

ZIP -The Road to a Total Safety Culture at Norwich Park Mine

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A priority for most mining and resource companies is the pursuit of zero incidents for their people. Traditionally this pursuit has utilised Behaviour-based Safety (BBS) systems and has achieved results of varying success. The Mining industry is particularly well documented within the safety literature for traditionally employing BBS systems as provided by companies such as DuPont (Canada) and Dr. Scott E. Gellar's company Safety Performance Solutions (USA). These companies have primarily incorporated components of BBS systems such as engineering, in addition to policies and procedures. Companies that have been brave and honest enough to conduct genuine assessments of their continuing safety performance have recognised that the early gains made through BBS are slowing and, in many cases, have reached plateaus. This is due to the limitations of the theoretical foundations of BBS, that is, Behaviourism. Behaviourism and the BBS model assume that external motivators are required to have employees behave in certain ways, therefore behavioural theory does not take into account a fundamental human aspect – that people think and feel independently of the inconsistent reward/punishment systems set up in a BBS system.

A successful response to the challenges inherent in the BBS systems is Cognitive Behavioural Safety (CBS). Drawing upon the psychological theory of Cognitive Behaviourism, CBS recognises that an individual's behaviour is a function not only of external influences and consequences but is also guided by internal attitudes, values, and belief systems. In particular, CBS is the combination of the psychological theory of Behaviourism, the foundation of BBS, and Cognitive Psychology – the psychology of how people think and feel. By combining these two psychological theories into CBS and applying them to safety within the mining industry, they have been observed to create a genuine opportunity for dramatically improving an individuals' ability to keep themselves safe. Dr E. Scott Geller has himself stated that '...behaviour based safety (BBS) programs, taken alone, cannot be effective unless the workforce believes in and willingly applies the principles of the BBS program. To achieve a true Total Safety Culture and Zero (incidents) for employees it is necessary to integrate both behavioural and person-centred approaches to safety.' (Linc – do you need a footnote here?)



CBS has been operationalised through the ZERO Incident Process otherwise known as ZIP, which is a unique psychologically-based safety process developed by Sentis – an organisation focused upon improving the safety and wellbeing performance of mining and resource companies both in Australia and worldwide. ZIP is designed to work alongside, and enhance, any BBS initiatives that are already in place.

RESEARCH

As ZIP grows in popularity within heavy industry (primarily the mining/ resources, and utilities) there is increasing evidence attesting to the efficacy of this Cognitive-Behavioural approach and its ability to build upon the gains made by existing safety programs and BBS systems in particular. The following provides an overview of a number of studies examining the effectiveness of ZIP in improving the personal safety and well-being of staff at sites across three countries (Australia, New Zealand, and Canada) within the mining, resource, and utility industries. The goal, being to provide a snapshot of results typically achieved

for organisations adopting the Zero Incident process to assist in the evaluation of ZIP, and an assessment of the suitability of ZIP for different businesses.

Introduction

That official occupational injury figures are still high indicates a need for better preventative safety strategies and programs. Due to an over representation of human error in the safety accident/incident causation chain, it is appropriately fitting that safety professionals focus their resources upon the precursors to human behavior and unsafe acts. One such precursor is safety-specific attitudes. Research has demonstrated that attitudes in general and safety-specific attitudes in particular, are important predictors of a person's behavior and subsequent involvement in accidents/incidents. Indeed, our research suggests that people, who score in the lower third on the ZERO Scale® (a psychometric tool for assessing 5 key safety attitudes) have a 500% increased likelihood of being involved in a safety incident. The Zero Incident Process (ZIP) is a psychologically-based safety process that combines behavioural and cognitive safety theory to develop the intrinsic motivation to stay safe/ well, and modify participant's safety and wellbeing attitudes. The following research evaluates the effectiveness of ZIP in reducing important safety indicators including Lost Time Injuries (LTI), Medical Treatment Injuries (MTI), Restricted Work Days (RWD), Total Injury Frequency rates (TIFR), and improving wellbeing measures across a number of work sites in the mining and resources industries.

Study 1

Method - A full roll-out of the safety version of ZIP was completed over a five month period at an Australian open cut coal mine. Of the 120 site personnel, 106 attended one of 9 ZIP courses, before the ZIP maintenance process were introduced.

Results - Data for injuries occurring 8-months prior to ZIP were obtained from the mining company, in addition to injury data occurring 14-months post ZIP roll-out. Figure 1 below graphs the number of LTIs, Restricted Work Injuries (RWI) and the total number of injuries for these time periods. As pictured in Figure 1, all injury frequencies decreased following the implementation of ZIP. The greatest decrease was evidenced for LTIs which were down 100% post training, with restricted work injuries reduced by 66%, with the total number of injuries down by 83.3% post ZIP. These gains translated into a 100% reduction in the LTIFR from 18.99 to Zero, and 81.7% reduction in the TIFR from 37.98 to 6.93 across the same time period.

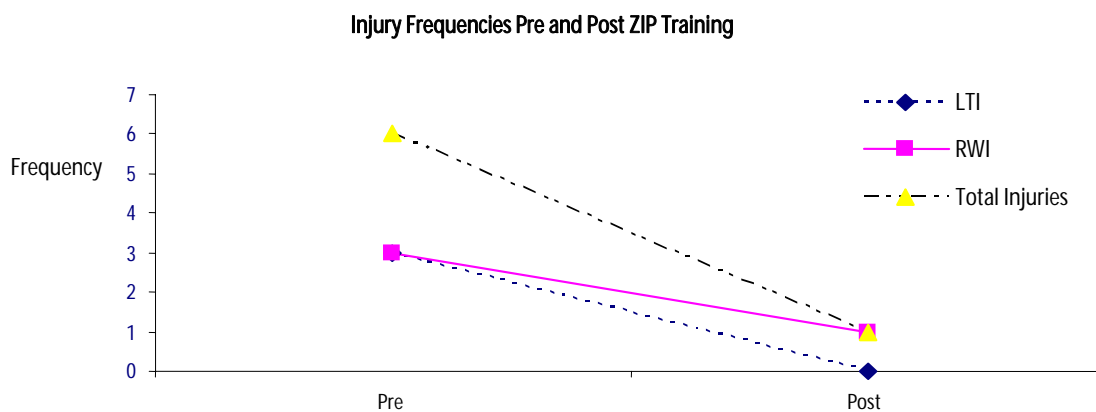


Figure 1 – Comparison of Lost Time Injuries (LTI), Restricted Work Injuries (RWI) and Total Number of Injuries Pre to Post ZIP Training.

Study 2

Method – ZIP- Safety was rolled out over a 24-month period at an Australian surface Bauxite mine. During this period a total of 235 personnel attended one of 16 ZIP courses.

Results - Similar to the results of Study 1, the total number of Person incidents recorded post training was significantly reduced across all ZIP trained personnel, as compared to pre training incidents. Prior to the implementation of ZIP 39% of attendees had been involved in person based safety incidents, however since completing ZIP 97.87% of attendees had not recorded a person based incident. While there was an overall decrease in the number of person incidents in both ZIP and non- ZIP trained personnel, the percentage decrease in ZIP participants was 95% compared to only a 53% decrease in non- ZIP participants.

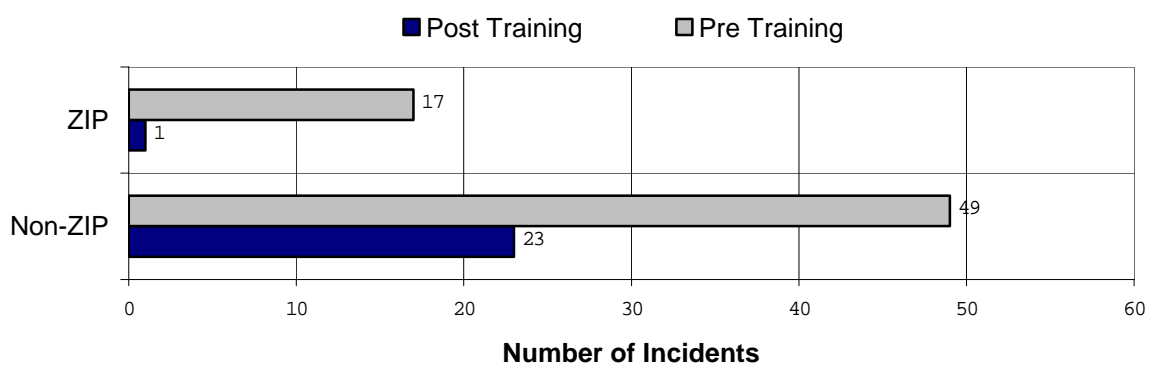


Figure 3 – Number of incidents for ZIP and non- ZIP participants pre- and post-ZIP.

Study 3

Method - ZIP- Safety was rolled out to a select team of Apprentices at an Australian surface Bauxite mine. The team of Apprentices was isolated from all other interventions (e.g. safety programs) on site.

Results - Injury and incident data was obtained from the organisation to assist with the research. In the 12 months prior to ZIP, 12 of the Apprentices had experienced injuries (i.e. all injuries excluding First Aids), with 9 LTIs being recorded each year for the previous 3 years. 22 months post- ZIP training, no member of the team has been injured.

Study 4

Method - ZIP- Safety was rolled out across an underground Australian coal mine consisting of approximately 400 employees over a 7-month period.

Results – In the three years prior to ZIP the site had evidenced a trend of increasing harm to its people, with rising incident and LTI rates,. In the 12 months prior to ZIP 16 LTIs and 35 Total Recordable Cases (TRC) were recorded. In the months following the ZIP roll-out, a 55% reduction in LTIs, 31% reduction in TRCs, and a 118% increase in the number of hazard reports were achieved. Within 12 months post-ZIP, the site achieved 4 months LTI free including no person being hurt on site in an LTI or MTC during the month of December, traditionally the most challenging month for the site.

Study 5

Method - ZIP- Safety was rolled out across an underground and open pit Canadian Diamond mine over a three year period. Given the size of the site (approx. 2200 personnel) and the seasonal restrictions on the process (i.e. ZIP training could only be conducted during winter months) a very methodological approach was adopted for the ZIP process. This means that individual business units completed their ZIP

training and embedded the maintenance process before initiating the ZIP roll-out with the next business unit.

Results – In the 4 years prior to ZIP, the classified injury frequency rate (CIFR) averaged 11.8 (with a CFIR of 7.39 in the year preceding ZIP). This dropped to 6.3 in the initial stages of the roll-out and further to 3.4 and 2.6 as the roll-out progressed. Indeed, in the latter two years of the roll-out, the CFIR rates had dropped to approx. 2 and 1, when people who had not yet experienced ZIP were excluded from the analysis. In relation to specific business units (in order of the rollout):

- Supply and Administration departments recently celebrated 25 months Classified Injury (CI) free;
- Small Projects, 19 months CI free;
- Processing plant, 16 months CI free;
- Mine Operations (Open Pit), 65% completed and 7 months CI free;
- Mobile and Technical/ Geological Support: - 50% completed ZIP – 77% reduction in CIs

Note: Underground operations who are yet to begin any ZIP roll-out, and who have little interaction with the other business units on site, have shown no change in their Classified Injury Frequency rate.

Study 6

Method – In relation to ZIP's efficacy at sites already operating with very low injury rates, a ZIP - Safety roll-out was recently commenced at a large aluminium smelter in NZ (over 1500 personnel), who demonstrated a steady history of safe operations and very low injury frequency rates.

Results – The LTIFR for the smelter in the 4 years prior to ZIP showed evidence of a strong plateau ranging between 0.4 and 0.54 (Year 1, 0.5; Year 2, 0.4; Year 3, 0.45; Year 4, 0.54). Consistent with that for the previous study, the roll-out of ZIP has been conducted very methodologically with maintenance processes being introduced on the back of the formal ZIP training. As a result, at 33% complete, the LTIFR rate has dropped to 0.21, with all injuries being experienced by non-zipped personnel.

Study 7

Method – In contrast to the studies conducted in the mining and resources industry, ZIP Safety has also been utilised to great effect in large energy companies. As one example, the ZIP roll-out to a large Australian government owned Power Company is nearing completion at the writing of this document. This business, which services over 600,000 residential and business customers, employs over 4,000 personnel, whom are geographically spread across a large Australian state. ZIP is designed to compliment and work in conjunction with other systems targeting other key aspects of safety such as behavioural observations, safety analyses, practice/ policy improvements, equipment upgrades etc, and given the scope of work for this company, controlled research was not possible in this instance. During the ZIP roll-out it was not possible to isolate business units from all other interventions, nor use control groups for comparison. Therefore, while ZIP was the major safety initiative for the company, it was not the only one, and so all results reported represent the total change in injury rates. Its inclusion here offers only an opportunity to examine ZIPs 'real world' efficacy within the total safety journey of such a large and diverse business.

Results – Since beginning ZIP, this company has moved 11 places in the Australian Energy LTIFR rankings; from ranking 12th, to being the number 1 ranking company among the 16 energy companies included in the measure. Recently, their LTIFR has declined from 2.01 to 0.44 as more business units complete the ZIP process, while their AIFR (all injury frequency rate) has dropped 83% from 9.86 to 1.60 (based on LTIs and MTIs per one million person hours worked).

Study 8

Method - ZIP- Wellbeing was rolled out at a national call centre consisting of approximately 152 full-time and part-time employees, where prior to ZIP, they were experiencing significant challenges related to staff turnover, poor productivity, and high levels of unapproved absenteeism.

Results - Post-ZIP, participants reported utilising the ZIP tools to assist them live the Company Values, which translated into increased productivity and job performance. All Key Performance Indicators (KPIs) as identified by the call centre were consistently above 95%, while there was a 66% decrease in WorkCover claims during the post- ZIP maintenance phases. Moreover, there was a 15% increase in participant's ability to manage stress, as evidenced by the ZERO Scale- Wellbeing measure, and a significant increase in the reported ability to manage relationships at work and at home. In the year following the ZIP-Wellbeing roll-out, this call-centre won a national award for the best call centre in QLD over 120 people.

Discussion

In an attempt to increase personal safety and wellbeing, ZIP focuses upon the individual level precursors to incidents, such as safety and wellbeing specific attitudes. ZIP specifically targets attitudes and educates participants about issues including understanding the brain, risk awareness, personal responsibility, control and choice. As evidenced by the above studies, it is evident that ZIP not only has a marked effect on minimising person injuries and harm to individuals (from both a safety and wellbeing perspective), but more importantly, that these changes are maintained and strengthened in the longer term. In so doing, ZIP builds on the gains made by BBS systems, and offers new possibilities to assist companies in taking their safety and wellbeing performance to a new level.

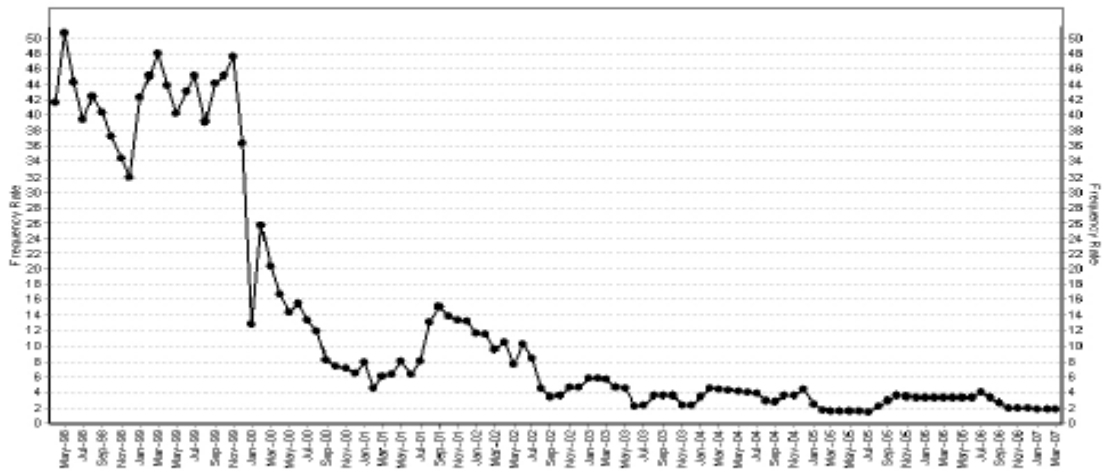
Norwich Park Mine is one of eight mines, which form the BHP Billiton Mitsubishi Alliance (BMA). BMA is the worlds largest coking coal producer, Australia's largest coking coal exporter and Queensland's largest exporter in any commodity group.

Norwich Park Mine is an Open cut mine situated in the Bowen Basin near the township of Dysart. We are the smallest mine within the BMA group and have an annual capacity of over 7 million tonnes of quality metallurgical coal.

Norwich Park is almost 30 years old having railed our first shipment of coal to the Hay Point terminal in December 1979, during this period we have witnessed the evolution of health and safety and the implementation of most of the various safety initiatives which are continually being devised.

We have experienced a steady improvement in our safety performance along with the industry. We have also experienced in recent times a plateau in our safety performance again consistent with the industry. This is reflected in the graph below.

12 month moving average - LTIFR
 Norwich Park Mine - BMA - **Employee/Contractor/Other**



In an effort to move the safety performance of Norwich Park beyond the current plateau a decision was made to step outside the traditional approach to safety and address the attitudes, values, beliefs and thinking of those individuals and work teams that comprise Norwich Park.

All staff and long term contractors are currently having the opportunity experience the Zero Incident Process. While it is currently too early to provide any quantitative data for the success of the Zero Incident Process on the Norwich Park Mine safety culture all of the qualitative evidence and feedback suggests that results are in line with the desired goals of ZIP and Norwich Park Mine’s journey towards Zero Harm.