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

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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?

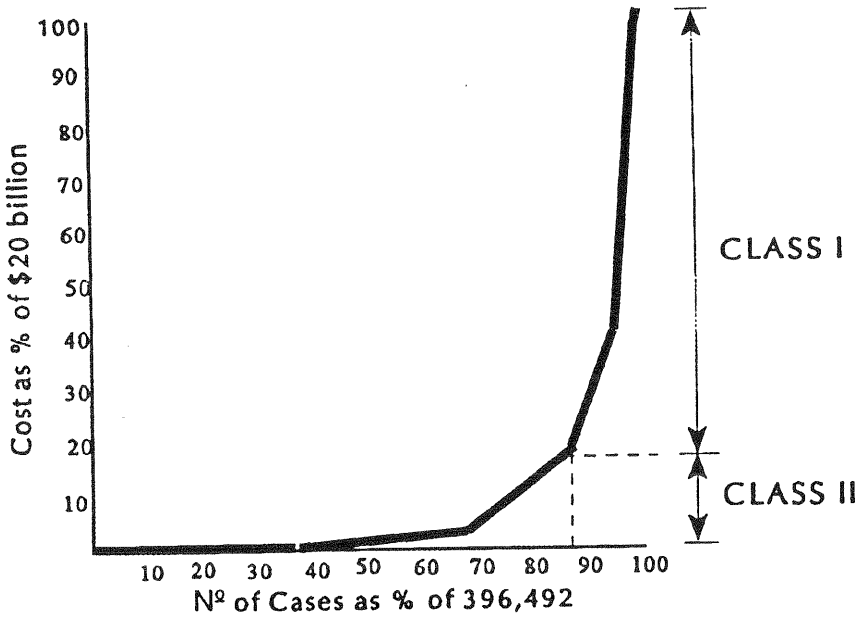

Figure I. Cost of damaging occurrence by severity of damage

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

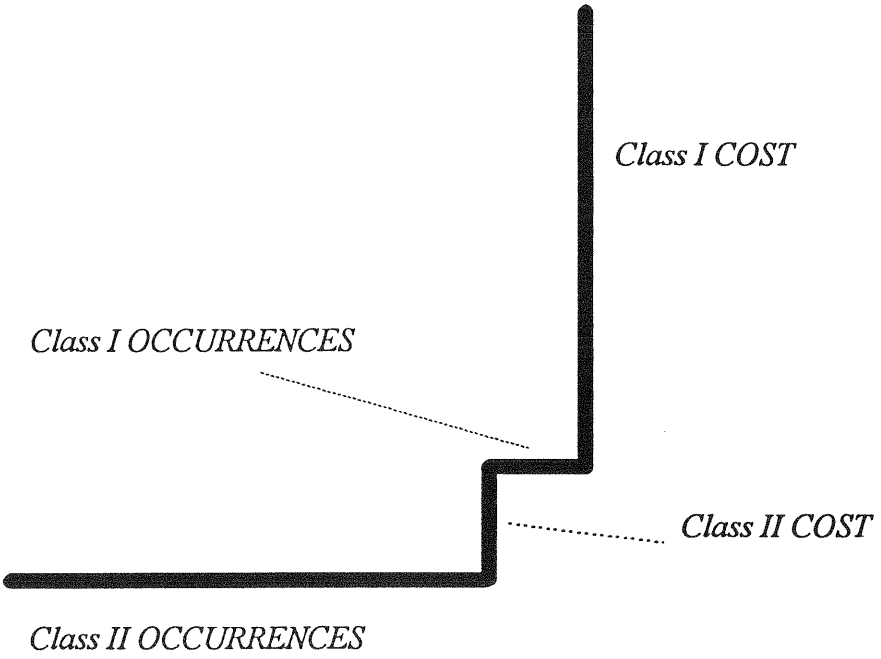

Figure II. Class I - Line Motif

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.

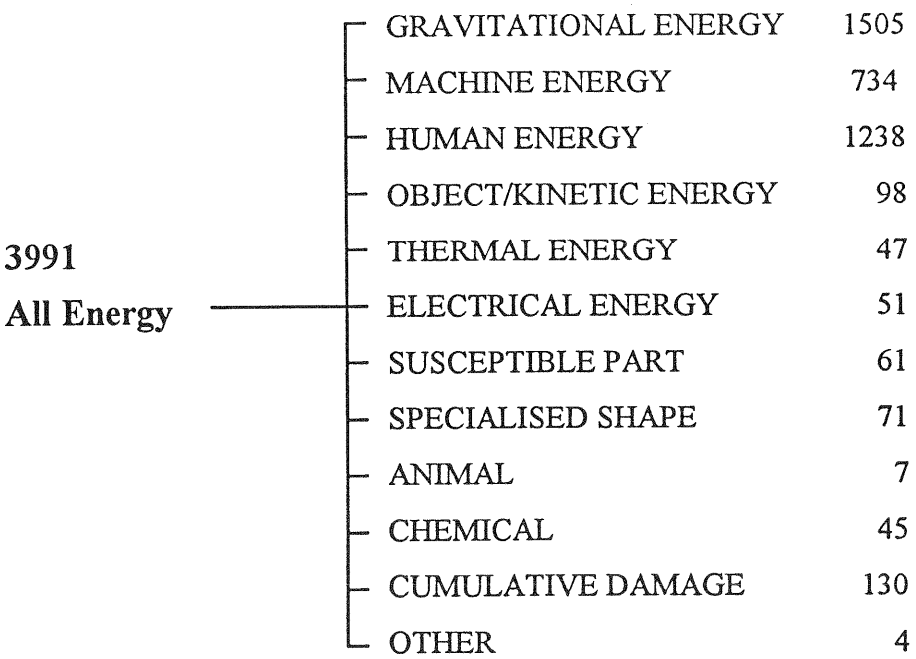

Figure III.

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

References

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[v] McDonald, G.L.: "Understanding Contributory Factors: Myths vs Reality". Paper presented at a Conference 'Investigating for Prevention' for Ergo Week 1994 presented by the Ergonomics Society of Australia (Qld). Brisbane, 1994.

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