ART-T

Geoff McDonald & Associates Pty Ltd A.C.N: 010 043 759 A.B.N: 46 040 291 294

11 Medinah Ct
Cornubia
Queensland 4130
Australia

Ph : (07) 3287 7079
(07) 3803 5252
Email: gmcdsafety@bigpond.com

IN HONOUR OF GEORGE ROBOTHAM

Dear Reader

I gather a considerable number of you have followed George Robotham's writings and came to appreciate his writings and the person George.

George was in an assistant safety role at a Central Queensland Coal Mine when we first met in the second half of the 1970s. He soon moved to a lead safety role at a related UTAH mine as Safety Advisor. The Mine Manager subsequently told me George was the best Safety Advisor he had seen.

George would have attended at least two of the three day Accident Data Collection courses I ran for UTAH and we worked together on a number of projects. If my memory serves me correctly, he was in the second intake of students at the Ballarat College of Advanced Education. (I lectured the first two intakes in the Post Graduate Course.)

George kept in contact regularly and became increasingly frustrated that his employers did not wish to move in the direction George wanted, but required him to stick with their essentially 'traditional' safety programmes.

He also became increasingly impatient with me for not having published at least one book – a view I share. (I have presented over 100 papers between 1974 and 2009.)

To relieve his frustrations and to urge me on, George prepared 'Geoff McDonald Important Concepts' a few weeks before his death. Our schedules did not enable us to get together and work through the document.

As a tribute to George and to honour George, I have worked through the document to make it somewhere near what George and I would have agreed on.

Following, to the best of my ability, is what George wanted to give you.

GEOFF MCDONALD IMPORTANT CONCEPTS

Introduction

My mentor for many years has been Geoff McDonald. Geoff is the smartest bloke I know and has made an outstanding contribution to safety. His expertise and contribution is not recognised sufficiently by the traditional safety establishment.

Geoff is an outstandingly clear thinker about safety and challenges the status quo. He is writing a book about safety that will be groundbreaking. Geoff, as a fresh graduate in Mechanical Engineering, started research into tractor fatalities 50 years before February 2014. For 'The Involvement of Tractor Design in Accidents', he received a Thesis only Master of Engineering. Concurrent study earned a Bachelor of Science with a Psychology Major.

Geoff presented me with a multitude of concepts over the years. Sometimes my not so clever brain has problems processing them; sometimes it takes a while for the penny to drop.

Important Geoff McDonald Concepts

In 1980, Geoff estimated that the vast majority of the quantity of damage to people from work involved permanent alteration of life (fatal or non-fatal). The estimate proved correct and the latest (fourth) estimate for 2008-09 was published in March 2012 by SafeWork Australia.

'*Because they go to work in Australia, 10 people per hour, 24 hours a day, 7 days a week, 52 weeks a year, have their lives permanently non-fatally altered.'* (Geoff McDonald)

1. Damage to people at work has a number of adverse outcomes:
    - Financial loss to employer, worker and community
    - Pain and suffering
    - Dislocation of lives
    - Permanence of death
    - **Workers carry over 75% of the loss**

2. Damage to people from work falls naturally into one of three classes:
    - Class I damage permanently alters the person's life and subdivides into:
        - Fatal
        - Non-fatal
    - Class II damage temporarily alters the person's life
    - Class III damage insignificantly alters the person's life (Geoff McDonald & Associates Pty Ltd)

Some people indicate a fixation and emphasis on minor personal damage. In terms of cost and suffering, Class I personal damage (90+%) far outweighs Class II and Class III. We get to hear about some of the fatal Class I damage, but little is known about the massive area of

non-fatal Class I damage (85-88%). If you are talking about getting the best bang for your buck, you must focus on Class I personal damage.

Geoff has investigated many thousand Class I personal damaging occurrences in his career and maintains the most effective way to make meaningful progress in safety is by focussing on Class I phenomena. I have been involved in three projects with Geoff where we have either analysed critical incidents or personal damaging occurrence experience and I found the results very impressive. The analysis of the critical incidents and personal damage occurrences really targeted control action in an appropriate manner.

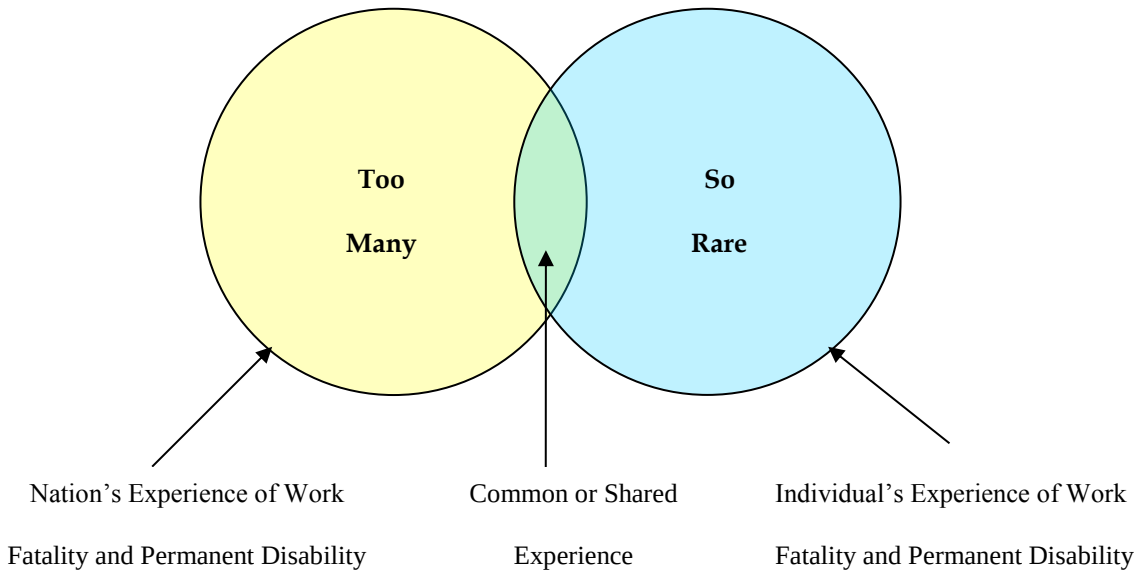
Industry taxonomies (collection of like) of Class I personal damage are a powerful tool for positive safety change. Standardised industry personal damage occurrence (accident) reporting systems will assist.

The Two Mandorlas

Geoff McDonald summarises two of the major safety problems with simple diagrams.

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. The thin mandorla represents this lack of veridical knowledge.

Figure 1 – Paradox Mandorla

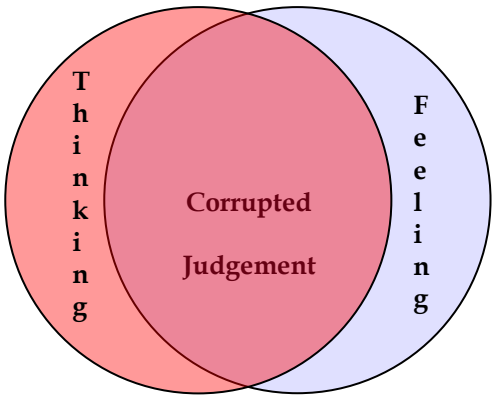


The second, the Judgement Mandorla, represents the thinking and the feeling function as described by Jung (1971). Both functions are used to make judgements which lead to action.

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", i.e. 'goodness' according to the person's values. It has nothing to do with 'truth'.

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). The large mandorla represents the large amount of corrupted judgement which exists at present.

Figure 2 – Judgement Mandorla

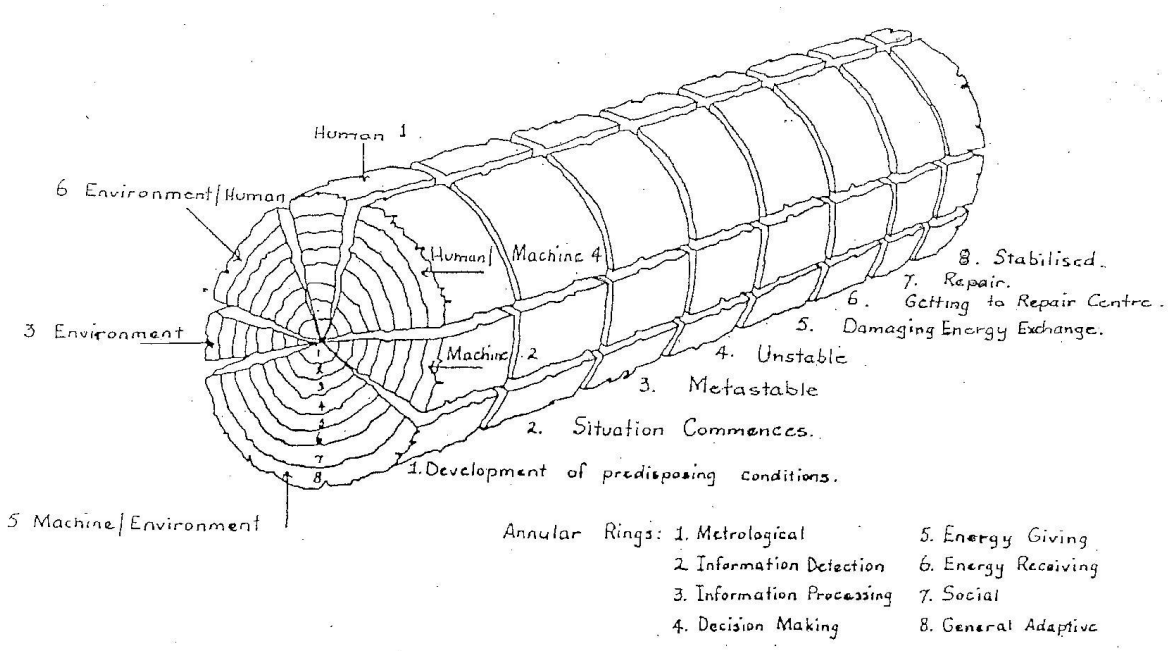


At present the Paradox Mandorla is very thin and the Judgement Mandorla is very fat. For effective and efficient safety at work The Paradox Mandorla needs to be fat and the Judgement Mandorla needs to be thin.

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 counterproductive. The large Mandorla represents the large amount of corrupted judgement which exists at present. A major problem in safety is we often use the feeling function instead of the thinking function.

Analysis Reference Tree-Trunk Method of Personal Damage Occurrence Investigation
(Developed by Geoff McDonald)

I have used this technique for ages and believe it produces very high quality investigations. I have been trained in a few other investigation methods and have read widely on the topic. I still keep coming back to the ART-T. For a number of years I used to teach a 2 day course on this method and some excellent investigations have resulted. The course also allowed people to challenge the more common beliefs about safety.



THE ANALYSIS REFERENCE TREE TRUNK (ART-T) MODEL ©

for guiding 'accident' investigation, analysis and evaluation

[George's statement that the model is 'very easy to use' is in part due to characteristics of George and partly due to his having been through courses on its use and then taught it for a number of years.

You will note a copyright symbol © on the model. Experience has shown it can be used in weird ways. The results of some uses I (Geoff) have found unbelievable. Some people take to the model like a duck to water; others have to make effort, sometimes a great effort to become very good. Others never make it.]

The staff of Intersafe are thoroughly developed in both the ART-T model and in investigating and reporting on Class I personal damaging occurrences. Their three day course is developed out of Geoff's original three day course and is honed by 35 years of continued learning and experience of Class I cases.

Roger Kahler, who owns the business, was mentored by Geoff through 3rd, 4th and a post graduate year of Mechanical Engineering at the University of Queensland. After working in industry, Roger worked as a director and consultant with Geoff McDonald & Associates Pty Ltd, before founding The Intersafe Group.

Geoff, of course thinks the course is excellent.

There are two mental shifts required to use ART-T.

Mental Shift 1

Look for essential factors not causes. An essential factor is one without which the final damage would not have occurred. 'Cause' is an emotionally laden (feeling judgement) term that infers blame.

Mental Shift 2

Essentially, the personal damage occurrence is represented by a tree-trunk lying on the ground. At the end of the tree-trunk, you have wedges representing Person elements, Machine elements and Environment elements. Along the length of the tree-trunk, you have 6 time zones. The annular or growth rings of the tree represent a number of Ergonomic elements for human machine and environment.

Instead of looking for 'causes', you look for 'essential factors' (an essential factor is one without which the final personal damage could not have occurred). The idea is to look for essential factors represented by each piece of wood. I (George) found the model very easy to use. Usually at least 30 essential factors will be found in each personal damage occurrence. This widens your options for control over some other methods of personal damage occurrence investigation.

Two Projects I Worked on with Geoff

Access Study

Geoff carried out a research project with the field work done by Terry Condon and the co-operation of coal mining open cut safety people including myself. A report 'Access to Earth Moving Equipment', Report No. 1214 was prepared for the National Energy Research & Development Program, 1989, following a 1987 'Investigation of Access Accidents' prepared for the Queensland Coal Owners Association.

Accidents when people are gaining access to and from mobile equipment have long been known to be a cause of significant loss in the Australian Mining Industry. The above research was carried out a number of years ago and resulted in access system design guidelines. Whilst there was much activity implementing the guidelines at the time, examples will be found, with the passage of time, where the guidelines are not being applied. Whilst the focus of the work was on access to mobile equipment, there is room for application of some of the guidelines to cabs of trucks and the back of trucks, utes and vans.

Some of the Access Guidelines

Access systems should have a fully developed and coordinated system of foot and hand supports and have the bottom step rigidly mounted within 400mm of the ground. In many cases, this can only be achieved by a mechanism allowing the access system to be taken out of its use position and stored in a damage free location whilst the machine operates.

The foot supports must provide a strong grip along and across the support on both the nose and major support area. The nosing of the step or platform must be strongly visually defined.

Foot and hand supports should be visually conspicuous.

Hand supports must be continuous and provide adequate grip.

One of the most effective means of avoiding access accidents is to eliminate the need foe access. Remote sensing of liquid levels, bottom filling of fuel tanks, centralised greasing systems will all help.

Stairs will often be better than a ladder.

A foot support material should be selected to maximise grip for contaminated conditions.

It is useful to interlock the access system with the parking brake system so the access system cannot be used unless the parking system of the machine is applied.

When the machine is used at night, directional lighting should be used to highlight the foot support edges.

Access should not begin in front of or behind the direct path of the vehicle wheels.

The mechanism shall not create the risk of injury. Potential injuries from mechanisms include crush points, shear points and nip points.

Note – The above is only a brief summary of the recommendation. You really need to refer to the full report.

When it comes to accessing equipment, the rule of thumb is that there must be at least 3 points of contact. This rule of thumb oby goes part way towards providing effective solutions.

Critical Incident Recall Discussion Paper

Many people will tell you near misses or near hits (better referred to as Critical Incidents) are reported in their organisation. My experience is that unless proper procedures are put in place to surface critical incidents you will only get to hear about a fraction of them.

Critical Incident Recall is an awesome technique particularly suited to high risk environments. The technique will not work unless there is a climate of trust created between management and workers. Communications must be open and honest and managers and supervisors must be prepared to put up with a lot of criticism and not react defensively. In the interests of getting to the truth, there must be no disciplinary actions. The senior department manager must be prepared to put his reputation on the line. The potential for some to push industrial issues is high with this technique. Open and honest communication and a determination to improve will defuse this.

Neither management nor workers will be prepared to commit to the work required in this technique unless here is a general realisation that problems exist.

Why Critical Incidents are not Reported

Critical incidents are not routinely reported in an organisation, for a number of quite valid reasons. These reasons include:

a) Peer pressure not to report these incidents
b) Embarrassment at having to admit making what is perceived to be a mistake
c) In an organisation that has an active safety programme, people may not wish to appear to be ruining the safety record
d) The significance and possible outcome of critical incidents may not be realised
e) The fear of punishment may be a factor
f) Complacency or 'she'll be right' attitude is highly likely to be a factor

Background to the Critical Incident Recall Work

This work was done in the electrical department of an open cut coal mine. Prior to this work an electrician was seriously burnt in a 415 volt switchboard explosion. Some of the essential factors were production pressure, inexperience, suspect high voltage testing equipment, the ergonomics of the switchboard and 'test and prove dead' not carried out.

The Mine Manager contacted Geoff to do a check tree-trunk investigation, but Geoff said that whatever the next Class I electrical case would be, it would not be that one. "Let's find out what it could be. We'll use Critical Incident Recall.'

Geoff came up, gave a short session for all electrical Department members. A few were carefully selected as trusted by the work force. These few learnt the techniques, the traps and most effective interacting and questioning techniques for getting reliable stories.

After a very short time, they learned of critical incidents with a very high potential for fatality. When they relayed these stories to their Superintendent, it was clear what could happen, but not clear what to do or what more may have been out there. Anxiety levels rose and heated uncomfortable discussions followed.

When the Mine Manager heard of this he rang Geoff and told him he had better get up there and sort out the mess he had created before someone gets killed in a brawl. (He always had a colourful turn of phrase.)

Geoff came and on the first day familiarised himself by talking directly to those reporting the most hair-raising occurrences. (Note – this was a highly efficient and productive coal mine and others generally admired them for how they did things.)

That night, Geoff used the model, that if you described a person Physically, Mentally, Emotionally and Spiritually, you would have a fairly complete description of the person. The

check interviewing strongly pointed to the shortages of veridical (true saying) knowledge. Therefore, the questions were biased to emphasise mental aspects of the work.

Approximately 40 questions were prepared and answered by making a mark on a horizontal line divided into 5 sections ranging from 'All the time' to 'None of the time', or 'Strongly agree' to 'Strongly disagree'.

Illustrative Example

'*I feel confident when working on electrical installations in the*…….' (Workshop, Coal Preparation Plant, Dragline) '*All of the time – None of the time'.*

'……. *is conscientious about safety'* (self, workmates, foreman, superintendent, the Mine) '*Strongly agree – Strongly disagree'.*

One shift at a time came into a classroom situation and answered the questions anonymously by marking a line across the scale accompanying each question. The shift was then divided into small groups. Each group plotted histograms for the answers on the questions they were allocated to compile the results. Each group took one or two sheets from each person.

Geoff told the Superintendent (an impressive man) that, if he came under criticism, he could not defend himself. The purpose of the exercise was to learn as much as possible. Geoff told him that if other members of the group thought he was being unfairly criticised, they would come to his rescue. As an ultimate backstop, Geoff promised to step in. As it happened there was zero adverse comment.

Each histogram, plotted on butchers paper, was then presented and people were asked to explain why the distribution of answers was as seen in front of them.

This was a critical part of the process. People were able to express their thoughts freely – as a contribution to the understanding of why 'that' distribution. There was no sniping or recriminations. Everyone was able to bring out the points they thought would be helpful. Note – the company had, at that time, been working with the guiding value that emphasis was on 'change for the future, not blame for the past'.

The Critical Incident Process revealed a number of equipment, procedural and personal areas that required increased emphasis. Specifically the following areas were addressed:

1. Training:
    - Routine and non-routine electrical procedures
    - Rescue and resuscitation
2. Isolation Procedures
    - Normal isolation and high voltage procedures were streamlined
3. Maintenance
    - General electrical and vehicle maintenance was improved
4. Plans/Diagrams

- Existing material was updated and requirements for additional information highlighted

5. High voltage Testing equipment

Notwithstanding 1-5 above, the biggest benefits were obtained through improved communications throughout all levels of the department. A new spirit of openness between staff and wages was developed; the benefits of this are considerable, but unable to be measured in real terms.

Personal Note

About a year after this work was done, I went camping on a cattle station with a group of people from work. Included in the group was an electrical foreman and an electrician. Around the camp fire after more XXXX Gold than was safe and healthy, we got talking about the work that was done. Both of them said prior to the process there was some very dodgy things happening that would have inevitably led to a fatality.

Geoff has influenced my thinking as shown by the following:

Terminology used in OHS

Probably the best example of a lack of scientific discipline in OHS lies in the terminology 'accident'. The term 'accident' implies carelessness (whatever that means), lack of ability to control its causation, an inability to foresee and prevent and a personal failure. How can we make meaningful progress on a major cost to Australian industry if we persist with such sloppy, unscientific terminology? The term 'accident' affects how the general population perceives damaging occurrences and the people who suffer the personal damage, inferring the event is 'an act of God' or similar event beyond the control and understanding of mere mortals. (Geoff McDonald)

The term 'accident' is best replaced by the term 'personal damaging occurrence'. Instead of talking about 'permanent disability' we should be talking about 'life altering personal damage'. There is a poor understanding in the community of the reasons why personal damage occurs. We are quick to make the assumption that the worker was careless. When one examines personal damage carefully, one will also identify a range of work system factors that contributed to the personal damage as well. Most of these work system factors are the responsibility of the employer at both common and statute law. Blaming workers for their careless behaviour is an emotionally appealing approach that is usually not all that productive in the bigger picture of preventing damage at work.

Displacement Activities

Geoff talks about displacement activities. A displacement activity is something we do, something we put a lot of energy into, but there is no valid reason for doing it. Geoff maintains traditional safety is full of displacement activities. I agree. (A note from Geoff. A

small male bird, when an attractive female bird does not respond to his best strutting and posturing efforts, dissipates his aroused energy by wiping his feet on the branch.)

Human Error Concept

When you pick up the newspaper and listen to the television or radio, you will find terms like 'driver error', 'human error' and 'pilot error' used frequently as if this was the definitive reason why 'accidents' more precisely referred to as personal damaging occurrences, occur. We are surrounded by this every day and it is an accepted part of our society. Authorities such as the police may have a focus on human error so they can find out who to blame and penalise after car crashes. When I hear people focussing on human error it really grates on me and tells me they did not understand the personal damage occurrence and they did a poor job on the investigation.

Now I am not going to be silly enough to say people are not part of the personal damage occurrence process, of course they are. A major objection to the human error concept is that there is usually a focus on the 'errors' of the individual who was damaged and people do not look at the essential factors provided by others who developed and managed the overall system being worked in. The term 'human error' often misdirects effort in safety. With personal damage occurrences I have investigated, I have found that people have done what on the surface appears to be some pretty stupid things. Often when one delves into the reason why they have done these things you find the environment and the equipment have contributed to the decision making process. I must admit there have been occasions, not many, when I have walked away from an investigation, after trying to do a thorough, professional and objective job, and thought what the person did was just dumb. Of course we all do dumb things at times and are not usually damaged in the process.

The human error concept is an accepted part of our society, but the reality is that the terminology is emotive, ill-defined, means different things to different people and in a lot of cases automatically infers blame. Even if the dependence on the human error concept was true, it is unhelpful. There are good reasons why human error is accepted as a big part of the reasons for personal damage occurrences. There is a fair bit of so-called safety research and high profile safety consultants that quote figures of about 90% of 'accidents' are the result of human error. Sometimes the same people who are using these statistics are flogging their behaviour based safety processes that they will have you believe are the answer to most of your safety problems. Behaviour based safety appears to be a big thing in the U.S.A., but it has had a chequered career in Australia. I have never seen any published studies claiming human error as the major factor that I did not think were dodgy. Making extreme claims based on small sample sizes is common. I have had a couple of occasions when I have questioned these claims and asked people to produce proof. They got dodgy and twitchy and gave a vague response. I have seen robust safety management systems with lots of training have an impact on behaviour, but I have some doubts about the American B.B.S. programmes.

If you look at Geoff McDonald's Analysis Reference Tree-Trunk model of personal damage occurrence investigation, you will find every personal damage occurrence will have Person, Environment and Equipment essential factors. The percentage contribution will vary. The trouble with the human error concept is that some organisations will concentrate on people fixes and forget about the equipment and environment fixes. Often fixing the person is the least effective way of getting meaningful change. For critical issues it is often more reliable to depend on things instead of people. Often working on the Person in association with working on the Environment and the Machine will be appropriate.

The above recognises there is a part to play in training workers and have supervisors enforce that the learnt behaviour occurs. You need to recognise that a 'least time, least effort' approach is a natural tendency with human beings and this is sometimes responsible for the behaviour you see.

The belief in human error as a major cause (another emotionally laden term) of 'accidents' is one of the many myths and misconceptions that hold back the progress of safety and contributes to a poor body of knowledge. It is sloppy, unscientific and emotive terminology.

['Human error' is identified by the feeling judgement function and gives a 'good' judgement – according to the values of the person making the judgement. It has nothing to do with 'truth' and inhibits the use of the thinking function. See the Judgement Mandorla and description pp. 3 and 4.

The belief in 'human error' causation has been an essential factor in many Class I occurrences. Sweden had established by 1964 that Roll Over Protective Structures would markedly reduce fatalities to less than a third of those in 1959 when ROPS were made compulsory on new tractors. There was a huge delay in Australia before farmers demanded them or governments legislated. The number of unnecessary deaths could approach 1000.

Japan made residual current devices (safety switches) compulsory for their manufacturing industry in 1969 (39 deaths), halved deaths by 1972 with 18, and by 1980 there was only 1.

In 1982, I was consulting to a Queensland Regional Electricity Board. The Chief Executive told me that at the last gathering of the Regional Electricity Boards, they decided to oppose the fitting of such devices as such fitment would result in electricians less scrupulously following the Wiring Rules. Again, many unnecessary deaths have followed – including some during the recent government-backed insulation installations. (I had all circuits of our house, built in 1969, protected by a core balance earth leakage relay. A failure in the circuitry on the new stove, next to the sink, could well have resulted in a family fatality.)

Nurses who had their lumbar spine severely damaged while single handedly lifting a patient by an 'incorrect' technique, were counselled and retrained. This made them psychologically confident to go out and continue to do permanently disabling damage to their spines as the 'correct' lifting technique was massively overloading their lower lumbar discs. Eventually single whole body lifts of a patient was banned and the lifting hoists were taken out of mothballs and put into service.

When I first entered industrial safety (1974), a new survey indicated that the major injury problem was 'strains and sprains'. The most frequent 'strain and sprain' injury was to the back. The most frequent 'cause' was 'not following instructions' i.e. lifted incorrectly. People were told to 'keep their back straight and to lift with their legs'.

In 1981, the U.S. NATIONAL Institute for Occupational Health and Safety (NIOSH) published 'Work Practices Guide for Manual Lifting'. It was authored by six professors from five USA universities and a leading orthopaedic surgeon from the University of Liverpool.

They brought together the available research material and developed guidelines required to enable those designing or implementing lifting tasks to keep the load on the lower lumbar spine under acceptable limits. This work has stood the test of time.

They reviewed information available on lifting techniques and found no evidence to support any particular lifting technique. The required control is to keep the bending moment (force on hands x horizontal lever arm to the L5-S1 disc) below acceptable limits.

Anyone who is teaching, training educating or trying to enforce 'correct lifting' is trying to correct 'human error' i.e. not lifting correctly, by using their feeling function to legitimise their 'good' solution which has no basis in fact and is ignorant of sound engineering principles.

These are but three of the 'human error' control strategies that perpetuate Class I personal damage by advocating behaviour controls and keeping out effective engineering controls.

A useful document is the 'Queensland Plant Code of Practice 2005' which in Appendix 1 discusses 'Human Error'. They state '*Human or worker error is not always the result of carelessness or negligence, but follows from normal human characteristics…'*. They describe factors (a) to (i):

(a) forgetfulness;
(b) vigilance;
(c) workers' diligence to 'get the job done' or to 'find a better way';
(d) capacity to understand information;
(e) ergonomics;
(f) psychological or cultural environment;
(g) habit;
(h) fatigue; and
(i) level of training.

They advise that '*Designers, manufacturers and employers should be aware of these factors in designing plant and developing work practices.'*

Being '*aware*' is insufficient. Consideration of factors (a) to (i), and more, must be integrated fully into the world of work.

There is a large body of Cognitive Psychology and of Neuroscience knowledge as well as ART-T investigations to support what they have presented as a first step in this direction. – Geoff]

Look after the pence and the pounds will look after themselves.

There is a belief in safety that if you bring controls to bear on all minor injuries, then the Class I injuries will look after themselves. This belief has misdirected effort with the result that inordinate effort is directed at minor incidents that have little potential for more serious damage. Certainly we should prevent minor incidents, but remember to concentrate our efforts where we get the best results. The Pareto Effect says 20% of incidents will give 80% of damage. This 20% must be identified and concentrated upon. What you must do is direct safety efforts where you will get the biggest bang for your buck. This will inevitably be through examination of the Class I personal damage phenomenon. [Geoff – Class I actually accounts for over 90% of the cost of personal damage (injury and disease). Over 75% of the costs are borne by the damaged person in the 'whole of life cost' of a downgraded life.]

Lost Time Injury Frequency Rate is an invalid unreliable measure of safety performance.

I have personal experience with a company that aggressively drove down L.T.I.F.R to a fraction of its original rate in a space of about 2 years yet killed 11 people in one incident.

The lost Time Injury Frequency Rate predominates discussions about safety performance. How can a company be proud of a decrease in L.T.I.F.R. from 60 to 10 if there have been 2 fatalities and 1 case of paraplegia amongst the lost time injuries? The L.T.I.F.R trivialises serious personal damage and is a totally inappropriate measure of safety performance. (Refer to the paper on this topic under articles on ohschange.com.au)

Conclusion

My belief is Geoff has not promoted his work as effectively as he could have. I firmly believe the eventual release of his book will be a momentous occasion for safety in Australia and the world.

Goodbye from George – his influence will live on with you.

From Geoff – many thanks to George.

George Robotham, Cert.IV T.A.E., Dip. Training & Assessment Systems, Diploma in Frontline Management, Bachelor of Education (Adult & Workplace Education), Qld University of Technology, Graduate Certificate in Management of Organisational Change (Charles Sturt University), Graduate Diploma of Occupational Hazard Management (Ballarat University), Accredited Workplace Health & Safety Officer (Queensland), Justice of the Peace (Queensland), Australian Defence Medal, Brisbane, Australia.

My passion is the reduction of permanently life altering (Class I) personal damage.

References

Department of Industrial Affairs, Queensland. ' **Plant Code of Practice 2005**'.

Jung, C.G., "**Psychological Types**", Volume 6. Bollingen Series XX, Princeton University Press (1921, 1971) Second Printing, 1974. U.S.A.

McDonald G.L. "**Access to Mobile Equipment**". A research grant publication for the Queensland Coal Association, September 1987.

McDonald GL., (1989). **"Access to Mobile Equipment".** Prepared for National Energy Research, Development and Demonstration Program (NERDDP) Coal Project No: 1214.

National Institute for Occupational Safety and Health (NIOSH) 1981. "**Work Practices Guide for Manual Lifting**". U.S. Department of Health and Human Services, NIOSH, Ohio.

SafeWork Australia (2012), '**The Cost of Work-Related Injury and Illness for Australian Employers, Workers and the Community: 2008-09**'.