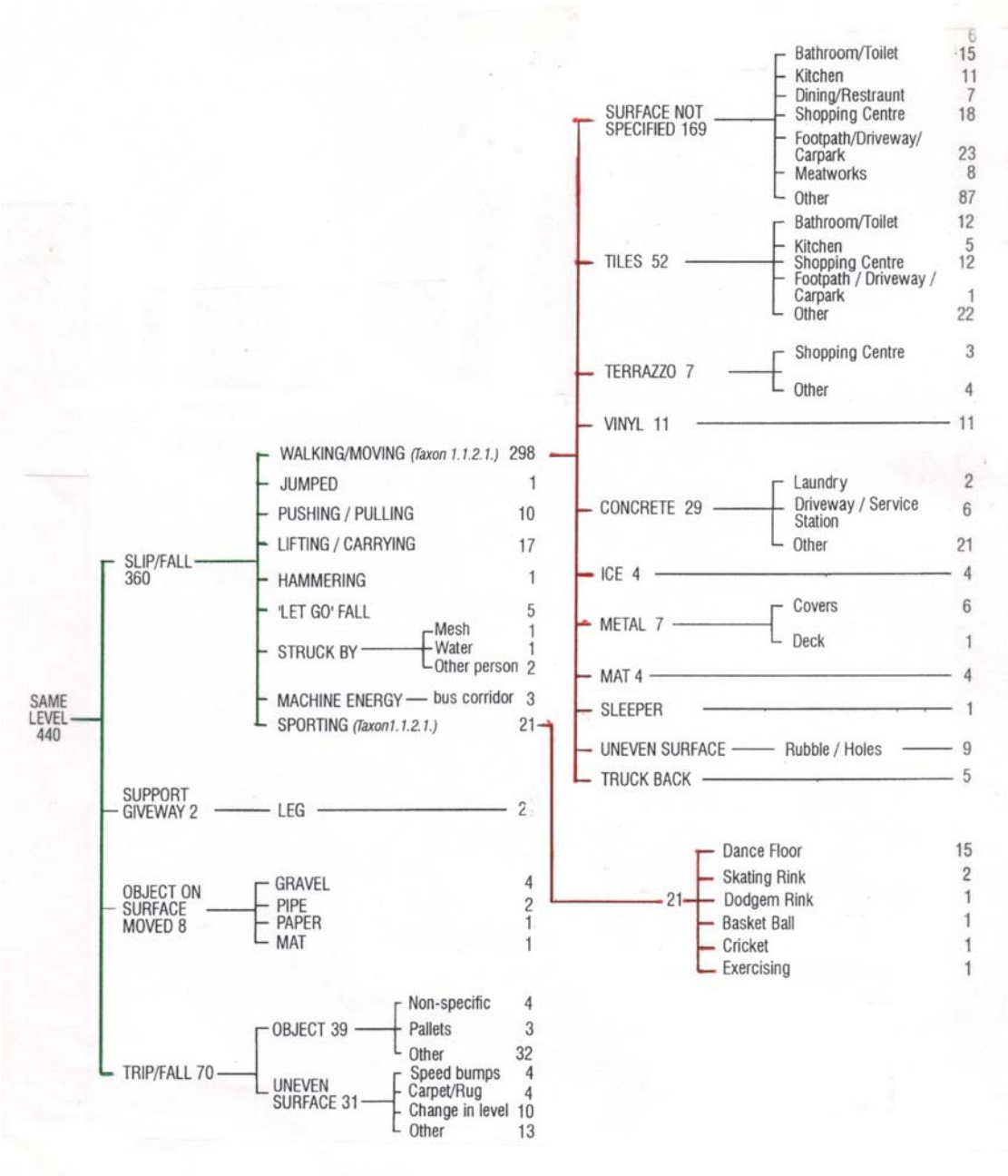

FIGURE 3.1

A more developed version of this taxonomic presentation can help communicate information quickly and widely.

In the year 2000-01 New South Wales had 1,419 “Falls to the Same Level”, so the Australia wide figure could rapidly provide good quality information on where the problems were and what was necessary to deal with them. As well as the Class I damage to employed people, there would also be a significant problem of Class I

damage to customers, invitees and other people using premises, and in the case where people derive an income by renting out premises there would be a considerable number of tenants also.

The damage from a slip/fall to the same level can extend from fatality through brain damage to damaged lumbar spine or coccyx, as well as damaged wrists, knees or ankles, with the heel strike slip being the most damaging loss of control.

3.2.3 Falls from Height

While there are specific measures introduced at government levels for falls involving a change of height, they do not deal adequately with many of the major sources of falls involving a change of height, and, again, a great deal more information is required to give an adequate understanding of the problem to be confronted.

Figure 3.2 is a Taxonomy of 791 Class I falls involving change of height. Looking at Figure 3.2 “Stairs” and “One Step Change” forms a major part of the group, with 188 and 13 respectively accounting for over 25% of cases.

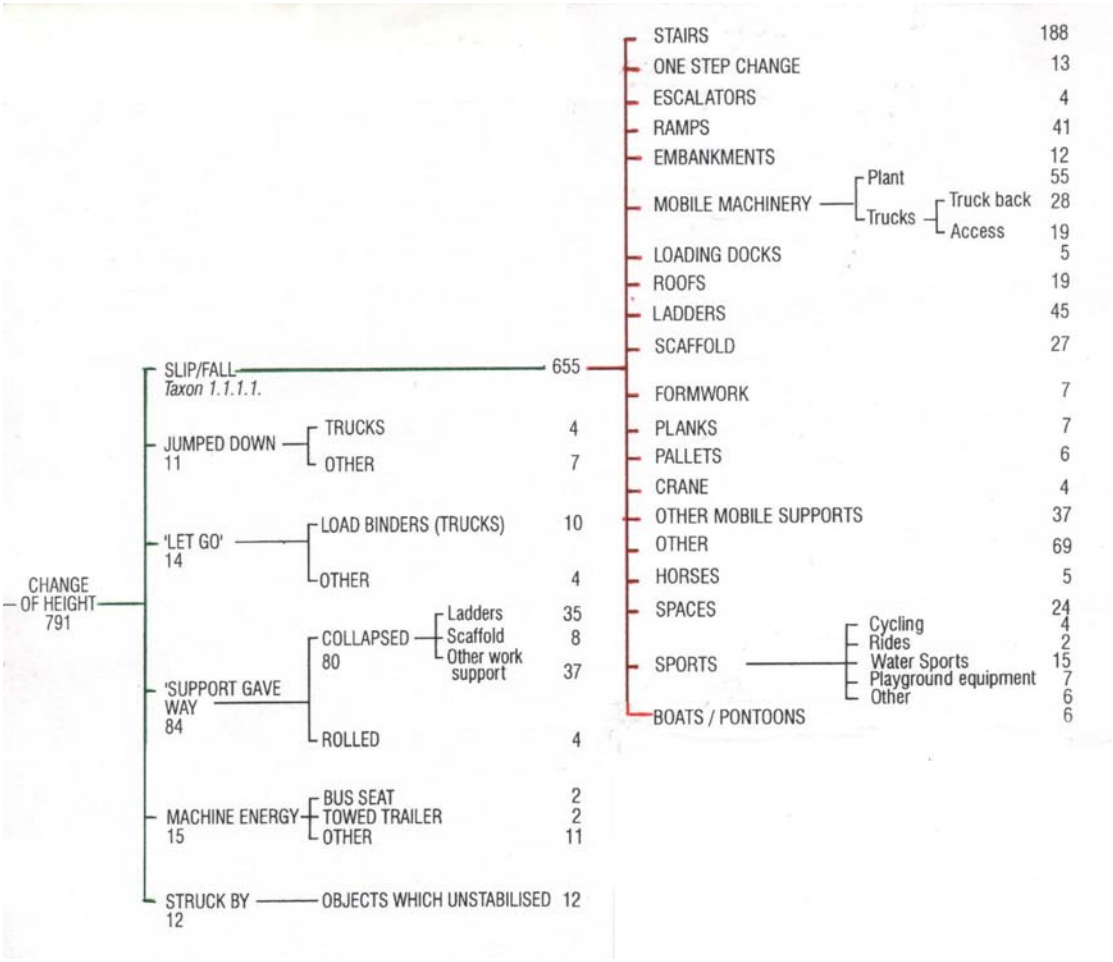

FIGURE 3.2

The requirements in the Building Code of Australia or AS1657 "Fixed platform, walkways, stairways and ladders – Design, construction and installation" both fall far short of specifying adequate requirements to minimise this source of damage.

'Ladders' account for 45 cases in the 'slip/fall', and 35 cases in the 'support gave way - collapsed'. This does not mean that the ladder necessarily structurally failed but includes cases where the ladder has moved out from under the person. It is frequently difficult for people to use ladders in a secured fashion required for good control because methods of securing are not built in to the ladder or the places where they will predictably be used. Again more detail of such occurrences is necessary. 'Mobile machinery' which includes 'plant and trucks' accounts for 102 cases of 'slip/fall' with the access to the operator's station on both trucks and plant being a major contributor. 'Falls from the back of truck' include 28 from the 'slip/fall' and 4 from 'people jumping down', and 14 where they have fallen off the back after the support holding

them on the truck has let go. In 10 cases they were pulling hard on a load binder handle when something in the system failed and the handle went slack.

There are also, of course, a selection of roofs, scaffolds, formwork, planks and the like.

Again, more detailed information is required. For example, there are two cases on file of quadraplegics who were refuelling bulldozers. One involved a small bulldozer where, while refuelling, the person was standing with his feet approximately 300mm, or one foot above ground level. The second involved the person standing on the ripper arms at a height of round about 1metre above ground level. In both cases the person's foot stayed on the support while the person overbalanced so that they pivoted around their foot and their head struck the ground before the rest of their body did. Quadraplegia from a slip and fall to the same level can also occur where there is a vertical surface against which the back of the person's head can strike as they fall so that their head is snapped forward.

Only by getting detailed information about a large number of the occurrences will the problem be defined sufficiently clearly for efficient action to be taken.

3.2.4 Manual Handling

'Manual handling' is the largest single category of permanent disability (35%) and in our experience the majority of permanent disabilities involves the disruption to a disc in the lumbar spine, although, of course, there are cases which involve damage to a disc in the cervical spine, shoulder damage and damage to other joints of the body. Attempts at controlling musculoskeletal damage have long been focussed around, so called, "correct" lifting technique which was challenged strongly by the American National Institute for Occupational Safety and Health in 1981, in their publication "A Work Practices Guide for Manual Handling" where they advocated an approach which sees the spine as a structure and argued that, like any other structure when overloaded, the spine would fail. They specified loading requirements on the individual so that the bending moment applied did not result in disc loads above 350kg. This approach has not been adopted widely.

In nursing there were many people making a living by training nurses in “correct “ lifting technique, and back damage and subsequent permanent disability remained high. Following a ban on the lifting of the whole body of patients in Queensland, the incidence of damaged lumbar spine dropped dramatically. Unfortunately I do not have the figures to substantiate this but I am confident they exist.

The difficulty of damage to the lumbar spine is that it involves Type A, Type B and Type C Damaging Energy Exchanges - as outlined in Chart I on page 22 of my original submission. The damage to the lumbar disc usually involves a failure of the wall of the disc. The disc has a gelatinous centre which, when a person is resting, is roughly oval in shape, paralleling the oval exterior of the lumbar disc. When the person is working with a load in front of them, the gelatinous centre triangulates to have the peak of the triangle facing forward and corners of the triangle side rear, near where the nerves exit the spinal column. The annulus surrounding the gelatinous centre is made up of a number of plies. Under experimental tests by Adams & Hutton, the disc was shown to fail by failure of the plies progressively starting from the inside and moving out. Anatomical work by Nick Bogduk and others shows that the inner two thirds of the annulus does not have nerve endings. Nerves are not directly activated by the failure of the inner two thirds of the lumbar disc. This failure mechanism and nerve distribution leave open the likelihood that extensive failure of the disc can occur without the person being aware of such failure. The onset of pain occurs related to an episode which is only adding a further increment of damage, rather than having created the whole of the damage. For this reason, it is necessary to look much further than the actual occurrence which precipitated the pain and incapacity of the person and look more at the lifetime of damaging energy exchange of the person’s lumbar disc.

The same argument can be applied to may other components of the body that fail as a result of manual handling.

It can be assumed, however, that if the sample is large enough, the occurrences that precipitate the onset of pain are the occurrences which produce increments of damage. With a large enough sample the manual handling activities to be controlled can be better identified.

This brief view of these three areas emphasises the need for much better quality information to give an understanding of exactly what it is that needs to be controlled, so that people can use a thinking function in developing control strategies which will be effective, rather than a feeling function which finds a "good" way to address an ill defined problem, and perpetuate the lack of progress towards minimising Class I personal damage.

4. ELIMINATING HAZARDS AT THE DESIGN STAGE

An Issues Paper on this topic has been received from NOHSC (2003) and will be responded to more fully later. Some comments are relevant in the present context.

The basic thrust of this development is welcome and sound.

Two aspects of the proposals to achieve safe design are relevant.

- Process
- Control

I would claim negligible expertise in the area of process other than to say that if the process does not generate a content which is well above that which exists at present, the results will be disappointing.

Paragraph 26 gives three core processes for systematic management of safe design.

- Risk management;
- Testing and examination; and
- Information provision

Without adequate content the effectiveness of these three processes can be severely limited.

Take the three examples given earlier, Manual Handling, Falls to the Same Level, Falls from Height. As outlined in Section 3.2, knowledge of just where these damaging occurrences happened, under what conditions and what were the relevant "communication energy" (eg. visual perception etc.), "control energy" (eg. shoe/heel – floor surface grip) and "damaging energy" exchanges are not known adequately.

Remember, Manual Handling and Falls of People make up nearly 60% of permanently disabling occurrences. More detail of these damaging occurrences is required to focus attention on the important areas, to identify what is required and to enable realistic strategies to be developed.

Paragraphs 51, 52 and 53 referred to the European experience in construction site safety and indicated an NRCOHSR (2003) report found far reaching aspects of the European regime but no clear evidence of improvement of Occupational Health and Safety performance in nearly ten years.

There has been a great deal of attention to overseas legislation and aspirations to "World's Best Practice".

While attention should be paid to overseas activity, it is far more important to pay attention to how people are receiving Class I damage and base action on what actually happens to permanently alter people's lives, rather than on ungrounded fads and fashions which have plagued safety throughout the years.

Paragraphs 56 – 58 mention the Building Code of Australia, sees three features as a possible basis for integrating safe design regulations and while it does not say so, the inference could be drawn that the Building Code of Australia is seen as acceptable for the end product (building) but does not deal with Work Health and Safety for construction. Again the question of content.

The Building Code of Australia falls short of providing user requirements by not providing effective controlling requirements for floor surfaces, stairs and railings (balustrades). The result is buildings with falls to the same level, falls on stairs and falls from balconies.

This Issues Paper "Eliminating Hazards at the Design Stage. (Safe Design*)* – Options to Improve Occupational Health and Safety Outcomes in Australia" once again appears to be dealing with process and assuming the content is known or will materialise.

Until

- we know very clearly, in fine detail and with veridical knowledge, how people receive Class I damage,
- use the thinking function to generate efficient and effective control measures, and
- use the feeling function to provide motivation and energy to implement changes

we will continue to stumble ineffectually in a sea of Consignorance, while misplacing effort and squandering resources.

G L McDonald January 2004

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From: Geoff McDonald & Associaties [gmcdsafety@uq.net.au]
Sent: 29 January 2004 1:34 PM
To: wcohs@pc.gov.au
Subject: Supplementary Submission to Productivity Commission Inquiry

Geoff McDonald & Associates Pty Ltd

36 Judith Street

Crestmead QLD 4132

Phone: (07) 3803 5252

29 January 2004

The Assistant Commissioner

National Workers' Compensation and OHS Inquiry

Productivity Commission

P O Box 80

BELCONNEN ACT 2616

Attention: Herb Plunkett

Dear Sir

During my attendance at the Sydney hearing of this inquiry, Dr Johns asked:

"Now the hard question: what's your solution".

I was not well prepared to answer that question and I have since prepared a supplementary submission to put forward what needs to guide the development of solutions, as well as some general and some more specific solutions. Please find attachments to this email.

I trust these further thoughts are useful to your enquiry and wish you well with your endeavours.

Yours faithfully

Geoff McDonald

Acknowledge of receipt of this email and attachments would be appreciated